

A Message from the President

Welcome to the University of Calgary, a diverse community of over 35,000 students, faculty and staff who share a commitment to excellence. Together, our university family has grown into one of Canada's top comprehensive research universities, with five campuses that are both picturesque and sustainable.

Our students come from across Alberta and Canada and from around the world, in search of an exceptional student experience. We create a supportive learning environment by allowing our students the opportunity, ability and responsibility to discover new knowledge, innovate and unleash their potential. This personal growth can only happen within a campus culture that is inclusive, curiosity-driven and respectful, where leadership from all is encouraged and enabled.

Under the guiding vision of our 2018-23 Academic and Research Plans, UCalgary students will explore, take risks, build resiliency and develop a growth mindset. This student experience is fueled by over 250 academic programs, as well as international options, experiential learning and research opportunities. The 95% undergraduate retention rate and 91.1% graduate employment rate speak volumes about our engaged students and their success following graduation.

Collectively, UCalgary is prioritizing people, connecting communities and driving innovation. Thank you for joining us on this bold and exciting course to make a positive impact on a personal level and a societal level.

I look forward to the many new milestones that we will reach together in the coming years.

Dr. Ed McCauley
President and Vice-Chancellor

For detailed information about the Faculties of Graduate Studies,
Law and Medicine (MD), please consult the individual Faculty calendars.

The online Calendar is the official University Calendar. The Calendar is available on our website: ucalgary.ca/pubs/calendar/.

Calendar Production

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Important Notice and Disclaimer

The material and information in this Calendar is compiled from academic and administrative office submissions and are time-sensitive. Every reasonable effort is made to ensure it is correct and accurate at the time of publication, but inaccuracies and errors may occur. If there is an inconsistency or conflict between the general academic regulations and policies published in the Calendar, and such regulations and policies as established by resolution of a Faculty or of the University General Faculties Council, the regulations and policies version as approved by the Faculty or the University General Faculties Council will prevail.

By the act of registration with the University of Calgary, each student shall be deemed to have agreed to be bound by the regulations and policies of the University and of the program in which that student is enrolled as well as any relevant Faculty policies and regulations.

Students are responsible for familiarizing themselves with the general information, rules and regulations contained in the Calendar, and with the specific information, rules and regulations of the Faculty or Faculties in which they are registered or enrolled or seek registration or enrolment, as well as the specific requirements of each degree, diploma or certificate sought. It is the student's responsibility to ensure that the courses chosen are appropriate to the program and graduation requirements.

Students should note that not every course listed in the Calendar is offered every year, nor does being admitted into a program guarantee space in any given course.

The University of Calgary has the responsibility and **reserves the right to make changes in the information contained in the Calendar**, and will provide as much notice as administratively possible in effecting such change.

The University of Calgary does not accept, and hereby expressly disclaims, any and or all responsibility or liability to any person, persons or group, either direct or indirect, consequential or otherwise, arising out of any one or more of such changes and, specifically, the University hereby disclaims liability to any person who may suffer loss as a result of reliance upon any information contained in this Calendar.

The University of Calgary disclaims all responsibility and liability for loss or damage suffered or incurred by any student or other party as a result of delays in or termination of its services, courses, or classes by reason of force majeure, pandemics, public health emergencies, fire, flood, riots, war, strikes, lockouts, damage to University property, financial exigency or other events beyond the reasonable control of the University. The University also disclaims any and all liability for damages arising as a result of errors, interruptions or disruptions to operations or connected with its operations or its campuses, arising out of computer failure or non-compliance of its computing systems.

Effective with the 2008/2009 edition, the online Calendar is the official University Calendar.

Academic Schedule

2019-2020 Academic Dates and Deadlines

Courses taught according to non-standard dates have different drop, add and withdrawal deadlines. Please refer to the Student Centre for details regarding those deadlines specific to your course(s). In addition, and in accordance with Faculty regulations, some courses will require Faculty approval to drop, add or withdraw from courses. The academic schedule may be updated online when required and as needed.

The schedules for the Faculties of Graduate Studies, Law and the Cumming School of Medicine may have different start and end dates.

| | Spring/Summer Term 2019 | Spring Intersession 2019 | Summer Intersession 2019 |
|---|-------------------------|--------------------------|--------------------------|
| Academic Dates | | | |
| Start of Term | Monday, May 6 | Monday, May 6 | Tuesday, July 2 |
| End of Term | Friday, August 23 | Friday, June 28 | Friday, August 23 |
| Start of Classes | Monday, May 6 | Monday, May 6 | Tuesday, July 2 |
| End of Classes | Tuesday, August 13 | Monday, June 17 | Tuesday, August 13 |
| Start of Exams | | Wednesday, June 19 | Thursday, August 15 |
| End of Exams | | Friday, June 21 | Monday, August 19 |
| Registration Dates | | | |
| Last day to drop a class without financial penalty* | Friday, May 10 | Friday, May 10 | Monday, July 8 |
| Last day to add or swap a course | | Friday, May 10 | Monday, July 8 |
| Last day to withdraw from a course** | | Monday, June 17 | Tuesday, August 13 |
| Tuition and Refund Dates | | | |
| End of refund period | Friday, May 10 | Friday, May 10 | Monday, July 8 |
| Tuition and Fee Payment Deadline | Wednesday, May 15 | Wednesday, May 15 | Wednesday, July 10 |
| Important Dates | | | |
| Spring Convocation | | Monday-Friday, June 3-7 | |
| Recognized Holidays (university closed) | | | |
| Victoria Day | | Monday, May 20 | |
| Canada Day | | Monday, July 1 | |
| Alberta Heritage Day | | | Monday, August 5 |

*There will be no academic record of a course that is dropped by this date and tuition will be refunded.

**There will be a "W" recorded for the course and tuition will not be refunded.

| | Fall Term 2019 | Winter Term 2020 |
|---|-----------------------------------|---------------------------------|
| Academic Dates | | |
| Start of Term | Monday, August 26 | Monday, January 6 |
| End of Term | Tuesday, December 24 | Thursday, April 30 |
| Block Week | Monday-Friday, August 26-30 | Monday-Friday, January 6-10 |
| Start of Classes | Thursday, September 5 | Monday, January 13 |
| Term Break, no classes | Sunday-Saturday, November 10-16 | Sunday-Saturday, February 16-22 |
| End of Classes | Friday, December 6 | Wednesday, April 15 |
| Start of Exams | Monday, December 9 | Saturday, April 18 |
| End of Exams | Thursday, December 19 | Wednesday, April 29 |
| Registration Dates | | |
| Last day to drop a class without financial penalty* | Thursday, September 12 | Thursday, January 23 |
| Last day to add or swap a course | Friday, September 13 | Friday, January 24 |
| Last day to withdraw from a course** | Friday, December 6 | Wednesday, April 15 |
| Tuition and Refund Dates | | |
| End of refund period | Thursday, September 12 | Thursday, January 23 |
| Tuition and Fee Payment Deadline | Friday, September 20 | Friday, January 31 |
| Important Dates | | |
| Deadline to Apply for Fall Convocation | Sunday, September 15 | |
| Fall Convocation | Friday, November 15 | |
| Deadline to Apply for Winter Conferral of Degree | | Wednesday, January 15 |
| Winter Conferral of Degree | | Friday, February 14 |
| Deadline to Apply for Spring Convocation | | Tuesday, March 31 |
| Recognized Holidays (university closed) | | |
| Labour Day | Monday, September 2 | |
| Thanksgiving Day | Monday, October 14 | |
| Remembrance Day | Monday, November 11 | |
| Holiday Observance | Wednesday-Tuesday, December 25-31 | |
| New Year's Day | | Wednesday, January 1 |
| Alberta Family Day | | Monday, February 17 |
| Good Friday | | Friday, April 10 |
| Easter Monday | | Monday, April 13 |

*There will be no academic record of a course that is dropped by this date and tuition will be refunded.

**There will be a "W" recorded for the course and tuition will not be refunded.

| | Spring/Summer Term 2020 | Spring Intersession 2020 | Summer Intersession 2020 |
|-----------------------|-------------------------|--------------------------|--------------------------|
| Academic Dates | | | |
| Start of Term | Wednesday, May 6 | Wednesday, May 6 | Monday, June 29 |
| End of Term | Friday, August 28 | Friday, June 26 | Friday, August 28 |
| Start of Classes | | Wednesday, May 6 | Monday, June 29 |
| End of Classes | | Wednesday, June 17 | Wednesday, August 12 |
| Start of Exams | | Friday, June 19 | Friday, August 14 |
| End of Exams | | Tuesday, June 23 | Tuesday, August 18 |

| Registration Dates | | | |
|---|-------------------------|-------------------------|----------------------|
| Last day to drop a class without financial penalty* | Tuesday, May 12 | Tuesday, May 12 | Friday, July 3 |
| Last day to add or swap a course | | Tuesday, May 12 | Friday, July 3 |
| Last day to withdraw from a course** | | Wednesday, June 17 | Wednesday, August 12 |
| Tuition and Refund Dates | | | |
| End of refund period | Tuesday, May 12 | Tuesday, May 12 | Friday, July 3 |
| Tuition and Fee Payment Deadline | Friday, May 15 | Friday, May 15 | Wednesday, July 8 |
| Important Dates | | | |
| Spring Convocation | Monday-Friday, June 1-5 | Monday-Friday, June 1-5 | |
| Recognized Holidays (university closed) | | | |
| Victoria Day | | Monday, May 18 | |
| Canada Day | | Wednesday, July 1 | |
| Alberta Heritage Day | | | Monday, August 3 |

*There will be no academic record of a course that is dropped by this date and tuition will be refunded.

**There will be a "W" recorded for the course and tuition will not be refunded.

Tentative Future Dates

To view the next two academic years: <http://www.ucalgary.ca/calendar-scheduling/regulations-and-policies>.

Please note that dates are tentative and subject to review and change.

Types of Credentials and Sub-Degree Nomenclature

Fundamental Principles

The following principles govern the credential offered by the University of Calgary and clarifies the nomenclature used:

1. All University of Calgary credentials will follow the Post-Secondary Learning Act Programs of Study Regulations.
2. Any changes to existing credentials or proposals for new credential types must maintain or enhance the integrity and quality of University of Calgary credentials.
3. University of Calgary credentials should balance breadth and depth of study within, and across disciplines.
4. The nomenclature for University of Calgary credentials has to be clear to students, potential employers and other academic institutions.
5. The autonomy of the University of Calgary is determined in large part by the content, nature and quality of credentials that are granted. The notion of two or more institutions awarding a single credential to a student should only be considered if the standards of the University are not compromised.
6. Normally, the Master of Arts, Master of Science and Doctor of Philosophy degree titles will be reserved for research-based programs.
7. Credentials must align with the Provincial Credential Framework and the University of Calgary General Faculties Council (GFC) approved Credential Framework.

Types of Credentials

The following are the different types of credentials offered at the University of Calgary.

A. Undergraduate Degrees

1. Bachelor's degree: A minimum 120-unit credential that can be direct-entry or an upper year entry program. Bachelor degrees

typically require a minimum of four years of study. Upper year entry programs may require fewer units, however, will include a minimum of number of pre-study units for admission consideration such that the total units completed is not below 120. Pre-study may be completed at the University of Calgary or another post-secondary institution.

2. Honours Bachelor's degree: Further specialization of a bachelor's degree requiring high academic standing and typically requiring a thesis project. A minimum 120-unit credential are required. The Faculty determines requirements and honours standing is noted on the transcript and parchment.
3. Combined Bachelor's degree: A minimum of 150 units are required and typically requires a minimum of five years of study. Awarded when students are registered in two different degrees (including honours degrees) simultaneously. Students graduate from both degrees concurrently. A student who wishes to graduate from one degree is no longer eligible for combine degree status and must complete each program requirements separately. Students receive two parchments for combined degrees. Combined degree combinations are institutionally approved.

Principles for Combined Undergraduate Degree Programs:

1. Combined degree programs are possible between faculties and within a faculty. Each faculty will specify which degree programs can be combined in the Academic Calendar along with the graduation requirements.
2. Students must meet the admission, academic review and graduation requirements of both programs.
3. A minimum of 30 additional units will be required beyond the individual degree programs, for a minimum of 150 units. There is no maximum limit.
4. Concurrent degrees in the Werklund School of Education are considered a combined degree.
4. Conjoint Undergraduate Degrees: A degree with instruction from two institutions. The degree may be awarded by the University of Calgary or a partner institution. Since both institutions have teaching responsibility for the degree, there is a formal agreement outlining the program structure, jurisdictional and academic regulations. Partnerships agreements, where another institution solely confers the credential, are not covered by conjoint degree definitions.

Types of Conjoint Undergraduate Degrees:

1. Collaborative program: The degree and curriculum belongs to the University of Calgary, however, the partner institution may provide some of the instruction. Fifty per cent of the content must be delivered by the University of Calgary. Parchment only indicates the University of Calgary.
2. Dual degree programs: Students attend and fulfill degree requirements at the University of Calgary and another institution as outlined in a formal agreement. Students receive two parchments, one from each institution and transcripts are issued by both institutions.
3. Joint degree programs: Students study at the University of Calgary and one or more other institutions. Program requirements are outlined in a formal agreement and normally includes at least fifty per cent of University of Calgary content. Students receives one parchment and one transcript with both institutions identified. The agreement indicates which institution will issue the parchment and the transcript. University of Calgary documentation will indicate "Joint Degree offered in Collaboration with the <University Name>."
5. Professional Undergraduate Degrees: Undergraduate degrees that lead to a professional Doctor degree (e.g., Doctor of Medicine, Juris Doctor and Doctor of Veterinary Medicine).

Sub-Degree Nomenclature

1. Majors: Normally 42–48 units completed within the number of units required for a bachelor's degree. Majors appear on the parchment and transcript. Some degree programs do not have

a major listed (e.g., Bachelor Nursing). Majors are identified in the Provincial Provider and Program Registry System (PaPRS).

2. Double Major: Normally an additional 42-48 units in an area that is different from the first major, in the same degree. Double majors are completed within the number of units required for a bachelor's degree. Students must obtain approval from their faculty to have courses count toward both a major and a minor. One parchment is issued with both majors listed and both majors are listed on the transcript. Double majors are institutionally approved.
3. Minor: A minor requires a minimum of 30 units normally completed within the number of units required for a bachelor's degree. Minors are not typically associated with the student's major field of study. Minors are recorded on the transcript but not on the parchment. Students must obtain approval from their home faculty to have courses count toward both a major and a minor. Students may declare up to two minors. Minors are institutionally approved.
4. Specialization: Exclusively used by the Schulich School of Engineering to identify a specialized area of study that is available to multiple majors but associated with the field of study (e.g., Bachelor of Science in Chemical Engineering with a specialization in Biomedical Engineering) at the undergraduate level. A specialization requires between 18 and 24 units and may require a student to take additional courses beyond the number of units required for a bachelor's degree. Students cannot complete a minor with a specialization. Specializations appear on the transcript but not on the parchment and are institutionally approved.
5. Concentration: A Concentration represents a focus within a degree or a major and requires a minimum 18 units. Concentrations will appear on the transcript but not on the parchment and are institutionally approved. Minors cannot not have concentrations.
6. Route: Exclusively used for the Bachelor of Education to identify the education level within the K-12 system (e.g., early years, elementary, secondary or K-12). Routes are noted on the transcript but not on the parchment and are institutionally approved.
7. Co-operative Education/Internship Programs: Formalized placement programs where student alternate work terms with academic terms. Students may complete a co-op program in one major. COOP/INTE will appear on the parchment and transcript and are institutionally approved. Students must complete one or more placements totaling a minimum of 12 months.

B. Undergraduate Credit Certificates and Diplomas

The University of Calgary may award the following undergraduate certificates and diplomas:

1. **University Certificate:** Composed of 15-30 units and is a free-standing credential. A transcripts and parchment are issued; however, the recipient does not participate in convocation. University certificates may ladder into other credit programs. University Certificates are identified in PaPRS.
2. **Post-Bachelor's Certificate:** Composed of 24-36 units and is a free-standing credential. A transcripts and parchment are issued; however, the recipient does not participate in convocation. University certificates may ladder into other credit programs. University Certificates are identified in PaPRS.
3. **University Diploma:** Composed of 60-80 units and is a free-standing credential. A transcripts and parchment are issued and the recipient may participate in convocation. University diplomas may ladder into other credit programs. University Diplomas are identified in PaPRS.
4. **Embedded Certificate:** Composed of 12–24 units normally taken concurrently with an eligible degree program. Courses taken as part of a degree program may also count toward embedded certificate requirements. The embedded certificate must be completed prior to graduation from the degree pro-

gram. Embedded certificates may not ladder into other credit programs. The certificate will be noted on the transcript and a single parchment will note both the degree and the embedded certificate earned. Since embedded certificates are designed to be completed within the degree framework, additional course work beyond the degree should not be required. Embedded certificates are intended to be thematic in nature and of interest to students across multiple faculties. When possible, embedded certificates should offer a breadth of courses across faculties related to the theme and should be open to students across the university with no dependency on a major area of study. Courses offerings should be flexible to enable completion within the number of units required for a bachelor's degree. Embedded certificates are institutionally approved.

C. Graduate Degrees

1. **Doctoral Degrees:** Advanced degree beyond the level of a Master's degree that requires course work, completion of candidacy and successful defense of a doctoral thesis. Includes the PhD, which demonstrates mastery of a field of study and demonstrated ability to conduct independent research, and profession/practice oriented doctoral degrees (such as the Doctor of Education) which demonstrate advanced knowledge of professional practice and demonstrated ability to conduct independent applied research.. Doctoral degrees are identified in PAPRS.
2. **Master's Degrees:** A degree requiring advanced study beyond a bachelor's degree. Research-oriented master's degrees focus on advanced research in a discipline and involve a significant supervised research component; may be thesis-based or course-based. Profession-oriented master's degrees are course based and equip students with research-informed knowledge that prepares them to be advanced practitioners in their field of study. Master's degrees are identified in PAPRS.
3. **Combined Graduate Programs:** Students are registered simultaneously in two degree programs at the University of Calgary or a degree and a post-baccalaureate certificate/diploma (e.g., JD/MBA, , JD/MPP MSW/MBA, etc.) Students must complete both programs concurrently. Students who wish to complete the programs separately will not be eligible for combined degree status. Two parchments will be issued.
4. **Conjoint Graduate Degrees:** A degree program involving more than one University.
 - a. **Collaborative program:** A collaborative agreement with another institution to offer a University of Calgary degree. The partner institution may provide some of the instruction, but the courses are University of Calgary courses. Sixty per cent of the content must be delivered by the University of Calgary. A University of Calgary parchment is the only credential issued.
 - b. **Cotutelle:** A doctoral program conducted at two institutions, with a supervisory committee comprised of faculty from both institutions. Programs must include at least thirty-three per cent of University of Calgary content (measured as time registered at the institution). The degree will be awarded by both institutions and parchments will indicate "Awarded under a Cotutelle arrangement with (University Name)."
 - c. **Dual degree programs:** Students study at two institutions. Students fulfill degree requirements at both institutions as outlined in a formal agreement. Students receive a transcript and parchment from each institution.
 - d. **Joint degree programs:** Students study at the University of Calgary and one or more other institutions. Normally includes at least fifty per cent of University of Calgary content. Students receive one parchment. The University of Calgary parchment will indicate "Joint Degree offered in collaboration with the (University Name)."

Sub-Degree Nomenclature

1. **Area of Study:** Area of study highlights the area within a teaching faculty when the area is not evident in the degree title. For

example, a PhD in Management will show the area of study as being Management. More than one area of study may be listed. Appears on the parchment and transcript. The area of study is identified in PaPRS.

2. **Specialization:** Specific focus within a graduate degree identified by specific course requirements. Appears on parchment and transcript. Specializations can be specific to an Area of Study, or Interdisciplinary (available to more than one area of specialization). Only one specialization is included on the parchment. Specializations are institutionally approved.
3. **Interdisciplinary program:** A thesis-based program that blends learning and supervision from two approved areas of study within the same degree title. A unique program plan is developed. A single parchment recognizes both areas of study (i.e., a PhD in Geography and Biological Sciences).

D. Graduate Certificates and Diplomas

Graduate certificates and diplomas are typically stand-alone credentials that can ladder to higher-level credentials and are identified in PaPRS. There are three types of graduate certificates and three types of graduate diplomas that may be awarded by the University of Calgary:

Certificates:

1. **Graduate:** Comprised of a minimum of 12 units. Will be noted on the transcript and a parchment will be issued. Students participate in convocation. May ladder into a master's degree.
2. **Post-Masters:** Comprised of a minimum of 12 units. Will be noted on the transcript and a parchment will be issued. Students participate in convocation. May ladder into a doctoral degree.
3. **Post-Doctoral:** Comprised of a minimum of 12 units. Will be noted on the transcript and a parchment will be issued. Students participate in convocation.

Diplomas:

1. **Graduate:** Comprised of a minimum of 18 units. Will be noted on the transcript and a parchment will be issued. Students participate in convocation. May ladder into a master's degree.
2. **Post-Masters:** Comprised of a minimum of 18 units. Will be noted on the transcript and a parchment will be issued. Students participate in convocation May ladder into a doctoral degree.
3. **Post-Doctoral:** Comprised of a minimum of 18 units. Will be noted on the transcript and a parchment will be issued. Students participate in convocation.

Undergraduate Degrees with a Major

| Faculty | Degree | Years | Major |
|---------|----------|-------|------------------------------------|
| Arts | BA | 4 | Ancient and Medieval History* |
| | BA | 4 | Anthropology, Social and Cultural* |
| | BSc | 4 | Anthropology* |
| | BA, BSC | 4 | Archaeology* |
| | BA | 4 | Art History |
| | BA | 4 | Canadian Studies* |
| | BA, BSc | 4 | Communication and Culture* |
| | BA, BCMS | 4 | Communication and Media Studies* |
| | BA, BFA | 4 | Dance |
| | BA | 4 | Development Studies* |
| | BFA | 4 | Drama |
| | BSc | 4 | Earth Science* |
| | BA | 4 | East Asian Language Studies* |
| | BA | 4 | East Asian Studies* |
| | BA | 4 | Economics* |

| | | | |
|--------------------------------|----------|------------------|---------------------------------------|
| | BA | 4 | English* |
| | BA, BFS | 4 | Film Studies* |
| | BA | 4 | French* |
| | BA, BSc | 4 | Geography* |
| | BA | 4 | German* |
| | BA | 4 | Greek and Roman Studies* |
| | BA | 4 | History* |
| | BA | 4 | International Indigenous Studies* |
| | BA | 4 | International Relations* |
| | BA | 4 | Italian Studies* |
| | BA | 4 | Latin American Studies* |
| | BA | 4 | Law and Society* |
| | BA | 4 | Linguistics* |
| | BA | 4 | Linguistics and Language* |
| | BA, BMus | 4 | Music |
| | BA | 4 | Philosophy* |
| | BA | 4 | Political Science* |
| | BA, BSc | 4 | Psychology |
| | BA | 4 | Religious Studies* |
| | BA | 4 | Religious Studies and Applied Ethics* |
| | BA | 4 | Russian |
| | BA, BSc | 4 | Science, Technology and Society* |
| | BA | 4 | Sociology* |
| | BA | 4 | Spanish* |
| | BA | 4 | Urban Studies* |
| | BFA | 4 | Visual Studies |
| | BA | 4 | Women's Studies* |
| Cumming School of Medicine | BCR | 4 | Community Rehabilitation |
| | BHSc | 4 | Bioinformatics |
| | BHSc | 4 | Biomedical Sciences |
| | BHSc | 4 | Health and Society |
| | MD | 3 after preprof. | Doctor of Medicine |
| Haskayne School of Business | BComm | 4 | Commerce* |
| Kinesiology | BKin | 4 | Kinesiology |
| | BKin | 4 | Leadership in Pedagogy and Coaching |
| | BKin | 4 | Mind Sciences in Kinesiology |
| | BSc | 4 | Biomechanics |
| | BSc | 4 | Exercise and Health Physiology |
| | BSc | 4 | Kinesiology |
| | BSc | 4 | Mind Sciences in Kinesiology |
| Law | JD | 3 after preprof. | Law |
| Nursing | BN | 4 | Nursing |
| Schulich School of Engineering | BSc | 4 | Chemical Engineering† |
| | BSc | 4 | Civil Engineering† |
| | BSc | 4 | Electrical Engineering† |
| | BSc | 4 | Energy Engineering† |
| | BSc | 4 | Geomatics Engineering† |
| | BSc | 4 | Mechanical Engineering† |
| | BSc | 4 | Oil and Gas Engineering† |

| | | | |
|------------------------------|-------|------------------|---|
| | BSc | 4 | Software Engineering† |
| Science | BA | 4 | Computer Science |
| | BSc | 4 | Actuarial Science* |
| | BSc | 4 | Applied and Environmental Geology |
| | BSc | 4 | Applied Chemistry** |
| | BSc | 4 | Applied Mathematics |
| | BSc | 4 | Astrophysics |
| | BSc | 4 | Biochemistry |
| | BSc | 4 | Biological Sciences |
| | BSc | 4 | Cellular, Molecular and Microbial Biology |
| | BSc†† | 4 | Chemical Physics |
| | BSc | 4 | Chemistry |
| | BSc | 4 | Computer Science† |
| | BSc | 4 | Ecology* |
| | BSc | 4 | Environmental Science |
| | BSc | 4 | General Mathematics |
| | BSc | 4 | Geology |
| | BSc | 4 | Geophysics |
| | BSc | 4 | Mathematics |
| | BSc | 4 | Natural Sciences |
| | BSc†† | 4 | Neuroscience |
| | BSc | 4 | Physics |
| | BSc | 4 | Plant Biology |
| | BSc | 4 | Pure Mathematics |
| | BSc | 4 | Statistics |
| | BSc | 4 | Zoology |
| Social Work | BSW | 4 | Social Work |
| Veterinary Medicine | DVM | 4 | Doctor of Veterinary Medicine |
| Werklund School of Education | BEd | 2 (after-degree) | Elementary |
| | BEd | 2 (after-degree) | Secondary |
| | BEd | 4 | |
| | BEd | 5 (concurrent) | Elementary |
| | BEd | 5 (concurrent) | Secondary |

† Internship option available

†† Honours only

* Co-operative Education option available

** Co-operative Education option only

Combined Degrees

Two degrees offered by two Faculties or within one Faculty requiring a minimum of five years to complete.

| Faculties | Degree | Years | Major |
|-----------------------------------|---|------------------|---|
| Arts | BA/BA BA/BSc BSc/BSc BFA/BA, BFA/BSc | 5 | Most Majors in Arts (see Faculty of Arts Regulation 3.4.5) |
| Arts/Science | BA/BA, BA/BSc, BSc/ BA or BSc/BSc | 5 | All Majors in Arts/All Majors in Science |
| Arts/Werklund School of Education | BA/BEd BFA/BEd BMus/BEd BSc/BEd | 5 5 5 5 | See Faculty of Arts - Concurrent Programs for a list of eligible Majors in Arts/Education |
| Cumming School of Medicine/Arts | BCR/BA or BSc/BCR | 5 | Community Rehabilitation and Disability Studies/Psychology |

| | | | |
|---|-----------------------|---|---|
| Haskayne School of Business/Arts | BComm/BA or BComm/BSc | 5 | See Haskayne School of Business - Combined Programs for a list of eligible Majors in Arts/Commerce |
| Haskayne School of Business/ Kinesiology | BComm/BKin | 5 | Commerce/Kinesiology (Kinesiology) |
| Haskayne School of Business/ Science | BComm/BSc | 5 | Commerce/Actuarial Science, Mathematics or Computer Science |
| Kinesiology/Arts | BKin/BA | 5 | Kinesiology (Kinesiology)/Dance |
| Kinesiology/ Werklund School of Education | BKin/BEd | 5 | Kinesiology (Leadership in Pedagogy and Coaching)/ Education |
| Schulich School of Engineering/ Arts | BSc(Eng)/BA or BSc | 5 | All Majors in Schulich/All Majors in Arts |
| Schulich School of Engineering/ Haskayne School of Business | BSc/BComm | 5 | Majors in Chemical, Civil, Electrical, Geomatics, Mechanical, or Software Engineering in Schulich/ Commerce |
| Schulich School of Engineering/ Science | BSc/BSc | 5 | All BSc majors in Science and all majors in Schulich. See Schulich School of Engineering 4.12 |
| Science | BSc/BSc or BSc/BA | 5 | Most Majors in Science (see Faculty of Science Regulation 3.4.F) |
| Science/ Werklund School of Education | BSc/BEd | 5 | General Mathematics/Education Natural Sciences/Education |

Minor Programs

| | |
|--|---|
| School of Architecture, Planning and Landscape | Architectural Studies |
| Arts | African Studies; Anthropology; Applied Energy Economics; Arabic Language and Muslim Cultures; Archaeology; Canadian Studies; Chinese; Communication and Media Studies; Dance; Development Studies; Drama; Earth Science; East Asian Studies; Economics; English; Film Studies; French; Geography; German; Greek; Greek and Roman Studies; History; History and Philosophy of Science; International Indigenous Studies; Italian Studies; Japanese; Latin; Latin American Studies; Law and Society; Linguistics; Medieval, Renaissance and Reformation Studies; Museum and Heritage Studies; Music; Philosophy; Political Science; Psychology; Religious Studies; Russian; Science, Technology and Society; Security Studies; Sociology; Sonic Arts; Spanish; Speech-Language Sciences; Urban Studies; Visual Studies and Art History; Women's Studies |
| Continuing Education | Workplace Learning |
| Cumming School of Medicine | Adapted and Therapeutic Physical Activity; Bioinformatics; Community Rehabilitation and Disability Studies; Health and Society |
| Haskayne School of Business | Management and Society |
| Science | Actuarial Science; Astrophysics; Biological Sciences; Chemistry; Computer Science; Data Science; Geology; Geophysics; Mathematics; Nanoscience; Physics; Statistics |

Student and Campus Services

Student and Enrolment Services

Enhancing the Student Experience

Student and Enrolment Services (SES) is committed to fostering a community that values student engagement, challenges students to explore their potential and supports each student's success through the provision of best practice services and programs that enhance the student experience in support of the Eyes High strategy of the University of Calgary.

Contact Information:

Vice-Provost (Student Experience)

Telephone: 403.220.6580

Email: vpse@ucalgary.ca

Location: MacKimmie Block 137

Website: ucalgary.ca/ses/

Career Services

Programs and services at Career Services include one-to-one career development and education, career workshops, access to full-time, summer, part-time and co-op or internship positions.

Telephone: 403.220.8020

Fax: 403.282.8342

Recruiting: recruit@ucalgary.ca

Student inquiries: csstdnt@ucalgary.ca

Location: MacEwan Student Centre 188

Website: ucalgary.ca/careers

Faith and Spirituality Centre

The Faith and Spirituality Centre (FSC) is a religious positive space that is open to engaging all viewpoints, regardless of belief, tradition, or spiritual outlook and including those that are questioning or seeking.

Telephone: 403.220.5451

Email: artuliss@ucalgary.ca

Location: MB 122

Website: ucalgary.ca/fsc

International Student Services

International Student Services (ISS) provides support services and customized advising for all international students adjusting to studying at the University of Calgary and to life in Canada. Our leadership initiatives develop, design and deliver unique peer-driven programs that connect international and Canadian students.

Telephone: 403.220.5581

Fax: 403.289.4409

Email: international.advice@ucalgary.ca

Location: MacEwan Student Centre 275

Website: ucalgary.ca/iss/

Leadership and Student Engagement

Leadership and Student Engagement (LSE) is dedicated to providing all University of Calgary students with the opportunity to develop their leadership identities. We provide a well-rounded university experience from first-year through to graduation.

Telephone: 403.210.5824

Fax: 403.210.9877

Location: MacEwan Student Centre 293

Website: ucalgary.ca/leadership

Native Centre

The University of Calgary welcomes, respects, and supports the rich diversity of Aboriginal learners, their communities, cultural traditions, and aspirations in post-secondary education. The Native Centre provides academic, personal, and cultural support to prospective and current First Nations, Métis, and Inuit students. Through student engagement and cultural events, the Native Centre also strives to create a welcome, inclusive, and inter-cultural educational environment for the whole campus community.

Telephone: 403.220.6034

Fax: 403.220.6019

Email: nativecentre@ucalgary.ca

Location Room 390z MacEwan Student Centre

Website: ucalgary.ca/nativecentre

Office of the Registrar

The Office of the Registrar assists students in carrying out a variety of administrative functions at the University of Calgary including Student Recruitment, Undergraduate Admissions, Enrolment Services, Awards, Financial Aid, Fee Payments, Systems and Scheduling (Student Centre), Exams and Convocation.

Website: ucalgary.ca/registrar

List of department contacts see: ucalgary.ca/registrar/contact-us

To email the Registrar directly: registra@ucalgary.ca

Enrolment Services: The frontline service area that provides services over the phone, via email and in-person in the following areas: prospective student inquiry, admissions, student awards, course registration support, financial aid and student fees.

Telephone: 1.403.210.7625

Fax: 1.403.289.1253

Email: esdocs@ucalgary.ca

Location: MacKimmie Block 117

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Recruitment and Admissions: The first point of contact for prospective students who are interested in attending an undergraduate program at the University of Calgary.

Telephone: 403.210.7625

Fax: 403.220.0762

Email: future.students@ucalgary.ca or ucalgary.ca/registrar/askucalgary

Website: ucalgary.ca/future-students/undergraduate

Undergraduate Awards: Provides undergraduate scholarships, bursaries and awards to entering and continuing students to recognize academic achievement and provide financial support for their post-secondary studies.

Telephone: 403.210.7625

Fax: 403.282.2999

Email: ucawards@ucalgary.ca

Website: ucalgary.ca/awards

Scholars Academy

The Scholars Academy provides talented students with the privilege of developmental opportunities that enhance their eligibility for prestigious scholarships and graduate/professional programs. Admission to the Scholars Academy requires students to be at the top of their class academically (mini-

imum 3.60 CGPA). Students are also chosen based on a demonstrated ability to make the most of offered opportunities and their commitment/involvement in the community.

Telephone: 403.220.2625

Email: sap@ucalgary.ca

Website: ucalgary.ca/sap

Student Accessibility Services

The Student Accessibility Services works collaboratively and innovatively with the campus community to create an accessible, equitable and supportive learning and living environment that enhances each student's academic and personal development.

Telephone: 403.220.8237

Fax: 403.210.1063

TTY: 403.220.2823

Email: access@ucalgary.ca

Location: MacEwan Student Centre 452

Website: ucalgary.ca/access

Student Ombuds Office

The Student Ombuds Office offers a safe place for undergraduate and graduate students of the University of Calgary to discuss student related issues, interpersonal conflict, academic and non-academic concerns, and many other problems.

For an appointment with the Student Ombuds, please send your request via email, call, or book an appointment online.

Telephone: 403.220.6420

Email: ombuds@ucalgary.ca

Website: <http://ucalgary.ca/ombuds/>

Student Success Centre

The Student Success Centre provides services and programs to undergraduate, graduate, international or open studies students. Our advisors, learning support staff, and writing support staff are here to assist you in enhancing your skills and achieving your academic goals.

Telephone: 403.220.5881

Fax: 403.220.0190

Location: Taylor Family Digital Library, 3rd Floor

Website: ucalgary.ca/ssc

Student Wellness Services

Student Wellness Services is committed to creating a healthy campus community, working collaboratively to create a campus environment where students, faculty and staff feel empowered to support each other and participate actively in maintaining their own health and well-being. With a student-centred approach, we offer comprehensive, holistic and accessible programs and services to foster all dimensions of wellness.

Mental Health Services

Programs and services at Student Wellness Services include counselling support such as workshops, groups, single sessions, online self-directed help, brief individual counseling, educational success strategies and career decisions. Whether you are a successful student looking to brush up on

your skills, are concerned about a friend, or in crisis, Student Wellness Services can help you identify ways to improve your well-being and achieve your goals.

Telephone: 403.210.9355, Option #2

Fax: 403.284.0069

Location: MacEwan Student Centre 370

Website: <https://ucalgary.ca/wellnesscentre/services/mental-health-services>

Peer Support and Health Promotion

Building resiliency and capacity by offering innovative events and programs to promote wellness in mind, body and spirit through peer support, training and workshops.

Telephone: 403.220.7011

Email: communityhub@ucalgary.ca

Location: Campus Community Hub Yarnuska Hall YA S005

Website: <https://www.ucalgary.ca/wellnesscentre/hub>

Health Services

Promoting and monitoring physical wellness for students and their dependents through access to medical, chiropractic, massage and nutrition services. In addition, our Student Medical Response Team is a 100% student volunteer run and organized team with the goal of providing qualified, and skilled pre-hospital emergency medical care to eligible University of Calgary community events.

Telephone: 403.210.9355, Option #3

Fax: 403.282.5218

Location: MacEwan Student Centre 370

Website: <https://www.ucalgary.ca/wellnesscentre/services/health>

Student Support and Outreach

Support and outreach to students to address immediate and ongoing mental health needs. A multi-disciplinary team provides mental health information, referrals, and help in developing personal coping strategies and response for reported students-at-risk.

Telephone: 403.220.9355

Fax: 403.282.5218

Location: MacEwan Student Centre 373

Website: ucalgary.ca/wellnesscentre/services/studentssupport

Women's Resource Centre

The Women's Resource Centre is a safe and welcoming place for students, staff, faculty, and community to come together to connect. The Peer Support program supports women in making informed choices by providing information and access to resources while recognizing that each woman is resilient and has the strength to be her own agent of change and development.

Telephone: 403.220.8551

Fax: 403.210.7970

Email: women@ucalgary.ca

Location: MacEwan Student Centre 482

Website: ucalgary.ca/women/

Hours: Monday to Friday, 8:30 a.m. – 4:30 p.m.

Active Living

As a University of Calgary student, you are automatically an 'all-access' member of one of Calgary's largest and most complete recreation facility. Students can also purchase family memberships at special student rates. Community members, alumni and staff are also welcome to become members.

Our facilities include a Fitness Centre, Racquet Centre, Aquatic Centre, Gymnastics Centre, and Outdoor Centre. Active Living offers a wide variety of programs from health and wellness, to recreation programs and certifications.

Look for Active Living and Outdoor Centre Program Guides in display racks located around campus.

Telephone: 403.220.7749 or 403.220.5029

Location: Kinesiology Complex

Website: ucalgary.ca/activeliving

Bookstore

The University of Calgary Bookstore is where you'll find textbooks and other course materials, Dinos gear and merchandise, books for leisure reading, gift items, school supplies and a full-service Starbucks to help you refuel any time of day.

Telephone: 403.220.5937

Email: bkstore@ucalgary.ca

Location: First floor, MacEwan Student Centre, 424 Collegiate Blvd. N.W.

Website: calgarybookstore.ca

Hours of operation: Monday to Friday, 9:00 a.m. to 6:00 p.m., Saturday: 10:00 a.m. to 5:00 p.m.

All Bookstore proceeds stay on campus; supporting student programming, academic, and research initiatives.

Campus Security

Campus Security is dedicated to maintaining the campus as a safe and pleasant place to live, work and study. Officers are on duty 24 hours a day, year round, to respond to your security and emergency needs. Campus Security, in partnership with the Students' Union, provides a Safewalk service to any location on campus including the LRT, parking lots, bus zones and campus housing. Campus Security can be contacted from any of the "Help" phones located around campus.

Telephone: 403.220.5333

Fax: 403.282.2765

Location: MacEwan Student Centre, Room 260

Website: ucalgary.ca/security

Conference and Event Management

Centrally managing over 42,000 square feet of bookable classroom, boardroom, conference, and event space, 141 lecture theatres and more than 200 hectares of beautiful,

park-like outdoor space, the Conference and Event Management (CEM) team is sure to find a creative solution for your event. Whether you need to arrange a multi-day conference, a business luncheon or a social event, our CEM staff will take care of all essential details.

Telephone: 403.220.3111

Email: mse@ucalgary.ca

Location: 169 University Gate N.W.

Website: ucalgary.ca/cem/

Office hours: Monday to Friday: 8:30 a.m. to 4:30 p.m.

All Conference and Event Management proceeds stay on campus; supporting student programming, academic, and research initiatives.

Dinos Athletics

Dinos Athletics is a full member of the Canada West Universities Athletic Association. Canada West is one of the most competitive conferences in Canadian Interuniversity Sport (CIS). The Dinos compete in Canada West conference league sports including basketball, field hockey, football, ice hockey, rugby, soccer, and volleyball and in Canada West tournament sports including cross-country, swimming, track and field, and wrestling. All undergraduate and graduate students are admitted free of charge to all regular season games upon presentation of proper I.D.

Telephone: 403.220.6803

Email: goDinos@ucalgary.ca

Location: Kinesiology Complex A 147

Website: goDinos.com

Food Services

University of Calgary Food Services oversees the food services operator, select retail outlets and catering on campus. The Dining Centre and 19 other food retailers across campus provides the campus community a variety of healthy choices.

Meal plans are managed by Food Services, in co-ordination with the Unicond office. Meal plans are available to anyone who has a Unicond. The cards are also loadable on an ad-hoc basis and can serve as a simple way to purchase food on campus (ucalgary.ca/unicond/use-unicond).

Telephone: 403.220.5541

Email: food.services@ucalgary.ca

Location: DC 18B, 2500 University Drive N.W.

Website: ucalgary.ca/ancillaryservices/foodservices

Hours of operation: Monday to Friday: 8:30 a.m. to 4:30 p.m.

All Food Services proceeds stay on campus; supporting student programming, academic, and research initiatives.

Graduate Students' Association

The Graduate Students' Association (GSA) provides a strong foundation for graduate

students at the University of Calgary by advocating on their behalf, and addressing their needs by offering essential services and programs that support and empower them during and after their academic endeavors.

Through services such as professional development workshops, mentorship opportunities, leadership opportunities, social events, a health and dental plan, and awards, grants, and bursaries, the GSA is dedicated to enhancing the well-being and student experience of graduate students.

The GSA also owns and operates the Last Defence Lounge, a full service restaurant located on the third floor of the MacEwan Student Centre (MSC 350).

For a full list of GSA services, visit: gsa.ucalgary.ca.

Hotel Alma

Hotel Alma treats guests to gracious service, affordable accommodations (special rates for staff and visiting families of students) and a host of meeting spaces. Accommodations include one, two and three bedroom apartments as well as traditional dormitory rooms and can accommodate groups of up to 1,122 people. Through the fall and winter season (late August through April), Seasonal Residence provides two bedroom, short-term residences to teams, student groups, exchange students, etc.

Telephone: 403.220.3203

Email: stay@hotelalma.ca

Location: 169 University Gate N.W.

Website: hotelalma.ca

Hours: 24-hours-a-day, seven-days-a-week

All Hotel Alma proceeds stay on campus; supporting student programming, academic, and research initiatives.

Information Technologies

The Information Technologies (IT) department provides computing and media services in support of learning, teaching, research, and administration at the University of Calgary.

IT supports many online services that students will utilize throughout their academic learning experience at the University of Calgary. For more information on IT services, visit ucalgary.ca/it/service-catalogue-list.

Telephone: 403.220.5555 or 888.342.3802

Email: itsupport@ucalgary.ca

Twitter: @UCalgary_IT

Location: 7th Floor, Mathematical Sciences Building

Website: ucalgary.ca/it

Libraries and Cultural Resources

Libraries and Cultural Resources (LCR) operates eight University of Calgary libraries on campus and across the city. Included in LCR are two art galleries: the Nickle Galleries and the Founders' Gallery at The Military Museums, as well as Archives and Special Collections, the University of Calgary Copy-

right Office, Research Data Centre and the University of Calgary Press.

For more information, please refer to: lcr.ucalgary.ca/.

Parking and Transportation Services

Parking and Transportation Services is your one-stop shop for all of your parking and transportation needs at the University of Calgary.

Telephone: 403.220.6772

Email: parking@ucalgary.ca

Location: Olympic Volunteer Centre (OVC), 1833 Crowchild Trail N.W.

Website: ucalgary.ca/parking

Hours of operation: Monday to Friday: 7:30 a.m. to 5:00 p.m.

All Parking and Transportation Services proceeds stay on campus; supporting student programming, academic, and research initiatives.

Residence Services

Residence Services provides quality accommodations and programs, which enhance the student experience, support academic success and foster leadership development.

Student Housing

Residence buildings offer a variety of accommodation styles, including traditional dormitory (for first-year), studios, one-bedrooms, two bedrooms and four bedroom apartments, as well as two and three bedroom suite-style buildings. Housing options transition with students as they progress through their university experience. All buildings have an academic lounge where students can study or attend tutoring sessions and a recreational lounge to relax with friends.

Telephone: 403.220.3210

Email: residence@ucalgary.ca

Location: DC01, 124 University Gate N.W.

Website: ucalgary.ca/residence

Hours of operation: Monday to Friday 8:00 a.m. to 8:00 p.m., Saturday 10:00 a.m. to 3:00 p.m., Sundays and Holidays 10:00 a.m. to 3:00 p.m.

Student-Family Housing

Student-family housing consists of 250 townhouses, arranged in a garden court setting specially designed for students with families. In addition to the facilities offered, Residence Education Staff facilitate programs and services to meet family members' needs, including community barbecues, summer camps, ESL conversation groups, and the Jenna Chang Children's Resource Library.

Telephone: 403.220.7227

Email: family.housing@ucalgary.ca

Location: 3735 - 32 Avenue N.W.

Website: ucalgary.ca/residence

All Residence Services proceeds stay on campus; supporting student programming, academic, and research initiatives.

Risk - Environmental Health and Safety

The University of Calgary is committed to providing a safe and healthy environment for students in which to learn. The EH&S Department provides leadership in the implementation of the University's Occupational Health and Safety and Environmental Management Systems, including WHMIS (Workplace Hazardous Materials Information System), radiation safety, and biohazardous materials. The EH&S website provides information on legislation; policies and procedures; safety courses and online registration; as well as other health and safety related information and guidance.

Telephone: 403.220.6345

Email: ucsafety@ucalgary.ca

Website: ucalgary.ca/safety

Student Legal Assistance (SLA)

Student Legal Assistance (SLA) is the on-campus law clinic staffed by U of C law students who, with the assistance of advising lawyers, provide pro bono representation and legal assistance to U of C undergraduate students and needy Calgary and area residents who are unable to afford a lawyer. This includes the commission of documents and statutory declarations (free to undergraduate students and \$10.00 for graduate students). SLA provides services throughout the year in civil, criminal and family law matters, with evening clinics during the academic year and daytime clinics during the summer months.

Telephone: 403.220.6637

Location: 3390 Murray Fraser Hall

Website: <http://slacalgary.ca/>

The Students' Union

The SU is the elected voice of undergraduate students at the University of Calgary and advocates on their behalf on the quality and affordability of their university education. The SU also provides a range of programs and services, such as the undergraduate student health and dental plan, the Q Centre, the Campus Food Bank, SU Volunteer Services, support for more than 300 student clubs, and events such as the annual Teaching Excellence Awards and Bermuda Shorts Day. The SU manages Mac Hall and operates the Den and Black Lounge, La Taqueria, Bound and Copied, Stör, and a conference centre and all proceeds are reinvested into programs that benefit students and the campus.

Telephone: 403.220.6551

Email: supres@ucalgary.ca

Location: Students' Union Office 251 MacEwan Student Centre

Website: <https://www.su.ucalgary.ca/>

Study Abroad Office/ International Learning

Students are encouraged to include an "international experience" in their time at

university. This may include Study Abroad in credit programs such as student exchange programs with partner universities; group study programs led by University of Calgary professors; term abroad programs; research projects; practica, internships and co-operative education abroad; independent study approved for a Letter of Permission. It may also include approved volunteering abroad or non-credit experience abroad.

Telephone: 403.220.5581

Fax: 403.289.4409

Email: study.abroad@ucalgary.ca

Location: MacEwan Student Centre, Room 275 (CISSA)

Website: ucalgary.ca/uci/abroad

Taylor Institute for Teaching and Learning

The Taylor Institute for Teaching and Learning is dedicated to better understanding and improving student learning. The Taylor Institute brings together teaching development, teaching and learning research, and undergraduate inquiry learning under one roof.

Telephone: 403.220.4949

Fax: 403.282.0730

Email: taylorinstitute@ucalgary.ca

Location: Taylor Institute for Teaching and Learning, 434 Collegiate Blvd.

Website: ucalgary.ca/taylorinstitute/

Unicard Office/UPass

The Unicard is a multi-purpose campus card for all students, staff and faculty, and is the official University of Calgary identification and access card. It can also be used to check out books at the library, to access the gym and athletic facilities and as a debit card for purchasing products and services on campus ranging from meals and Bookstore merchandise to printing and photocopying.

Telephone: 403.220.7290

Email: unicard@ucalgary.ca

Location: Dining Centre 018, 124 University Gate N.W.

Website: ucalgary.ca/unicard

Hours of operation: Monday to Friday: 8:30 a.m. to 4:30 p.m.

All Unicard proceeds stay on campus; supporting student programming, academic, and research initiatives.

University Child Care Centre Society (UCCC)

The University Child Care Centre Society currently has two locations at the U of C: one located on Main Campus between Scurfield Hall and the Biological Sciences Building and the other on West Campus, across from the Alberta Children's Hospital. Both of our centres are licensed, monitored and regulated by both Alberta Human Services Child development branch and Alberta Environmental Health.

Email: waitlist@ucalgary.ca

Website: ucalgary.ca/uccc

Hours of Operation: 7:30 a.m. to 5:30 p.m., Monday through Friday.

University Theatre Services

University Theatre Services (UTS) is a support service department within the Faculty of Arts, with a primary function to support the academic programs of the departments in the Faculty. UTS also provides a wide variety of production, publicity, box-office and management support services to all users of the University Theatre, the Rozsa Centre including the Eckhardt-Gramatté Hall, the Boris Roubakine Recital Hall and the Reeve Theatre, including both on campus and off campus customers. The Rozsa Centre also provides complete facilities for small conferences and meetings.

For more information please visit our website at: scpa.ucalgary.ca/theatre-services/welcome-theatre-services.

Admissions

A.1 Classification of Students

Contacts

All enquiries relating to admission should be directed as follows:

Undergraduate Admissions

| |
|---|
| MacKimmie Block 2500 University Drive N.W. Calgary, Alberta T2N 1N4 |
| Telephone: 403.210.7625 |
| Email: ucalgary.ca/future-students/undergraduate/contact |
| Web: ucalgary.ca/future-students |

School of Architecture, Planning and Landscape

| |
|---|
| 2500 University Drive N.W. Calgary, Alberta T2N 1N4 |
| Telephone: 403.220.4388 |

Cumming School of Medicine (Medical Doctor)

| |
|---|
| Room G740 - Health Sciences Centre 3330 Hospital Drive N.W. Calgary, Alberta T2N 1N4 |
| Telephone: 403.220.4262 |
| Email: ucmedapp@ucalgary.ca |

Faculty of Graduate Studies

| |
|--|
| Earth Sciences 1010 2500 University Drive N.W. Calgary, Alberta T2N 1N4 |
| Telephone: 403.220.4938 |
| Email: graduate@ucalgary.ca |

Faculty of Law

| |
|---|
| Murray Fraser Hall 2500 University Drive N.W. Calgary, Alberta T2N 1N4 |
| Telephone: 403.220.4155 |
| Email: law@ucalgary.ca |

Veterinary Medicine

| |
|---|
| TRW 2D01, 3280 Hospital Drive N.W. Calgary, Alberta T2N 4Z6 |
| Telephone: 403.220.8699 |
| Email: vet.admissions@ucalgary.ca |

The language of instruction at the University of Calgary is English except in certain courses. As resources permit, selected courses in some disciplines may also be offered in other languages.

A.1.1 Undergraduate Students

Undergraduate students are students who have fulfilled admission requirements and

are registered in courses for credit towards an undergraduate degree, diploma or certificate. Visiting students, visiting student researchers and Open Studies students are considered undergraduate students.

Undergraduate students fall into two categories:

(a) Full-time students: Those students who are registered in the equivalent of nine or more units each term;

(b) Part-time students: Those students who are registered in fewer than nine units each term.

Undergraduate students, or students in programs identified with undergraduate faculties, are classified as follows:

1. Regular Student: A student who has been formally admitted to study in the University and is registered in a program leading to a degree, diploma or certificate (credit).

2. Open Studies Student: A student who is permitted to register in credit courses, but who is not admitted to a program leading to a degree, diploma or certificate (credit). For more information, refer to A.14 (Admission to Open Studies).

3. Visiting Student/Visiting Student Researcher: A student who is permitted to register in credit-based courses who is registered at another recognized/accredited degree granting institution and has obtained a letter of permission to take courses at the University of Calgary toward their home institution credential or to complete research at the University of Calgary toward their home institution credential.

4. Exchange Student: A student who is permitted to register in credit courses at the University of Calgary as part of a formal exchange agreement.

A.1.2 Graduate Students

Graduate students are those students who are admitted to the Faculty of Graduate Studies to pursue a master's or doctoral degree, diploma or certificate, or are admitted as regular, interdisciplinary degree, Cotutelle, qualifying, conditional admission for language upgrading, visiting and exchange. Refer to the Faculty of Graduate Studies section for further information.

A.2 Undergraduate Admission

Applicants must meet the minimum standards indicated in this Calendar. Applicants seeking admission to the School of Architecture, Planning and Landscape, Cumming School of Medicine (MD program), Faculty of Graduate Studies, Faculty of Law, and Faculty of Veterinary Medicine are advised to contact the faculty/school directly for admission procedures.

All applicants must satisfy the admission requirements. Admission to all programs at the University of Calgary is competitive. The

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admission average required to secure an offer of admission will be determined once the qualifications of the applicant pool have been assessed for each faculty/program; therefore, meeting the minimum admission requirement does not guarantee admission. While every attempt will be made to accept all qualified applicants to the University of Calgary, enrolment will be limited to the number of students that can be accommodated by the resources available to maintain an acceptable quality of education.

A.3 Deadline Dates for Undergraduate Applications for Admission and Supporting Documents

Information on admission deadlines can be found at ucalgary.ca/future-students/undergraduate/apply.

Information for change of program can be found in section D (Change of Faculty or Program).

Information on exchange programs can be found at: ucalgary.ca/future-students or ucalgary.ca/pubs/calendar/current/a-8-3.html.

Information on open studies programs can be found at: ucalgary.ca/future-students/open-studies.

Failure to submit transcripts by the deadlines will result in the cancellation of the applicant's Application for Admission. Applicants are encouraged to monitor their Student Centre in MyUCalgary (my.ucalgary.ca) to check the status of their application and documents received.

Students granted tentative admission on the basis of unofficial transcripts and for whom **official** transcripts have not been received by the deadline dates, may have their admission rescinded or have a hold placed on their record that will restrict registration activity.

Deadline Dates for International Foundations Program

A. IFP Pathways Application Deadlines

Applications for admission to the IFP Pathways will be accepted for the Fall Term only. Students must submit their Application for Admission and all required documents to the Admissions Office following regular Fall High School application or International deadlines.

B. IFP Bridging Application Deadlines

B.1 Applications for admission to IFP Bridging with an assessed admission with the condition of meeting the English language requirement prior to degree start will be accepted for the Fall Term only. Students must submit their Application for Admission and all required documents to the Admissions Office following regular Fall High School admission or outside Canada deadlines.

B.2 Applications for admission to IFP Bridging before or while applying for a degree program will be accepted for Fall, Winter or combined Spring/Summer Terms.

Information on application deadlines can be found at ucalgary.ca/future-students/undergraduate/apply.

A.4 General Admission Procedures

Students who wish to be considered for admission to the University must complete an Application for Admission, pay the application fee and submit required documentation to demonstrate they meet the admission requirements (e.g., official transcripts, Eng-

lish language proficiency requirements, etc.). Qualified students who receive a notice of acceptance, will be required to accept the offer of admission prior to registering in courses.

The University of Calgary reserves the right, published requirements notwithstanding, to refuse applicants for admission or registration, even if they meet the entrance requirements, on the basis of their overall academic records or on the basis of grounds that, in the opinion of the University, are reasonable in the circumstances. If registration is cancelled, the application fee will not be refunded.

All students seeking admission to the University must ensure the information provided as part of their application for admission is true and accurate. Students who are identified as falsifying or omitting information as part of the admission process, up to the add/swap deadline, will have their admission and registration cancelled by the Registrar's Office. After the course add/swap deadline, academic misconduct regulations outlined in section K (Statement on Principles of Conduct) apply. Students who are identified as falsifying or omitting information may be identified to other post-secondary institutions. Falsified documents may be referred to the appropriate authorities for potential prosecution under the Criminal Code of Canada.

A.4.1 Application for Admission

An undergraduate Application for Admission must be completed by students who wish to be admitted to an undergraduate degree or diploma program. The University of Calgary participates in the Alberta Post-Secondary Application System. The Application for Admission is available online at applyalberta.ca/pub/app_process.asp.

International students can access the online application at ucalgary.ca/future-students/undergraduate/apply.

Students who wish to enter the Faculties of Graduate Studies, Law, Veterinary Medicine, or the School of Architecture, Planning and Landscape can access the application at: applyalberta.ca/pub/app_process.asp or from the specific faculty website.

Students wishing to enter the MD program in the Cumming School of Medicine should contact the School for the application form and admission information: ucalgary.ca/mdprogram/admissions.

Students who wish to register as Visiting, Exchange or Open Studies students must complete the online application form available at: ucalgary.ca/future-students/undergraduate/apply.

Students who leave the University of Calgary to attend another post-secondary institution, must re-apply for admission and provide official transcripts from all post-secondary institutions attended. Please note that when an application is completed through the Alberta Post-Secondary Application System (APAS), students authorize the University of Calgary to request transcripts on their behalf

from Alberta Education and other participating Alberta institutions, if applicable.

Students who have not attended the University of Calgary for two years or more (one year for the Faculty of Nursing and the Schulich School of Engineering) and students who are applying to an after-degree must re-apply for admission.

Any student who applied for admission to the University, but never attended, must complete a new Application for Admission and submit official transcripts. Previously submitted documents will be destroyed after a period of one year.

Students who have been suspended, expelled or required to withdraw from a faculty should refer to section A.6 (Required to Withdraw Students) for further information.

Incomplete applications or those submitted without the application fee will not be processed. Complete applications must be submitted to the Admissions Office prior to the application deadline to be considered. The University accepts no responsibility for denials of admission based on the failure of applicants who do not complete their application in a timely manner.

Future students should not wait until the results of test scores and/or final high school results are received before applying for admission.

A.4.2 Application Fee

Applicants submitting an Application for Admission to the University are required to pay a non-refundable \$125.00 application fee (\$145.00 for applicants presenting international credentials) by the application deadline. Applications received without the fee will not be considered for admission. Students who are required to re-apply for admission to the University of Calgary are required to pay this fee.

Students are encouraged to submit payments online. If paying by cheque or money order, make payable to the University of Calgary.

The above fees are subject to change without advance notice.

A.4.3 Supporting Documents

Supporting documents, such as transcripts, must be received by the University by the deadlines indicated on the website: ucalgary.ca/future-students/undergraduate/documents. If official transcripts are not available by the deadlines, students may provide unofficial copies of high school and post-secondary records to be considered for tentative admission. They may be emailed as a PDF or TIFF file to transcripts@ucalgary.ca. Alternatively, they can be sent to us by transcript delivery systems such as Parchment or e-ScriptSafe.

Official transcripts are documents which are sent directly to the Admissions Office from the Department of Education and/or other institutions maintaining such records. Through APAS, applicants who have attended high school and/or another participating institution(s) in Alberta provide authorization to the University of Calgary

to request transcripts on their behalf from Alberta Education and/or the institution. It is the applicant's responsibility to request out-of-province institutions to send complete official transcripts directly to the Admissions Office. See paragraph above for acceptable delivery formats.

International applicants seeking admission on the basis of documents which are in a language other than English must submit official documents in the original language as well as English translations prepared by a certified translator. Documents must indicate the courses studied and the grades obtained in each course.

Transcripts received by the Admissions Office become the property of the University of Calgary and will not be photocopied or returned to students or forwarded to other institutions.

Documents submitted, but not required for admission, will be destroyed. Students are advised to only submit documents requested by the University and required for admission consideration.

A.4.4 Admission Deposit

Students who are offered admission will be required to pay a one-time \$500.00 admission deposit by the deadline indicated in their offer of admission to confirm their seat in their admitted program. The deposit is non-refundable and will be applied against tuition and fees. Re-admits are required to pay the admissions deposit.

A.4.5 Deferral of Admission

Offers of admission are only valid for the term outlined in the admission letter. Students who are not registered in a course(s) after the course drop deadline for this term must re-apply for admission, unless they are approved for a deferral of admission.

Requests for deferral of admission are available to students who are applying directly from high school and have not attended another post-secondary institution. Requests may be submitted after a student has been admitted and paid the \$500.00 admission deposit. Deferral requests may be submitted in writing to the Associate Registrar, Recruitment and Admissions who will consult with the Faculty to which the student has been admitted. Deferrals are only approved for special circumstances and will be considered on a case-by-case basis. Students who attend another post-secondary institution during the deferral period will have the deferral cancelled and must re-apply for admission.

Students admitted to the Cumming School of Medicine (MD program), Veterinary Medicine, and Law see the faculty website for admission deferral information.

A.4.6 Finalizing Admission

Admission decisions for students who are currently completing coursework are finalized when final transcripts are received confirming that course requirements have been met.

High school students must complete all 30-level course requirements (or equivalent), maintain the minimum admission average required for their program in their admission year and obtain their Alberta Grade 12 Graduation (or equivalent) by the end of June. Students who do not finalize the requirements or do not provide final official transcripts by August 1 will have their admission and registration cancelled.

Additional admission decisions may be considered in July when final grades are received. July admission offers will be made to the applicants with the highest admission average first (top-down).

Transfer students must complete all course requirements (or equivalent), maintain the minimum admission average required for their program in their admission year by the end of May. Students who do not finalize the requirements or do not provide final official transcripts by June 1 will have their admission and registration cancelled. Additional admission decisions may be considered in May when final grades are received. May admission offers will be made to the applicants with the highest admission average first (top-down).

A.4.7 Alternate Admission Offers

Applicants will be considered for their first and second choice programs in order of choice. Applicants who are not granted admission to their first or second choice programs may be waitlisted and/or offered admission to an alternate program.

A.5 Undergraduate Admission Requirements

Admission to an undergraduate program may be obtained under one of the following categories:

1. Canadian High School Admission
2. International High School Admission
3. Transferring from Another Post-secondary Institution
4. Adult Student Admission
5. Second Degree

High School Admission Average: will be calculated using the five approved courses required for admission by the selected faculty (see Section A.5.1.1 or visit ucalgary.ca/future-students/undergraduate/apply). The University will determine the equivalent for applicants whose courses were completed outside of the Alberta secondary school system.

All applicants must demonstrate English language proficiency (refer to A.11 English Language Proficiency).

A.5.1 Canadian High School Students

The general admission requirement to the University of Calgary is Alberta Grade 12 graduation, or equivalent, and the completion of five courses at the 30 level (or equivalent). For information on equivalent courses visit ucalgary.ca/registrar/requirements. Students will be considered for admission

decisions using the early admission process or the standard admission process.

Admission is competitive and meeting the minimum requirement does not guarantee admission. Students presenting an approved option as their fifth course must obtain a minimum 65 per cent average on the remaining four courses in addition to meeting the program specific competitive admission average.

Students must submit their application and supporting documents by the deadlines outlined in section A.3 (Deadline Dates for Undergraduate Applications for Admission and Supporting Documents). For more information on how to apply visit: ucalgary.ca/future-students/undergraduate/apply.

The University reserves the right to require additional assessments in cases where questions exist concerning documentation.

A.5.1.1 Admission Requirements

Prerequisite Requirements

Admission requirements may differ from prerequisite requirements for a specific degree or program. Applicants must be aware that they may be admitted to a program for which there are course prerequisite to complete the program. Course prerequisites can be found in the course description section of this calendar (ucalgary.ca/pubs/calendar/current/course-desc-main.html).

See "Admission Requirements Table" on page 18.

A.5.1.2 Standard Admission Process for Current High School Students

The standard admission process considers five courses required for admission to a specific program. The admission average will be calculated using five courses at the 20 or 30 level (or equivalent). Approved subjects and approved option subjects are listed in section A.5.1.1 (see Approved Courses and Approved Options). At least one approved course must be at the 30 level (or equivalent). If grades for a 20-level and 30-level courses are provided in the same subject, the 30-level grade will be used.

For the Schulich School Engineering the standard admission process will be based on four courses if a grade for Mathematics 31 is not available.

Equivalent courses will be used for students who have completed studies outside the province of Alberta. For information on course equivalencies visit: ucalgary.ca/registrar/requirements.

Admitted students must complete all 30-level (or equivalent) course requirements outlined in A.5.1.1, maintain the admission average required for admission in the application year and obtain the Alberta Grade 12 Graduation (or equivalent).

Students presenting an approved option as their fifth course must obtain a minimum 65 per cent average on the remaining four courses in addition to meeting the program specific competitive admission average.

Admission Requirements Table

| Faculty/Program | Required Courses | Supplementary Requirements | Notes |
|---|---|---|--|
| Arts | | | |
| Dance, Drama, Music, and Visual Studies | - English Language Arts 30-1 - Four approved courses at the 30 level A maximum of two approved Fine Arts courses are permitted: either two 5-credit courses, or one 5-credit and one 3-credit course. Approved courses may include locally developed courses specific to Art, Dance, Drama or Music. | BMus: online audition form and audition. Dance: statement of interest and audition. Visual Studies: portfolio. | Admission to the BMus, BA (Music) or Minor in Music requires evidence of successful completion of RCM Level 8 Theory or the departmental music theory diagnostic exam. |
| Earth Science | - Chemistry 30 - English Language Arts 30-1 - Mathematics 30-1 - Two approved courses at the 30 level of which one may be an approved option. | | |
| Economics | - English Language Arts 30-1 - Mathematics 30-1 - Three approved courses at the 30 level of which one may be an approved option. | | |
| Geography (BA, BSc), Psychology (BA) | - English Language Arts 30-1 - Mathematics 30-1 or 30-2 - Three approved courses at the 30 level of which one may be an approved option. | | |
| Psychology (BSc) | - Biology 30 - Chemistry 30 - English Language Arts 30-1 - One approved course or option at the 30 level. | | |
| All Other Programs | - English Language Arts 30-1 - Four approved courses at the 30 level of which one may be an approved option. | | |
| Cumming School of Medicine | | | |
| BCR | - English Language Arts 30-1 - Biology 30 - Three approved courses at the 30 level of which one may be approved option | | |
| BHSc | - English Language Arts 30-1 - Mathematics 30-1* - Biology 30 - Chemistry 30 - One approved course or option at the 30 level | Online supplementary application | *A grade of at least 70% in Mathematics 30-1 is required for admission. |
| Haskayne School of Business | - English Language Arts 30-1 - Mathematics 30-1 - Two of: <ul style="list-style-type: none"> • Aboriginal Studies 30 (5 credits) • Biology 30 • Chemistry 30 • Computing Science, Career and Technology Series Advanced Level (5 credits) • Language or Language and Culture courses at the 30 level • Mathematics 31 • Physics 30 • Science 30 • Social Studies 30-1 - One additional approved 5-credit (or two 3-credit) course or option at the 30 level | | |
| Kinesiology | | | |
| Most majors | - English Language Arts 30-1 - Mathematics 30-1* - Biology 30 - Chemistry 30 - One approved course or option at the 30 level | | *Exercise and Health Physiology: A grade of at least 70% in Mathematics 30-1 is required for admission. |
| Biomechanics | - English Language Arts 30-1 - Mathematics 30-1* - Biology 30 - Chemistry 30 - Mathematics 31** | | *A grade of at least 70% in Mathematics 30-1 is required for admission. **If Mathematics 31 is not available, the admission average is based on four courses. Physics 30 is recommended. |

| | | | |
|---|---|--|--|
| Nursing | <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 or 30-2* - Biology 30 - Chemistry 30 - One approved course or option at the 30 level | | *Mathematics 30-2 is preferred. |
| Schulich School of Engineering | <p>Regular admission route:</p> <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 - Mathematics 31 - Chemistry 30 - Physics 30 <p>Biology-based admission route:</p> <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 - Mathematics 31 - Chemistry 30 - Biology 30 | | If Mathematics 31 was not attempted, the final admission average will be a minimum of 5% higher. Mathematics 31 will be replaced with another approved course. Admission offers via the Biology-based admission route are conditional on successful completion of the Schulich School of Engineering Summer Bioengineering Institute prior to the start of the engineering program. |
| Science | <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 - Two of Biology, Chemistry or Physics at the 30 level*, Mathematics 31, CTS Computer Science Advanced - One approved course or option at the 30 level | | *Students are encouraged to take high school courses related to their intended major. |
| Werklund School of Education | | | |
| Four-Year Education Program: Community-Based | | | |
| English Language Arts | <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 or 30-2 - One of Science 30, Biology 30, Chemistry 30 or Physics 30 - Two approved courses or options at the 30 level | | Preference for admission will be given to students from rural communities. Students solely deficient English 30-1 and/ or not meeting the competitive average requirement will automatically be considered for the Bridging pathway. See Werklund School of Education 4.2.2. |
| Mathematics, Science | <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 - Two of Biology 30, Chemistry 30, Physics 30, Mathematics 31 or CTS Computer Science Advanced (5 credits) - One approved course or option at the 30 level | | |
| Social Studies | <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 or 30-2 - One of Science 30, Biology 30, Chemistry 30 or Physics 30 - Social Studies 30-1 - One approved course or option at the 30 level | | |
| Four Year Education Program: On Campus | | | |
| <p><i>Elementary:</i> Early Childhood Education, English Language Arts, Fine Arts Education</p> <p><i>Secondary:</i> English Language Arts, Fine Arts Education – Drama, Fine Arts Education – Visual Studies</p> <p><i>K-12:</i> English Language Learners, Second Languages</p> | <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 or 30-2 - One of Science 30, Biology 30, Chemistry 30 or Physics 30 - Two approved courses or options at the 30 level | | |
| <p><i>Elementary Mathematics, Science</i></p> <p><i>Secondary Mathematics, Science – Biology, Science – Physics</i></p> | <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 - Two of Biology 30, Chemistry 30, Physics 30, Mathematics 31 or CTS Computer Science Advanced (5 credits) - One approved course or option at the 30 level | | |
| <i>Elementary and Secondary: Social Studies</i> | <ul style="list-style-type: none"> - English Language Arts 30-1 - Mathematics 30-1 or 30-2 - One of Science 30, Biology 30, Chemistry 30 or Physics 30 - Social Studies 30-1 - One approved course or option at the 30 level. | | |

Recommended courses: May be required as a prerequisite for a first-year course, however, they are not required nor used for admission.

Approved Courses

The following is a list of approved Alberta high school courses. Information regarding equivalent courses is available at: ucalgary.ca/registrar/requirements

- Aboriginal Studies 30 (5 credits)
- Biology 30
- Chemistry 30
- Computing Science, Career and Technology Series Advanced Level (5 credits)
- Fine Arts courses: Unless stated above, one Fine Arts course may be used for admission to a non-Fine Arts program (Art 30 or 31, Choral Music 30, General Music 30, Instrumental Music 30, Drama 30, Dance 35)
- Language or Language and Culture Courses at the 30 level
- Mathematics 30-1
- Mathematics 30-2
- Mathematics 31
- Physical Education 30
- Physics 30
- Science 30
- Social Studies 30-1

Standard admission process: see section A.5.1.2.

Approved Options

- Other five-credit 30-level courses excluding Special Projects 30 and English 30-2.
- Three-credit courses: two three-credit 30-level courses can be combined to fulfil one approved option requirement.
- One-credit courses: five advanced credits in Career and Technology Studies (CTS) can be used to fulfil one approved option requirement.

Intermediate and Advanced Credits cannot be combined to satisfy a course requirement.

Standard admission process: see section A.5.1.2.

Notes:

- Two courses in the same subject area may not be presented to satisfy entrance requirements unless the courses are Mathematics 30-1, Mathematics 30-2 or Mathematics 31.
- Only one 30-level course in a language stream may be used to satisfy admission requirements.
- Science 30 cannot be used to replace a specific 30-level science courses required for admission (Chemistry, Biology, Physics).

Students attending a non-semester school (linear) will be considered for admission using mid-term grades.

A.5.1.3 Early Admission Process for Current High School Students

The early admission process considers current high school students who present a competitive admission average calculated on four approved courses. The average will be calculated on grades from 20-level courses (or equivalent). If grades for 30-level (or equivalent) courses are available, they will be used to calculate the average.

Admitted students must complete all 30-level (or equivalent) course requirements outlined in A.5.1.1, maintain the admission average required for admission in the year of application and obtain their Alberta Grade 12 Graduation (or equivalent).

Equivalent courses will be considered for courses completed outside the province of Alberta. For information on course equivalencies visit: ucalgary.ca/registrar/requirements.

See "Early Admission Requirements Table" on page 22.

A.5.2 International High School Admissions**The United States and Countries Offering American-Based Curricula**

Applicants who are completing or have completed their twelfth year of education in an American-based high school curriculum may be considered for admission based on an evaluation including standard college entrance exams (Scholastic Assessment Test (SAT) or American College Test (ACT), meeting Faculty course requirements and proof of high school graduation. Admission is competitive and meeting the minimum score does not guarantee admission.

Applicants following an American-based curriculum in countries outside the United States (and US territories) are not required to provide the SAT or ACT scores.

Applicants who have attended a university/college may not submit SAT or ACT tests in order to gain admission to the University of Calgary.

Students are required to have a minimum combined Evidence-Based Reading and Writing plus Mathematics (ERW+M) score of 1190.

If presenting the ACT Test, a minimum composite score of 24 is required.

All test scores and an official high school transcript showing that the high school diploma has been conferred must be received by August 1.

Notes:

1. Only one of SAT Mathematics Level 1 or Mathematics Level 2 may be presented for admission.
2. Application information for the tests may be obtained from:

SAT: collegeboard.com/

ACT: actstudent.org/

Either the SAT Test or ACT Test is required for admission to all programs.

SAT test equivalents are accepted as equivalents for required high school courses as detailed in A.5.1.1 High School Admission Requirements:

| Course Requirement | SAT Subject Test |
|-------------------------------------|------------------------------------|
| English Language Arts 30-1 | Evidence-based Reading and Writing |
| Mathematics 30-1 | Mathematics Level 1 |
| Mathematics 30-1 and Mathematics 31 | Mathematics Level 2 |
| Chemistry 30 | Chemistry |
| Biology 30 | Biology E/M |
| Physics 30 | Physics |

Language or Language and Culture Courses at the 30 level

Spanish, Spanish with listening, French, French with listening, Chinese with listening, Italian, German, German with listening, Modern Hebrew, Latin, Japanese with listening, Korean with listening

Countries Offering the British Education System

General Certificate of Education (GCE)/ General Certificate of Secondary Education (GCSE)

Students who present the GCE or GCSE will be considered using five academic courses as detailed in A.5.1.2 (Standard High School Admission Requirements). Applicants can be considered with two courses at Advanced

Level (A) and three GCSE/Ordinary Level, or four courses at Advanced Subsidiary Level (AS) and one at the "GCSE/Ordinary" Level. Grades of "D" and "E" are not acceptable.

The University of Calgary awards advanced credit for specific "A" level courses when a grade of "C" or better is achieved. Students should refer to section A.12 (Transfer Credit/Advanced Standing) for details.

Other Countries

Applicants educated in other countries may be considered for admission on their academic merits. Those completing Canadian high school courses will always have the grades obtained in these courses used in lieu of equivalents obtained on international certificates. Detailed information is available at: ucalgary.ca/future-students/undergraduate/apply.

International students seeking admission on the basis of documents not listed on the Admissions website should submit certificates indicating the courses studied and the grades achieved to the Admissions Office. When these certificates are in a language other than English, English translations (prepared by a certified translator) must accompany the original documents.

A.5.2.1 International Baccalaureate (IB)

Applicants who have completed the International Baccalaureate diploma can be considered for admission on the basis of their diploma score. Students must meet the score and specific course requirements for the program to which they have applied.

For applicants who complete both the International Baccalaureate diploma and senior matriculation/secondary school graduation, admission will be based on that credential which is to the advantage of the student.

The University of Calgary awards up to 30 units (one year) for the completed International Baccalaureate diploma. Specific course credit for Higher Level courses is awarded as set out in section A.12 (Transfer Credit/Advanced Standing).

Students awarded the full year of credit for a completed International Baccalaureate

diploma remain eligible for all admission categories and University awards normally open to entering first-year students.

A.5.3 Transferring from Another Post-Secondary Institution

Applicants who have attended an accredited/recognized post-secondary institution may be considered for admission on the basis of their post-secondary academic standing. Some programs may require applicants to complete, or be in the process of completing, specific course requirements at the high school or post-secondary level. In some cases, university transferable coursework may satisfy high school prerequisites.

Students are considered post-secondary transfer when they have completed 12 units or more from a recognized/accredited institution by December 31 of the year prior to the year of admission for Spring, Summer, and Fall entry; and August 31 for Winter entry unless otherwise stated. The minimum admission GPA requirement is 2.00; however, admission is competitive and meeting the minimum admission requirement does not guarantee admission to the university, a specific faculty or program.

Students are not permitted to register in a University of Calgary degree, diploma or certificate programs while simultaneously working towards a credential at another institution, unless a formal partnership exists between institutions. Students who wish to attend the University of Calgary as a visiting student (letter of permission) please see section A.8.1 (Visiting Students).

Applications and supporting documents received by the stated deadline will be automatically considered for early admission.

Refer to section A.12 (Transfer Credit/Advanced Standing) for information on the transfer of credits.

Transfer Admission GPA: Will be calculated using the most recent course work to a maximum of 30 units (University of Calgary courses and/or transferable courses taken at other institutions), unless otherwise specified by the Faculty. All courses attempted within a term will be included except where the number of courses taken within a term results in the overall number of units exceeding 30 units. Should this occur, the highest grades from the oldest term being considered will be used to calculate the GPA. In some faculties prerequisite courses will be included first. Grades in high school equivalent courses offered by post-secondary institutions will not be used in determining the Transfer Admission GPA.

Prerequisite Requirements: Admission requirements may differ from prerequisite requirements for a specific degree or program. Applicant must be aware that they may be admitted to a program for which there are course prerequisite to complete the program. Course prerequisites can be found here: ucalgary.ca/pubs/calendar/current/course-desc-main.html.

A.5.3.1 Transfer Admission Requirements

See "Transfer Admission Requirements Table" on page 26.

A.5.3.2 Supplementary Admission Requirements

Some faculties/programs consider other criteria in addition to the admission average. This may include an audition, portfolio or supplementary information form. The following faculties require additional criteria:

- Faculty of Arts (Dance, Music, Visual Studies)
- Cumming School of Medicine (BHSc)
- Schulich School of Engineering (Energy Engineering)
- Faculty of Social Work
- Werklund School of Education (After-Degree French teachable subject area)

For additional details on supplementary application information visit: ucalgary.ca/future-students/undergraduate/apply.

A.5.4 Adult Student Admission

Applicants who are 21 years of age or older by the first day of classes who are unable to present the five high school courses or at least 12 post-secondary units required for admission, are automatically considered for admission as an Adult Student. To be considered under the category, applicants must be Canadian citizens or Permanent Residents.

Adult Students must present English Language Arts 30-1 or an acceptable equivalent. Additional grade 12 level high school courses, or equivalent, are normally required by the faculty to which the student is seeking admission. In addition, the University's requirements for English language proficiency apply to Adult Students (see A.11 English Language Proficiency).

Official Transcripts: Applicants must provide official transcripts for all high schools and post-secondary institutions attended.

University of Calgary Continuing Education Courses: Applicants must indicate the courses taken and the expected date of completion on the Application for Admission. Continuing education transcripts can be ordered online: <https://conted.ucalgary.ca/info/transcripts.jsp>

Admission Requirements

| Faculty | Courses Included in Admission Average |
|---------|---------------------------------------|
|---------|---------------------------------------|

Early Admission Requirements Table

| Faculty/Program | Required Courses | Supplementary Requirements |
|---|--|--|
| Arts | | |
| Dance, Drama, Music and Visual Studies | English Language Arts 20-1 Social Studies 20-1 Two approved courses | Dance: statement of interest and audition. BMus: online audition form and audition. Visual Studies: portfolio. |
| Earth Science | Chemistry 20 English Language Arts 20-1 Mathematics 20-1 One approved course | |
| Economics | English Language Arts 20-1 Mathematics 20-1 Two approved courses | |
| Geography (BA, BSc), Psychology (BA) | English Language Arts 20-1 Mathematics 20-1 or 20-2 Two approved courses | |
| Psychology (BSc) | Biology 20 Chemistry 20 English Language Arts 20-1 Mathematics 20-1 | |
| All Other Programs | English Language Arts 20-1 Mathematics 20-1 or 20-2 Social Studies 20-1 One approved course | |
| Cumming School of Medicine | | |
| BCR | English Language Arts 20-1 Biology 20 Two approved courses | |
| BHSc | English Language Arts 20-1 Mathematics 20-1 Biology 20 Chemistry 20 | Online supplementary application |
| Haskayne School of Business | English Language Arts 20-1 Mathematics 20-1 Two of: Aboriginal Studies 20 (5 credits), Biology 20, Chemistry 20, Computing Science, Intermediate Level (5 credits) or Advanced Level (5 credits) Career and Technology Series, Language or Language and Culture courses at the 20 level, Physics 20, Science 20, Social Studies 20-1 | |
| Nursing | English Language Arts 20-1 Mathematics 20-1 or 20-2 Biology 20 Chemistry 20 | |
| Schulich School of Engineering | Regular admission route: English Language Arts 20-1 Mathematics 20-1 Chemistry 20 Physics 20 Biology-based admission route: English Language Arts 20-1 Mathematics 20-1 Chemistry 20 Biology 20 | Admission offers via the Biology-based admission route are conditional on successful completion of the Schulich School of Engineering Summer Bioengineering Institute prior to the start of the engineering program. |
| Science | English Language Arts 20-1 Mathematics 20-1 Two of Biology 20, Chemistry 20, Physics 20 | |
| Werklund School of Education | | |
| Four Year Education Program: Community-Based | | |
| English Language Arts | English Language Arts 20-1 Mathematics 20-1 or 20-2 One of Science 20, Biology 20, Chemistry 20 or Physics 20 One approved course or option at the 20 level | Preference for admission will be given to students from rural communities. |
| Mathematics Science | English Language Arts 20-1 Mathematics 20-1 Two of Science 20, Biology 20, Chemistry 20, or Physics 20 | |
| Social Studies | English Language Arts 20-1 Mathematics 20-1 or 20-2 One of Science 20, Biology 20, Chemistry 20 or Physics 20 Social Studies 20-1 | |

| Four Year Education Program: On-Campus | | |
|--|--|--|
| <i>Elementary:</i> Early Childhood Education, English Language Arts, Fine Arts Education <i>Secondary:</i> English Language Arts, Fine Arts Education – Drama, Fine Arts Education – Visual Studies <i>K-12:</i> English Language Learners, Second Languages | English Language Arts 20-1 Mathematics 20-1 or 20-2 One of Science 20, Biology 20, Chemistry 20 or Physics 20 One approved course or option at the 20 level | |
| <i>Elementary:</i> Mathematics, Science <i>Secondary:</i> Mathematics, Science – Biology, Science – Physics | English Language Arts 20-1 Mathematics 20-1 Two of Biology 20, Chemistry 20, Physics 20, or CTS Computer Science Advanced (5 credits) | |
| <i>Elementary and Secondary:</i> Social Studies | English Language Arts 20-1 Mathematics 20-1 or 20-2 One of Science 20, Biology 20, Chemistry 20 or Physics 20 Social Studies 20-1 | |

Recommended courses: May be required as a prerequisite for a first-year course, however, they are not required nor used for admission.

Approved Courses

The following is a list of approved Alberta high school courses. For information on equivalent courses visit ucalgary.ca/registrar/requirements.

- Aboriginal Studies 20 (5 credits)
- Biology 20
- Chemistry 20
- Computing Science, Intermediate Level (5 credits) or Advanced Level (5 credits) Career and Technology Series
- Fine Arts courses: Unless stated above, one Fine Arts course may be used for admission to a non-Fine Arts program (Art 20 or 21, Choral Music 20, General Music 20, Instrumental Music 20, Drama 20, Dance 25)
- Language or Language and Culture Courses at the 20 level
- Mathematics 20-1
- Mathematics 20-2
- Physical Education 20
- Physics 20
- Science 20
- Social Studies 20-1

Any two of the following 3- or 4-credit courses may be combined to fulfil one approved course:

- Political Thinking 20
- Comparative Government 20
- Religious Ethics 20
- Religious Meanings 20
- Local and Canadian Geography 20
- Personal Psychology 20
- General Psychology 20
- General Sociology 20
- Sociological Institutions 20
- Origins of Western Philosophy 20
- Contemporary Western Philosophy 20
- Western Canadian History 20
- Canadian History 20
- Economics for Consumers 20

| | |
|--|--|
| Arts | Earth Science English 30-1 Chemistry 30 Mathematics 30-1 Economics English Language Arts 30-1 Mathematics 30-1 Geography (BA, BSc), Psychology (BA) English Language Arts 30-1 Mathematics 30-1 or 30-2 Psychology (BSc) English 30-1 Biology 30 Chemistry 30 Mathematics 30-1 All Other English Language Arts 30-1 |
| Haskayne School of Business | English Language Arts 30-1 Mathematics 30-1 |
| Cumming School of Medicine - BCR | English Language Arts 30-1 Biology 30 |
| Cumming School of Medicine – BHSc | English Language Arts 30-1 Mathematics 30-1* Biology 30 Chemistry 30 |
| Kinesiology | <i>*Kinesiology will also accept Mathematics 31 Nursing will also accept Mathematics 30-2</i> |
| Nursing | |
| Schulich School of Engineering | English Language Arts 30-1 Mathematics 30-1 Physics 30 Chemistry 30 Mathematics 31 (Applicants without Mathematics 31 or equivalent may be considered with a higher average). |
| Science | English Language Arts 30-1 Mathematics 30-1 Two of Biology 30, Chemistry 30, Physics 30, Mathematics 31, CTS Computer Science Advanced 5 Credits |
| Werklund School of Education (BEd Four-Year program) | Early Childhood Education/English Language Arts/ Fine Arts Education/English Language Learners/ Second Languages: English Language Arts 30-1 Mathematics 30-1 or Mathematics 30-2 One of Science 30, Biology 30, Chemistry 30, or Physics 30 Mathematics/Science: English Language Arts 30-1 Mathematics 30-1 Two of Biology 30, Chemistry 30, Physics 30, Mathematics 31 or CTS Computer Science Advanced (5 Credits) Social Studies: English Language Arts 30-1 Social Studies 30-1 Mathematics 30-1 or Mathematics 30-2 One of Science 30, Biology 30, Chemistry 30, or Physics 30 |

Werklund School of Education
(Concurrent Program)

Requirements depend on Faculty offering the concurrent program.
See Arts, Kinesiology or Science

Applicants who have completed high school courses required for admissions more than ten years ago, may not have adequate prerequisites for certain courses. Applicants should contact the faculty to which they are seeking admission for additional information.

A.5.5 Second-Degree Students

Students who hold a three- or four-year bachelor's degree (or equivalent) from a recognized/accredited institution may pursue a program leading to a second or subsequent bachelor's degree (commonly referred to as an After-Degree), provided they qualify for admission and meets all University and Faculty regulations. Consultation with academic advisors regarding admission and graduation requirements is necessary. The following regulations apply:

1. Applicants will not be considered for admission to a second or subsequent degree program in any major field, or equivalent, in which they already possess a degree or in a field that is deemed, by the University of Calgary, to be similar or equivalent to a degree already attained (e.g. applicants with a prior Bachelor of Business Administration will not be admitted to a Bachelor of Commerce).
2. Applicants holding a minor or equivalent will only be admitted to a second degree in the same area of the minor at the discretion of the University.
3. Normally, a minimum of 60 units must be taken from the University of Calgary. These 60 units are in addition to any courses used to satisfy requirements for the previous credential(s).
4. Prerequisites may be waived or advanced standing granted at the discretion of the admitting Faculty.
5. A student admitted to a second or subsequent degree program must satisfy all corresponding degree and major field requirements current at the time of admission into the program.
6. Combined degrees are not available for second or subsequent baccalaureate degrees.

A.6 Required to Withdraw Students

Students who have been required to withdraw for academic reasons from any faculty at the University of Calgary or another post-secondary institution will not be permitted to register at the University until at least twelve months have elapsed since the student was required to withdraw. To qualify for admission, students are required to submit an application for admission and meet competitive admission criteria as outlined in A.5 (Undergraduate Admission Requirements), with the following exemptions:

1. Students required to withdraw for academic reasons other than a low grade point average, may be eligible for consideration of admission by another faculty provided they maintained a 2.00 or higher grade point average since their last review.
2. Students required to obtain a grade point average (GPA) above 2.00 for continuation in a program may be eligible for consideration of admission by another faculty provided they maintained at least a 2.00 grade point average since their last review.
3. Under exceptional circumstances, a University of Calgary student required to withdraw for academic reasons can be granted special permission by the appropriate Associate Dean of the faculty for immediate admission to the Fall Term. An Associate Dean can place restrictions on course registration and require a specific level of performance. Registration as an Open Studies student is not permitted.

Students seeking admission or re-admission after having been required to withdraw for academic reasons may submit a letter which: offers an explanation for their previously poor record; outlines their academic plans; and explains why they are now likely to be successful. This letter is mandatory for applicants to the Haskayne School of Business, the Faculty of Nursing and the Werklund School of Education. Admission is not automatic and will be considered on an individual basis.

Students who are granted admission or re-admission after having been required to withdraw will be admitted or re-admitted on probation.

Students who have twice been required to withdraw from one or more faculties at this or any other institution will not normally be considered for admission at any time.

Applicants seeking admission who have been involved in academic/non-academic misconduct at the University of Calgary or another institution which resulted in a suspension will only be considered for admission once the suspension period or one year has elapsed, whichever comes first. In all cases of academic/non-academic misconduct, admission or re-admission to the University of Calgary is at the discretion of the faculty to which the applicant is seeking entrance. A student expelled from a faculty will not be considered for re-admission to the same faculty.

A.7 Home-Schooled Applicants

Home-schooled applicants can qualify for admission by presenting provincial (diploma) examination results in appropriate courses (where applicable) or by completing the appropriate SAT subject tests, AP or IB courses in required high school courses as detailed in A.5.1.1 (Admission Requirements).

A.8 Special Admission Categories

A.8.1 Visiting Students

Visiting students must complete the Visiting Student Application form and submit:

1. A letter of permission from their home institution indicating the specific courses approved to take and the term(s) approved to attend the University of Calgary.
2. A copy of their home institution official transcript.
3. Evidence of satisfying English Language Proficiency requirements (if applicable).

A.8.2 Visiting Student Researcher

The Visiting Student Researcher admission status is available to graduate and undergraduate students who are enrolled in a full-time degree program at an accredited or recognized post-secondary institution. Visiting student researchers are full-time students who attend the University of Calgary to support a specific research project that aligns with their studies at their home institution. To apply as a visiting student researcher students must:

1. Submit a completed the Visiting Student Application form and pay the application fee.
2. Provide the name of the University of Calgary supervisor and their department name*.
3. Provide the name and approval of the University of Calgary supervisor's chair/head of department*.
4. Indicate start and end dates on campus.
5. Provide details of any financial arrangements (e.g., stipend, travel costs, research expenses, etc.).

**Not applicable if part of a formal exchange agreement. With formal exchange agreements, only the agreement needs to be referenced on the application form.*

A.8.3 Exchange Students

Exchange students are registered in a degree program at another post-secondary institution and wish to attend the University of Calgary as part of a formal exchange agreement. Students apply through the Exchange Co-ordinator at their home institution and provide the following:

1. Complete the Exchange Student Application form via the home institution's Exchange Co-ordinator. Permission to take courses at the University of Calgary will be provided by the home institution.
2. An official transcript from the home institution.
3. Evidence of satisfying the University of Calgary's English Language Proficiency requirement.

A.8.4 Indigenous Students Access Program (ISAP)

The University of Calgary acknowledges and respects the rich diversity of our learners, their communities, cultures and traditions, and their aspirations and abilities. In order to ensure equitable access and successful participation of Indigenous learners, the University of Calgary offers an Indigenous Students Access Program for eligible students of Indigenous ancestry, i.e., First Nations (status and non-status), Métis and Inuit.

The Indigenous Students Access Program (ISAP) is a one year program that provides an alternate access route for Indigenous students applying from high school or adult learners looking to complete a post-secondary degree program. This admission pathway is available to Indigenous students who may not meet the admission requirements of their desired faculty program or are seeking additional support during a transition year.

The program offers enhanced academic and cultural support and is designed to give students the academic foundations they need, as well as assist in the selection of relevant courses to prepare them to apply to a specific degree program.

Admissions Requirements

Applicants must meet the general admission requirements for Open Studies (see section A.14.2 Admission Requirements) and complete a supplementary application form which will be reviewed by the ISAP admission committee. The application deadline is July 1. Students will be admitted to ISAP only in the Fall term due to the cohort nature of the program.

Students will be required to meet or talk by phone with the ISAP advisor to discuss their educational background, their academic goals, post-secondary funding, course options, and available support services.

For more information about the program, the support it provides and its requirements, see section C.1.1 (Indigenous Students Access Program). Interested applicants may also contact 403.220.5975 or email ISAP@ucalgary.ca.

A.8.5 Dual Credit Students

Dual Credit programs enable current high school students to take university level courses at the University of Calgary for credit that can be applied toward their post-secondary education and their high school credential.

Dual Credit programs are formal agreements between a Board of Education or School and the University of Calgary and regulations governing the agreement are outlined in a Memorandum of Understanding (MOU) and the Dual Credit Operating Procedures available from the Office of the Registrar.

Dual Credit students will be considered as high school applicants should they apply

for admission to a degree program, and have not completed more than 30 units at a post-secondary institution. Students who have completed more than 30 units will be considered transfer students.

A.9 Diverse Qualifications Admission Process

The University of Calgary seeks first and foremost to attract excellent academic students. However, the University also recognizes that those who have achieved excellence outside academics or who have overcome significant hardships can make positive contributions to the University community. Recognizing that excellence means more than academic excellence, the University of Calgary may admit up to one per cent of new undergraduate students annually under this category.

To be eligible to apply under the Diverse Qualifications Admission Process, students must demonstrate:

- Excellence in non-academic areas
- High potential in academic/research activities
- Perseverance under great difficulty or hardship

In addition, students must:

- Meet the minimum admission requirements as specified in section A.5 of the Calendar
- Meet the University's English Language Proficiency requirement
- Be either a citizen or permanent resident of Canada
- Indicate their desire to be considered under this category on the Application for Admission
- Provide contact information for two references
- Complete a personal profile outlining circumstances, personal achievements and educational goals
- Provide official transcripts from all high school and post-secondary institutions attended

For further information about the Diverse Qualifications Admission Process and application deadlines, visit: ucalgary.ca/future-students/undergraduate/diverse-qualifications.

A.10 Combined or Concurrent Degree Admissions

Admission will only be considered for combined or concurrent degrees outlined in the Faculty sections of this Calendar. Students wishing to enter such combined or concurrent degrees must carefully read descriptions to determine when admission to such degrees may be obtained.

(continued on page 32)

Transfer Admission Requirements Table

| Faculty of Arts | | | |
|--|---|--|--|
| Degree Sought | Minimum Number of Post-Secondary Units Required for Admission GPA Calculation | Required Courses for Admission | Notes |
| Dance, Drama, Music and Visual Studies | 12 units completed by the end of the Fall Term in the year of application. | A transferable post-secondary English course(s) or English Language Arts 30-1 or equivalent. | Admission to the BMus, BA (Music) or Minor in Music programs requires evidence of RCM Level 8 or the departmental music theory diagnostic exam. BMus: online audition form and audition. Dance: statement of interest and audition. Visual Studies: portfolio. |
| Earth Science | 12 units completed by the end of the Fall Term in the year of application. | Chemistry 30, English Language Arts 30-1 and Mathematics 30-1 (or transferable post-secondary equivalents). | |
| Economics | 12 units completed by the end of the Fall Term in the year of application. | English Language Arts 30-1 and Mathematics 30-1 (or transferable post-secondary equivalents). | |
| Geography (BA, BSc), Psychology (BA) | 12 units completed by the end of the Fall Term in the year of application. | English Language Arts 30-1 and Mathematics 30-1 or 30-2 (or transferable post-secondary equivalents). | |
| Psychology (BSc) | 12 units completed by the end of the Fall Term in the year of application. | Biology 30, Chemistry 30, English Language Arts 30-1 and Mathematics 30-1 or 30-2 (or transferable post-secondary equivalents). | |
| All Other Programs | 12 units completed by the end of the Fall Term in the year of application. | A transferable post-secondary English course(s) or English Language Arts 30-1 or equivalent. | |
| Cumming School of Medicine | | | |
| Degree Sought | Minimum Number of Post-Secondary Units Required for Admission GPA Calculation | Required Courses for Admission | Notes |
| Bachelor of Community Rehabilitation | | | |
| BCR (University Transfer route) | 15 units | | |
| BCR (Post-Diploma route) | 60 units | An approved transferable post-secondary diploma. | |
| Bachelor of Health Sciences | | | |
| BHSc | 12 units completed by the end of the Fall Term. Students must complete 24 units by the end of the Winter Term in the year of application. | Applicants must have taken a minimum of four of the following courses corresponding to the intended major. Biomedical Sciences Major: Biology 241, 243, Chemistry 201, 203, Mathematics 249 (or 265), Physics 211 (or 221), 223 or transferable post-secondary equivalent courses. Bioinformatics Major: Biology 241, 243, Computer Science 231 (or 217), 233 (or 219), Mathematics 265 (or 249), 267, Chemistry 201, 203 or transferable post-secondary equivalent courses. Health and Society Major: Biology 241, 243, Health and Society 201, any 200-level 3-unit English or Comparative Literature 203, and three of Psychology 200, 201, Sociology 201, Anthropology 203, Geography 205, 251, Economics 201, 203, any 200-level Political Science course, Community Rehabilitation 205, 207 or transferable post-secondary equivalent courses. ucalgary.ca/pubs/calendar/current/md-4-4.html . | A supplementary application is required. |
| Haskayne School of Business | | | |
| Degree Sought | Minimum Number of Post-Secondary Units Required for Admission GPA Calculation | Required Courses for Admission | Notes |
| BComm | 12 units completed by the end of the Fall Term in the year of application including a minimum of 9 units of required courses for admission. All required courses for admission (18 units) must be completed by the end of the Winter Term in the year of application. | Junior English or other transferable post-secondary English course (with a grade of "C-" or better) Mathematics 249 or 265 or equivalent transferable post-secondary mathematics course (with a grade of "C-" or better) Statistics 213 or equivalent transferable post-secondary statistics course (with a grade of "C-" or better) Statistics 217 or equivalent transferable post-secondary statistics course (with a grade of "C-" or better) Economics 201 or equivalent transferable post-secondary microeconomics course (with a grade of "C-" or better) Economics 203 or equivalent transferable post-secondary macroeconomics course (with a grade of "C-" or better) | Statistics 213: Must be completed by the end of the Fall Term of the year of application as this course serves as a prerequisite to Statistics 217. |

Faculty of Kinesiology

| Degree Sought | Minimum Number of Post-Secondary Units Required for Admission GPA Calculation | Required Courses for Admission | Notes |
|---------------|--|---|---|
| BKin, BSc | 12 units completed by the end of Fall Term in the year of application. Transfer GPA will be calculated on the most recently completed 12 to 30 units by the end of Fall Term in the year of application. | English 30-1, Mathematics 30-1*, Chemistry 30 and Biology 30 or equivalent post-secondary transfer courses. | *Biomechanics and Exercise and Health Physiology majors require a minimum of 70% in Mathematics 30-1. *Biomechanics major requires Mathematics 31 (calculus). Physics 30 is recommended but will not be counted in the calculation for incoming average. |

Faculty of Nursing

| Degree Sought | Minimum Number of Post-Secondary Units Required for Admission GPA Calculation | Required Courses for Admission | Notes |
|--------------------------|--|--|---|
| BN (Direct Entry) | Applicants with 12 units or fewer will be considered on high school requirements. | | Applicants with more than 12 units are not eligible for this route. |
| BN (Transfer Route) | 30 units completed by the end of the Winter Term for fall admission; completed by the end of Summer Term for winter admission. | Mathematics 30-1 or 30-2, Chemistry 30 and Biology 30 or equivalent high school or post-secondary transfer courses. Transferable post-secondary equivalent courses in: <ul style="list-style-type: none"> English or equivalent (3 units) Arts, Humanities, Social Science (3 units) Statistics (3 units) Human Anatomy and Physiology course(s) (6 units with minimum grade of "C-" approved by the Faculty of Nursing) | |
| BN (Degree-Holder Route) | Approved degree with minimum of 90 units. All admission requirements must be met by the end of Summer Term for winter admission. | Transferable post-secondary equivalent courses in: <ul style="list-style-type: none"> English or equivalent (3 units) Arts, Humanities, Social Science (3 units) Statistics (3 units) Human Anatomy and Physiology course(s) (6 units with minimum grade of "C-" approved by the Faculty of Nursing) | |

Schulich School of Engineering

| Degree Sought | Minimum Number of Post-Secondary Units Required for Admission GPA Calculation | Required Courses for Admission | Notes |
|---|---|--|---|
| BSc Engineering (Common First Year) | 12 units completed by the time of application; GPA calculated using the most recent 12 to 30 units, regardless of transferability to Engineering. | English 30-1, Mathematics 30-1, Mathematics 31, Chemistry 30, Physics 30 (or equivalents). | Includes Engineering diploma-holders and other related diploma-holders. |
| BSc Engineering (placed directly in Engineering major) | 24 units or more of required first year Engineering courses; GPA calculated using at least 24 units, up to a maximum of the most recent 30 units of science, mathematics, or engineering courses, regardless of transferability to Engineering. Placement is competitive. | English 30-1, Mathematics 30-1, Mathematics 31, Chemistry 30, Physics 30 (or equivalents). The minimum of 24 units must include at least 8 of the following courses: Mathematics 275, 277, 211, Chemistry 209, Engineering 200, 201, 202, 225, 233, Physics 259, (or transferable post-secondary equivalents). | |
| BSc Engineering (Engineering Tech Diploma Holders+ Additional Coursework) | 24 units or more of required first year Engineering courses; GPA calculated using the Diploma cumulative GPA and subsequent courses in science, mathematics, and engineering up to a maximum equivalent of 30 units, regardless of transferability to Engineering. | English 30-1, Mathematics 30-1, Mathematics 31, Chemistry 30, Physics 30 (or equivalents). The minimum of 24 units must include at least 8 of the following courses: Mathematics 275, 277, 211, Chemistry 209, Engineering 200, 201, 202, 225, 233, Physics 259, (or equivalent transferable post-secondary courses). | |
| BSc Energy Engineering and Polytechnic transfer pathway to Geomatics Engineering (Engineering Technology Diploma Holders) | 45-60 units; GPA calculated using the cumulative diploma GPA. Diploma in progress: admission will be based on a minimum of 45 units using the GPA calculated by the end of the Fall Term in the year of application. | English 30-1, Mathematics 30-1, Mathematics 31, Chemistry 30, Physics 30 (or equivalents). Some diplomas may qualify for equivalency of one or more high school requirements. Diploma from an approved program at an institution with a transfer program agreement (or equivalent) with a minimum cumulative GPA of 3.30. | Students who completed all or parts of their engineering technology diploma more than eight years prior to the start of their first term at the University of Calgary will be required to demonstrate that their technical knowledge remains current. See Schulich School of Engineering, Section 3.1 Admissions for details. |
| BSc Energy Engineering and Polytechnic transfer pathway to Geomatics Engineering (Engineering Technology Diploma Holders + Additional Coursework) | 60 units. GPA calculated using the cumulative diploma GPA and the most recently completed transferable courses in science, mathematics, and engineering up to a maximum of 60 units. | English 30-1, Mathematics 30-1, Mathematics 31, Chemistry 30, Physics 30 (or equivalents) [Some diplomas may qualify for equivalency of one or more high school requirements]. Diploma from an approved program at an institution with a transfer program agreement (or equivalent) with a minimum cumulative GPA of 3.30. | Students who completed all or parts of their engineering technology diploma more than eight years prior to the start of their first term at the University of Calgary will be required to demonstrate that their technical knowledge remains current. See Schulich School of Engineering, Section 3.1 Admissions for details. |

| Faculty of Science | | | |
|--|--|---|---|
| Degree Sought | Minimum Number of Post-Secondary Units Required for Admission GPA Calculation | Required Courses for Admission | Notes |
| BSc (Most majors) | 12 units completed by the end of the Fall Term in the year of application | English 30-1, Mathematics 30-1 and two courses from the following: Biology 30, Chemistry 30, Physics 30, Mathematics 31 or CTS Computer Science Advanced (or transferable post-secondary equivalents). | |
| BSc (Biochemistry; Cellular, Molecular and Microbial Biology; Ecology; Plant Biology; Zoology) | 15 units completed by the end of the Fall Term in the year of application and 30 units completed by the end of the Winter Term in the year of application*. | English 30-1, Mathematics 30-1 and two courses from the following: Biology 30, Chemistry 30, Physics 30, Mathematics 31 or CTS Computer Science Advanced (or transferable post-secondary equivalents). | *Students interested in these programs who have not completed 30 units are recommended to apply for the Biological Sciences major instead. |
| BSc Geology (Petroleum Geology Concentration) | 15 units completed by the end of the Fall Term in the year of application and 30 units completed by the end of the Winter Term in the year of application. | English 30-1, Mathematics 30-1 and two courses from the following: Biology 30, Chemistry 30, Physics 30, Mathematics 31 or CTS Computer Science Advanced (or transferable post-secondary equivalents). | |
| BSc Honours (Neuroscience) | 45 units completed by the end of the Fall Term in the year of application. 60 units must be completed by the end of the Winter Term in the year of application for a final admission offer. | Biochemistry 341 or 393* or transferable post-secondary equivalents. Biology 241, 243, 311 and 331* or transferable post-secondary equivalents. Chemistry 351 and one of 201 or 211 and one of 203 or 213* or transferable post-secondary equivalents. One English course* or transferable post-secondary equivalents. Mathematics 211 or 213 and one of Mathematics 249 or 265 or 275* or transferable post-secondary equivalents. Physics 211 or 221* or transferable post-secondary equivalents. Psychology 200 and 312* or transferable post-secondary equivalents. | *All required courses must be completed with grades of "C-" or better. |
| Faculty of Social Work | | | |
| Degree Sought | Minimum Number of Post-Secondary Units Required for Admission GPA Calculation | Required Courses for Admission | Notes |
| BSW (Alberta Social Work Diploma) | Cumulative GPA achieved on the completed Alberta social work diploma (minimum of 30 units). Courses taken after the diploma will be included as well. For applicants still working on the diploma, the cumulative GPA will be calculated on the most recently completed courses starting with those taken prior to the application deadline (fall and prior). | A transferable post-secondary English course(s) or English 30-1 or equivalent. Alberta social work diploma from a post-secondary institution with a transfer agreement with the Faculty of Social Work. | Minimum GPA of 2.30. All applicants must submit the University of Calgary online application and upload their resume of work and volunteer experience, essay, and two letters of reference. For application instructions visit: fsw.ucalgary.ca . |
| BSW (University Transfer - including current University of Calgary students) | 30 units of university-transferable courses starting with courses completed prior to the application deadline (fall and prior). | A transferable post-secondary English course(s) or English 30-1 or equivalent. A minimum of 57 units of university-transferable non-social work courses plus Social Work 201 (or equivalent). | |
| BSW (Non-Social Work Degree) | 30 units from the non-social work degree program. | A transferable post-secondary English course(s) or English 30-1 or equivalent. A non-social work degree from a recognized institution plus Social Work 201 (or equivalent). | |
| BSW (Non-Social Work Diploma) | 30 units of university-transferable courses starting with courses completed prior to the application deadline (fall and prior). | A transferable post-secondary English course(s) or English 30-1 or equivalent. A non-social work diploma from a recognized institution plus 27 units of transferable non-social work courses and Social Work 201 (or equivalent). | |
| BSW (Non-Alberta Social Work Diploma) | 30 units of university-transferable courses starting with courses completed prior to the application deadline (fall and prior). | A transferable post-secondary English course(s) or English 30-1 or equivalent. Social work diploma from a recognized institution that does not have a transfer agreement with the Faculty of Social Work plus 30 units of transferable non-social work courses. | |

| Werklund School of Education | | | |
|--|--|---|--|
| Degree Sought | Minimum Number of Post-Secondary Units Required for Admission GPA Calculation | Required Courses for Admission | Notes |
| BEd (4 Year Program - Community-Based) | | | |
| English Language Arts | 12 units completed by the end of the Fall Term of the year of application. | - English Language Arts 30-1 - Mathematics 30-1 or 30-2 - One of Science 30, Biology 30, Chemistry 30 or Physics 30 Or post-secondary transferable equivalent(s) | Preference for admission will be given to students from rural communities. |
| Mathematics, Science | 12 units completed by the end of the Fall Term of the year of application. | - English Language Arts 30-1 - Mathematics 30-1* - Two of Biology 30, Chemistry 30, Physics 30, Mathematics 31 or CTS Computer Science Advanced (5 credits) Or post-secondary transferable equivalent(s) | |
| Social Studies | 12 units completed by the end of the Fall Term of the year of application. | - English Language Arts 30-1 - Mathematics 30-1 or 30-2 - One of Science 30, Biology 30, Chemistry 30 or Physics 30 - Social Studies 30-1 Or post-secondary transferable equivalent(s) | |
| BEd (Four-Year Program) On-Campus | | | |
| <i>Elementary:</i> Early Childhood Education, English Language Arts, Fine Arts Education <i>Secondary:</i> English Language Arts, Fine Arts Education – Drama, Fine Arts Education – Visual Studies <i>K-12:</i> English Language Learners, Second Languages | 12 units completed by the end of the Fall Term of the year of application. | - English Language Arts 30-1- - Mathematics 30-1 or 30-2 - One of Science 30, Biology 30, Chemistry 30 or Physics 30 Or post-secondary transferrable equivalent(s). | |
| <i>Elementary:</i> Mathematics Science <i>Secondary:</i> Mathematics Science – Biology Science – Physics | 12 units completed by the end of the Fall Term of the year of application. | - English Language Arts 30-1 - Mathematics 30-1* - Two of Biology 30, Chemistry 30, Physics 30, Mathematics 31 or CTS Computer Science Advanced (5 credits) Or post-secondary transferrable equivalent(s) | |
| <i>Elementary and Secondary:</i> Social Studies | 12 units completed by the end of the Fall Term of the year of application. | - English Language Arts 30-1 - Mathematics 30-1 or 30-2 - One of Science 30, Biology 30, Chemistry 30 or Physics 30 - Social Studies 30-1 Or post-secondary transferrable equivalent(s) | |
| BEd (Concurrent Program) | 12 units completed by the end of the Fall Term of the year of application. | A transferable post-secondary English course(s) or English 30-1 or equivalent. Must meet course requirements for faculty offering the concurrent degree. | |
| Bachelor of Education (After Degree) Community-Based | | | |
| <i>Elementary Route:</i> English Language Arts, French, Mathematics, Science, Social Studies | A degree with at least 90 units from an accredited post-secondary institution recognized by the University of Calgary by the end of the Winter Term. | Transferable post-secondary equivalent course in English Literature or French Literature (3 units). | Preference for admission will be given to students from rural communities. |
| <i>Secondary Route:</i> English Language Arts, French, Mathematics, Science – Biology, Science – Chemistry, Science – Physics, Social Studies | A degree with at least 90 units from an accredited post-secondary institution recognized by the University of Calgary by the end of the Winter Term. | Applicants must present an undergraduate degree with an academic major or a minimum of 30 units, of which only 12 units can be at the first year level, in the Teachable Subject Area the applicant chooses, except for Fine Arts, French, and Second Languages, where a degree in the Teachable Subject Area is required. See 3.1.3 Two-Year BEd (After-Degree) Program for detailed requirements. Transferable post-secondary equivalent course in English Literature or French Literature (3 units). | |

| | | | |
|---|--|---|--|
| Bachelor of Education (After Degree) On-Campus | | | |
| Elementary: Early Childhood Education, English Language Arts, English Language Learners, Fine Arts Education, French, Inclusive Education, Second Languages, Mathematics, Physical Education, Science, Social Studies | | | |
| <i>Secondary Route:</i> English Language Arts, French, Mathematics, Science – Biology, Science – Chemistry, Science – Physics, Social Studies | A degree with at least 90 units from an accredited post-secondary institution recognized by the University of Calgary by the end of the Winter Term. | Applicants must present an undergraduate degree with an academic major or a minimum of 30 units, of which only 12 units can be at the first year level, in the Teachable Subject Area the applicant chooses, except for Fine Arts, French, and Second Languages, where a degree in the Teachable Subject Area is required. See 3.1.3 Two-Year BEd (After-Degree) Program for detailed requirements. Transferable post-secondary equivalent course in English Literature or French Literature (3 units). | Preference for admission will be given to students from rural communities. |
| Bachelor of Education (After Degree) On-Campus | | | |
| <i>Elementary:</i> Early Childhood Education, English Language Arts, English Language Learners, Fine Arts Education, French, Inclusive Education, Second Languages, Mathematics, Physical Education, Science, Social Studies | A Bachelor's degree from an accredited post-secondary institution recognized by the University of Calgary by the end of the Winter Term. | Transferable post-secondary equivalent courses in English Literature or French Literature (3 units). | Applicants in the Elementary-French Teachable Subject Area must be proficient in French and will be required to demonstrate their proficiency prior to admission to the program. |
| <i>Secondary:</i> English Language Arts, Fine Arts Education – Drama, Fine Arts Education – Music, Fine Arts Education – Visual Studies, French, Second Languages, Mathematics, Physical Education, Science – Biology, Science – Chemistry, Science – Physics, Social Studies | A Bachelor's degree from an accredited post-secondary institution recognized by the University of Calgary by the end of the Winter Term. | Applicants must present an undergraduate degree with an academic major or a minimum of 30 units, of which only 12 units can be at the first year level, in the Teachable Subject Area the applicant chooses, except for Fine Arts, French, and Second Languages, where a degree in the Teachable Subject Area is required. See 3.1.3 Two-Year BEd (After-Degree) Program for detailed requirements. Transferable post-secondary equivalent courses in English Literature or French Literature (3 units) | Applicants in the Secondary-French Teachable Subject Area must be proficient in French and will be required to demonstrate their proficiency prior to admission to the program. |

English Language Proficiency Chart

Applicants may also satisfy the English Language Proficiency requirements by presenting one of the following:

| Acceptable English Language Tests | Education | Nursing | All other Undergraduate programs |
|--|--|--|---|
| TOEFL iBT | 100 with a minimum of 27 in each sub-score | 92 with a minimum of 23 in each sub-score | 86 |
| TOEFL PBT | N/A | N/A | 560 |
| IELTS Academic | 8.0 with no bands below a 7.0 | 7.0 with no bands below a 7.0 | 6.5 |
| CAEL | N/A | N/A | 70 |
| MELAB | Overall score of 92 with a minimum score of 4- (4 minus) on the Speaking Test | Overall score of 90 with a minimum of 3+ (3 plus) on the Speaking Test | 85 |
| PTE | 70 (see Note) | 64 (see Note) | 60 |
| Cambridge English Language Assessment: Cambridge English: Advanced (CAE) | 200 | 185 | 180 |
| Cambridge English Language Assessment: Cambridge English Proficiency (CPE) | 200 | 185 | 180 |
| University of Calgary International Foundation Program | Successful completion of Tier 3 courses with a minimum grade of "B" in each of IPFX 290, 293 and 297. Applicants must also present an additional speaking test (see Note). | Successful completion of Tier 3 courses with a minimum grade of "B" in each of IFPX 290, 293 and 297. Applicants must also present an additional speaking test (see Note). | Successful completion of Tier 3 |
| University of Calgary Continuing Education - Academic Communication Certificate | N/A | N/A | Successful completion of all courses in the Academic Communication Certificate with a minimum grade of "B+" in each course. |

Note: Applicants must also present one of the following in order to satisfy the spoken English requirement:

Nursing: Minimum score of 23 on the speaking component of the TOEFL iBT or 3+ on the MELAB Speaking Test.

Education: Minimum score of 27 on speaking component of the TOEFL iBT or a 4- on the MELAB Speaking Test.

Applicants to the Faculties of Law, Graduate Studies, Cumming School of Medicine (excluding applicants to the Bachelor of Health Sciences and Bachelor of Community Rehabilitation) or Veterinary Medicine should check English Language Proficiency requirements directly with those faculties.

Normally, students will only be admissible if the English Language Proficiency requirement have been satisfied. The Registrar has the authority to use discretion in exceptional circumstances. Students must meet English Language proficiency requirements in addition to meeting the English subject admission requirement for the program to which they are applying.

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A.11 English Language Proficiency

English is the official language of instruction at the University of Calgary. All applicants must demonstrate English language proficiency to be considered for admission to an undergraduate program. English language proficiency is achieved by meeting one of the following criteria:

- Successful completion of at least three years of formal, full-time study in English at a secondary school that meets one of the following requirements:
 - Is in an exempt country; OR
 - Is accredited to offer Canadian, American or British curricula; OR
- Successful completion of at least two years of formal, full-time study in English at an accredited or recognized post-secondary institution in Canada or a University of Calgary approved English-speaking country; OR
- Achieved a final grade of 80 per cent or better on the Alberta English Language Arts 30-1 (or equivalent); OR
- Achieved a grade of 5 or better on the International Baccalaureate (IB) Higher or Standard Level English A (Literature or Language and Literature) examination or a grade of 6 or better on the Higher Level English B examination; OR
- Achieved a grade of 4 or better on the Advanced Placement (AP) English Literature and Composition or English Language and Composition examination; OR
- Achieved a grade of "A" or "B" in GCSE-level, A/S-level or A-level English (non-ESL) in the General Certificate of Education (GCE)/General Certificate of Secondary Education (GCSE) curriculum; OR
- Successful completion of at least three years at a school in English that is an accredited member of the Council of International Schools (CIS), including completion of a senior academic English course (Alberta 30-1 level or equivalent); OR
- Successful completion of a University of Calgary English credit course, comparative literature course, or university equivalent with a final grade of "B-" or better; OR
- Successful completion of an approved English language test/program as follows:

See the English Language Proficiency Requirements table.

A.11.1 International Foundations Program

IFP Pathways and Bridging applicants will need to submit minimum scores in one of the following external English Language Proficiency assessments:

| Language Test | Score for Schulich School of Engineering Pathways ¹ | Score for Haskayne School of Business Pathways ² | Score for Faculty of Science Pathways ³ | Score for IFP Bridging |
|---|--|---|--|------------------------|
| IELTS | 6 | 6 | 6 | 5.5 |
| TOEFL iBT | 72 | 76 | 80 | 70 |
| TOEFL PB | 523 | 523 | | 523 |
| CAEL | 50 | 50 | | 50 |
| Cambridge Advanced (taken after Jan. 2015) | 169 | 169 | | 169 |
| Cambridge Proficiency (taken after Jan. 2015) | 169 | 169 | | 169 |
| MELAB | 74 | 74 | | 74 |

¹Schulich School of Engineering admission requirements must also be met, and may be found at: ucalgary.ca/pubs/calendar/current/en-3-1.html.

²Haskayne School of Business admission requirements must also be met, and may be found at: ucalgary.ca/pubs/calendar/current/ha-4-1-1-1.html.

³Faculty of Science admission requirements must also be met, and may be found at: ucalgary.ca/pubs/calendar/current/sc-4-8.html.

A.12 Transfer Credit/Advanced Standing

The University of Calgary will consider university-level course work completed at a recognized/accredited post-secondary institution (or equivalent) for credit toward a University of Calgary credential.

Students wishing to transfer should refer to the Alberta Transfer Guide which lists all course and program transfer agreements between post-secondary institutions in Alberta, Northwest Territories and Nunavut. The guide and other transfer information are available online at transferalberta.ca or by contacting: Alberta Council on Admissions and Transfer, Telephone: 780-422-9021 or 1-800-310-0000 (toll free). Email: acat@gov.ab.ca.

Students from other universities or colleges may be admitted with transfer credit to undergraduate programs. The amount of credit granted is determined by faculty regulations.

Students transferring from other institutions must make themselves aware of the prerequisites for courses they wish to take. This may be done by consulting the Courses of Instruction section of this Calendar. Students receiving specified transfer credit status for particular courses should be aware that this does not necessarily imply that exact course equivalence is being awarded; it may indicate an equivalent level of experience in a particular subject area.

Students transferring to the University of Calgary who have attended publicly supported post-secondary institutions in Alberta shall be subject to the same regulations as those transferring from one faculty to another within the University. The University of Calgary honours all transfer credit agree-

ments as listed in the Alberta Transfer Guide and follows the CARL transfer statement:

The Province of Alberta recognizes four Comprehensive Academic and Research Institutions (CARI) within the Campus Alberta system: Athabasca University, the University of Calgary, the University of Lethbridge, and the University of Alberta. Alberta's CARIs are committed to the advancement of Campus Alberta goals, including enhanced learner movement within the advanced education system. To facilitate mobility, the four CARIs accept each other's credit courses for transfer. Minimum grade and program requirements determine the applicability of specific courses to a student's program.

Students who have taken the equivalent of university courses in some other manner may be given advanced placement (i.e., excused from taking such courses) but will not be granted advanced credit. In these cases, students will be required to substitute courses to complete program requirements.

The University reserves the right to require applicants for advanced credit or advanced placement to write examinations at any level including that of matriculation standing.

A.12.1 International Baccalaureate (IB) Program

The University of Calgary awards up to a full year of credit (30 units) for the completed International Baccalaureate diploma. Specific advanced standing or placement for Higher Level courses are awarded provided a minimum grade of "5" or higher is achieved. The balance of credit (including credit for Higher Level courses with grades below "5") required to bring the total to 30 units will be at the junior unassigned option level. In the case of advanced credit, a grade of "CR" will be recorded on the student's record.

Applicants who have not completed the diploma will receive advanced standing or placement as set out below for each Higher Level course completed with a grade of "5" or above. Junior unassigned option credit beyond that set out below is not available to students who do not complete the full IB diploma. Official IB transcripts are required as part of the evaluation process.

Students awarded advanced credit or advanced placement for IB courses should consult their faculty regarding course selection. Note that if advanced credit is awarded for a 200-level course that is a prerequisite for a 300-level course, students will be permitted to enter the 300-level course in first year.

Higher level IB courses approved for advanced credit or advanced placement are:

| IB Subject | University of Calgary Equivalent |
|--------------|---|
| Anthropology | Anthropology 203 |
| Biology | Biology 243* |
| Chemistry | Chemistry 201/203 or 209 (Engineering only) |

| | |
|---|---|
| Computer Science | Computer Science 231 and 3 units junior Computer Science*** or Engineering 233 (Engineering only) |
| Economics | Economics 201/203 |
| English A (Literature or Language and Literature) | 3 units junior English† |
| French A1 or A Literature | French 315 |
| French A2 or A Language/Literature | French 227 |
| French B | French 213 |
| Geography | Geography 205 and 3 units junior Geography† |
| German A1 or A Literature | German 333 |
| German A2 or A Language/Literature | German 331 |
| German B | German 204 |
| History | 6 units junior History† |
| Italian A1 or A Literature | Italian 303 |
| Italian A2 or A Language/Literature | Italian 301 |
| Italian B | Italian 203 |
| Latin | Latin 301/303 |
| Mathematics | Mathematics 249 |
| Mathematics (Further) | Mathematics 265 or 275 (Engineering only) |
| Music | Advanced Placement (Based on audition/ placement tests, students may be given advanced placement and permitted to take selected Music courses by "Special Assessment.") |
| Philosophy | 3 units junior Philosophy† |
| Physics | Physics 221/223 |
| Psychology | Psychology 200 |
| Russian A1 or A Literature | Russian 303 |
| Russian A2 or A Language/Literature | Russian 301 |
| Russian B | Russian 209 |
| Spanish A1 or A Literature | Spanish 303 |
| Spanish A2 or A Language/Literature | Spanish 301 |
| Spanish B | Spanish 203 |
| Visual Art | Art 231/233 |

*Students awarded Biology 243 credit for AP Biology or IB Higher Level Biology will still be required to complete Biology 241.

**Students who successfully complete a challenge examination may receive credit for Computer Science 233 in lieu of the junior Computer Science.

†"Junior" refers to credit at the 200 level, but for which no direct University of Calgary equivalency exists.

A.12.2 Advanced Placement (AP) Program

AP students automatically receive advanced credit or advanced placement in approved courses where they present grades of 4 or higher. In the case of advanced credit, a grade of "CR" will be recorded on the

student's record. Official AP transcripts are required as part of the evaluation process.

| AP course | University of Calgary Equivalent |
|---------------------------------------|--|
| Art History | Art History 201/203 |
| Art Studio (Drawing Portfolio) | Art 241/243 |
| Art Studio (2-D Portfolio) | Art 231 |
| Art Studio (3-D Portfolio) | Art 233 |
| Biology | Biology 243* |
| Calculus AB | Mathematics 265 |
| Calculus BC | Mathematics 275 |
| Chemistry | Chemistry 201/203 or 209 (Schulich School of Engineering only) |
| Chinese Language and Culture | Chinese 207 |
| Computer Science A | Computer Science 217** |
| Economics (Microeconomics) | Economics 201 |
| Economics (Macroeconomics) | Economics 203 |
| English (Language & Composition) | 3 units junior English† |
| English (Literature & Composition) | 3 units junior English† |
| Environmental Science | 3 units junior Science |
| French Language and Culture | French 227 |
| German Language and Culture | German 333 |
| Government & Politics (Comparative) | Political Science 201 |
| Government & Politics (United States) | 3 units junior Political Science† |
| History (European History) | History 201 |
| History (United States History) | 3 units junior History† |
| History (World History) | 3 units junior History† |
| Human Geography | 3 units junior Geography†† |
| Italian Language and Culture | Italian 301 |
| Japanese Language and Culture | Japanese 207 |
| Latin | Latin 303 |
| Music (Theory) | Music 211 |
| Physics C (Electricity & Magnetism) | 3 units junior Physics† or Physics 259 (Schulich School of Engineering only) |
| Physics C (Mechanics) | Physics 221 |
| Physics 1 | 3 units junior Physics**** |
| Physics 2 | 3 units junior Physics**** |
| Psychology | Psychology 200 |
| Spanish Language | Spanish 303 |
| Spanish Literature and Culture | Spanish 321 |
| Statistics | Statistics 213 |

*Students awarded Biology 243 credit for AP Biology or IB Higher Level Biology will still be required to complete Biology 241.

**Students who successfully complete a challenge examination may receive credit for Computer Science 231 in lieu of Computer Science 217.

***Students who successfully complete a challenge examination may receive credit for Computer Science 233 in lieu of the junior Computer Science (3 units).

****Not acceptable in lieu of Physics 211/221 or 223.

†"Junior" refers to credit at the 200 level, but for which no direct University of Calgary equivalency exists.

††Students who wish to major in Geography will be required to take Geography 251.

A.12.3 General Certificate of Education - Advanced Levels

Students will automatically receive advanced credit in approved courses where they present grades of "A", "B" or "C". Examination results must be verified by the appropriate examining board. Attested or certified copies are not acceptable. Credit has been determined as follows:

| GCE Course | University of Calgary Equivalent |
|---------------------|---|
| Biology | Biology 241/243 |
| Chemistry | Chemistry 201/203 or 209 (Engineering only) |
| Economics | Economics 201/203 |
| English | 6 units junior English† |
| English Literature | 6 units junior English† |
| Further Mathematics | 3 units junior Mathematics† |
| History | 3 units junior History† |
| Mathematics | Mathematics 249 |
| Physics | Physics 221/223 |
| Psychology | Psychology 200 |
| Pure Mathematics | Mathematics 249 |
| Statistics | Statistics 213/217 |

†"Junior" refers to credit at the 200 level, but for which no direct University of Calgary equivalency exists.

A.13 Admission Appeals

Admission to the University of Calgary is competitive. Meeting the minimum admission requirements outlined in this Calendar does not guarantee admission.

Admission decisions may not be appealed. Inquiries related to calendar regulations or admission requirements may be directed to the Admissions Office.

Applicants who have experienced exceptional circumstances that have impacted their academic record may apply under the Diverse Qualification Process outlined in section A.9 by the Diverse Qualifications application deadlines.

If a student's circumstances change after the application deadline, contact the Associate Registrar, Recruitment and Admissions for assistance. Change of circumstances will be reviewed on a case-by-case basis by the Associate Registrar, Recruitment and Admissions and the Associate Dean of the Faculty to which the student is applying.

Students admitted to the Cumming School of Medicine (MD program), Veterinary Medicine, and Law, please see the faculty website for admission appeal information.

A.14 Admission to Open Studies (Degree holder and Non-Degree holder)

Open Studies is administered by the Office of the Registrar. Students in this registration category are permitted to take credit courses, however are not admitted to a program leading to degree, diploma or certificate. Open Studies degree holders and non-degree holder registration categories are available to students who are Canadian citizens or permanent residents.

Open Studies is a non-designated learning program as defined by the Alberta Government.

For information on exchange, visiting or the International Foundation Program (IFP), see the applicable section under Section A: Admissions.

Note: Current Open Studies students who wish to apply for admission to a degree program will have the application for admission fee waived, provided there is no more than a 12-month break between their studies and they have not attended another post-secondary institution.

A.14.1 Application Process

To apply, applicants:

- Submit the online application (ucalgary.ca/future-students/open-studies/degree-nondegree).
- Pay a non-refundable application fee (see A.4.2).
- Submit official transcripts from past high schools or post-secondary institutions attended by the deadlines on the website: ucalgary.ca/future-students/open-studies.

A.14.2 Admission Requirements

To be considered for Open Studies, applicants must meet the following requirements:

A. Academic Requirements*:

1. Present a minimum 65 per cent in English 30-1, or equivalent; OR
2. Present a minimum 2.00 GPA in a transferrable post-secondary English course(s), OR
3. Achieved a minimum 2.00 cumulative GPA on the most recent 12 units from another post-secondary institution; OR
4. Be a University of Calgary Alumnus.

*When more than one academic requirement is presented, the highest level education is used for admission. Students who do not meet one of these requirements may be considered for Open Studies under the Diverse Qualifications Admissions Process (section A.9).

B. Submit the following documents:

1. Degree holders: must submit official transcript reflecting the credential awarded.

2. Non-degree holders: must submit official transcripts from all high school and post-secondary institutions attended.
3. University of Calgary Alumni are not required to provide transcripts, provided they have not attended any other post-secondary institutions.
4. Provide proof of English Language Proficiency Requirements (if applicable, see A.11 English Language Proficiency).

C. Be in good standing.

The following limitations apply to Open Studies:

1. Discontinued students from Open Studies at the University of Calgary may not apply to Open Studies for a period of 12 months since the end of the term in which they were last registered. Students must reapply for admission and meet the current Open Studies admission requirements.
 2. Students who have been discontinued more than once from Open Studies are not eligible for readmission to Open Studies.
 3. Students who are currently under suspension from a University of Calgary Faculty or from another post-secondary institution must wait until their suspension period has ended before they can apply to Open Studies. Students must meet the current Open Studies admission requirements.
 4. Students who are required to withdraw from a University of Calgary Faculty or from another post-secondary institution must wait a minimum of 12 months before they can apply to Open Studies. Students must meet the current admission requirements for Open Studies.
 5. Students who are required to withdraw from the University of Calgary for unsatisfactory academic performance will be considered for admission to Open Studies provided they attain a 2.00 cumulative GPA on the most recent 12 units from another post-secondary institution.
 6. Students who have been expelled from a Faculty at the University of Calgary for academic or non-academic misconduct are not permitted to apply to Open Studies until 24 months have passed since the end of the term in which they were last registered.
- may be limited to the courses they can audit due to enrolment pressures.
2. (a) The audit fees are outlined in the Tuition and General Fees section of this Calendar.
(b) All auditing fees are non-refundable.
 3. ACADEMIC STAFF, POST-DOCTORAL FELLOWS and VISITING SCHOLARS (not to be interpreted as visiting students) are eligible to audit without payment of fees, are not required to seek admission to the University, but must obtain written permission from the instructor of the course on a "Permission to Audit" form obtained from Enrollment Services. Such audits will not be recorded on an official transcript. Academic staff and visiting scholars who wish to have an audit course recorded on an official transcript must pay the regular audit course fees.
 4. A course in which the student is registered and attends as an auditor, will be entered on the student's record. It will not count towards any degree or diploma program, nor will the student in an undergraduate faculty be permitted to change registration in that course from audit to credit or credit to audit status after the change deadline at the beginning of the term in which the course begins.
 5. The auditing students shall, before admission to the class concerned, obtain written permission on a "Permission to Audit" form from: first, the dean (or designate) of the faculty offering the course in which they would like to register in; and second, the instructor teaching the course. Permission obtained from a dean (or designate) shall not bind the instructor to accept a student as an auditor in the class.
 6. Applicants may audit a course which was previously successfully completed and may take for credit a course which was previously audited. Approval will be required as stated above.
 7. Any student seeking to audit courses must meet all admission, registration and fee deadlines applying to regular students. Equivalent courses will be considered for courses completed outside the province of Alberta. For information on course equivalencies visit: ucalgary.ca/registrar/requirements.

A.15 Auditing Regulations

1. Auditing privileges are extended to students who have been admitted as a Degree, Visiting or Open Studies student. Auditing students participate in classroom activities however they may not be able to complete lab or tutorial components of a course. Students do not complete any exam or course assignments nor receive a grade for the course(s) they are auditing. Students

Academic Regulations

B. Registration

Most undergraduate students will complete course registration for the Fall and Winter Terms via MyUofC using their online Student Centre. It is strongly recommended that students obtain academic advising from their faculty or department advisors, as appropriate, prior to registration.

It is expected that students will follow the program outlined in this Calendar. Registration in a course does not indicate acceptance of the course for degree purposes. Faculties reserve the right to refuse a student's registration in courses when they are not appropriate to the degree program in which the student is registered.

Prerequisites are not normally waived. Minimum grades in prerequisite courses are required to ensure that students have prior knowledge and/or skills to be able to successfully engage with learning in more advanced courses. In some faculties, in exceptional cases, if a student can demonstrate that they have equivalent knowledge to prerequisites listed, then they may seek approval from the relevant department/faculty to enrol in the course. Refer to individual faculties for more information.

The University of Calgary reserves the right, published requirements notwithstanding, to reject applicants for admission or registration in courses, even if they technically meet the entrance requirements, on the basis of their overall academic records or on the basis of grounds that, in the opinion of the University, are reasonable in the circumstances.

B.1 Student Accommodation

The Student Accommodation Policy and the Procedure for Accommodations for Students with Disabilities set out the University's obligation to provide reasonable accommodation to students when they have requested such an accommodation on a protected ground, in its role as a service provider, under the Alberta Human Rights Act. The detailed University policy and procedure document is available at: ucalgary.ca/policies/files/policies/student-accommodation-policy.

B.1.1 Accommodation of Students with Disabilities or Medical Conditions

Students who require an accommodation because of a disability or medical condition should communicate this need to Student Accessibility Services (SAS) in accordance with the Procedure for Accommodations for Students with Disabilities. To view the full procedure document see ucalgary.ca/policies/files/policies/student-accommodation-policy. Also, see section E.6 regarding

Recording of Lectures and section G.3 Final Examinations. For additional information on support services and accommodations for students with disabilities, visit ucalgary.ca/access/.

B.1.2 Accommodations on Protected Grounds other than Disability

Students who require an accommodation in relation to their coursework or to fulfil requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to their Instructor or the appropriate Associate Dean, Department Head or the department/faculty designated contact person. Students who require an accommodation unrelated to their coursework or the requirements for a graduate degree, based on a protected ground other than disability, should communicate this need, preferably in writing, to the Vice-Provost (Student Experience). For additional information on support services and accommodations for students with disabilities, visit ucalgary.ca/access/.

B.2 Registration Procedures

Students are assigned a date and time when they can begin to register, online, for their Fall/Winter and Spring/Summer courses. This is referred to as their Enrolment Appointment in their Student Centre. Students can add/drop/swap courses from this time up to the course add/drop/swap date for the term in which the course is offered. Students can view their Enrolment Appointment details in their Student Centre at my.ucalgary.ca. Students should register in courses for both the Fall and Winter Terms during their Enrolment Appointment.

Information to help students prepare for their Enrolment Appointment and instructions on how to register is available at ucalgary.ca/registrar/registration.

New students will receive information about course selection and registration after accepting their offer of admission. Online resources are available at ucalgary.ca/registrar/registration.

Open Studies students will receive information on how to register with their admission notice. Students can register in courses through their Student Centre at my.ucalgary.ca. Students must ensure they meet prerequisite requirements for the courses in which they wish to register. Some courses may be restricted to degree students only or may require students to obtain permission from the faculty/department.

Visiting/Exchange students may register through their Student Centre at my.ucalgary.ca after receiving their admission notice. Students must ensure they meet course

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prerequisite requirements and obtain any necessary approvals prior to registration.

B.2.1 Residency Requirements

University of Calgary bachelor degrees require that a minimum of 60 units be completed with courses offered by the University of Calgary. The exception is the Bachelor of Social Work, which requires a minimum of 30 units.

Students who wish to complete a second degree should consult with their Faculty to determine which units may apply from the first degree toward the second degree. Typically, second degrees require a minimum of 60 additional units.

University of Calgary undergraduate students who wish to take courses at another post-secondary institution must obtain approval (letter of permission) prior to registering in a course(s). Information regarding Letters of Permission is available at ucalgary.ca/registrar/registration. Most students can apply for a Letter of Permission through their Student Centre at my.ucalgary.ca. The exception is students in the Bachelor of Health Science (BHSc). BHSc students must contact their program office for information about letters of permission.

University of Calgary graduate students who wish to take courses at another post-secondary institution must consult with the Faculty of Graduate Studies and obtain approval prior to registering in a course(s). Requests are reviewed on a case-by-case basis.

B.3 Withholds

Withholds may be placed on student access to registration and other services for reasons including, but not restricted to, the following: indebtedness to the University (fees, library fines, parking, residence, laboratory fees, etc.), faculty registration restrictions, outstanding documents, etc. Prior to registering for a term, students are advised to check for any withholds on their records. The issue(s) may then be dealt with to ensure any withhold is removed permitting the student access to course registration.

B.4 Schedule of Classes

The schedule of classes offered in each term is available before the opening of registration. The University reserves the right to make any changes it deems necessary including the cancellation of particular courses and to adjust a student's timetable to meet this schedule. Schedule of class information is available from the Enrolment Services website (ucalgary.ca/registrar) and via MyUofC using the online Student Centre. Students should refer to the Schedule of Classes to ensure that they are not selecting courses at overlapping times.

B.5 Course Enrolment Limitations

It should be noted that some faculties limit enrolment in their courses solely to students registered in their faculty or in a particular program, and that limits on class or laboratory sizes are frequently imposed. Refer to

the Enrolment Services website, (ucalgary.ca/registrar) for a listing of such restrictions.

B.6 Block Week and Non-Standard Schedules

The University of Calgary has three established terms per year: Fall, Winter and Summer. The Summer Term is set up with two intersessions: Spring and Summer. While most courses follow a traditional term structure, some courses may be scheduled in either a block week format or a non-standard schedule. The following regulations apply to courses scheduled in block week or as non-standard.

B.6.1 Block Week

Five days are set aside at the start of Fall and Winter Terms for Block Week to offer credit courses in an intensive structure. Dates for Block Weeks are provided in the Academic Schedule.

The following regulations apply to courses offered during Block Week:

1. Undergraduate and graduate courses may be scheduled in a Block Week format.
2. Block Week courses must meet the approved GFC hours for a course and shall not exceed eight hours per day.
3. 200-level courses should not normally be offered during Fall Term Block Week.
4. All course components for Block Week courses (lectures, labs, tutorials, etc.) must be held within the days designated in the academic schedule as Block Week. Attendance at lectures, tutorials, laboratories, etc. cannot be required beyond the duration of the Block Week(s). Course outlines must provide deadline dates for all assessments.
5. A course may be scheduled over both the Fall and Winter Block Weeks (two weeks).
6. Block Week courses should not be scheduled to meet prerequisite requirements for courses offered in the term in which the Block Week course is offered. Courses with a remedial focus may be scheduled, however, add/drop dates for regular term courses will be adhered to should a prerequisite not be met.
7. Pre-term study is only permitted in Block Week courses when the deadline to register in the course is one month in advance of the start of lectures. The course registration date and details about pre-term study must be included in the "Class Notes" section of the registration system. It is the responsibility of the course instructor to ensure students have access to pre-term study materials.
8. The last day to drop a Block Week course shall be 11:59pm on the first day of classes.
9. The last day to withdraw from a Block Week course shall be the last day of Block Week.
10. The day before the withdrawal deadline, instructors must inform students of their progress in the course. Normally, at

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least 30 per cent of the grade should be provided to students by the withdrawal deadline. Students may have assignments during the remainder of the term. The course outline must clearly indicate all required assignments, deadline dates and the weighting of the assignments.

11. Normally, there are two options for scheduling final examinations for Block Week courses: (1) final examinations may be scheduled on the Saturday before the drop deadline for the regular term in which the block week is scheduled; or (2) final examinations may be scheduled on the fifth Saturday of the term in which the block week is scheduled. The date of the final examination must be provided on the course outline. The faculty offering the course will schedule the final examination. Alternatively, a take-home final examination may be distributed on the last day of classes. Exceptions require approval from the Provost and Vice-President (Academic).
12. Tests held on the last day of classes cannot exceed 10 per cent of the final course grade. Exceptions require the approval of the Provost and Vice-President (Academic).

13. Final grades for Block Week courses will follow the grade submission timelines for the term in which the course is scheduled.
14. Block Week courses count toward a student's course load (total units) for the term in which the course is scheduled.
15. All courses scheduled during Block Week are subject to the GFC approved policy on Universal Student Ratings of Instruction.

B.6.2 Non-Standard Scheduled Courses

1. Courses may be scheduled as non-standard when they do not follow regular meeting patterns or when scheduling course components during both block week and the regular term (e.g., lectures during block week and labs throughout the regular term).
2. Non-standard scheduled courses must meet the approved GFC hours for a course and shall not exceed eight hours per day.
3. 200-level courses should not normally be scheduled as non-standard to provide students with the greatest flexibility and course selection opportunities.
4. Pre-term study is not permitted for non-standard scheduled courses, all meeting times must be included in the non-standard scheduling request.
5. Courses may be scheduled as multi-term across either the Fall and Winter Terms, or the Spring and Summer intersessions.
6. The last day to drop a non-standard course varies by course dates and is normally set at 10 per cent of the scheduled class time. The date will be indicated in their student centre – see the calendar icon.
7. The last day to withdraw from a non-standard course shall be 11:59pm on the last day of scheduled course time.
8. The day before the withdraw deadline, instructors must inform students of their progress in the course.
9. Final grades for non-standard courses will follow the grade submission timelines for the term in which the course is scheduled.
10. Final examinations for non-standard courses will be scheduled in the final examination period for the term in which the course is scheduled, if applicable.
11. All courses scheduled as non-standard are subject to the GFC approved policy on Universal Student Ratings of Instruction.

B.7 Part-Time Students

Undergraduate students are considered part-time when they are registered in fewer than nine units per term (fall and winter terms only). The exception is students who have an approved accommodation for a reduced course load. Students who would like to pursue their studies on a part-time basis should consult with the faculty advis-

ing office as special permission may be required. Faculties that allow part-time studies without prior approval include the Faculties of Arts and Kinesiology.

Graduate students should consult section D.3 (b) of the Graduate Calendar for part-time status.

B.8 Graduate Level Courses

University of Calgary undergraduate students are permitted to register in graduate level courses only with permission of both their Faculty and the Department offering the course. Undergraduate students are not normally permitted to take courses numbered 700 level or above. Access to graduate level courses (numbered 600 and above) for Visiting and Exchange students is limited to those admitted to a graduate program. For Open Studies and other students, access to graduate courses is restricted to those with adequate preparation, normally an undergraduate degree or the equivalent. Permission for an Open Studies or other student to register in any graduate level course must be obtained from the Faculty of Graduate Studies office.

B.9 Repeating Courses

A student may repeat a course previously attempted (excluding withdrawals) only once. To repeat a course more than once requires the permission of the faculty in which the student is registered and the department offering the course. Permission is granted only under exceptional circumstances.

Students repeating courses taken at the University of Calgary will not have the original grade, failure or otherwise, removed from the transcript of record. The transcript of record will indicate both the original grade and the repeated course with its final grade in the term in which it was taken.

Taking or repeating a course that is a prerequisite for a higher level course after having completed the higher level course with a grade of "C-" or better will be allowed only with the permission of both the faculty in which the student is registered and the department offering the course.

B.10 Faculty Approval of Course Selections

Students should obtain the advice of their faculty in selecting courses; however, the student is ultimately responsible for the correct selection. Faculties reserve the right to cancel a student's registration in a course, regardless of the date, if the student fails to meet a stated prerequisite. Approval for waiver of prerequisites must be obtained prior to registration in a course.

B.10.1 Credit in Courses by Special Assessment (Challenge Examinations)

Some faculties will allow students who feel knowledgeable in the subject matter of a particular course to seek credit through special assessment (i.e., subjecting to an examination only without attending the course and completing all requirements in the normal way during a regular term). Fac-

ulties and departments are free to determine which, if any, of their courses may be taken by special assessment, by any particular student, and to determine the nature and scheduling of the examination or assessment procedures involved. The evaluation must be completed and a grade reported by the specified deadline for that particular academic term. Only those courses listed on the Schedule of Classes and offered during an academic term may be taken by special assessment.

To complete a course under this policy, a student must obtain written permission by the registration deadline from the head of the department offering the course and the Dean's Office of the faculty in which the student is registered, on appropriate forms headed "Credit by Special Assessment" (available from: ucalgary.ca/registrar/student-forms).

Upon submission of a completed form to Enrolment Services, students may no longer cancel their registration in the course being taken by special assessment or withdraw from the course being completed in this manner.

It should be noted that in all cases the fees for taking a course by special assessment are the same as regular course fees.

Failures in courses completed by special assessment shall be noted on the student's permanent record in the same manner as a course completed by attending lectures.

A course in which the student was previously registered may not be taken subsequently by special assessment, nor may any course be attempted more than once in this way.

Students wishing to seek credit for courses by this method are advised to contact their faculty offices for faculty regulations and to determine the number of courses which may be completed by this method in a given year or program.

B.11 Course Load

Normally the maximum course load for a student in Fall or Winter Term is five courses; however, this is subject to individual faculty requirements. Students wishing to take more than the normal course load require faculty approval.

B.12 Student Responsibility

Each student is personally responsible for the continuing completeness and accuracy of their course registration. Advice is available from faculty or department offices. Students should ensure that courses selected are appropriate to their degree program, including the number of courses to complete requirements for graduation. Particular care should be exercised with the sequence in which courses are taken to meet any prerequisite or corequisite requirements.

Each student is also responsible for any change of registration made necessary by the results of final grades at the end of a term.

B.13 Changes of Courses or Course Sections

Students wishing to drop a course or change from one course to another may do so via MyUofC using their online Student Centre.

No student may attend a section of a course in which they are not officially enrolled.

No changes in courses will be permitted later than the dates specified in the Academic Schedule.

B.14 Withdrawal from Courses and Withdrawal from the Term

B.14.1 Withdrawal from a Course(s)

Students who withdraw from course(s):

- Prior to the drop deadline: will have the course(s) removed from their permanent record/transcript and will not be required to pay fees for the course(s),
- After the drop deadline: will have the withdrawal recorded on their permanent record/transcript and will not receive a fee refund.

Students may withdraw from a course(s) through the Student Centre (my.ucalgary.ca) by the withdraw deadline (see Academic Schedule), with the exception of students in the Faculties of Law, Nursing, the Cumming School of Medicine (BHSc), the Schulich School of Engineering and the Werklund School of Education who must first obtain approval from their faculty to withdraw from a course.

Students who wish to withdraw from a course more than once must speak with an academic advisor as they are not able to withdraw from a course a second time through the Student Centre (my.ucalgary.ca). Students who withdraw from more than 30 units, attempted at the University of Calgary, may be Required to Withdraw (RTW) from their faculty. A student may not withdraw from a course to avoid academic misconduct (see K.5.2 Notations and Penalties).

Students are encouraged to speak with their academic advisor prior to withdrawing from a course(s) or making changes to their course schedule.

One week before the withdrawal deadline, instructors must inform students of the grade currently earned in the course; provided papers, assignments or tests have been submitted with sufficient time for marking.

Students who do not formally withdraw from a course are still considered registered in the course, even if they are no longer attending classes. In these cases, students will be assigned a grade and are responsible to pay the fees assessed for the course.

B.14.2 Withdrawal from a Term

Students may withdraw completely from a term through the Student Centre (my.ucalgary.ca) by the withdraw deadline, provided this is the first withdraw from all courses within the Term. This excludes students in the Faculties of Law, Nursing, the Cumming School of Medicine (BHSc), the Schulich School of Engineering, the Werklund School

of Education and students withdrawing from a course a second time.

Law, Nursing, the Cumming School of Medicine (BHSc), the Schulich School of Engineering, the Werklund School of Education and students intending to withdraw from a course a second time who wish to withdraw completely from a term after the registration deadline must obtain permission from their faculty prior to the withdraw deadline. Students should visit their faculty advising office for additional information.

The date a student withdraws from a term is noted on a student's transcript.

Students in the Faculty of Graduate Studies should refer to the Graduate Studies Calendar section on Withdrawals (D.5) or Leave of Absence (D.7) for regulations on withdrawing from a term.

B.14.3 Extenuating Circumstance Withdrawal

Extenuating Circumstance Withdrawals (EW) are defined as unexpected and uncontrollable circumstances that make it impossible for a student to complete the term or a course. EWs typically consider situations such as medical emergencies, compassionate grounds, or unforeseen conditions/situations that arise after the start of term and are considered on a case-by-case basis. Short-term illnesses or pre-existing, unmanaged conditions are not typically considered for an EW.

EWs are considered when a student must withdraw from all courses in a given term or from a specific course due to the circumstance(s) that has been presented. Inability to achieve a high or passing grade in a specific course is not considered grounds for an EW.

Normally, EW requests must be submitted within 30 calendar days of the last day of the term to the Office of the Registrar. The Registrar will review the request in consultation with the student's home Faculty. If a student is unable to submit the request on their own, the Associate Dean of their faculty may submit on the student's behalf. Application information is kept in strict confidence.

Typically, a student must withdraw by the withdrawal deadline for an EW application to be considered. Approved EW applications will result in an "EW" being placed on the transcript to replace a "W" notation. Normally, students who attempt the final exam are not considered for an EW.

EWs are not included in the withdrawal limit noted in section B.14.1 (Withdrawal from a Course). The impact of EWs on the program completion time will vary by faculty or program. Faculties will review extensions to program completion times on a case-by-case basis.

In cases where an EW request is denied, students may file an appeal in writing to the Office of the Vice-Provost (Student Experience) within 10 business days of the date EW decision notification. Students must provide: a) a copy of the decision; b) a statement of the basis for appeal; c) a statement

of facts relevant to the basis of appeal; d) a statement of the outcome sought; and e) any supporting documentation to which the student intends to refer at the appeal hearing.

For more information on how to apply for an EW visit: ucalgary.ca/registrar/registration/appeals

B.15 Payment of Fees or Notification of Financial Assistance

A student's registration is not complete until the balance of fees for any term has been paid. Fees are due and payable by the prescribed deadlines. See the Tuition and General Fees section for details.

Students whose fees are not paid by the prescribed deadlines and who have not applied for financial assistance will not have their course registrations cancelled and will be indebted to the University for their tuition and general fees. Interest will be charged on outstanding balances at an annual rate as determined by the University (12 per cent at the time of the posting of this Calendar). Fee and interest rates may be subject to change without prior notice.

Students who apply for financial assistance and subsequently decide not to attend University, must advise Enrolment Services to cancel their registration before the deadline for fee payments, otherwise, they will be indebted to the University for their tuition and general fees.

B.16 Fee Refund

No refund of tuition and general fees will be made after the change of registration deadlines given in the Academic Schedule.

B.17 Change of Personal Information

Students should promptly inform Enrolment Services of changes in personal information - changes in contact information, name, citizenship, etc. Students who wish to change their surnames or given names must provide proof in the form of legal documentation. A Change of Personal Information form, for this purpose, is obtainable at Enrolment Services or on the web at ucalgary.ca/registrar/student-forms.

Students should change their contact information via MyUofC using their online Student Centre. **The University is not responsible for incorrect mailing and for missed deadlines, etc. due to the student's failure to report a change of contact information.**

It is to the student's advantage even after graduation to maintain an up-to-date contact information at the University.

B.18 Changes in Regulations

The University reserves the right to make changes in regulations governing degree programs from time to time. All such changes apply to new and continuing students. However, students continuing in the same program will be phased into the new program regulations without extending the number of courses required for their degree.

Where a required course for a degree program is no longer offered, the faculty may specify an alternate. Students who interrupt their program by a Fall or Winter Term or more will be required to comply with new regulations upon resumption of their studies. Students should annually refer to the Calendar for appropriate faculty regulations governing their degree programs.

B.19 Registration Exemption Requests

Students may submit a request for the following exemptions from the registration regulations:

1. Requests for a late withdraw (W) from a course(s), provided a student has not attempted the final examination/assessment.
 - a. Requests must normally be submitted within 30 calendar days of the last day of the term in which the course was taken or in exceptional circumstances up to one year from the start date of the course.
2. Requests for a late add/drop/swap for a course.
 - a. These requests will be granted only in exceptional circumstances. A student must outline the exceptional circumstances for the request and provide supporting documentation. In the case of a late add/swap, a student must also provide written support from the Dean, or designate, of the Faculty offering the course.
3. Requests to exceed the number of units permitted as an Open Studies students.
 - a. Requests must be submitted at least 30 calendar days prior to the start of the term in which a student wishes to take additional courses.

Requests and supporting documentation must be submitted to the Office of the Registrar for decision at rgappeal@ucalgary.ca within the timelines noted above, if any.

Decisions will be provided within 30 calendar days and will be sent by email to the student's UCalgary email account.

Should a student wish to appeal a decision of the Registration Exemption Committee, they may do so within 15 calendar days of date of the communication providing the decision. Appeals will only be considered on procedural grounds or based on new information that was not available at the time of the original request. Appeals must be submitted to the Vice-Provost (Student Experience) for decision at vpse@ucalgary.ca. The decision of the Vice-Provost (Student Experience) is final.

B.20 Academic Turnaround Program (ATP)

The Academic Turnaround Program (ATP) provides currently enrolled students facing their first Required to Withdraw (RTW) ruling for academic reasons the opportunity to continue in their current program on probation. Participating faculties are Arts, Has-

kyne School of Business, Schulich School of Engineering, and Science.

Eligible students in participating faculties receive a written invitation to participate in ATP from the dean or designate. This letter will specify a deadline by which the student must initiate participation in ATP or the student will be required to withdraw. Students approved for ATP may continue their studies on probation provided that they fulfil all requirements and are compliant with all conditions of the program.

ATP requirements will be provided to students in writing by the faculty dean or designate. Students who do not fulfil all requirements outlined below will be required to withdraw and will be notified by the dean or designate. The notification will include information on the right of appeal and the process for appealing an RTW ruling.

Students who receive a first RTW ruling from a non-participating faculty who are interested in completing a degree program offered by either the Faculty of Arts or the Faculty of Science may seek admission to those faculties through ATP. If admitted, the student transcript will reflect the RTW standing issued by their current faculty followed by an "Admitted on Probation" standing in their new faculty.

Approval for ATP requires:

1. Participation in an Academic Turnaround Workshop;
2. Submission and approval of a Contract and Plan for Success.

Continuation in ATP requires:

1. Attendance at "Successful Turnaround and Educational Preparation Support" (STEPS) seminars for one specified term;
2. Compliance with course load restrictions and registration in any specific courses required by the student's home faculty;
3. Student progress will be reviewed by their faculty regardless of the number of University of Calgary courses completed by the end of one academic year in ATP. In order to continue in ATP, students must receive a cumulative GPA of 2.00 or more across all University of Calgary courses completed since being admitted to ATP.

Completion of ATP:

For completion requirements, students should refer to the Faculty/School Regulations section of their home faculty.

Students in combined degree programs must follow the regulations of their primary faculty. If their primary faculty does not participate in ATP, students may seek to complete a single degree program in a participating faculty by engaging in ATP.

Students in ATP may elect to take a leave of up to one academic year as part of their success plan. This should be indicated in the contract and in the Plan for Success. Upon return to University, students are required to attend the STEPS seminars and must contact their faculty for access to register.

Students in ATP are not permitted to take courses elsewhere on a Letter of Permission.

The requirements noted here specify the minimum requirements for ATP. Participating faculties may specify additional requirements, which are noted in their Faculty/School Regulations section. Students who are non-compliant with any of the ATP conditions will be required to withdraw. Any exceptions to regulations noted here or in the individual faculty/school sections require the approval of the Associate Dean.

Students may participate only once in ATP while registered as an undergraduate student in any faculty/school at the University of Calgary. Only in exceptional circumstances will a second attempt at ATP be permitted.

C. Open Studies Registration, Registration Standing and Appeals

The Office of the Registrar administers registration in the Open Studies category. Students in this registration category are not admitted to a program leading to degree, diploma or certificate. Students who are Canadian citizens or permanent residents are eligible to register in this category.

This section only applies to students who are registered as a non-degree holder or degree holder. For information on exchange or visiting, see the appropriate Faculty section. For information on the International Foundation Program, see section R (International Foundation Program).

C.1 Registration

1. Course Load:
 - a. Non-degree holders: students are permitted to register in a maximum of 12 units per term.
 - b. Degree holders: students are permitted to register in a maximum of 18 units per term.
2. Enrolment Limit: Normally, students registered in the Open Studies category may attempt a maximum of 36 units. Failed courses are considered as attempts.
3. Students who withdraw from more than 15 units will be discontinued.
4. Open Studies students who wish to audit courses must follow Auditing Regulations (see A.15).
5. Open Studies students are eligible to register on the Enrolment Appointment date indicated in their Student Centre.
6. Open Studies students who have been inactive for one Calendar year must re-apply for admission.

Student Responsibility

Students are responsible for the completeness and accuracy of their application and registration and for any adjustments throughout the registration process. Students are responsible for ensuring they have the necessary prerequisites and corequisites for courses.

Academic Advising

Academic advising is available to all Open Studies students through the Student Success Centre. For additional information visit ucalgary.ca/ssc or email success@ucalgary.ca.

C.1.1 Indigenous Students Access Program

Indigenous students are welcomed to a learning environment that integrates Indigenous knowledge and worldviews and provides cultural support and enhanced support for academic success, including a cohort structure in core courses, a designated Indigenous Student Advisor, cultural workshops, leadership training, academic support sessions, and peer support. Students are provided with cultural support through the Native Centre and have access to faculty program advisors for advice regarding course electives in the faculty they wish to enter.

Students are required to attend regularly-scheduled weekly sessions in the Native Centre. These sessions help to build community among the cohort of ISAP students, enhance academic skills and knowledge, build effective study habits, and allow students to explore university study with Elders, mentors and peers.

Students register in required core courses as a cohort and take elective courses in their areas of interest up to a total of 12 units per term. Students who take a minimum of 9 units per term are considered full-time students and may qualify for student loans, as well as other sources of funding.

High school upgrading courses may be taken concurrently through Continuing Education at the University of Calgary or other adult learning institutions, as needed.

Program Requirements

Fall Term

Core Course 1: English 251 – Literature and Society

Core Course 2: Indigenous Studies 201 – Introduction to Indigenous Studies

Weekly sessions at Native Centre

Midterm meeting with ISAP advisor

Winter Term

Core Course 3: Indigenous Studies 397 - Special Topics in Canadian Indigenous Studies

Weekly sessions at Native Centre

Midterm meeting with ISAP advisor

For more information, contact the Native Centre at 403.220.6034 or email ISAP@ucalgary.ca

For details on ISAP admission requirements, see section A.8.4 Indigenous Students Access Program.

C.2 Academic Performance

Academic performance is monitored after each term. All course attempts in the term will be reviewed.

A formal review of academic performance will occur after the winter term. Decisions

regarding registration standing will be made at this time. Students who earn a grade point average less than 1.70 on a minimum of nine (9) units will be discontinued from Open Studies.

Students who have withdrawn from more than 15 units will be discontinued from Open Studies unless they can demonstrate sufficient cause for the withdrawals.

Discontinued students from Open Studies at the University of Calgary may not register in Open Studies for a period of twelve months from the end of the term they last attended. Re-applicants will be required to meet the Open Studies admission standards prior to being reconsidered.

Open Studies students are encouraged to speak with the Open Studies Academic Advisor available in the Student Success Centre (success@ucalgary.ca). Open Studies students are not eligible for the Academic Turn Around program.

Notwithstanding the specific regulations pertaining to Academic Performance, academic performance may be reviewed at any time and students with generally poor academic performance may be discontinued at the discretion of the Office of the Registrar.

C.3 Appeal Process

A student in Open Studies may appeal a decision regarding a course limit, academic assessment (final grade), discontinuation, student academic misconduct, or student non-academic misconduct.

Should a student wish to appeal a decision made by the Registrar regarding their course limit or discontinuation must do so within 15 calendar days of the date on the communication from the Registrar, or designate. Appeals are submitted to the Vice-Provost (Student Experience) (vpse@ucalgary.ca).

Appeals relating to academic assessments (final grades), a decision regarding student academic misconduct, or a decision regarding student non-academic misconduct will follow the appeals process outlined in sections I (Reappraisal of Graded Term Work and Academic Assessments (final grades)), and J (Student Appeals to the University Appeals Committee and the University Appeals Tribunal).

C.4 Student Misconduct

The principles outlined in section K (Statement on Principles of Conduct) apply to all Open Studies students. Section K.5 (Plagiarism/Cheating/Other Academic Misconduct) outlines the process that will be followed by all Open Studies students. The Vice-Provost, Student Experience is considered the Dean equivalent for all Open Studies students. The Registration Appeals Committee is considered the Faculty Appeals Committee.

D. Change of Faculty or Program

Requests for a Change of Program may be made through the online Student Centre via MyUofC. The deadline dates for Change of Programs are as follows:

Fall Term:

February 1: All programs

Winter Term:

September 1: Faculty of Nursing (Transfer and Degree Holder Routes only).

December 1: All programs within the Faculties of Arts, excluding programs in Dance, Drama, Earth Science, Economics, International Relations, Law and Society, Music, Psychology or Visual Arts; Kinesiology; Science, excluding programs in Biological Sciences, Computer Science, Chemistry, Environmental Science, Geoscience, Neuroscience and Neuroscience.

Note: The Haskayne School of Business, Cumming School of Medicine, Schulich School of Engineering, Faculty of Social Work, and Werklund School of Education do not accept transfer students for the Winter Term. Change of Programs to the Faculty of Kinesiology for the Winter Term will be considered only if the quota permits additional admissions.

Note: Change of Programs to combined degree programs must be submitted by the deadline date of the faculty with the earlier deadline.

Spring Intersession:

March 1: All faculties

(except those noted below)

Summer Intersession:

May 1: All faculties

(except those noted below)

Note: Change of Programs to the Faculties of Art (Drama, Music, or Visual Arts only), Cumming School Medicine, Haskayne School of Business, Faculty of Nursing, Schulich School of Engineering, Faculty of Science, Faculty of Social Work and the Program of Dance are not accepted for the Summer Term (including Spring Intersession). The Faculty of Kinesiology recommend that students enter the Fall Term. Change of Programs to the Werklund School of Education for the Summer Term will be considered only for those students who are seeking admission to a Degree program with a Summer intake.

Students who wish to request a Change of Program for the Summer Term should contact their Faculty.

Owing to the short period between the end of examinations in the Fall Term and the start of classes in the Winter Term, students wishing to transfer to a different faculty or program between the Fall and Winter Terms will be allowed to register for courses in the new faculty if they are admissible prior to release of Fall Term grades. If, as a result of the Fall Term grades, the transfer is not approved, the student will be returned to their original faculty provided they have not been required to withdraw. Students re-admitted to their former faculty will be cancelled from Winter Term courses which do not fit their degree program, regardless of the date. New courses can only be selected up to the deadline date specified in the Academic Schedule.

E. Course Information

E.1 Course Outlines

Every course is required to have a course outline that provides the overall structure and requirements of a course and informs students about the kinds of learning experiences they can expect in the course. Course outlines are to be submitted to departmental offices (or in the case of non-departmentalized Faculties or interdisciplinary programs, the Dean's Office). The home unit head is required to approve course outlines and confirm that the required elements listed below are included.

Each instructor responsible for a course is required to make a course outline available to each student no later than the first meeting date for the course. It is expected that the course outline (or in the case of clinical and professional practice-based courses, a Faculty-approved alternate document) will be available as a web-based document or through the learning management system (i.e. Desire2Learn). If it is not, a paper version of the outline will be handed out to every student at the first meeting of the class, and made available for those unable to attend the first class.

In addition to the required general information (number and title of course, name of the instructor, day, place and time of regular classes, prerequisites/corequisites, etc.) each course outline must contain the following:

- (a) Course objectives/learning outcomes of the course;
- (b) Required (and recommended) textbooks, readings, materials including electronic resources;
- (c) Information on grading methods and/or scales used in the course;
- (d) In all courses where exemptions to the Examination and Tests regulations are approved by the Dean or the Dean's designate, the exemption should be noted in the course outline.
- (e) The weights to be assigned to the various components which are to be considered in determining the final grade (term papers, laboratory work, class participation, tests, final examinations, etc.). This weighting may not be changed during the term or at the time of grade reporting;
- (f) Whether or not a passing grade on any particular component of a course is essential if the student is to pass the course as a whole;
- (g) Whether or not there will be a final examination and if an examination is held, whether the use of aids such as open book, etc., are permitted;
- (h) Whether students in the course may be expected to participate as subjects or researchers when research on human subjects may take place;
- (i) When writing and the grading thereof is a factor in the evaluation of the student's work (see E.2 Writing Across the Curriculum statement);

(j) A list and description of approved optional and mandatory supplementary fees for courses;

(k) Academic Accommodations. It is the student's responsibility to request academic accommodations and according to the University policies and procedures listed below.

The student accommodation policy can be found at: ucalgary.ca/access/accommodations/policy.

Students needing an Accommodation because of a Disability or medical condition should communicate this need to Student Accessibility Services in accordance with the Procedure for Accommodations for Students with Disabilities ucalgary.ca/policies/files/policies/student-accommodation-policy.

Students needing an Accommodation based on a Protected Ground other than Disability, should communicate this need, preferably in writing, to "(Instructor) (Associate Dean) (Department Head) (other designated person)". The course outline should clearly list the appropriate contact person and their contact details.

(l) Information regarding the Freedom of Information and Protection of Privacy Act and how this impacts the receipt and delivery of course material.

(m) Information on academic misconduct and the consequences thereof;

(n) Emergency Evacuation/Assembly Points (ucalgary.ca/emergencyplan/assemblypoints);

(o) Internet and Electronic Communication Device information;

(p) Safewalk information;

(q) Student Union or Graduate Student representative contact information;

(r) Link to the Student Ombuds' Office (ucalgary.ca/ombuds/) ombuds@ucalgary.ca.

(s) Link to campus mental health resources, including SU Wellness Centre and the Campus Mental Health Strategy website.

Instructors will also indicate in the course outline the use of calculators and/or electronic devices that will be allowed. In the absence of a written statement, the presumption is that the use of any calculators and/or electronic devices during examinations will not be allowed.

Instructors have the authority, at the discretion of the dean of their faculty, to require that specific course assignments, term papers and academic exercises be submitted in an electronic format. Instructors cannot require that multiple copies of an assignment be submitted.

E.2 Writing Across the Curriculum

Writing skills are not exclusive to English courses and, in fact, should cross all disciplines. The University supports the belief that throughout their University careers, students should be taught how to write well so that when they graduate their writing abilities will be far above the minimal standards required at entrance. Consistent with this belief, students are expected to do a substantial amount of writing in their

University courses and, where appropriate, members of faculty can and should use writing and the grading thereof as a factor in the evaluation of student work. The services provided by the Writing Support, part of the Student Success Centre, can be utilized by all undergraduate and graduate students who feel they require further assistance.

E.3 Attendance

Regular attendance is advised for students in all courses and there is no regulation that precludes an instructor from taking attendance in the class. The University has directed that attendance will not be considered when assessing a student's grade except in courses where class participation is a required component of the course.

In these cases, if a student is absent from a course the student may be asked to provide documentation regarding the absence.

For additional information on supporting documentation, see section M.1. Supporting Documentation and the Use of a Statutory Declaration.

E.4 Religious/Spiritual Observance

The University recognizes and respects the diversity of its members, including diversity of religious faiths and observances. It is understood that some students may not be able to attend classes, write tests or write final examinations on days of observance. Students should consult the Student Accommodation Policy (ucalgary.ca/policies/files/policies/student-accommodation-policy) for further information. Religious accommodation requests relating to class, test or exam scheduling or absences must be submitted no later than 14 days prior to the date in question.

E.5 Ethics of Human Studies

The University is concerned with safeguarding the rights of people in the conduct of its affairs both on and off campus. Students may be requested to serve, on a voluntary basis, as human research subjects as part of a course. In such instances, the course outlines must describe the students' expected roles as subjects. Courses may also follow the pedagogical practice of assigning students to serve as apprentice researchers, e.g., interviewing community members. In all course work dealing with human studies, ethical guidelines with respect to risks and benefits, informed consent, deception, privacy and confidentiality must be followed both by students and their instructors. Students should be referred to departmental ethics committees for information in regard to ethical safeguards. For more information on ethics and compliance visit <https://research.ucalgary.ca/conduct-research/ethics-compliance>.

E.6 Recording of Lectures

Recording of lectures other than audio recordings, as outlined below are not permitted.

Audio recording of lectures, other than where an audio recording is an accom-

modation, shall be permitted for individual private study only at the discretion of the instructor. For any other use, whether by duplication, transcription, publication, sale or transfer of recordings, written approval must be obtained from the instructor for the specific use proposed. Any use other than that described above constitutes academic misconduct and may result in suspension or expulsion.

Any student with a disability who is registered with Student Accessibility Services (SAS), and who requires an accommodation to make audio recordings of course material shall be provided with such an accommodation if determined necessary by an Access Advisor in SAS.

With the permission of the instructor, students without a formal accommodation may audio record lectures, provided that the student and instructor sign a release form available from departmental and faculty offices. A copy of the Release form shall be retained by the instructor and by the department in which the course is offered. Any audio recording by students is permitted only for the purposes of private study by the individual student.

Students are cautioned that lectures, demonstrations, performances, and any other course material provided by an instructor may include copyright protected works. The Copyright Act and the copyright law protect every original literary, dramatic, musical and artistic work, including lectures by University instructors. Any audio recording by students is permitted only for the purposes of private study by the individual student. Students may not distribute, email or otherwise communicate these materials to any other person.

Students are encouraged to make notes of classroom discussions, lectures, demonstrations, and performances in order to advance their own learning and to develop a record for purposes of private study. The ordinary process of taking notes is encouraged since this practice requires that students develop the ability to actively attend to the material under consideration and to quickly summarize pertinent information in a coherent manner. Electronic or mechanical recording of lectures discourages the development of these important skills. In addition, the presence of audio recording devices may inhibit frank and open discussion of course material in the classroom, or otherwise interfere with the proper academic conduct of the class.

This regulation applies to all forms of electronic or mechanical recording of lectures, laboratories, tutorials, presentations, performances, electronic (computer) information, the duplication of course material, and to the translation of recordings or transcriptions of any of these materials to another form by electronic or mechanical means.

F. Academic Standing

F.1 Grading System and Transcripts

The official grading system must be used to report final grades to the Office of the Registrar.

If the official grading system is not used for individual assignments, quizzes, etc., the system used must be provided on the course outline as well as a conversion chart that enables students to determine their grade in relation to the official grading system. Approval is required as per the Course Outline regulation (section E.1 Course Outlines). The conversion chart should not be changed during the term. Should it become necessary to change a grading scale, it can only be changed during the term if the grades will not be lowered. Any concerns about changes to the conversion chart should be raised with the Department Head (or equivalent). Students not satisfied by the Department Head (or equivalent) should contact the Faculty office to follow normal appeal procedures.

F.1.1 Undergraduate Grading System

| Grade | Grade Point Value | Description |
|-------|-------------------|---|
| A+ | 4.00 | Outstanding performance |
| A | 4.00 | Excellent performance |
| A- | 3.70 | Approaching excellent performance |
| B+ | 3.30 | Exceeding good performance |
| B | 3.00 | Good performance |
| B- | 2.70 | Approaching good performance |
| C+ | 2.30 | Exceeding satisfactory performance |
| C | 2.00 | Satisfactory performance |
| C- | 1.70 | Approaching satisfactory performance. |
| *D+ | 1.30 | Marginal pass. Insufficient preparation for subsequent courses in the same subject |
| *D | 1.00 | Minimal Pass. Insufficient preparation for subsequent courses in the same subject. The Faculty of Law utilizes a "D" grade that does not carry weight in calculating the grade point average. This will be noted in the calendar description as "Not Included in GPA" where applicable. |
| F | 0.00 | Failure. Did not meet course requirements. Several Faculties utilize an F grade that does not carry weight in calculating the grade point average. This will be noted in the calendar description as "Not Included in GPA" where applicable. |

| | | |
|-----|------|--|
| **I | 0.00 | Incomplete. Sufficient work has not been submitted for evaluation, unable to adequately assess. May also be used when a final exam is not submitted. |
| CR | | Completed Requirements. Carries no weight in calculating the grade point average. This will be noted in the calendar description as "Not Included in GPA" where applicable |
| RM | | Remedial Work Required. Utilized by the Cumming School of Medicine (MD program). Carries no weight in calculating the grade point average. This will be noted in the calendar description as "Not Included in GPA" where applicable. |

Notes:

- A grade of "C-" or below may not be sufficient for promotion or graduation, see specific faculty regulations.
- The number of "D" and "D+" grades acceptable for credit is subject to specific undergraduate faculty promotional policy.

F.1.2 Graduate Studies Grading System

| Grade | Grade Point Value | Graduate Description |
|-------|-------------------|---|
| A+ | 4.00 | Outstanding performance |
| A | 4.00 | Excellent performance |
| A- | 3.70 | Very good performance |
| B+ | 3.30 | Good performance |
| B | 3.00 | Satisfactory performance |
| B- | 2.70 | Minimum pass |
| C+ | 2.30 | All grades of "C+" or lower are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements. Individual programs may require a higher passing grade. |
| C | 2.00 | |
| C- | 1.70 | |
| D+ | 1.30 | |
| D | 1.00 | |
| F | 0.00 | |
| **I | 0.00 | Incomplete. Sufficient work has not been submitted for evaluation, unable to adequately assess. May also be used when a final exam is not submitted. |

| | | |
|----|--|---|
| CR | | Completed Requirements. Carries no weight in calculating the grade point average. This will be noted in the calendar description as "Not Included in GPA" where applicable. |
|----|--|---|

F.2 Symbols

Symbols are used to note a standing in a course when a grade is not issued or available.

| Symbol | Description |
|--------|--|
| AE | Aegrotat standing |
| AU | Audit |
| DFE | Deferred Final Exam |
| DFT | Deferred Term Work |
| EW | Extenuating Circumstance Withdraw – no academic penalty or impact on GPA |
| GP | Grade Pending |
| IP | Course in Progress |
| MT | Multi-term course |
| RW | Required to Withdraw |
| SGR | Supplemental Exam Granted |
| W | Withdraw - no academic penalty or impact on GPA |
| X | Grade not reported |

F.3 Academic Notations

Academic notations indicate a student's overall academic standing or highlight the receipt of special honours or distinctions. Notations are typically applied to a specific term; however, they can relate to multiple terms.

F.3.1 Academic Standing

In Good Standing: The progression requirements for a Faculty have been achieved. See the faculty section for specific requirements.

Academic Probation: The progression requirements for a faculty have not been achieved following an academic review. Students are placed on academic probation for a period of one year.

Disciplinary Probation: Penalty for plagiarism, cheating or other academic misconduct. Eligible to proceed in an academic program.

Required to Withdraw: If *In Good Standing* is not achieved during the Academic Probation period or performance requirements as outlined in section F.5 (Unsatisfactory Standing) and/or faculty-specific performance requirements are not met, a student will be required to withdraw from the Faculty. May also be used for other academic misconduct penalties where the student is required to withdraw.

Suspension: Not permitted to register in any University of Calgary program or faculty for

the period of the suspension. Will be eligible to re-apply for admission after the end of the suspension period. In cases of academic misconduct, the notation will read: Suspended by <Faculty/School> for academic misconduct.

Expulsion from Faculty: Permanent removal from the faculty registered in at the time of the offence. A student does not have a right to be re-admitted to the faculty they were registered in. May be considered for re-admission to another faculty after at least twelve months have passed since the end of the term the expulsion was applied. In cases of academic misconduct, the notation will read: Expelled by <Faculty/School> for academic misconduct.

Expulsion from University: Permanent removal from the University. A student does not have the right to apply for re-admission to the University.

F.3.2 Unsatisfactory Standing

All faculties review a student's performance for continuation in a program. University regulations require that an undergraduate student, at the time of review, be required to withdraw from the University if the student's grade point average is less than 1.70. Most faculties have higher requirements for continuation in a program.

Students will be permitted one probationary period while registered as undergraduate students at the University of Calgary. Students will be required to withdraw rather than be placed on probation for a second time. Probationary periods that have occurred in excess of five years previous will not be counted.

The records affecting promotion and graduation of all students in the Faculty are reviewed by persons designated by the faculty council. A student whose record is then found to be unsatisfactory will be so notified by the Dean (or designate). The student may be required to withdraw (RW) from the faculty or to repeat the year. Students who receive RW letters are encouraged to speak with an academic advisor and/or Counseling Services.

A Faculty reserves the right to review a student's academic standing at any time and, at the discretion of the Dean or designate, a student may be permitted to continue in program under specified conditions or required to withdraw if specified conditions of admission or continuation in the program are not met. These conditions shall be specified in writing by the Dean or designate to the student.

The transcript of record will indicate if a student has been required to withdraw or placed on probation due to unsatisfactory standing. Normally, this notation will not be removed from the transcript of record.

Students who have been required to withdraw from a faculty at the University of Calgary and wish to return must re-apply for admission to the University by the stated deadlines. For details on application requirements and processes, see section A.6 (Required to Withdraw Students).

For specific faculty promotional policies, please refer to each faculty section of this Calendar.

F.3.3 Aegrotat Standing

Aegrotat standing may be granted when a student is prevented by illness or injury from completing a course(s). The faculty offering the course(s) may award this standing to students who have completed a significant portion of the course material/learning outcomes and are able to progress in their program.

Students apply to the Dean (or designate) of the faculty offering the course.

F.3.4 Honours Degrees and Degrees with Distinction

Honours degrees are available from the Faculty of Arts, Kinesiology, Cumming School of Medicine (BHSc) and Science. Please refer to the graduation requirements for Honours degrees in the faculty sections of this Calendar.

The notation "With Distinction" will be awarded to candidates and inscribed on the graduation parchment for the degrees of BA, BSc, BComm, BCR, BSc (Engineering), BFA, BKin, BMus, BN, BSW, DVM or JD if the candidate has obtained the required average as defined under the faculty promotion policy.

A student who has taken part of their work at another university may be granted a degree "With Distinction" at the discretion of the faculty concerned.

F.3.5 Dean's List

The Dean's List recognizes the outstanding academic achievement of students in the Cumming School of Medicine (BHSc, BCR), Haskayne School of Business, Schulich School of Engineering and the Faculties of Arts, Kinesiology, Law, Nursing, and Science. Each Faculty's section of this Calendar outlines the requirements for inclusion on the Dean's List. Placement on a Dean's List is noted on the student's transcript. Students on academic sanctions at the time of academic review, as outlined in section K. Statement on Principles of Conduct of this Calendar, are not eligible for the Dean's List.

F.4 Grade Point Average

All grades are used in the calculation of yearly grade point averages, both for purposes of the official transcript of record and cumulative grade point averages determined by the faculties. When determining a grade point average, the average will be based on the second decimal point and will not be rounded. For example, a GPA calculated at 2.999 will be 2.99.

For promotion or graduation, refer to individual faculty sections for requirements.

To determine the grade point average, the course grade point is multiplied by the unit value of the course (e.g. 6 units) to determine the weighting. The weightings are added together then divided by the total number of units to determine the grade point average (GPA).

Example: A student who completed two, 6-unit and four, 3-unit courses with grades would have the grade point average computed as follows:

| Courses | Letter Grade | Grade Point | Course Units | Weighted Grade Point |
|----------|--------------|-------------|----------------|----------------------|
| Course A | A+ | 4.00 | 6 | $4.00 \times 6 = 24$ |
| Course B | B | 3.00 | 6 | $3.00 \times 6 = 18$ |
| Course C | C | 2.00 | 3 | $2.00 \times 3 = 6$ |
| Course D | D | 1.00 | 3 | $1.00 \times 3 = 3$ |
| Course E | F | 0.00 | 3 | $0.00 \times 3 = 0$ |
| Course F | A | 4.00 | 3 | $4.00 \times 3 = 12$ |
| Total | | | 24 | 63 |
| GPA | | | $63/24 = 2.62$ | |

F.5 Transcripts

An official transcript is a complete and unabridged record of a student's academic history at the University of Calgary. Official transcripts bear the University seal and signature of the Registrar. Official transcripts may be sent directly to an institution or provided to the student, either by mail in sealed envelopes or in-person. Transcripts will not be released without authorized consent from the student.

A transcript will not be issued if the student has any outstanding financial obligations at the University. In some instances transcripts may be withheld until a future date, such as a pending appeal.

Students may request copies of their official transcripts through the Student Centre (my.ucalgary.ca), in-person at Enrolment Services, or by submitting the Transcript Request form. Courier delivery options are available for a fee. For more information visit: ucalgary.ca/registrar/student-forms.

A Course and Credit report (unofficial transcript) detailing courses attempted and credits earned is available to students through the Student Centre (my.ucalgary.ca). These transcripts do not bear the University seal or the signature of the Registrar. This report should not be used when an official transcript is required.

G. Examinations and Tests

Effective evaluation practices require that students have multiple opportunities to demonstrate their learning and receive feedback. This principle underlies the following regulations:

- The final exam may not count for more than 50 per cent when calculating the final grade, except in the cases of clinical or professional practice-based courses in academic programs leading to professional designation, registration and/or licensing.
- In clinical or professional practice-based courses in academic programs leading to professional designation, registration and/or licensing, regardless of their duration, student learning may be formally evaluated at the end of the learning experience, as long as effective formative

feedback processes are in place at intervals during the course.

- In courses that do not extend over a standard term, and with the approval of the Dean or the Dean's designate, evaluation weightings may be non-standard as long as the evaluation plan includes opportunities for students to receive feedback on their learning at intervals during the course.
- Exemptions to the Examination and Tests regulations may be made on pedagogical grounds with the approval of the Dean or the Dean's designate.
- In all courses where exemptions to the Examination and Tests regulations are approved by the Dean or the Dean's designate, the exemption should be noted in the course outline.
- Regardless of the format of a course, any external accreditation requirements must be met (or exceeded) in the evaluation plan for a course.

G.1 Scheduling of Tests and In-Class Assessments

Tests and in-class assessments must be scheduled within regular class time except in those special cases where prior approval has been obtained from the dean of the faculty offering the course.

Common mid-year tests in courses that run over more than one term must occur during the final examination period, and must be scheduled by the Registrar, except:

- Mid-year tests that are take-home or oral tests, or mid-term projects.
- Mid-year tests in Law, Medicine (MD program only) and Veterinary Medicine, which are scheduled by each Faculty. The School of Architecture, Planning and Landscape also schedules its own mid-year tests except for courses in the Architectural Studies minor.

In courses completed over a standard term, any tests carried out during the last 14 calendar days of classes (as defined in the Academic Schedule) may not account in total for more than 10 per cent of the final grade, except in the case of laboratory or oral testing, take-home examinations or terminal projects. This regulation does not apply to tests held at the end of the Fall Term in courses which run over both Fall and Winter Terms, in clinical or professional practice-based courses, or in courses that do not extend over a standard term (see G. Examinations and Tests).

G.1.1 Course Assessments and Absences

A student who is absent from an assessment in a course will receive a grade of zero on the assessment. If a student communicate with the instructor and explains the circumstances around the absence, the instructor may transfer the percentage weight for the assessment to another component of the course, such as the final examination, set another assessment, or make alternative arrangements. An instructor will normally

make this decision based on the information provided by the student. The instructor may ask for supporting documentation to confirm an absence. For additional information on supporting documentation, see section M.1. Supporting Documentation and the Use of a Statutory Declaration.

Students are responsible for costs that may be associated with obtaining supporting documentation.

See also G.6 Deferral of Final Examinations or G.7 Deferral of Term Work.

G.2 Proof of Identity

G.2.1 Tests

Invigilators of any tests may, when they have reason to believe there is cause to do so, challenge any candidate to produce proof of identity either in the form of the University of Calgary ID card (Unicard) or government-issued photo ID.

If there is clear evidence that impersonation has occurred, the individual shall not be permitted to continue the test and shall be reported immediately to the dean or delegate of the faculty in which the course is offered.

A student who is not able to provide acceptable proof of identity may be permitted to continue the test if the student agrees to provide verification at a later date. If verification is not provided, then the student will receive an "F" on the test, and the matter will be referred to the dean or delegate of the faculty in which the course is offered for further disciplinary action.

G.2.2 Final Examinations

All candidates for final examinations are required to place their University of Calgary ID cards (UNICARD) on their desks for the duration of the examination. This requirement is publicized at the time of posting of the examination timetable each session.

Students without an ID card who can produce an **acceptable** alternative ID, e.g., government-issued photo ID, will be allowed to write the examination.

A student without acceptable ID will be required to complete an Identification form. The form indicates that there is no guarantee that the examination paper will be graded if any discrepancies in identification are discovered after verification with the student's file.

A student who refuses to produce identification or who refuses to complete and sign the form will not be permitted to write the examination. The circumstances will be reported immediately in writing to the dean and to the Registrar for consideration of further disciplinary action.

G.3 Final Examinations

Any final examination scheduled by the Registrar is held in the examination period following the session in which the course was completed, as defined in the Academic Schedule.

Students requiring an accommodation because of disability or medical condition

should contact SAS in accordance with the Procedure for Accommodations for Students with Disabilities available at: ucalgary.ca/policies/files/policies/student-accommodation-policy. Students who require an accommodation on a protected ground other than disability should communicate this need, preferably in writing, to their Instructor or the appropriate Associate Dean, Department Head or the department/faculty designated contact person.

Should a student write and hand in an examination for grading and later request the cancellation of the examination and a deferred examination or a retroactive withdrawal, such a request will be denied.

Students and instructors of record with courses with Registrar-scheduled final examinations must be available for the entire final examination period as outlined in the Academic Schedule.

See ucalgary.ca/registrar for additional final examination regulations.

G.4 Scheduling of Examinations

All final examinations must be scheduled by the Registrar, except:

- Final examinations which are take-home examinations, oral examinations or terminal projects.
- Final examinations in Law, Medicine (MD program only) and Veterinary Medicine, which are scheduled by each Faculty. The School of Architecture, Planning and Landscape also schedules its own final exams except for courses in the Architectural Studies minor.

Common mid-year tests in courses that run over more than one term must occur during the final examination period, and must be scheduled by the Registrar, except:

- Mid-year tests that are take-home or oral tests, or mid-term projects.
- Mid-year tests in Law, Medicine (MD program only) and Veterinary Medicine, which are scheduled by each Faculty. The School of Architecture, Planning and Landscape also schedules its own mid-year tests except for courses in the Architectural Studies minor.

In all Faculties, unscheduled examinations, assignments, tests, etc., may not be held by instructors after the last day of classes, i.e., during the study break or the examination period at the end of each term. Any such testing should be conducted by the instructor during the regular class periods before the end of a term. (See G.1 Scheduling of Tests and In-Class Assessments for weighting of tests during the last 14 calendar days of the standard term.)

Requests for pre-assignment of examinations to special dates for whatever cause or reason will not be accommodated. Similarly, requests for changes to the dates of scheduled examinations will not be approved. Student votes and petitions to change a scheduled final examination will not be considered as these have been found to result in undue pressure on students not in agreement with an altered examination schedule.

The Examinations Timetable for Registrar-scheduled examinations will be published approximately one month after the start of the term and will be available via MyUofC in the online Student Centre and at the Enrolment Services website: ucalgary.ca/registrar/exams.

G.5 Evening Credit and Campus Course Examinations

Final examinations in all courses, including evening credit courses, late afternoon courses and week-end courses are scheduled by the Registrar. The University cannot guarantee that examinations for evening credit courses will be scheduled in the evening but an effort is made to schedule as many examinations as possible in the evening.

G.6 Deferral of Final Examinations

Deferred examinations are allowed in the following circumstances: debilitating illness, severe domestic affliction, religious conviction or absence due to a faculty-approved activity. Students who have three final examinations within 24 hours are permitted to request that one examination be deferred to the deferred examination period.

The authority to grant or deny a deferred final examination rests with the Dean (or designate) of the Faculty in which the course is offered. The Application for a Deferred Final Examination is available from ucalgary.ca/registrar which outlines the application process.

Deferred final examinations will not be granted if a student:

- Misses a final exam without just cause
- Books travel during a scheduled exam time
- Misreads the exam schedule
- Submits a final exam for marking
- Completes less than half of the assigned work in a course

G.6.1 Religious Conviction, Three exams in 24 hours, Absence due to a Faculty-Approved Activity

Students must inform their faculty advising office within 10 business days after the release of the exam schedule of any exam conflicts due to religious conviction, three exams in 24 hours, two (2) exams scheduled at the same time or expected absence due to a Faculty approved activity.

Students who do not provide appropriate notification may not be approved for a deferred exam.

G.6.2. Debilitating Illness or Unforeseen Crisis

A. Prior to a Scheduled Final Exam:

Students must inform their faculty as soon as possible if they are unable to attend a scheduled final exam. Typically, this would be done via email to the instructor, the Dean (or designate) or as per approved faculty regulations. Students will be required to provide supporting documentation (for more information, see M.1. Supporting Documenta-

tion and the Use of a Statutory Declaration). Students are responsible for any costs that may be associated with obtaining supporting documentation.

B. During a Scheduled Exam:

If a crisis/illness occurs during an examination that prevents a student from continuing with the exam, the student must report to the course instructor (or equivalent), hand in the unfinished exam and request the exam be cancelled. Normally, students are not permitted to request a cancellation of their examination once 50 per cent of the examination time has passed. Students will be required to provide supporting documentation confirming the illness/crisis experienced during the examination.

In either situation (A. or B. above), the application and supporting documentation must normally be provided no later than two business days after the scheduled exam. Students who do not apply for a deferred final examination within this time-period will not be considered for a deferred final exam.

G.6.3 Limitations and Misuse of Deferred Examination Regulations

Students who request multiple deferred exams will be required to meet with a faculty advisor, the Student Success Centre or the SU Wellness Centre after the fourth deferred exam request; this is cumulative and applies to all studies pursued at the University of Calgary. Students may be required to reduce their course load in future terms or participate in exam preparation workshops.

Misuse of the deferred exam regulation, falsifying documentation or false statements made on any of the documentation provided for a deferred examination will be considered academic misconduct and is subject to the academic misconduct regulations outlined in section K. Statement on Principles of Conduct of this calendar.

G.6.4 Scheduling of Deferred Examinations

Normally, deferred examinations will be scheduled prior to the end of the course change period of the term immediately following the final exam period*.

Deferred final examinations are scheduled by the Office of the Registrar and a timetable will be made available at: ucalgary.ca/registrar one week prior to the deferred examination period. Students writing a deferred final examination must consult this timetable to determine the exact date and time of their deferred examination.

A deferred final examination will be different in content and/or format from the original final examination.

Students in their graduating year who defer Winter Term final examinations may not graduate until the Fall convocation ceremony.

Normally, deferred final examinations may not be deferred a second time nor will students be eligible for a late withdraw. Requests for late withdraws will not be considered when a student does not attend

a deferred examination without sufficient cause.

**Does not apply to the Cumming School of Medicine (MD program only) and the Faculties of Law and Veterinary Medicine.*

G.7 Deferral of Term Work

Term work is defined as any papers, projects, tests or other assignments that are due on or prior to the last day of the term.

Term Work due Before the End of Lectures:

Instructors, subject to any established departmental or faculty procedures, may establish their own deadlines for the completion of term work. Students must be made aware of any departmental or faculty procedures on the course outline.

Term Work due After the End of the Term:

Should a request to defer term work exceed the end of the term, a Deferral of Term Work form must be completed. Deferrals are granted at the discretion of the Dean (or designate) and are normally granted for 30 days beyond the end of term. Should circumstances warrant, the maximum time that may be granted for a deferral of term work is one additional term. Application forms are available at: ucalgary.ca/registrar.

See section E.3 Attendance for additional information regarding absences from tests.

G.8 Debarment

A student may be refused permission to write a final examination in a course, on the recommendation of the department concerned and with the concurrence of the dean of the faculty, in the following circumstances:

1. The student has neglected to do a substantial proportion of the written and/or laboratory assignments in a course of which these are an essential feature.
2. The student has not officially registered in the course.

G.9 Examination Results

Students may access their **final grades** via MyUofC using their online Student Centre. For requests for official transcripts, see F.5 Transcripts.

G.10 Final Examination Papers

After grading, final examination answer papers are forwarded to the faculty or department office and retained for a period of **one year** from the end of the month the final exam period was held in. During this period students may be able to view their graded final exam paper in the faculty/department office or obtain a photocopy of their graded paper at a cost determined by the faculty/department office.

G.11 Examinations for Online and Off-Site Courses

Students registered in online or distance delivery course may be required to write a final examination onsite at the Calgary campus. The course outline will provide final examination requirements.

When the final examination is scheduled on the Calgary campus, students must be provided with the opportunity to write the final examination at an approved invigilation centre if their current residence is more than 100 kilometres from the Calgary campus. A list of approved invigilation centres is available at ucalgary.ca/registrar/exams/preparing-final-exams. Students must inform the course instructor by the following dates if they wish to write a final examination off-site:

| | |
|--------|------------|
| Fall | November 1 |
| Winter | March 1 |
| Spring | June 1 |
| Summer | August 1 |

Students registered in an onsite course are expected to write the final examination at the location indicated in the Final Examination schedule. It is only under exceptional circumstances, and with the permission of the Associate Dean of the faculty offering the course, that a student will be permitted to write the examination off-site. The Associate Dean may require documentation to support the request. Examinations may be written at an approved invigilation centre or be invigilated by an individual approved by the faculty.

Students will be responsible for invigilation fees, if any, charged by external examination centres.

H. Graduation

H.1 Applying to Graduate

All undergraduate and graduate students who expect to receive a credential must complete an Application to Graduate (whether you are attending the convocation ceremony or not). The Application to Graduate is available through the Student Centre at my.ucalgary.ca. Deadlines to apply to graduate are available at: ucalgary.ca/registrar/graduation.

There are three conferrals per year: Fall Convocation, Winter Conferral, and Spring Convocation.

| Credential requirements completed | Eligible Conferral |
|-----------------------------------|--------------------|
| By end of Summer Term | Fall Convocation |
| By end of Fall Term | Winter Conferral* |
| By end of Winter Term | Spring Convocation |

**There is no graduation ceremony connected with the Winter Conferral; students are invited to attend the Spring Convocation ceremony.*

Students granted a letter of permission or approval for a deferred examination in the Winter Term of their graduating year are eligible to apply for Fall Convocation. Students are responsible for obtaining official transcripts and submitting them to the Office of the Registrar not later than one month before any conferral.

Students must be approved by their Faculty to be eligible to graduate and to participate in a convocation ceremony. Students who are not approved will be required to submit

another Application to Graduate for a future conferral date.

H.2 Names on Parchment

The University only uses the legal name of a student on the parchment. Names are printed in upper case lettering in the following order: Given Name(s) and Surname. The use of an initial in place of a given name is not permitted. Any changes to the name currently on file with the Registrar's Office must be supported by government issued documentation. See section B.17 (Change of Personal Information) for more information.

H.3 Parchment Information

Minors and approved concentrations and undergraduate specializations will not be indicated on degrees but will be noted on the official transcript.

H.4 Double Majors

Some degree programs permit a double major. Double major degrees will only be awarded if it is possible to obtain the degree with each of the majors. For example, a BA in Computer Science and History is permitted, whereas, a BSc in Computer Science and History would not be awarded since it is not possible to obtain a BSc in History.

H.5 Ceremony Attendance

Information regarding the convocation ceremony is available at: ucalgary.ca/registrar/graduation. Graduands must notify the Convocation Office, by the deadline indicated in the Student Centre at my.ucalgary.ca, whether or not they will attend the ceremony. Seating is reserved only for those graduands who have notified the Convocation Office that they will be attending the ceremony.

Graduands who have indicated that they will not be attending the ceremony will have their degree mailed. A fee will apply.

H.6 Parchment Reprints

The University does not issue duplicate parchment; however, due to extraordinary circumstances, a replacement parchment may be issued. The Degree Reprint Form can be found online at: ucalgary.ca/registrar/student-forms. The new parchment will be marked "duplicate" with the date it was reprinted. A fee will apply.

H.7 Posthumous Degrees

With the approval of the Registrar, a degree may be awarded posthumously to a deceased student who completed a degree program or was completing the last term of their degree program. Degrees granted posthumously will be noted on the transcript of record.

H.8 Convocation

Convocation ceremonies are held in Spring and Fall Terms on campus. Please refer to the Academic Schedule for dates. Students can access graduation information online at: ucalgary.ca/registrar/graduation.

H.9 Academic Dress

H.9.1 Hoods

Hoods are established in accordance with the guidelines provided by the North American Intercollegiate Code. Faculty/credential colours are as follows:

School of Architecture, Planning and Landscape - russet

MArch - russet

MEDes - russet

MLA - russet

MPlan - russet

Faculty of Arts - white*

BA - white

BCS - silver grey

BFA - brown

BFS - scarlet

BMUS - pink

BSc - golden yellow

Cumming School of Medicine

BCR - dark green

BHSc - dark green

MD - dark green

Faculty of Graduate Studies - philosophy blue*

LLM - purple

MA - white

MBA - sapphire blue

MBT - golden yellow

MC - light blue

MCE - light green

MDCS - dark green

MEd - light blue

MEng & MSc in Eng - orange

MFA - brown

MGIS - golden yellow

MKin - sage green

MMus - pink

MN - apricot

MP - russet

MPP - turquoise

MSc - golden yellow

MSS - white

MSW - citron yellow

EdD - light blue

PhD - philosophy blue

BDipl - colour of discipline

MDipl - colour of discipline

PDipl - colour of discipline

Haskayne School of Business - sapphire blue

BComm - sapphire blue

Faculty of Kinesiology - sage green*

BKin - sage green

BSc - golden yellow

Faculty of Law - purple

Faculty of Nursing - apricot

Schulich School of Engineering - orange

BSc in Eng - orange

DipSc - orange

DipSH - orange

Faculty of Science - golden yellow*

BA - white

BSc - golden yellow

Faculty of Social Work - citron yellow

Faculty of Veterinary Medicine - grey*

DVM - asphalt

Worklund School of Education - light blue

BEEd - light blue

DipEd - light blue

University of Calgary

Inclusive Education Program - Olympic red

**Indicates the stole colour for the dean when there are different hood colours for the degrees within the faculty.*

1. For the Bachelors' and Masters' degrees, the University of Calgary uses a black hood lined with the University colours, gold with red chevron, and trimmed with the colour indicating the subject of the degree, in a silk-like material. Diploma programs graduates wear the bachelor's hood of the faculty offering the Diploma.

2. For Inclusive Education Program, the University of Calgary uses a black associate's hood with an Olympic red trim chevron.

3. For the PhD hood, the body is doctors' scarlet, with a lining of gold and a chevron of scarlet with a three-inch trim at the edge (inside and out) of philosophy blue. The Doctorate hood (e.g., EdD, DB etc.) conforms to the Intercollegiate Code in shape, size and colour. The trim colour is the same as the masters' hood.

4. For Honorary Doctorates of the University of Calgary (LLD) the hoods have a body in gold, lined in doctors' scarlet with a gold chevron. The trim is a one-inch band of white silk edged with a three-inch band of scarlet velvet, the configuration follows that of the PhD hood.

5. The honorary degree Doctor of the University of Calgary (DUC) has been awarded previously. The hood is similar to the LLD hood without the white band.

H.9.2 Headwear

1. The headwear for Bachelors' and Masters' is the black mortarboard or trencher-type hat.

2. For Doctors', the headwear is a black velvet John Knox cap or birretum.

H.9.3 Gowns

1. Bachelors' and Masters' gowns follow the black gown specified by the North American Intercollegiate Code.

2. Doctorate gowns (PhD) are doctors' scarlet in colour with a gold yoke. The silk trim on the sleeves and front panels is of blue silk. Doctorate gowns (EdD) conform to the Intercollegiate Code in design. The normal gown for the EdD is the black gown with light blue bars on the arm.

3. Honorary Doctorate gowns are gold with a red velvet yoke. Trim on inside and outside of sleeves and the front panels is red velvet.

H.9.4 Deans' and Vice-Presidents' Scarves

The academic deans have scarves in the appropriate faculty colour with an embroidered University coat-of-arms, approximately two and one half by three and one half inches, on the left side. The vice-presidents' scarves are of the scarlet used in the president's gown and trimmed around the edges with the same silver braid.

H.10 Official Degrees/Diplomas/Certificates

School of Architecture, Planning and Landscape

- Master of Architecture (MArch)
- Master of Environmental Design (MEDes)
- Master of Planning (MPlan)

Faculty of Arts

- Bachelor of Arts (BA)
- Bachelor of Arts (Honours)
- Bachelor of Communication and Media Studies (BCMS)
- Bachelor of Communications Studies (BCS)
- Bachelor of Film Studies (BFS)
- Bachelor of Fine Arts (BFA)
- Bachelor of Fine Arts (Honours)
- Bachelor of Music (BMus)
- Bachelor of Science (BSc)
- Bachelor of Science (Honours)

Cumming School of Medicine

- Bachelor of Community Rehabilitation (BCR)
- Bachelor of Health Sciences (BHSc) (Honours)
- Doctor of Medicine (MD)

Faculty of Graduate Studies

- Master of Arts (MA)
- Master of Biomedical Technology (MBT)
- Master of Business Administration (MBA)
- Master of Counselling (MC)
- Master of Education (MEd)
- Master of Engineering (MEng)
- Master of Fine Arts (MFA)
- Master of Geographic Information Systems (MGIS)
- Master of Kinesiology (MKin)
- Master of Laws (LLM)
- Master of Music (MMus)
- Master of Nursing (MN)
- Master of Public Policy (MPP)
- Master of Science (MSc)
- Master of Science in Biomedical Engineering (MSc)
- Master of Science in Chemical Engineering (MSc)
- Master of Science in Civil Engineering (MSc)
- Master of Science in Electrical Engineering (MSc)
- Master of Science in Geomatics Engineering (MSc)

- Master of Science in Mechanical Engineering (MSc)
- Master of Social Work (MSW)
- Master of Strategic Studies (MSS)
- Nurse Practitioner Certificate (NP)
- Post-Baccalaureate Certificate
- Post-Bachelor Certificate
- Post-Master Certificate
- Post-Doctoral Certificate
- Graduate Diploma (BDipl)
- Post-Doctoral Diploma (PDipl)
- Post-Master's Diploma (MDipl)
- Doctor of Education (EdD)
- Doctor of Philosophy (PhD)

Haskayne School of Business

- Bachelor of Commerce (BComm)

Faculty of Kinesiology

- Bachelor of Kinesiology (BKin)
- Bachelor of Kinesiology (Honours)
- Bachelor of Science (BSc)
- Bachelor of Science (Honours)

Faculty of Law

- Juris Doctor (JD)

Faculty of Nursing

- Bachelor of Nursing (BN)

Schulich School of Engineering

- Bachelor of Science in Chemical Engineering (BSc)
- Bachelor of Science in Civil Engineering (BSc)
- Bachelor of Science in Computer Engineering (BSc)
- Bachelor of Science in Electrical Engineering (BSc)
- Bachelor of Science in Energy Engineering (BSc)
- Bachelor of Science in Geomatics Engineering (BSc)
- Bachelor of Science in Manufacturing Engineering (BSc)
- Bachelor of Science in Mechanical Engineering (BSc)
- Bachelor of Science in Oil and Gas Engineering (BSc)
- Bachelor of Science in Software Engineering (BSc)
- Diploma of the Schulich School of Engineering (DipSc)
- Diploma of the Schulich School of Engineering and the Haskayne School of Business (DipSH)

Faculty of Science

- Bachelor of Arts (BA)
- Bachelor of Arts (Honours)
- Bachelor of Science (BSc)
- Bachelor of Science (Honours)

Faculty of Social Work

- Bachelor of Social Work (BSW)

Faculty of Veterinary Medicine

- Doctor of Veterinary Medicine (DVM)

Werklund School of Education

- Bachelor of Education (BEEd)
- Diploma of the Faculty of Education (DipEd)

H.11 Honorary Degrees

The Senate of the University of Calgary is responsible for selecting individuals to receive the University's highest academic honour – the Honorary Doctor of Laws (LLD). Honorary degrees are conferred by the Chancellor to recognize extraordinary achievement in community, national or international service and to honour those individuals whose accomplishments are of such excellence that they provide, through example, inspiration and leadership to the graduates of the University. Contributions may have been made in any field, including the arts, business, the professions, scholarly endeavours and voluntary activities. Normally excluded from consideration are those currently holding elected office, as well as current members of the University community. For more information, contact senate@ucalgary.ca or telephone 403.220.6581.

H.12 The Order of the University of Calgary

The Order of the University of Calgary is a prestigious University award recognizing exemplary and distinguished service to the University. The award is available to any member of the University community, those currently or formerly attached to the University and to those representing the University in the community. Candidates nominated for membership in the Order may include, but are not limited to faculty, staff, students (graduate or undergraduate), volunteers and alumni. For more information, contact senate@ucalgary.ca or telephone 403.220.6581.

I. Reappraisal of Graded Term Work and Academic Assessments (Final Grades)

The University acknowledges that there are instances when a student may wish to challenge University decisions about graded term work or academic assessments (final grades). The following guidelines and procedures deal with those occasions.

The definition for the term “graded term work” is set out in Section I.2 (Reappraisal of Graded Term Work).

The term “academic assessment” means the determination of a student's final level of achievement in a specific course, and includes grades, credit or fail designations, and, if specified in a course outline, assessments of all aspects of professional behaviour.

I.1 General Principles

1. Reappraisals of graded term work and academic assessments occur at the department/faculty level that originated those decisions.

2. Reappraisals of term work are generally settled at the department/faculty level. The reappraisal process is outlined in

Sections I.2 (Reappraisal of Graded Term Work) and I.3 (Reappraisal of an Academic Assessment).

3. Students are responsible to present their arguments as effectively and as fully as possible. Mere dissatisfaction with a grade is not a valid reason for requesting a reappraisal.

4. Appeals of thesis examinations or candidacy components that do not result in a student being required to immediately withdraw are considered to be appeals of academic assessments, and are made to the Faculty of Graduate Studies Faculty Appeals Committee as described in the Graduate Calendar. Graduate students wanting to appeal a thesis examination decision or candidacy component decision that does not require them to immediately withdraw must submit their appeal to the Faculty of Graduate Studies Faculty Appeals Committee. Any other graded term work or academic assessment appeals submitted by graduate students must be submitted as described in Sections I (Reappraisal of Graded Term Work and Academic Assessments (final grades)) and J (Student Appeals to the University Appeals Committee and the University Appeals Tribunal) of this calendar.

I.2 Reappraisal of Graded Term Work

A student who feels that a piece of graded term work (term paper, essay, test, etc.) has been unfairly graded, may have the work reappraised as follows. The student shall discuss the work with the instructor **within ten business days** of being notified about the mark or of the item's return to the class. If not satisfied, the student shall take the matter to the head of the department offering the course **within 2 business days of receiving the decision from the instructor**, who will arrange for a reappraisal of the work **within the next ten business days**. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected. Students in faculties without a departmental structure should take the matter to the dean, or designate, of the faculty offering the course. The result of that reappraisal will be given to the student in writing along with information about appealing the reappraisal.

The reappraisal of graded term work may cause the grade to be raised, lowered or to remain the same. There is no limit to the number of pieces of graded work that a student may request be reappraised, however a single piece of work may only be reappraised once.

I.3 Reappraisal of Academic Assessments (Final Grades)

In the reappraisal of a final grade, the only element that will be considered is the grading of the final assessment that makes up the final mark (e.g., final examination, final project, final paper). An exception may occur when the Instructor of Record evaluates a piece of graded term work at the end of the

term; that grade may also be considered in a reappraisal of final grade.

A student seeking a reappraisal of a final grade should first attempt to review the final assessment with the department or faculty offering the course. After which, the student shall obtain a Reappraisal of Final Grade form from ucalgary.ca/registrar (under Student Forms). The student must indicate exactly what error was made in marking the final assessment and/or in computing the final grade. The reappraisal will only be considered if the student provides a detailed rationale that outlines where and for what reason an error is suspected.

Students requesting a reappraisal of a final grade must submit their request by the following dates:

Fall Term – March 1

Winter Term – June 30

Spring Intersession – August 15

Summer Term – October 15

Supplemental Examinations: 30 calendar days from the date the examination was written

For information relating to Law, Veterinary Medicine and the Cumming School of Medicine (MD) courses, please refer to the faculty section.

The reappraisal form shall be submitted to Enrolment Services who will forward it to the department head or dean of the faculty offering the course. Reappraisals of final grades are dealt with by the head of the academic unit in consultation with members of academic staff. Normally, the department/faculty will respond to a reappraisal request within thirty calendar days of its initiation. After the reappraisal is completed, the department shall return the form to the Registrar's Office who shall inform the student in writing of the decision.

Students should be aware that the grade being reappraised may be raised, lowered or remain the same. A student may request a reappraisal of final for a maximum of two courses in one academic year (September 1 – August 31).

I.4 Graded Term Work and Academic Assessment (final grade) Appeals

Prior to appealing a graded term work or academic assessment reappraisal decision, a student must complete the reappraisal process set out in Sections I.2 (Reappraisal of Graded Term Work) or I.3 (Reappraisal of Academic Assessments (final grades), as appropriate.

Appeals of reappraisals of graded term-work are made to the Faculty offering the course, whose Faculty Appeals Committee is the final level of appeal for graded term-work.

Appeals of reappraisals of academic assessments are made first to the Faculty Appeals Committee of the Faculty offering the course, and then to the University Appeals Committee in accordance with the Student Misconduct and Academic Appeals Policy. The University Appeals Commit-

tee is the final level of appeal for academic assessments.

Appeals of grades associated with academic misconduct, as outlined in Section K.3 (Student Academic Misconduct) must follow the process set out in the Student Misconduct and Academic Appeals Policy.

Appeals made to a Faculty Appeals Committee must be made **within ten business days** of the unfavourable reappraisal decision and in accordance with that Faculty Appeals Committee's procedures available at www.ucalgary.ca/student-appeals.

For process information and resources regarding the appeals process, visit the Student Appeals Office website: www.ucalgary.ca/student-appeals.

Students may obtain information and support with understanding the appeals process and submitting an appeal from the Student Ombuds Office. For more information, visit www.ucalgary.ca/ombuds/.

Please note that graduate students wanting to appeal decisions of the dean regarding supervision should refer to the Faculty of Graduate Studies Calendar.

J. Student Appeals to the University Appeals Committee and University Appeals Tribunal

In June, 2018, the General Faculties Council approved the Student Misconduct and Academic Appeals Policy, Faculty Appeals Policy and Procedure, University Appeals Committee Procedure, and University Appeals Tribunal Procedure. All appeals relating to academic assessments, academic progression matters, and student academic misconduct and student non-academic misconduct, as defined in the Student Misconduct and Academic Appeals Policy, will be managed under this policy effective January 1, 2019.

For process information and resources regarding appeals, please see the Student Appeals Office website at: www.ucalgary.ca/student-appeals.

Students may obtain information and support with understanding the appeals process and submitting an appeal from the Student Ombuds Office. For more information, visit www.ucalgary.ca/ombuds/.

J.1 Continued Registration While Under Appeal

Most students who appeal academic decisions shall be entitled to provisional registration to continue their studies pending the outcome of the appeal. For specific faculty regulations please refer to each faculty section of this Calendar. The student must contact the Faculty office to register in courses while under appeal. The student is required to pay all fees. If the appeal is denied prior to the end of the term, the original date of suspension, expulsion or other academic sanction shall pertain and, in the case of suspension or expulsion, the student's registration will be cancelled and

all assessed tuition fees will be credited to the student's account. The student must discontinue attending classes. If the appeal is upheld, the provisional registration will be made permanent. If the appeal is denied after a final grade has been assessed, the date of suspension, expulsion or other academic sanction will be adjusted and the student's registration in future terms will be cancelled.

Students appealing to the University Appeals Tribunal are not permitted to register while under appeal.

K. Statement on Principles of Conduct

K.1 Preamble

This statement applies to all members of the University community – including students, faculty, administrators, any category of staff, practicum supervisors, examiners, and volunteers. This statement applies in all situations where the persons are acting in their University capacities, whether or not on the University's property. It also applies to visitors or any other persons on University property, and to persons with whom the University contracts for services.

All members of the University community have a responsibility to familiarize themselves with this Statement on Principles of Conduct and to conduct themselves accordingly.

K.2 Statement

1. The University of Calgary community has undertaken to be guided by the following statements of purpose and values:

- To promote free inquiry and debate
- To act as a community of scholars
- To lead and inspire societal development
- To respect, appreciate, and encourage diversity
- To display care and concern for community

2. The University seeks to create and maintain a positive and productive learning and working environment as outlined in the University Code Conduct Policy (ucalgary.ca/policies/files/policies/code-of-conduct_1.pdf), which highlights an environment in which there is:

- Respect for the dignity of all
- Fair treatment of individuals
- Respect for academic freedom
- Respect for University Resources and the property of individuals

3. Those persons appointed by the University to positions of leadership and authority have particular responsibility, not only for their own conduct, but also for ensuring, to the extent of their authority and ability:

- That a positive and productive learning and working environment is created and maintained
- That conflicts and concerns are addressed in a positive, timely, reasonable, and effective manner

- That persons within their jurisdiction are informed of their rights and responsibilities with respect to conduct

4. The University undertakes to ensure that its policies, systems, processes, and day-to-day operations foster the goals in #1 and #2 above.

5. The University encourages and undertakes to support all members of the University community in resolving conflicts and concerns in a positive, timely, reasonable, and effective manner.

6. The University undertakes to ensure that the protection afforded by the principles of natural justice is extended to all members of the University community.

7. The University undertakes to provide resources through various offices to generate awareness related to this Statement on Principles of Conduct throughout the University community and to assist in resolving conflict in a positive way.

Note: The principles of natural justice reflect a concept that ensures fair play. The specific requirements of natural justice will often vary depending on the circumstances but are generally considered to ensure a full and fair consideration of the issue, including consideration in the absence of bias.

K.3 Student Academic Misconduct

A single offence of cheating, plagiarism, or other academic misconduct, on term work, tests, or final examinations, etc., may lead to disciplinary probation or a student's suspension or expulsion from the faculty by the Dean, if it is determined that the offence warrants such action. A student is defined as any person registered at the University for credit or non-credit courses.

K.4 Statement of Intellectual Honesty

Intellectual honesty is the cornerstone of the development and acquisition of knowledge. Knowledge is cumulative and further advances are predicated on the contributions of others. In the normal course of scholarship these contributions are apprehended, critically evaluated, and utilized as a foundation for further inquiry. Intellectual honesty demands that the contribution of others be acknowledged. To do less is to cheat. To pass off contributions and ideas of another as one's own is to deprive oneself of the opportunity and challenge to learn and to participate in the scholarly process of acquisition and development of knowledge. Not only will the cheater or intellectually dishonest individual be ultimately their own victim but also the general quality of scholarly activity will be seriously undermined. It is for these reasons that the University insists on intellectual honesty in scholarship. The control of intellectual dishonesty begins with the individual's recognition of standards of honesty expected generally and compliance with those expectations. With respect to student work in a course, it is the responsibility of the instructor to specify the academic requirements of the course.

K.5 Plagiarism/Cheating/Other Academic Misconduct

K.5.1 Definitions

1. **Plagiarism** – Plagiarism involves submitting or presenting work as if it were the student's own work when it is not. Any ideas or materials taken from another source written, electronic, or oral must be fully and formally acknowledged. Plagiarism includes but is not limited to:

(a) The work submitted or presented was done, in whole or in part, by an individual other than the one submitting or presenting the work (this includes having another impersonate the student or otherwise substituting the work of another for one's own in an examination or test),

(b) Parts of the work are taken from another source without reference to the original author,

(c) The whole work (e.g., an essay) is copied from another source, and/or,

(d) A student submits or presents work in one course which has also been submitted in another course (although it may be completely original with that student) without the knowledge of or prior agreement of the instructor involved.

While it is recognized that scholarly work often involves reference to the ideas, data and conclusions of other scholars, intellectual honesty requires that such references be explicitly and clearly noted. Plagiarism is an extremely serious academic offence.

It is recognized that clause (d) does not prevent a graduate student incorporating work previously done by them in a thesis or dissertation.

2. **Cheating** is an extremely serious academic offence. Cheating at tests or examinations includes but is not limited to dishonest or attempted dishonest conduct such as speaking to other candidates or communicating with them under any circumstances whatsoever; bringing into the examination room any textbook, notebook, memorandum, other written material or mechanical or electronic device not authorized by the examiner; writing an examination or part of it, or consulting any person or materials outside the confines of the examination room without permission to do so, or leaving answer papers exposed to view, or persistent attempts to read other students' examination papers.

3. **Other Academic Misconduct** – Other academic misconduct includes, but is not limited to, tampering or attempts to tamper with examination scripts, class work, grades and/or class records; failure to abide by directions by an instructor regarding the individuality of work handed in; the acquisition, attempted acquisition, possession, and/or distribution of examination materials or information not authorized by the instructor; the impersonation of another student in an examination or other class assignment; the falsification or fabrication of clinical or laboratory reports; the non-authorized tape recording of lectures.

4. Any student who voluntarily and consciously aids another student in the commission of one of these offences is also guilty of academic misconduct.

5. **Code of Conduct** – University policy that outlines the University's expectations with respect to the behaviour of Employees, Academic Staff Members, Students, Postdoctoral Scholars and Appointees.

K.5.2 Notations and Penalties

Where a Dean or designate is satisfied that a student is guilty of plagiarism, cheating or other academic misconduct, a notation of academic misconduct will be placed on the student's university record until the student is approved for graduation. This notation is not considered a penalty; it is for internal administrative tracking purposes and does not appear on the student's official transcript.

In addition to the notation, students may receive penalties as described below and may be required to complete an educational workshop on an aspect of academic integrity.

1. **Failing Grade** – A student may be given a failing grade on either course work (assignment, test etc.) or a course in which that student is found guilty of plagiarism, cheating or other academic misconduct. A failing grade will be applied in conjunction with other penalties mentioned in this section except when leniency is warranted. When leniency is warranted, a failing grade is the only penalty that will be applied. When a student is registered in a faculty other than that in which the course is given, a failing grade is the only penalty which shall be applied by the host faculty. A student may not avoid a failing grade by withdrawing from the course.

2. **Disciplinary Probation** – Students are entitled to proceed with their program, but only on the condition that registration will be forfeited and the student suspended or expelled, if they are found guilty of a further academic offence. A student who is placed on disciplinary probation is eligible to continue in the faculty, as per usual, after the satisfactory completion of their probationary period. This penalty shall be applied by the faculty in which the student is registered at the time of the offence and will be noted on the student transcript for the duration of the probationary period or until graduation, whichever comes first. In addition a notation of academic misconduct will be placed on the student record until graduation.

Note: If there is evidence that an offence has been committed, yet there is doubt as to the existence of a clear intention to deceive or otherwise commit an academic offence, the normal penalty will be disciplinary probation.

3. **Suspension** – Suspension takes place when a student is denied registration within a degree or other academic program for a specified period of time. A student who has been placed under suspension is conditionally eligible to reapply for admission or registration at either the end of a specified period of time or thereafter. Suspension does not

imply automatic readmission; a student must satisfy the Dean and/or the faculty concerned of their eligibility for readmission. This penalty shall be applied by the faculty in which the student is registered at the time of the offence and a notation of academic misconduct will be placed on the student record until graduation.

Note: If a student is guilty of plagiarism, cheating or other academic misconduct in circumstances which suggest a clear intention to deceive or otherwise commit an academic offence, the normal penalty will be either suspension or expulsion from the faculty. If there is more than a single offence, the normal penalty will be expulsion from the faculty, and in the most serious cases, expulsion from the University.

4. Expulsion – A student who is expelled from a faculty is dismissed permanently from the faculty with no right to apply for readmission to that faculty. This penalty shall be applied by the faculty in which the student is registered at the time of the offence and a notation of academic misconduct will be placed on the student record.

5. Effects of Suspension or Expulsion from a Faculty – A student suspended or expelled from a faculty normally may not apply or be considered for readmission to the University in another faculty, until at least twelve months after the end of the session in which the academic offence takes place.

6. Expulsion from the University – If, upon suspending or expelling a student from a faculty, the Dean and/or faculty determine that the severe sanction of expulsion from the University is warranted, such a recommendation may be made to the Vice-President (Academic), who may act to expel the student from the University. A notation of expulsion due to academic misconduct will appear permanently on the student transcript.

7. Credential Rescission – If a Faculty determines that credential rescission is warranted, the Dean (or designate) may make the recommendation to the Provost and Vice-President (Academic). The authority to approve a credential rescission rests with the Provost and Vice-President (Academic). If approved, the original conferring of a degree, diploma or certificate is permanently deleted from the student's academic record and a notation of "<Degree/Diploma/Certificate> Rescinded" and the date of rescission will appear permanently on the student transcript. Students who have a credential rescinded are prohibited from future studies at the University of Calgary.

K.5.3 Procedures

1. Identification of Students in Tests or Examinations – Invigilators of any tests or examinations may, when they have reason to believe that there is cause to do so, challenge any candidate to produce proof of identity either in the form of the University I.D. card or of some acceptable equivalent (i.e., one bearing a photograph) such as the Provincial Driver's License, Canadian Citizenship Card, Passport, etc.

If there is clear evidence that impersonation has occurred, the individual shall not be permitted to continue the examination and shall be reported immediately to the Dean of the faculty in which the course is offered or a delegate.

A student who is not able to provide acceptable proof of identity may be permitted to continue the examination provided that they undertake to provide verification of identity later. If verification is not provided, then the student will receive an "F" in the examination, and the matter will be referred to the Dean of the faculty in which the course is offered or a delegate for consideration of further disciplinary action.

2. The Responsibility of Instructors in Cases of Plagiarism, Cheating and Other Academic Misconduct – An instructor has the obligation to report immediately all suspected cases of plagiarism, cheating or other academic misconduct in their course or courses to the Dean of their faculty, or a delegate, and to the head of department or equivalent.

3. The Encouragement of the Reporting of Plagiarism, Cheating or Other Academic Misconduct – Students or other persons who consider that they have evidence of conduct which amounts to plagiarism, cheating or other academic misconduct are encouraged to report such conduct to the Dean of the relevant faculty or a delegate. An individual or group of individuals making such a report must be prepared to state the alleged facts and their reasons for suspicion in writing, and to appear before the Dean, a delegate, the appropriate faculty disciplinary body, or any University body hearing an appeal.

4. The Responsibility of the Dean of the Faculty in Which the Course is Offered – The initial responsibility for dealing with cases of plagiarism, cheating or other academic misconduct, lies with the Dean of the faculty offering the course in which the student is enrolled or a delegate, subject to structures for advice, recommendation or action devised by that faculty. Where the student is registered in that particular faculty, any disciplinary action taken will normally not be of concern to any other faculty.

5. The Relative Responsibilities of the Faculty in Which a Student Takes a Course and the Faculty in Which They are Registered at the Time of the Offence – In cases in which a student who is accused of plagiarism, cheating or other academic misconduct is registered in a faculty other than that in which the course is given, the Dean of the faculty in which they are registered shall be advised of the incident, its circumstances, and its disposition within the host faculty, and where appropriate shall take disciplinary action within their own faculty subject to structures for advice, recommendation or action devised by that faculty. This notification shall be the responsibility of the Dean of the host faculty, or a delegate.

6. The Disposition of Cases by the Faculty in Which a Student is Registered at the Time of the Offence – In alleged cases of plagiarism, cheating or other academic misconduct

the Dean or a delegate after advising the student of the allegation and its basis and providing them with copies of any documentary evidence supporting the allegation shall interview both the instructor and the student concerned. Where they are satisfied that there is conclusive evidence that the student has committed an offence, the Dean or a delegate shall, subject to any structures for advice, recommendation or action devised by that faculty, exercise authority to place on probation, suspend or expel the student from the faculty in question. The probation, suspension or expulsion will be confirmed in writing to the student at their current address, the letter to include reference to faculty and University appeal procedures. In cases in which the student has admitted the offence reference shall be made to this fact in the letter.

The Registrar will be notified of the action taken. Upon receiving notification, the Registrar is empowered to withhold the issuance of a transcript or statement of grades for the student disciplined pending the expiry of the appeal period, or exhaustion of the appeal process allowed for under K.5.5 (Student Academic Misconduct Appeals).

K.5.4 Academic Misconduct – Criminal Offence

Where there is a criminal act involved in plagiarism, cheating or other academic misconduct, e.g., theft (taking another student's paper from their possession, or from the possession of a faculty member without permission), breaking and entering (forcibly entering an office to gain access to papers, grades or records), forgery, personation and conspiracy (impersonating another student by agreement and writing their paper) and other such offences under the Criminal Code of Canada, the University may take legal advice on the appropriate response and, where appropriate, refer the matter to the police, in addition to or in substitution for any action taken under these regulations by the University.

K.5.5 Student Academic Misconduct Appeals

Appeals relating to student academic misconduct will follow the regulations in Section J. (Student Appeals to the University Appeals Committee and University Appeals Tribunal).

K.6 Disciplinary Action for Non-Academic Misconduct

All non-academic misconduct is managed under the Student Non-Academic Misconduct Policy.

Appeals relating to student non-academic misconduct will be managed as set out in Section J (Student Appeals to the University Appeals Committee and University Appeals Tribunal).

L. Integrity in Scholarly Activity

In addition to its regulations dealing with student academic misconduct, the University has a policy and procedures governing

the scholarly integrity of members of the University's faculty and persons holding postdoctoral fellowships or their equivalent. The policy and procedures are titled Integrity in Scholarly Activity and apply to both teaching and research.

L.1 Policy

The University and its members are committed both institutionally and individually to integrity in scholarly activity. Accordingly, the University has developed and implemented a policy and attendant procedures for handling cases of alleged scholarly misconduct. These are designed to recognize the differences among disciplines, to provide for fair treatment of those whose integrity is brought into question, and to protect those who set the process in motion or otherwise assist in dealing with complaints.

L.2 Scholarly Misconduct

The policy defines scholarly misconduct as including: plagiarism; fabrication or falsification of research data; conflict of scholarly interest, including suppressing the publication of the work of another scholar and improper negative reviewing of a research grant application by another scholar; and other practices that deviate significantly from those which are commonly accepted as appropriate within the scholarly communities.

As well, each faculty has definitions and guidelines which are applicable to those disciplines and activities which characterize scholarly work within the faculty. In particular, the faculty guidelines deal with the retention of original data and material products relating to scholarly activity and the authorship of published or presented work.

L.3 Summary of Procedures

Possible misconduct is to be first reported to the dean of the faculty. The dean is then responsible for assessing the report and ensuring that the prescribed procedures are followed. Two formal steps are involved, an enquiry to determine if a report warrants a full investigation followed by an investigation if warranted. At the end of an investigation, the dean is required to act on the investigating committee's report including, according to the outcome, initiating disciplinary proceedings.

The detailed procedures contain provisions with respect to the time allowed for each stage, the make-up of the enquiry and investigating committees, the rules and procedures the committees are to follow and the manner of their reporting. Appeals of the outcome of the process are possible under the provisions of the University-Faculty Collective Agreement.

L.4 Confidentiality

The policy and procedures provide for a high degree of confidentiality throughout the process. Persons who report misconduct will not be named unless the case cannot be investigated otherwise and then only with those persons' consent. Persons who are reported will not be named unless and until

the case against them has been substantiated by thorough investigation.

L.5 Information

Information about and copies of the policy and procedures can be obtained from deans and the office of the Vice-President (Research). Copies of the faculty guidelines and definitions are available from the office of the dean of the faculty concerned or the office of the Vice-President (Research).

M. Additional Regulations

M.1. Supporting Documentation and the Use of a Statutory Declaration

Students may be asked to provide supporting documentation for an exemption/special request. This may include, but is not limited to, a prolonged absence from a course where participation is required, a missed course assessment, a deferred examination, or an appeal. Students are encouraged to submit documentation that will support their situation. Supporting documentation may be dependent on the reason noted in their personal statement/explanation provided to explain their situation. This could be medical certificate/documentation, references, police reports, invitation letter, or a statutory declaration, etc. The decision to provide supporting documentation that best suits the situation is at the discretion of the student. Students cannot be required to provide specific supporting documentation, such as a medical note.

Students can make a Statutory Declaration as their supporting documentation (available at ucalgary.ca/registrar). This requires students to make a declaration in the presence of a Commissioner for Oaths. It demonstrates the importance of honest and accurate information provided and is a legally binding declaration. Several registered Commissioners for Oaths are available to students at no charge, on campus, please see ucalgary.ca/registrar.

Falsification of any supporting documentation will be taken very seriously and may result in disciplinary action through the Academic Discipline regulations or the Student Non-Academic Misconduct policy.

N. Student Communication and Responsibilities

The University of Calgary's primary method to communicate with students is electronic communications. This includes email and Student Centre notifications.

University of Calgary students are provided with a UCalgary email address. Official notifications and communications from the University of Calgary will only be sent to the UCalgary email address. Students are responsible for ensuring they set up their UCalgary email prior to the start of their first term at the University of Calgary and are accountable for reading messages sent to their UCalgary email account, or posted on their Student Centre, on a regular basis to ensure important information is not missed.

Co-operative Education/ Internship

1. Summary of Programs

Contact Information by Faculty

Faculty of Arts

Location: Social Sciences 102

Telephone: 403.220.8636 or 403.210.8509

Email: artscoop@ucalgary.ca

Web page: arts.ucalgary.ca/co-op/

Haskayne School of Business

Location: Scurfield Hall 346

Telephone: 403.220.7533

Email: hsbcoop@ucalgary.ca

Web page: haskayne.ucalgary.ca/services/career-centre/co-op

Schulich School of Engineering Career Centre

Location: Engineering C 205

Telephone: 403.220.2930

Email: engineer@ucalgary.ca

Web page: schulich.ucalgary.ca/internship/

Faculty of Science

Location: Undergraduate Science Centre
EEEL 426

Telephone: 403.220.8600

Email: usc@ucalgary.ca

Web page: ucalgary.ca/science/
undergraduate/co_op_internship

Co-operative Education Programs

Co-operative Education programs are offered in the following areas. See the faculty description for further information.

Faculty of Arts

Anthropology (BSc)

Anthropology - Social and Cultural (BA)

Ancient and Medieval History

Archaeology

Canadian Studies

Communication and Culture

Communication and Media Studies

Development Studies

Earth Sciences

East Asian Language Studies

East Asian Studies

Economics

English

Film Studies

French

Geography

German

Greek and Roman Studies

History

International Indigenous Studies

International Relations

Italian Studies

Latin American Studies

Law and Society

Linguistics

Linguistics and Language

Multidisciplinary Studies

Philosophy

Political Science

Religious Studies

Russian

Sociology

Spanish

Urban Studies

Visual Studies

Women's Studies

Haskayne School of Business

Accounting

Business Analytics

Business Technology Management

Energy and Professional Land Management

Entrepreneurship and Innovation

Finance

General

International Business Strategy

Marketing

Operations Management

Organizational Behaviour and Human
Resources

Personal Financial Planning

Real Estate Studies

Risk Management and Insurance

Risk Management: Insurance and Finance

Supply Chain Management

Faculty of Science

Actuarial Science

Ecology

Internship Programs

Internship programs are offered in the following areas. Please see faculty description for further information.

Schulich School of Engineering

Chemical

Civil

Electrical

Energy

Geomatics

Mechanical

Oil and Gas

Software

Faculty of Science

Computer Science

Introduction

Co-operative Education and Internship are optional academic programs that provide students the opportunity to enhance their education by acquiring career-related work experience before graduation. Students gain practical experience, develop a network of contacts, and obtain a better understanding of careers in their field. This program allows students the opportunity to apply knowledge and skills developed in the classroom in a practical work environment, enhancing both the academic and employment portions of their University career.

Each four month Co-operative Education/ Internship work term is registered as a Co-operative Education or Internship course. Evaluation of the Co-operative Education/ Internship course/work term is a faculty responsibility and is based on successful completion of a work term report and/or assignment(s) and satisfactory work performance. Work performance is monitored by a Career Advisor and the employer.

Pattern

Students in the Co-operative Education/ Internship program complete the normal academic curriculum while integrating a number of work terms into their program. Work terms and study sessions are full time and all students receive a salary while on a work term.

Co-operative Education students complete a minimum of twelve months and a maximum of twenty months of work experience (depending on Faculty/Department requirements), normally alternating periods of work and study starting and ending on an academic session. Internship students complete twelve to sixteen months continuous work experience between their third and fourth academic years. Co-operative Education/ Internship programs are designed to expose

Application Deadlines Chart

| | May 1 | September 15 | October 1 | October 15 | December 1 |
|---|----------|--------------|-----------|------------|------------|
| Arts | - | - | - | X | - |
| Schulich School of Engineering* | - | - | - | X | - |
| Haskayne School of Business BComm | X** X | - | - | - | X |
| Science (Ecology, Applied Chemistry and Actuarial Science) | X | - | X | - | - |
| Science – Computer Science*** | X | - | X | - | - |

*Students may apply to Engineering Internship after October 15 but must contact the Engineering Internship Centre directly regarding admission.

**Deadline for transfer students.

***Students who do not meet the application deadline should contact Computer Science department regarding admission.

students to a realistic work environment with employment occurring in all seasons of the year.

Each Co-operative Education/Internship position is evaluated as a suitable learning opportunity by the University and students continue to interact with the University for the duration of their employment. Each four-month work term is registered as a Co-operative Education/Internship course and non-refundable course fees are assessed. Courses are evaluated on a Completed Requirements/Fail (CR/F) basis. Upon successful completion of all program criteria, the Co-operative Education or Internship designation will appear on the student's academic transcript and degree parchment.

Opportunities

A variety of employment opportunities exist for Co-operative Education/Internship participants. Positions are offered in business, government, the professions and not-for-profit organizations. The number and variety of work experience positions available and advertised to Co-operative Education and Internship students varies from term to term and some positions are outside of Calgary. Students compete for job opportunities (placement is not guaranteed) and employers make the hiring decisions. Employers seek students who have relevant education, computer skills, some related work and volunteer experience, and extracurricular involvement.

Students have the option of applying to Co-operative Education/Internship positions advertised through Career Services "Career-Link", or finding their own job and having it approved as a suitable learning opportunity. Students can also apply for credit by special assessment on work experience previously completed (Engineering Internship does not offer special assessment on work experience previously completed).

2. Academic Regulations

2.1 Admissions

Information pages describing each Co-operative Education/Internship program and application forms are available on the Career Services Co-op/Internship page (ucalgary.ca/careers/co-op-internships).

Information is also available at the Engineering Career Centre (EN C 205), the Haskayne

School of Business Co-op Office (SH 346), the Undergraduate Science Centre (EEEL 426), and the Arts Co-op Office (SS 102).

Students in Bachelor of Arts and Bachelor of Science Co-operative Education programs normally apply to Co-operative Education in the second year of their program. Applications to the Haskayne Co-op Program are accepted twice a year - on May 1st and December 1st. Direct entry students normally apply during their second year of the BComm Program; change of program and transfer students apply by May 1st of the year that they apply to the business school, normally the end of their second year. Students in Schulich School of Engineering (applications accepted by October 15th) and Computer Science (applications accepted by May 1st and October 1st) Internship programs apply in third year. All students in the Faculty of Science (Ecology, Applied Chemistry and Actuarial Science) can apply during their second year by May 1st and December 1st. Students in the Faculty of Arts apply during their second year on October 15th directly through CareerLink (<https://careerlink.ucalgary.ca/login.htm>).

Students should be aware that the Career Development Workshop or equivalent is a requirement for admission. For the Faculty of Arts the pre-employment workshops are held after admission to the program.

Application Deadlines

See the Application Deadlines chart.

2.2 Requirements

Students must:

- Be registered as full-time students,
- Be registered in a faculty/department offering Co-operative Education/Internship programs,
- Meet faculty/department GPA and course entrance requirements (Consult the appropriate faculty sections of this Calendar),
- Complete the Career Development Workshop or equivalent.

Note: Students entering the Haskayne School of Business are required to complete a Co-op Orientation and workshops in lieu of the Career Development Workshop.

Students applying to Co-operative Education/Internship should also be aware of the following:

1. Students must be legally permitted to work in Canada. International students must obtain a Co-op Work Permit to be eligible for work placements.
2. Students who are registered in combined degree programs can be eligible for Co-operative Education/Internship programs if one of the majors is in a faculty or department in which a Co-operative Education/Internship program is offered.
3. Students may be required to attend a personal interview with Co-operative Education/Internship and/or the faculty to decide admissibility.
4. The University reserves the right to refuse admission to a Co-operative Education/Internship program on academic or other grounds.
5. Transfer students from other universities will be considered for admission to the Co-operative Education/Internship program. Please refer to the application deadlines for the Co-operative Education/Internship program. Transfer students applying to the Haskayne School of Business apply to the Co-operative Education/Internship program by May 1st of the year they are applying to the Haskayne School of Business. All transfer students should complete one academic session at the University of Calgary prior to a work term.

Application Process

Students must submit a completed Co-operative Education/Internship Student Application form by the appropriate deadline date. For more information on the application process, students should contact Career Services (MSC 188), the Engineering Internship Centre (SB 149), the Haskayne School of Business Co-op Office (SH 346), the Arts Co-op Office (SS 102), or the Science Co-op/Internship Office. Incomplete applications will not be accepted.

Applications for admission are reviewed by the faculty/department/internship office/Engineering Student Centre.

Admitted students pay an admission fee of \$50.00 to the Fees Office and are given access to the Co-op/Internship job postings.

Admission Appeal Procedure

Students who believe there has been an error in the assessment regarding the suitability of their admission to the program should contact the Faculty office.

No student whose application is in the appeal process will be allowed to apply for Co-operative Education/Internship positions until a formal decision on the appeal has been made.

2.3 Registration

Course Registration

Registration in Co-operative Education/Internship course(s) occurs when the student accepts a position with an organization and completes the Co-operative/Internship Work

Term Record document on Career-Link. Students who have accepted a placement obtained through the Co-operative Education/Internship placement process are required to complete a work term record immediately according to their Faculty Co-operative Education/Internship processes. The completed work term record is used by Career Services or the relevant Internship Office to ensure the student is registered in the appropriate co-op/internship courses. The appropriate tuition fees will be payable to the Fees Office.

Students registered in a Co-operative Education or Internship course are considered full-time students by the University for the purpose of student loans, Students' Union fees and Student Health and Dental Insurance coverage. Because of Revenue Canada's policy regarding the Education Tax Amount, Co-operative Education and Internship students are not classified as full- or part-time on the T22 02A form issued by the University and do not qualify for the Education Tax Amount.

2.4 Course Work

Planning Work Terms and Academic Sessions

Please refer to the appropriate Faculty section in this Calendar for information on the number and scheduling of work terms.

It is the student's responsibility to plan work terms and academic sessions in relation to course availability. The University cannot guarantee all courses will be available in all sessions.

Both Co-operative Education and Internship programs should start and end with an academic session. Students in Co-operative Education programs normally alternate between periods of work and study. Work periods can be four months or eight months (two consecutive work terms) starting in January, May and September. Students in some programs may do three consecutive work terms with permission from their department of study. Co-operative Education programs with three or four work terms have a maximum of two spring/summer work terms. Co-operative Education programs with five work terms have a maximum of two consecutive, spring/summer work terms and three summer work terms in total.

Internship programs are a minimum of twelve and a maximum of sixteen consecutive months.

Co-operative Education and Internship Courses

Each four-month Co-operative Education/Internship work term is registered as a Co-operative Education/Internship course. Co-operative Education/Internship courses are in addition to the normal requirements for a degree program.

Each work term (Co-operative Education/Internship course) is approximately four months in duration beginning either in January, May or September. Courses are graded on a Completed Requirements/Fail (CR/F)

basis. This grade is not included in the calculation of the grade point average.

Once students are registered in a Co-operative Education/Internship course (i.e., have accepted a placement), they are committed and expected to fulfill their commitment. If the placement accepted is for more than one four-month work term, students are registered in the appropriate number of Co-operative Education/Internship courses and are committed to complete all of them.

Students cannot withdraw from a Co-operative Education/Internship course (or leave a work term/placement) without permission from both Co-operative Education/Internship Program Office and the Faculty. (See 2.8 Withdrawal Policies.)

Transfer Credit for Co-operative Education/Internship Courses

Students transferring to the University of Calgary from another university, or transferring from one program to another, should consult with the faculty regarding possible transfer credits. To receive a degree with "Co-operative Education" students must complete a minimum of one four month work term under the University of Calgary. Some faculties may require more than the minimum of one work term and each faculty determines the maximum number of transfer credits allowed.

To receive a degree with "Internship" designation students must complete a minimum of twelve consecutive months of work while enrolled in the University of Calgary Engineering Internship Program.

Credit by Special Assessment

Students who feel that they have previous relevant work experience and who wish to receive formal university credit may apply for credit "by special assessment". Students should consult THEIR FACULTY CO-OPERATIVE EDUCATION/INTERNSHIP OFFICE for instructions regarding the application and review process. Prior work experience will be evaluated by the faculty in which the student is registered. Students granted credit "by special assessment" will be assessed the course fees for Co-operative Education/Internship courses. Note: special assessment is not available for the Engineering Internship Program.

2.5 Student Standing

Co-operative Education/Internship Course Evaluation

Successful completion (Completed Requirements) of a co-operative education course/work term requires submission of work term reports and/or assignments and satisfactory job performance.

Work Term Report: The work term report is evaluated by a faculty member. Provided that it meets established criteria, the report is marked a Pass. If it is sub-standard, a Re-submit is required.

Failure to meet the work term report requirements results in a grade of "F" for the course. The student will be required to withdraw from the program and will not

receive Co-operative Education/Internship designation.

Work Term Assignments: Students in the Schulich School of Engineering will be expected to complete assignments as part of their internship courses. Work term assignments must be submitted by specified dates, and will be evaluated by staff in the Schulich School of Engineering. Provided an assignment meets established criteria, the assignment will be deemed to be a Pass. If an assignment is sub-standard, a re-submit is required. Students should attempt to submit all course components by their respective specified deadlines. All required coursework must be submitted no later than the date on which classes end in the term as specified in the Academic Schedule. All coursework submitted within a 5 day period following the date when classes end will only be accepted if an extension was previously approved by the course instructor. A Deferral of Term Work form must be completed, should an extension of time be sought for completion of any term work beyond the 5 day period. Deferrals may only be granted at the discretion of the Dean of the Schulich School of Engineering, and will normally not exceed thirty days. In the event a student receives permission from the Dean to defer their coursework, they will receive a final grade of incomplete (I) during the deferral period. If all course components are not satisfactorily completed and submitted prior to the end of the deferral period, the final course grade will be changed to a fail (F). A final grade of "F" in an internship course will prevent students from registering in subsequent internship courses. If eligible, the student may choose to repeat the course in the subsequent term. Not clearing a final grade of "F" from an Internship (INTE) course will result in the student being removed from the internship program, and may result in the student being withdrawn from the Engineering program. Note that a student may only receive a final grade of "F" once during the internship period and still remain in the internship program.

Job Performance: The student's job performance is assessed by the employer. Performance evaluations are conducted periodically during the internship and submitted to the Internship Office. An Advisor monitors performance feedback to determine whether any follow-up action is required.

If a student receives unsatisfactory performance or is asked to leave employment by an employer, the University will investigate the situation and determine the appropriate grade. If a student is asked to leave employment for "just cause" a grade of "F" will be given and the student will be required to withdraw from the Co-operative Education/Internship program. The student will not receive Co-operative Education/Internship designation and a permanent notation will be placed on the transcript of record that the student was required to withdraw from the Co-operative Education/Internship program.

Maintenance Requirements

Students must meet minimum GPA and course requirements established by faculty and maintain full-time status on academic sessions. Students who do not meet these requirements will be required to withdraw from the Co-operative Education/Internship program.

2.6 Graduation

Students who successfully complete the Co-operative Education/Internship program as required by the faculty in which they are registered will receive Co-operative Education or Internship designation on their transcripts and degree parchment.

2.7 Fees and Expenses

Admission fee: \$50.00

Course fees are assessed for each Co-operative Education/Internship course at the time that the course is registered. Fees are payable on the normal fee deadlines. For more information refer to the Tuition and General Fees section of the Calendar.

Co-operative Education/Internship course fees are non-refundable and are due and payable, even if the student subsequently withdraws from the course(s) or is required to withdraw from the Co-operative Education/Internship program. (See 2.8 Withdrawal Policies).

In addition to the Co-operative Education/Internship course fees, other fees including full-time Students' Union fees will be assessed. Campus Recreation and Athletic fees are optional. Students may opt out of Health and Dental Insurance in the Fall and Winter Terms with proof of alternate coverage. Students who register for other University courses while on a work term, will be assessed other course fees on a fee per course basis. Students should refer to the Tuition and General Fees section of this Calendar for more information.

2.8 Withdrawal Policies

The Co-operative Education/Internship program strongly values the commitment that is made between students and Co-op/Internship Employers. Our withdrawal policies have been set to encourage students to be accountable for their commitments.

Students cannot withdraw from a Co-operative Education/Internship course (or leave a work term/placement) without permission from both their Co-operative Education/Internship Program Office and the faculty.

Permission is only granted in cases of serious illness, domestic affliction or for academic issues. Students who receive permission to withdraw will receive credit for completed course/work terms. They will be withdrawn from the current registered course/work term. They will also be dropped from registered course/work terms not yet started and no fees will be charged for these course/work terms.

Withdrawal with Permission

(a) Student contacts their appropriate co-operative or internship office;

(b) A University representative meets with the student and employer to investigate and try to resolve issues when feasible or appropriate and seek a resolution;

(c) When the issue meets the criteria above and cannot be resolved, faculty approval can be given for the student to withdraw without penalty.

Withdrawal without Permission

Students who leave a work term (withdraw from a Co-operative Education or Internship course) without permission will be assigned a grade of "F" on the course and will be dropped from subsequent courses. No fees will be charged for the subsequent courses.

In addition students will be required to withdraw from the Co-operative Education/Internship program and will not receive Co-operative Education/Internship designation, notwithstanding the fact that they had completed the minimum work term requirements for the program. A permanent notation will be placed on the transcript of record that the student was required to withdraw from the Co-operative Education/Internship program.

Tuition and General Fees

The following are the approved tuition and general fees for the University of Calgary. The University reserves the right to change fees without notice. Changes to fees will be reflected in this Calendar. This is considered the official fee listing and will be used for all fee assessments and appeal considerations.

P.1 Undergraduate and Graduate Fees

Tuition and General Fees (2018 - 2019)

For more information, see below.

P.1.1 Undergraduate Tuition and General Fees

See the Undergraduate Tuition and General Fees Chart.

P.1.2 Graduate Tuition and General Fees

Graduate students are assessed tuition and general fees as listed below. Refer to the Academic Schedule for payment deadlines or consult with the Faculty of Graduate Studies regarding payment plans.

Thesis-Based Students

Students in a thesis-based degree (master's or doctoral) program are assessed annual tuition fees. All tuition fees are pro-rated over four terms: one-third in Fall, one-third in Winter, one-sixth in Spring and one-sixth in Summer.

Students in thesis-based master's programs (excluding MBA) are assessed tuition fees for the first year. After the first year, annual continuing fees will apply. Students in the thesis-based MBA program are assessed tuition fees in both the first and second years. After the second year, continuing fees will apply (see P.1.2.1 Graduate Program-Specific Fees).

Students in Doctor of Philosophy programs are assessed tuition fees until the term immediately following admission to candidacy (Spring/Summer are counted as one term). For information on admission to candidacy, see section K. (Candidacy) of the Graduate Studies Calendar. In all subsequent years, students will be assessed annual continuing fees.

The tuition fees below are the annual rates and apply to all thesis-based programs except for those specified in P.1.2.1 Graduate Program-Specific Fees.

| | Canadian and Permanent Residents | International Students |
|---------------------------------|----------------------------------|------------------------|
| Tuition fees (except MBA) | \$5,593.50 | \$12,695.88 |
| Tuition fees (thesis-based MBA) | \$11,463.12 | \$25,293.24 |
| Continuing Fees | \$1,627.38 | \$3,693.48 |

Please note that differential fees may be assessed for courses offered by certain faculties or programs. All students who take these courses are required to pay the differential fee. Students in thesis programs who take courses with differential fee assessments will be required to pay the differential fee assessment in addition to their regular full or continuing fees.

Course-Based Students

Students in most course-based master's programs pay tuition fees on a per course basis. Students in course-based programs are assessed tuition fees by course, based on the level of the course; therefore, undergraduate students taking a graduate-level course (600 or above) will pay the Graduate Studies course fee. Graduate students taking an undergraduate-level course will pay the undergraduate course fee.

Some programs may charge additional program fees, refer to the Program-Specific Fee table.

Please note that differential fees may be assessed for courses offered by certain faculties or programs. All students who take these courses are required to pay the differential fee. Students in thesis programs who take courses with differential fee assessments will be required to pay the differential fee assessment in addition to their regular full or continuing fees (with the exception of Haskayne PhD students).

The fees below apply to all course-based programs except for those specified in P.1.2.1 Graduate Program-Specific Fees.

| | Canadian/Permanent Residents | International Students |
|---------------------------------------|------------------------------|------------------------|
| Graduate 3-unit course fee | \$714.78 | \$1,622.64 |
| Graduate 6-unit course fee | \$1,429.56 | \$3,245.28 |
| Internship course 1.5 unit course fee | \$357.39 | \$811.32 |

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General Fees

| Fees assessed per term | Full-Time | Part-Time |
|------------------------|-----------------|-----------------|
| U-Pass | \$151.00 | - |
| Campus Recreation | \$35.90 | \$35.90 |
| Athletics* | \$24.65 | \$24.65 |
| Student Services Fee | \$150.00 | \$50.00 |
| | \$361.55 | \$110.55 |

*Athletics fee assessed Fall and Winter Terms only.

| Graduate Student fees assessed annually | Full-Time | Part-Time |
|---|-----------------|-----------------|
| Graduate Students Association (GSA) | \$176.84 | \$147.00 |
| Group Insurance | \$11.00 | - |
| Health Insurance | \$326.58 | - |
| Dental Insurance | \$264.09 | - |
| Graduate Bursary Donation* | \$10.00 | \$10.00 |
| Total | \$788.51 | \$157.00 |

P.1.2.1 Graduate Program-Specific Fees

In addition to the program-specific fees listed below, courses offered off-campus or through distance delivery methods may have

Undergraduate Tuition and General Fees Chart (2018–2019)

Undergraduate students are assessed tuition and general fees as listed in the Tuition and General Fees chart below. Please refer to the Academic Schedule for payment deadlines. Fees are assessed based on the level of the course; therefore, undergraduate students taking a graduate-level course (600 or above) will pay the Graduate Studies course fee. Graduate students taking an undergraduate-level course will pay the undergraduate course fee.

2019 - 2020 Rates (effective Fall Term 2019)

Tuition

| | Per 3 Units | Co-op/ Intern/Off-Campus (4 Months) | Law (3 units) | Vet Medicine (per term) | IFP* (3 units) |
|-------------------------------|-------------|---|------------------|----------------------------|-------------------|
| Canadian Student Tuition | \$538.59 | \$423.00 | \$1,026.24 | \$5,432.10 | \$538.59 |
| International Student Tuition | \$611.28 | \$479.10 | \$1,136.94 | N/A* | \$612.00 |
| Visa Differential | \$1,222.56 | \$958.20 | \$2,273.88 | N/A | \$612.00 |

*Regular tuition fees apply to IFP Pathways.

| Undergraduate Market Modifier* | |
|---|----------|
| Haskayne School of Business (Per 3 Units) | \$238.83 |

*The Government-approved market modifier for Haskayne undergraduate courses was implemented in Fall of 2011. Continuing students admitted prior to Fall 2011 do not pay this fee.

| Doctor of Medicine Program (MD) (per Cumming School of Medicine terms) | | | | | | |
|--|--------|--------------|--------------------|-----------|--------------|--------------------|
| Canadian Student Tuition | Year 1 | Fall | \$7,506.09 | Year 2, 3 | Summer | \$5,004.06 |
| | | Winter | \$7,506.09 | | Fall | \$5,004.06 |
| | | | | | Winter | \$5,004.06 |
| | | Total | \$15,012.18 | | Total | \$15,012.18 |

General Fees

| Fall and Winter (per term) | Full-Time* (9+ units) | Part-Time (3-6 units) | Co-op/ Intern/Off-Campus (4 Months) | MD Program |
|----------------------------|--------------------------|--------------------------|---|-----------------|
| Students' Union General | \$32.50 | \$14.50 | \$4.00 | \$5.50 |
| Students' Union Ancillary | \$23.75 | \$17.75 | \$23.00 | \$23.25 |
| U-Pass | \$151.00 | - | - | \$151.00 |
| Campus Recreation | \$35.90 | \$35.90 | - | \$35.90 |
| Athletics | \$49.29 | \$49.29 | - | \$49.29 |
| Donation | \$10.00 | \$7.00 | \$10.00 | \$10.00 |
| Student Services Fee | \$225.00 | \$75.00 | - | \$225.00 |
| | \$527.44 | \$199.44 | \$37.75 | \$499.94 |

| General Fees Assessed Per Year | Full-Time* (9+ units per term) | Co-op/ Intern/Off-Campus (4 Months) | MD Program |
|--------------------------------|-----------------------------------|---|------------|
| Student Health Plan | \$103.00 | \$103.00 | \$103.00 |
| Student Dental Plan | \$90.00 | \$90.00 | \$90.00 |

*Includes Law and Veterinary Medicine

| Summer Term (per intersession*) | Full-Time (6+ units) | Part-Time (3 units) | Co-op/ Intern/Off-Campus (2 Months) | MD Program (4 months) |
|---------------------------------|-------------------------|------------------------|---|--------------------------|
| Students' Union General | \$7.50 | \$7.00 | \$4.00 | \$1.25 |
| Students' Union Ancillary | \$15.25 | \$15.25 | \$15.25 | \$15.25 |
| U-Pass | \$145.00 | - | - | \$145.00 |
| Campus Recreation | \$17.95 | \$17.95 | - | \$35.90 |
| Donation | \$7.00 | \$7.00 | \$7.00 | \$10.00 |
| Student Services Fee | \$75.00 | \$37.50 | - | \$150.00 |
| | \$267.70 | \$84.70 | \$26.25 | \$357.40 |

*Fees are assessed individually for each the spring intersession and the summer intersession, except for the Doctor of Medicine (MD). Spring/Summer Intersession: Six (6) units are considered full-time and three (3) units are considered part-time during the intersession.

tuition charges that differ from the regular tuition rates.

All fees below are annual (per 12-months) unless stated otherwise. For additional information on fees and payment plans please see: <http://grad.ucalgary.ca/current/tuition>.

Cumming School of Medicine

| | Canadian/ Permanent Resident | International |
|---|------------------------------------|---------------|
| Master of Disability and Community Studies | | |
| Community Rehabilitation per 3-units | \$1,212.00 | N/A |
| Continuing fees from Year 4 onwards at registration anniversary | \$1,212.00 | N/A |
| Master of Pathologists' Assistant | | |
| Annual fee | \$8,500.00 | \$17,000.00 |
| Per 3 units | \$714.78 | \$1,622.64 |

School of Architecture, Planning and Landscape*

| | Canadian/ Permanent Resident | International |
|---|------------------------------------|---------------|
| Post-Baccalaureate Certificate in Built and Landscape Heritage | | |
| Per 3 units | \$1,750.00 | \$3,975.00 |
| Post-Baccalaureate Certificate in Designing Smart and Secure Communities | | |
| Per 3 units | \$2,175.00 | \$4,950.00 |
| Post-Baccalaureate Certificate in Sustainable Urban Design | | |
| Per 3 units | \$2,175.00 | \$4,950.00 |

*Students admitted to the MEDes program prior to 2009 pay an annual continuing fee of \$814.00 (Canadian/Permanent Resident) or \$1,846.64 (international).

Haskayne School of Business

| | Canadian/ Permanent Resident | International |
|---|------------------------------------|---------------|
| Doctor of Business Administration (Per Year for Years 1-3) | | |
| Continuing fee (Year 4) | \$10,000.00 | \$10,000.00 |
| Continuing fees (Year 5 onwards) | \$5,000.00 | \$5,000.00 |
| Executive MBA (per 8-months) | \$34,500.00 | \$34,500.00 |
| Executive MBA (Global Energy) (program fee) | \$108,383.00 | \$108,383.00 |
| Thesis-based MBA | | |
| Annual fee (Years 1 and 2) | \$11,463.12 | \$25,293.24 |
| Continuing fee | \$1,627.38 | \$3,693.48 |
| Course-based MBA* | | |
| Per 3 units | \$1,623.12 | \$2,880.78 |

*The Government-approved market modifier for the MBA program was implemented in Fall of 2011. Students admitted prior to Fall 2011 pay \$1,302.33 (Canadian/Permanent Resident) or \$2,880.78 (international) per 3 units.

Faculty of Law

| | Canadian/ Permanent Resident | International |
|--|------------------------------------|---------------|
| Undergraduate (600 level, per 3 units) | \$1,026.24 | \$3,410.82 |
| Graduate Level (700+ level, per 3 units) | \$714.78 | \$1,622.64 |

Network and Software Security

| | Canadian/ Permanent Resident | International |
|--|------------------------------------|---------------|
| Graduate Certificate in Network Security | | |
| Per 3 units | \$3,000.00 | \$4,000.00 |
| Graduate Certificate in Software Security | | |
| Per 3 units | \$3,000.00 | \$4,000.00 |

Faculty of Nursing

| | Canadian/ Permanent Resident | International |
|---|------------------------------------|---------------|
| Graduate Certificate in Advanced Nursing Practice I and II | | |
| Per 3 units | \$1,850.00 | \$2,500.00 |
| Post-Master's Nurse Practitioner Diploma | | |
| Annual Fee | \$714.78 | \$714.78 |
| Per 3 units | \$714.78 | \$1,622.64 |

School of Public Policy

| | Canadian/ Permanent Resident | International |
|--|------------------------------------|---------------|
| Master of Public Policy | | |
| Annual Full-Time fee | \$20,492.88 | \$30,739.35 |
| Annual Part-Time fee | \$10,246.44 | \$15,369.68 |
| MPP course fee (per 3 units) (For students not in MPP program) | \$1,615.98 | \$2,424.02 |

Sustainable Energy Development

| | Canadian/ Permanent Resident | International |
|--|------------------------------------|---------------|
| MSc in Sustainable Energy Development | | |
| SEDEV (per 3 unit course) | \$1,785.00 | \$2,785.00 |

Werklund School of Education

| | Canadian/ Permanent Resident | International |
|--|------------------------------------|---------------|
| EdD (Distance Delivery) | | |
| Annual fee (years 1 - 4) | \$11,221.00 | \$14,540.55 |
| Continuing fee (from Year 5 onwards at registration anniversary) | \$4,041.00 | \$5,233.81 |

| | | |
|--|------------|------------|
| Education Certificate (Distance Delivery) | | |
| Continuing fee from Year 2 onwards at registration anniversary | \$1,212.00 | \$1,212.00 |
| Education Diploma (Distance Delivery) | | |
| Continuing fee from Year 3 onwards at registration anniversary | \$1,212.00 | \$1,212.00 |
| Master of Education (Distance Delivery) | | |
| Continuing fee from Year 4 onwards at registration anniversary | \$1,212.00 | \$1,212.00 |
| Distance per 3 units | \$1,212.00 | \$1,212.00 |
| Master of Education - Educational Psychology | | |
| Distance per 3 units | \$1,212.00 | N/A |
| Continuing fee from Year 4 onwards at registration anniversary | \$1,164.00 | N/A |
| Master of Counselling (Distance Delivery) | | |
| Annual fee | \$1,578.00 | N/A |
| 3 units | \$1,212.00 | N/A |
| Post-Bachelor's Diploma - Educational Psychology | | |
| One-time fee on admit term | \$488.00 | |

P.1.2.2 Graduate Fee Regulations

Transfers between Course-based and Thesis-based Master's Programs

Students transferring from a thesis-based route to a course-based route within a program will be assessed according to the tuition regulations for course-based programs from the first term of registration in the course-based program.

Students who have completed fewer than 18 units in a course-based route will be assessed full fees for one year from the date of transfer to a thesis route within the program. Annual continuing fees will be assessed for subsequent years. Students who complete 18 units or more in a course-based route will be assessed annual continuing fees from the date of transfer into a thesis-based route within the program.

Courses Taken Extra-to-Program

Students in a thesis-based or a course-based program who wish to take a course that is extra to their degree program will be assessed a regular course fee in addition to the regular graduate tuition assessment. For more information, see D.1 Registration in the Graduate Studies Calendar.

Late Charges

Students who do not register by the posted deadline will be assessed a late registration fee of \$60.00.

Students who make course changes (i.e., additions or substitutions) after the posted deadline will be assessed a fee of \$60.00 for each Change of Registration form.

Leaders in Medicine

Leaders in Medicine students are permitted to register in both the MD and the graduate program simultaneously for one term for the purpose of taking the final examination without graduate fees being assessed.

Academic Staff, Post-doctoral Fellows and Visiting Scholars (Graduate Studies)

Academic Staff, Post-doctoral Fellows and Visiting Scholars (not to be interpreted as visiting students) are eligible to audit courses without payment of fees, and are not required to seek admission to the University, but must obtain written permission from the instructor of the course on a "Permission to Audit" form obtainable online from the Office of the Registrar (ucalgary.ca/registrar/student-forms). Such audits will not be recorded on an official transcript. Academic staff and visiting scholars who wish to have an audit course recorded on an official transcript must pay the regular audit course fees.

P.1.2.3 Health and Dental Insurance

Each student is responsible for their own basic health-care coverage and must be enrolled in a provincial health plan or its equivalent. The Graduate Student Association arranges an extended health and dental benefit plan which is compulsory for full-time students unless proof of alternative coverage (i.e., Blue Cross, Clarica), with their name and UCID on it, is submitted to the GSA online (gsa.ucalgary.ca/optingout) or in person (MacKimmie Tower, Room 214) before the fee payment deadline.

Family Coverage must be applied for before the fee deadline. Part-time students are automatically excluded from the Health and Dental Plan, but may apply to the GSA to purchase this coverage. Application must be made before the fee payment deadline.

P.1.2.4 Donations

The Graduate Bursary Donation is an optional \$10.00 per year for full- and part-time graduate students.

Students who wish to opt-out must do so in writing through the Faculty of Graduate Studies before the Fee Payment deadline of your Annual Registration by emailing graduate@ucalgary.ca.

P.1.3 Audit Fees

See Audit Fees chart.

P.1.4 Undergraduate Co-operative Education/Internship Course Fees

A non-refundable fee of \$50.00 is payable upon admission to the Co-operative Education or Internship program. Students will see this charge in their online Student Centre.

Full-time Co-operative Education/Internship students are required to pay Students' Union fees and Student Health and Dental Plan fees. Campus Recreation, Athletic, UPass and Student Services fees are not charged; however, if the student concurrently registers in other University of Calgary courses, all compulsory general fees will be charged.

Co-operative Education/Internship fees are non-refundable once the student has registered in the course.

P.1.5 Off-Campus Fees

Tuition Fees for off-campus credit courses will be assessed at the time of registration in the course(s).

General fees for off-campus courses will be assessed at the Co-op/Internship rate as outlined in the chart here: P.1.1 Undergraduate Tuition and General Fees.

Off-campus students who wish to obtain the UPass, may do so by contacting Enrolment Services.

P.1.6 Exchange Students

The amount of tuition fees assessed and the institution to which fees are to be paid are determined by the Exchange agreement that is in effect at the time of the commencement of the program.

University of Calgary outgoing undergraduate exchange students will automatically be opted out of the Student Health and Dental Plan. To opt into the plan, students must complete the appropriate opt-in form available from the Student Health and Dental Plans Office or from their exchange co-ordinator. Students will automatically be assessed the Bursary Fund donation and if they wish to opt out, must complete the opt-out form available in the Student Centre. INCOMING Exchange students will not be automatically assessed for either the Stu-

dent Health and Dental Plan fee. Students should contact the Student Health and Dental Plans Office to inquire about insurance options.

Inquiries regarding assessments should be directed to the Exchange student advisors in Enrolment Services.

P.1.7 Visiting Students

Visiting students who take courses are assessed general fees and tuition fees on a per course basis.

Visiting student researchers are assessed campus recreation, student services fee and AD&D Insurance (graduate students only) each term. See A.3 Admission Categories in the Graduate Calendar for further information.

P.1.8 International Students

Students who are not Canadian citizens or permanent residents of Canada are required to pay a differential fee in addition to the international tuition fee.

Canadian student status includes: a) Canadian Citizens; b) Permanent Residents; c) conventional refugees.

International students who are dependents of foreign Consular officials will be assessed fees at the Canadian student rates.

International students whose immigration status changes will be required to provide proof of the new status before a change in fee assessment will be made. Students must provide a signed copy of their permanent residence papers or citizenship papers to enrolment services or the Faculty of Graduate Studies prior to the fee payment deadline for term. Requests received after the fee payment deadline will take effect during the next academic term in which the student is registered.

For 2018/19 the base international tuition fee for a 3 unit course at the undergraduate level: \$611.28; graduate level: \$811.32.

Note: Applicants who are in Canada on a Work Permit or dependents of persons on a Work Permit are required to pay international fees, unless the dependents are Canadians or Permanent Residents.

P.1.9 Senior Citizens

The University of Calgary waives tuition fees related only to undergraduate, bachelor's level courses for senior citizens. The senior citizen must be 65 years of age or older by the fee deadline for the term they are registered in. Students are still responsible for the appropriate application fee and any mandatory supplementary course fees (if applicable).

Students' Union, Campus Recreation, Athletic and Student Services fees are waived; however, if senior citizens wish to use any of these services, they must pay the required fees. Any senior citizens who register as full-time students will be assessed the Students' Union Bursary, as well as the Health and Dental Plan fees and must opt out using forms available at Enrolment Services

Audit Fees Chart

Audit fee rates per 3 units:

| Undergraduate-level (except MD and JD) Canadian Students | Undergraduate-level (except MD and JD) International Students | Graduate-level Canadian Students | Graduate-level International Students |
|--|---|----------------------------------|---------------------------------------|
| \$ 269.31 | \$916.92 | \$357.39 | \$811.32 |

In addition to the tuition fees, students auditing courses must pay appropriate general fees as indicated in the fee chart. For courses with a differential fee assessment (e.g., MBA courses) a student who audits a course will be assessed half the current course fee and half the current differential fee.

(<https://www.mystudentplan.ca/uofcalgary/en/home>).

P.1.10 Mandatory Supplementary Fees for Courses

Course supplementary fees may be charged to students for materials or services associated with particular courses or sections of courses. Students will be notified of the additional fees in one of two ways: (1) fees are viewable under Class Notes in the Student Centre; (2) once registered in a class with a supplementary fee, the fee will be indicated in the Finances section of the Student Centre. Departments/instructors are not permitted to charge mandatory supplementary course fees which are not assessed by the Registrar's Office. Departments may charge students a laboratory breakage fee when appropriate. The laboratory breakage fee should be approved by the Dean (or designate) and listed in the course outline.

Mandatory supplementary fees for courses are due by tuition fees payment deadline. In most cases, they are non-refundable after the last day to drop a course for the term(s); however, some courses may have earlier deadlines for refunds. When an earlier date is used it will be listed in the Class Notes section of the course schedule and on the faculty/department website.

The following general principles apply to course supplementary fees:

1. Tuition fees should provide for credit instruction, which includes the following:
 - a. Evaluation of work/performance which includes practicums, marking of papers, examinations and other assignments.
 - b. Laboratories which include laboratory assistance or supervision, laboratory materials or supplies.
 - c. Resources to support instruction. This includes, but is not limited to materials or services required as a result of the method of teaching used by the instructor, classroom audio visual equipment, models for art classes, practice rooms, films and videotapes used for instructional purposes, course outlines, etc.
 - d. Library facilities and related basic services.
2. Mandatory supplementary fees may be considered for special materials or services not included under general principle #1, if deemed necessary for the successful completion of the course as approved by the Provost & Vice-President (Academic).
3. Optional supplementary costs are those the student has the option of obtaining from a variety of sources. Examples include but are not limited to art supplies, laboratory coats, goggles, project materials, medical scrubs.

Off-campus courses may be exempt from these principles as needed to accommodate different course structures. Questions regarding mandatory supplementary fees

can be directed to the department initiating the fee.

P.1.11 Haskayne School of Business Fee

Commerce courses at the 200, 300, 400 and 500 level (excluding Tourism Management) will be assessed a tuition differential fee of \$238.83 per 3 units in addition to tuition fees. Continuing students admitted to the Haskayne School of Business prior to Fall 2011 are exempt from paying the tuition differential fee.

P.1.12 Faculty of Law

In addition to tuition and general fees, there is a mandatory \$75.00 per term Law Career Services Fee for all Law students.

Tuition fees for the Faculty of Law are assessed on a per-course basis. JD students should refer to the Undergraduate Tuition and General Fees chart.

Non-JD students, including those in a graduate program in the Faculty of Law, who register in a JD course, must also pay the law program differential portion of the tuition fees.

International students pay a visa differential in addition to the international student tuition and general fees.

P.1.13 Faculty of Nursing

Students admitted to the University of Calgary nursing program at Medicine Hat College campus are assessed by, and pay fees to, the University of Calgary.

P.1.14 Postgraduate Medical Education

A tuition fee of \$485.23 per term, to a maximum of \$970.46 over a 12-month period, will be charged to all residents/fellows enrolled in postgraduate medical education based on the number of months active in the program.

The above fees will be assessed at the time of registration. Fees will be waived on the basis of a reciprocity for Canadian medical school residents taking electives through the Cumming School of Medicine.

Residents/fellows will be sent a confirmation of their fee assessment with the fee payment deadline noted on the assessment. All fees are payable to the University of Calgary. See <http://ucalgary.ca/registrar/finances> for payment options.

P.1.15 Schulich School of Engineering

Full-time Engineering Students pay a mandatory \$10.00 fee per term for the Engineering Students' Society.

P.1.16 Faculty of Social Work (Edmonton and Lethbridge Divisions)

Students who are admitted to the University of Calgary's Faculty of Social Work program but are attending the University of Lethbridge or the University of Alberta campus will be assessed University of Calgary tuition fees. Students will also be assessed the

student donation, but can opt out of this fee by completing the online Change of Donation form. Students are also automatically enrolled in the Student Health and Dental Plan (see P.2.2). University of Calgary general fees will not be assessed; however, students will be responsible for paying the required general fees of the institution that they are attending. These fees will be visible in the online Student Service Centre and can be paid via standard University of Calgary payment options.

Inquiries regarding general fees may be directed to the program co-ordinator at the institution which the student is attending.

P.2 General Fees

P.2.1 Students' Union (SU) Fees

Undergraduate students (excluding Medicine - MD) are required to pay Students' Union general fees each term. This is to maintain the operations of the Students' Union. In addition students pay Students' Union Ancillary Fees. This consists of eight separate fees previously approved by student referendum to support external third parties or specific SU programs. Fee amounts are directly transferred by the Students' Union to appropriate committees or third parties to administer as follows:

| Fee | Full-Time | Part-Time |
|------------------------------|----------------|----------------|
| Radio Station (CJSW) | \$5.00 | \$5.00 |
| Library Assistance Fee | \$3.75 | \$2.00 |
| Campus Television (NUTV) | \$4.50 | \$4.25 |
| Student Newspaper (Gauntlet) | \$4.50 | \$2.75 |
| Student Legal Assistance | \$1.75 | \$1.75 |
| Refugee Student Program | \$2.25 | \$1.00 |
| Volunteer Services | \$0.75 | \$0.50 |
| Committee of 10,000 | \$0.50 | \$0.00 |
| Total | \$23.00 | \$17.25 |

More information is available on the Students' Union's website at <https://www.su.ucalgary.ca/>.

P.2.2 Student Health and Dental Plan Fees

All full-time undergraduate students in 9 units or more per Fall and Winter Term at the University of Calgary are automatically enrolled in the Student Health and Dental Plan when they register for classes. For the convenience of students, payments are made in two installments, September and January. The premium for each plan is assessed and charged annually; therefore the process for waiving fees for the year must be done prior to the fee deadline.

The Health Plan provides students with a comprehensive set of health insurance benefits (prescription drugs, paramedical services, such as physiotherapy, chiropractic treatment, and many other benefits). This plan is supplementary to any provincial health-care plan. The Managed Dental Plan provides students with dental coverage through a specific network of dental clinics

throughout Calgary. For eligible students starting in the Fall Term, coverage begins September 1 and ends August 31 provided there has been no change in their eligibility status from the Fall Term to the Winter Term. In cases where there has been a status change, coverage may end December 31. For eligible students starting in the Winter Term, coverage begins January 1 and ends August 31.

Optional family coverage (for one or both plans) is also available for an additional fee. This procedure must be completed by the fee payment deadline for the term.

If proof of comparable coverage is presented to the Undergraduate Health and Dental Plan Office, prior to the opt-out deadline, students can opt-out of the Health and/or Dental Plan. The opt-out deadline is the fee payment deadline for the term. Continuing full-time students need only opt out of the plans once. An eligible student can opt back into the plan unconditionally prior to the fee deadline every Fall Term or within 30 days of loss of comparable coverage during the year. The health and dental insurance fees are non-refundable if a student withdraws from a term.

For further details, please contact:

Undergraduate Health and Dental Plan Office (352 MacEwan Student Centre)

Telephone: 403.220.3906

Fax: 403.282.2729

Email: uofcalgaryplan@mystudentplan.ca

Website: <https://www.su.ucalgary.ca/programs-services/student-services/health-dental/>

P.2.3 Student Services Fee

The Student Services Fee is mandatory for all undergraduate, medicine and graduate students. Students are assessed on a per term basis for the fall and winter terms and per intersession during the summer term based on full-time or part-time status.

The Student Service Fee is a comprehensive fee that covers a number of services provided to University of Calgary Students.

P.2.4 Campus Recreation and Athletic Fees

Descriptions of the Campus Recreation and Athletic programs are to be found in the Student and Campus Services section of this Calendar.

Payment of the athletic fee entitles part-time students to free admission to interuniversity athletic games.

Students completing all University of Calgary courses off-campus are not required to pay campus recreation or athletic fees.

Campus recreation and athletic fees are non-refundable if a student withdraws from a term.

P.2.5 UPass (Universal Transit Pass)

In a 2002 referendum, the Students' Union and Graduate Students' Association members supported the introduction of the

compulsory UPass program for all full-time students. The UPass program requires each full-time student attending the University of Calgary to pay a compulsory fee, per term. In return for a reduced rate transit pass.

More information can be found at: <http://ucalgary.ca/unicard/upass>.

Eligibility For the UPass

Full-time Students

To be eligible you must be a full-time undergraduate student registered in three courses for the Fall or Winter Terms or two courses for the Summer Term (including Spring Intersession) with at least one of the courses being on-campus, or a graduate student with full-time status.

Students who are issued the UPass when their status is full-time and subsequently change their status to part-time are no longer considered eligible to use the UPass program. Students are required to return this sticker to the Parking and Transportation services counter by the posted deadline. Failure to return this sticker will result in a hold placed on the student account. Students that change their status from part-time to full-time must wait 48 hours for the change to appear in the system before they can obtain a UPass.

Co-operative Education, Internship and Distance Education Students

Co-operative education, internship and distance education students are not automatically assessed the UPass fee (during the terms away from campus), but are eligible to have the fee added for the applicable session(s) (Fall, Winter or Summer). To do so, make sure you are registered in a COOP or INTE course or as a distance education student; contact Enrolment Services to have the UPass fee added to your student account and after the system is updated (1-2 days), the UPass sticker may be picked up at the UPass Centre or Parking and Transportation Services. If you are registered in a campus-based course at the University of Calgary while you are on a work term or during your distance education program, you will automatically be assessed the compulsory UPass fee.

P.3 Donations

P.3.1 Bursary Funds

All students (including Open Studies and Visiting students) are being asked to make a tax deductible donation to the Student Peer Assistance Bursaries (undergraduate students) and the Graduate Students' Association Bursary Fund (graduate students). Full-time undergraduate students are automatically levied \$10.00 per Fall and Winter Term; part-time undergraduate students and Summer Term (including Spring Intersession) students are levied \$7.00 per term. Full- and part-time graduate students are levied \$10.00 per year. The monies raised will be used to provide bursaries for undergraduate and graduate students in financial need. Change or cancellation of donation forms are available at Enrolment Services (ucalgary.ca/registrar/student-forms) and must be

submitted on or before the term fee deadline to opt out of the fee. The donation is not refundable after the deadline for payment of fees.

P.3.2 Calgary Engineering Endowment Fund

All Engineering students are being asked to make a tax deductible donation to the Calgary Engineering Endowment Fund. Full- and part-time undergraduate students (excluding Open Studies and Diploma students) are automatically levied \$25.00 per Fall and Winter Terms. The monies which are raised will be put into an endowment fund with the interest being used towards improving the Engineering undergraduate program. The donation is not refundable after the deadline for payment of fees. Change or cancellation of donation forms are available at the Schulich School of Engineering Office and Enrolment Services or online at ucalgary.ca/registrar/student-forms and must be submitted on or before the term fee deadline to opt out of the fee.

P.4 Fee Regulations

P.4.1 Payment of Fees

Fees are due by the fee payment deadline specified for each term. Consult the Academic Schedule for fee payment deadline information. Students who are receiving government student assistant must have their student loan confirmed in their Student Centre by the fee payment deadline to avoid interest charges.

Note: Some courses may have earlier fee payment deadlines or drop restrictions. These are noted in the Class Notes section of the Schedule of Classes.

P.4.2 Method of Payment

Students may only pay their fees through online banking, International fund transfer, cheque, money order and bank draft. Cheque, debit and bank drafts payments may be made in-person by visiting Enrolment Services

For detailed information on how to pay fees visit: www.ucalgary.ca/registrar/finances/tuition-fees/pay-your-fees.

If fees are to be paid from government student loans, the University of Calgary must confirm funding prior to the fee payment deadline. Student loans will be confirmed electronically with a pre-approved remittance amount. A remittance amount is paid directly to the University toward the student account. No interest accrues if payment is received within 30 days of the fee deadline. Payments received after 30 days are subject to late interest from the term fee deadline. Students are responsible for any amount outstanding in excess of the remittance amount or if loan funding is declined.

Students are responsible for all fees assessed by the University of Calgary and affiliates. The University of Calgary will not withdraw students from their current course registrations for non-payment or non-attendance.

P.4.2.1 Third-Party Sponsors

Sponsored students are students who have their education funded by a third party, such as a company, agency or foreign government. If fees are paid by a third-party, students will need to submit a sponsorship letter to Student Receivables prior to the term fee payment deadline. Sponsorship letters must be renewed once per year, usually in September.

For more information on paying fees by a sponsorship visit www.ucalgary.ca/registrar/finances/tuition-fees/sponsors.

P.4.3 Late Payment of Fees

Students whose fees are not paid by the term fee deadlines and who have not confirmed financial assistance will accrue interest on the outstanding balance at the rate of 1 per cent per month. Interest is calculated on the daily outstanding balance of \$75.00 or more and is not compounded.

Students with an outstanding balance will have a hold placed on their record and services will be restricted (see B.3 Withholds). Students will receive email messages to their ucalgary.ca email address on a monthly basis if there is an outstanding balance. Interest rates are subject to change without prior notice.

For more information visit ucalgary.ca/registrar/finances/tuition-fees/late-fees-and-payment-issues.

P.4.4 Delinquent Student Accounts

Any current or former student with an overdue debt to the University of Calgary, including any administrative department, the Students' Union or the Graduate Students' Association, will not be allowed to register, will not receive transcripts of grades or parchments at graduation and may also be denied access to other University services until the outstanding account is settled in full, or in exceptional circumstances an acceptable payment arrangement is made. Delinquent student accounts that are 120 days past due, will receive a final notice in the mail and the balance will be forwarded to an external collection agency.

Students are encouraged to consult with Enrolment Services if they are having difficulty meeting their financial obligations.

P.4.5 Fee Refunds

Tuition or general fee refunds will be made for courses dropped up to and including the course drop deadline as outlined in the Academic Schedule. If a credit balance for the term remains on your account, you can request a refund through the Student Centre.

Student loan or a scholarship recipients will be reviewed prior to refunds being issued to ensure the refund is in alignment with student loan or scholarship regulations.

After the course drop deadline no refund of any tuition or general fees will be made.

Graduate thesis-based students who withdraw from individual courses will not have

any changes made to their fee assessment for the year.

Graduate thesis-based students who withdraw from program will have tuition fees assessed to the end of the term in which they withdraw. If the student withdraws from program before the fee payment deadline, the tuition fees for that term will be refunded.

For more information visit ucalgary.ca/registrar/finances/tuition-fees/refunds.

Awards and Financial Assistance

Undergraduate Awards

Location: MacKimmie Block 117

Telephone: 403.210.7625

Email: ucawards@ucalgary.ca

Website: ucalgary.ca/registrar/finances/awards

Financial Aid (Government Student Loans)

Location: MacKimmie Block 117

Telephone: 403.210.7625

Email: financialaid@ucalgary.ca

Website: ucalgary.ca/registrar/finances/student-loans

Graduate Student Awards Office

Location: Earth Sciences, Room 1010

Website: grad.ucalgary.ca/awards

The University of Calgary supports students through scholarships, bursaries and awards and participates in government student loan programs. Programs are available to recognize outstanding achievement, community service and leadership and provide financial support to students in need.

Students are encouraged to develop a plan for financing the costs of university from their first term through to the completion of their program. To access financial assistance, apply for awards and government student loans well before the start of the academic year and be aware of the application deadlines for awards and government student loans. Although each student's needs and resources differ, the University provides a list of general fees and expenses. Refer to the Tuition and General Fees section in this Calendar for details.

Q.1 Awards for Undergraduate Students

Q.1.1 Types of Awards and Requirements

Scholarship: Offered in recognition of academic standing. To be considered for a scholarship, a student must normally present a minimum GPA of 3.20.

Bursary: Offered on the basis of clearly demonstrated financial need and satisfactory academic achievement. To be considered for a bursary, a student must present a minimum GPA of 2.60 and complete the financial information section of the awards application.

Competitive Award: Requires the submission of an online awards application. Academic standing and other criteria such as financial need, field of study, extra-curricular activities and contribution to community and/or campus life may be considered.

Nominated Award: No awards application is required. The faculty or department recommends recipients to Undergraduate Awards.

Q.1.2 Awards Application Procedure

The Online Award application is available through my.ucalgary.ca and must be submitted by the respective deadlines. Applying for admission will give access to apply for awards. Admission to the University of Calgary is not required before applying for awards.

Q.1.3 Award Eligibility

Undergraduate Award eligibility may be based on the following:

- Academic Merit:
 - Entering students from high school – based on admissions average.
 - Transfer students – based on admissions GPA.
 - Continuing students – based on GPA from previous Fall and Winter Terms with a minimum completion for 24 units.
- Full-time Registration – registered in at least 9 units in both Fall and Winter Terms for the year the award is awarded.
- Financial Need – determined based on information provided the online awards application.
- Other potential criteria may include but are not limited to:
 - Extra-curricular activities
 - Leadership
 - Field of Study

Q.1.4 Award Payment Information

For most award competitions, the award funds are split into two equal payments over Fall and Winter Terms and are automatically applied to outstanding tuition and fees. Excess award funds are processed in October (Fall Term) and in February (Winter Term) by direct deposit to the recipient's bank account. With the exception of certain prizes and scholarships for graduating students, or if otherwise stated in the award condi-

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tions, payment of awards is contingent upon recipients maintaining full-time enrolment at the University of Calgary through the upcoming Fall and Winter Terms. Exceptions to these registration requirements are made for students participating in official exchanges and term abroad programs where tuition is paid to the University of Calgary.

Payment of tuition and fees is normally the first charge against undergraduate awards.

Award recipients must provide their banking information so excess award funds can be electronically deposited. This must be completed and updated through my.ucalgary.ca. Students who do not update or provide electronic banking information will experience a delay in excess award funds.

Q.1.5 Policy and Regulations

Undergraduate awards are distributed equitably among the most deserving students, and adhere to the terms of reference.

If a student is granted an award, the University of Calgary reserves the right to release pertinent recipient information to award donors, high schools, provincial funding bodies, University of Calgary faculty and administrative offices and public news agents. Specific information may be used by the university for promotional purposes.

Award recipients who no longer meet the program/registration/course load requirements, due to extenuating circumstances, may wish to submit an official awards appeal. Contact Undergraduate Awards directly by email: ucawards@ucalgary.ca. Students with incomplete grades are not considered for awards.

The University of Calgary assumes liability for the payment of scholarships, bursaries, prizes and other awards only to the extent that gifts from donors or returns from investments for these purposes will permit.

Q.1.6 Award Competitions

Award competitions for entering or continuing undergraduate students at the University of Calgary are listed below.

- President's Admission Scholarships

- IB Diploma Scholarships
- University of Calgary International Entrance Scholarships and Awards
- High School Awards:
 - Prestige Awards:
 - Seymour Schulich Academic Excellence Scholarships
 - Seymour Schulich Community Service/Entrepreneurial Awards
 - Chancellor's Scholarships
 - Leader in Health Sciences Scholarships
 - Ena Lee Leader in Business Scholarships
 - High School Awards
- Undergraduate Awards for Continuing Students
- Faculty of Veterinary Medicine Awards
- Cumming School of Medicine Bursaries
- Medical Elective Awards
- Athletic Awards
- Convocation Awards for Graduating Undergraduate Students

For a complete listing of undergraduate awards, including names, numbers, values and criteria, visit <https://www.ucalgary.ca/registrar/finances/awards>.

President's Admission Scholarships

President's Admission Scholarships are offered to students admitted to the University of Calgary directly from high school on the basis of their high school grades and who are entering the first year of an undergraduate degree program in the Fall Term. Entering students with an admission average of 95 per cent or higher are eligible to receive a President's Admission Scholarship valued at \$5,000 (non-renewable).

IB Diploma Scholarships

IB Diploma Scholarships valued at \$3,500 each are offered to students entering first year in any undergraduate degree program in the Fall Term who are admitted directly from high school. The student must have completed an IB Diploma and achieved a minimum score of 35 to be eligible for consideration.

University of Calgary International Entrance Scholarships and Awards

International Entrance Scholarships and Awards valued at \$60,000, \$15,000 (renewable annually) and \$10,000 (non-renewable) are offered to international students entering first year in the Fall Term in any undergraduate degree program. Students entering the International Foundations (IFP) program, formerly English for Academic Purposes (EAP) are not eligible for these awards.

Prestige Awards

Seymour Schulich Scholarships and Awards

Seymour Schulich Academic Excellence Scholarships and the Seymour Schulich Community Service/Entrepreneurial Awards

are prestigious renewable awards offered to students applying to the University of Calgary on the basis of their high school grades and entering the first year of a Bachelor of Science (BSc) degree program in the Schulich School of Engineering in the Fall Term.

Seymour Schulich Academic Excellence Scholarships are based on exceptional academic merit. Seymour Schulich Community Service/Entrepreneurial Awards are based on academic merit as well as contribution to school life, community service and/or entrepreneurial talent.

Chancellor's Scholarships

Chancellor's Scholarships are prestigious renewable awards offered to students applying to the University of Calgary on the basis of their high school grades and entering the first year of an undergraduate degree program in the Fall Term.

Leader in Health Sciences Scholarships

Leader in Health Sciences Scholarships are prestigious renewable awards offered to students applying to the University of Calgary on the basis of their high school grades and who are entering the first year of the Bachelor of Health Sciences degree program in the Cumming School of Medicine in the Fall Term.

Ena Lee Leaders in Business Scholarships

This scholarship was established by the Lee family to recognize the leadership and academic ability of students pursuing an undergraduate degree at the University of Calgary's Haskayne School of Business.

High School Awards

The University of Calgary offers scholarships and bursaries to students applying to the University on the basis of their high school grades and information provided in the online awards application.

Undergraduate Awards for Continuing Students

The University of Calgary offers scholarships and bursaries to students continuing in their undergraduate degree program.

Eligibility: Open to students continuing in their undergraduate degree program after successfully completing the previous Fall and Winter Terms as a full-time student at the University of Calgary. A minimum GPA of 3.20 is required for scholarships and 2.60 for bursaries. The majority of these awards require the completion of a minimum of 24 units of academic course work; applicants with a verifiable permanent disability are considered for these awards upon completion of a minimum of 18 units of academic course work.

Spring and summer courses are not used in the calculation of a scholarship average for awards purposes, nor can they be used to reduce course load requirements.

Co-op and Internship Program Students:

Co-op Program: Students in co-op programs are eligible to apply for these awards

after successfully completing study terms in the previous Fall and Winter Terms as a full-time student at the University of Calgary. Co-op students who participated in a work term offered by the University of Calgary in either the previous Fall Term or Winter Term may be eligible to apply for these awards; please contact Undergraduate Awards (ucawards@ucalgary.ca) to verify eligibility requirements.

Internship Program: Students in internship programs are eligible to apply for these awards after successfully completing study terms in the previous Fall and Winter Terms as a full-time student at the University of Calgary. Internship students who participated in a work term offered by the University of Calgary in either the previous Fall Term or Winter Term may be eligible to apply for these awards; please contact Undergraduate Awards (ucawards@ucalgary.ca) to verify eligibility requirements.

Students participating in a 12- or 16-month internship offered by the University of Calgary are eligible to apply for these awards just prior to returning to full-time study at the University of Calgary. Grades earned in the previous Fall and Winter Terms before the start of the internship are used to calculate a scholarship average.

Official Exchange Programs: University of Calgary students who participated in an official exchange program in either the previous Fall Term or Winter Term are eligible to apply for these awards. Transferable courses from the host institution are combined with those from the University of Calgary to calculate a scholarship average. Students who participated in an official exchange over both terms are not eligible.

University of Calgary students who attended another post-secondary institution in either the previous Fall Term or the previous Winter Term, and did not participate in an official exchange, are not eligible for these awards.

Students entering the first year of an after-degree program are not eligible for these awards. However, these students are encouraged to apply after completing a minimum of one year of the after-degree program.

Students with a previous degree who are entering the Doctor of Veterinary Medicine (DVM) program are not eligible. DVM students should apply after completing their first year of full-time studies in the Faculty of Veterinary Medicine. See Q.1.7 Faculty of Veterinary Medicine Awards for more information.

Students with a previous degree who are enrolled in the Faculty of Law JD program are not eligible. JD students should apply for Faculty of Law Awards. See Q.1.8 Faculty of Law Awards for more information.

Students with a previous degree who are enrolled in the Doctor of Medicine (MD) program are not eligible. MD students should apply for Cumming School of Medicine Bursaries. See Q.1.9 Cumming School of Medicine Awards for more information.

Q.1.7 Faculty of Veterinary Medicine Awards

The University of Calgary offers scholarships and bursaries to students enrolled in the Doctor of Veterinary Medicine (DVM) program in the Faculty of Veterinary Medicine.

- Eligibility: Open to students entering or continuing in the Doctor of Veterinary Medicine program at the University of Calgary. Students entering the first year of the program are eligible for nominated awards only. Students continuing in second, third or fourth year are eligible for nominated awards and competitive undergraduate awards, which require an award application.

Q.1.8 Faculty of Law Awards

The University of Calgary offers scholarships, awards and bursaries to students enrolled in the Faculty of Law JD program.

Q.1.9 Cumming School of Medicine Awards

Q.1.9.1 Bursaries

The University of Calgary offers bursaries to students enrolled in the Doctor of Medicine (MD) program in the Cumming School of Medicine.

Students wishing to apply for the competitive Medical Elective Awards submit a separate application; refer to the "Medical Elective Awards" section in this Calendar for details.

- Eligibility: Open to students entering or continuing in the Doctor of Medicine (MD) program at the University of Calgary.
- Students in year two or three of the Doctor of Medicine program must be in satisfactory academic standing to be eligible for these awards.
- Students entering the Bachelor of Health Sciences or Bachelor of Community Rehabilitation program (admitted on the basis of their high school grades) are not eligible for these awards and should apply for High School Awards (refer to the "High School Awards" section of this Calendar for details).
- Students continuing in the Bachelor of Health Sciences or Bachelor of Community Rehabilitation program are not eligible for these awards and should apply for Undergraduate Awards for Continuing Students (refer to the "Undergraduate Awards for Continuing Students" section of this Calendar for details).

Q.1.9.2 Medical Elective Awards

The University of Calgary offers awards to students enrolled in the Doctor of Medicine (MD) program in the Cumming School of Medicine who are participating in a medical elective.

- Eligibility: Open to students continuing in the Doctor of Medicine (MD) program who are participating in a medical elective approved by the Undergraduate Medical Education (UME) office.

Q.1.10 Athletic Awards

The University of Calgary offers awards to student athletes enrolled full-time who are participating on Dinos athletic teams. Student athletes may be eligible for other awards at the University of Calgary – refer to the academic award categories listed elsewhere in this Calendar.

Athletic Awards are offered annually and are subject to U Sports regulations. For further information, contact the Director of Athletics, Faculty of Kinesiology (knesinfo@ucalgary.ca).

Eligibility:

Entering student athletes: Students entering an undergraduate degree program in the Fall Term at the University of Calgary directly from high school must have a final admission average of 80.0 per cent or greater on a minimum of 18 units of transfer credit, as calculated by the Admissions Office.

Entering students who are officially transferring into a recognized University of Calgary undergraduate degree program from another post-secondary institution must have an official transfer GPA of 2.00 or greater, as calculated by the Admissions Office.

Students in their first year of studies in an undergraduate degree program at the University of Calgary who do not meet either of the above two requirements may be nominated in May of year one to receive a "First Year Athletic Award." To be eligible, a minimum GPA of 2.00 completed on at least 18 units taken at the University of Calgary over the previous Fall and Winter Terms is required.

Continuing student athletes: Non-entering students continuing in a recognized undergraduate degree program (years two, three, four, etc.) must have earned a minimum GPA of 2.00 on at least 18 units completed at the University of Calgary over the previous Fall and Winter Terms.

Visiting students or students attending the University of Calgary on a Letter of Permission from another university are not eligible for University of Calgary Athletic Awards.

Student athletes who participate in Coop or Internship work terms are encouraged to contact Undergraduate Awards directly (ucawards@ucalgary.ca) in advance of their work term for information about qualifying for athletic awards. Eligibility varies on a case-by-case basis.

Q.1.11 Awards for Graduating Students

Convocation Awards for Undergraduate Students

Medallions presented at convocation are among the most prestigious of University awards. These awards reflect the highest academic distinction earned by a student in a particular discipline.

Medallions are presented at the spring convocation ceremonies in June, with the exception of the University of Calgary-Qatar medallions, which are presented at the fall convocation ceremony in November.

Students who graduated at the previous fall convocation ceremony are considered for convocation medallions on the same basis as those who graduate at spring convocation.

Gold Medallions: Each faculty awards one gold medallion to the student graduating with the highest distinction in scholarship.

Silver Medallions: Each department (or equivalent unit) awards one silver medallion to the student graduating with the highest distinction in scholarship in their program.

Eligibility: For students completing their undergraduate degree program requirements with academic excellence at the University of Calgary. Each faculty and department determines its own definition of academic excellence and establishes guidelines for the selection of medallion recipients, with consideration to the following criteria:

- Grade point average
- Course load
- Minimum number of University of Calgary courses taken

Application: No application required. Students are nominated by their faculties. It is the responsibility of the University's undergraduate Awards Office Committee in Enrolment Services to select recipients for the Governor General's Silver Medallions, the Muriel Kovitz Prize, and the Lieutenant Governor's Gold Medallion.

Q.2 Graduate Studies Awards

See the Faculty of Graduate Studies website. Information concerning Graduate Studies Awards can be found at: grad.ucalgary.ca/awards.

Q.3 Financial Aid

Q.3.1 Government Student Loans

The Financial Aid office facilitates the confirmation and disbursement of approved government student loans enabling students to receive their government-approved loan funding.

Student loans are available to Canadian citizens or permanent residents who are studying full- or part-time in a degree-granting program. Programs not leading to a degree (such as Continuing Education programs are not eligible for government loan funding).

Students apply for loans through their home province/territory of residence (not the province where you will be attending university) and are considered for both federal and provincial loans and a variety of grants.

Loans: are determined and awarded based on financial need. Loans remain interest free while studying full-time but must be repaid upon graduation or any break in study longer than 6 months.

Grants: are determined and awarded based on financial need and other criteria. Grant eligibility is automatically assessed with a student loan application. Grants do not have to be repaid.

Alberta Students

Alberta residents who require financial assistance to pursue post-secondary education may obtain student loans by applying online through Student Aid Alberta. Students submit one loan application and may be eligible to receive any combination of Federal loans, provincial loans and grants.

Students with questions about loan eligibility and the application process can contact Student Aid Alberta directly for more information.

Student Aid Alberta
Box 28000 Station Main
Edmonton, AB T5J 4R4
Telephone: 1-855-606-2096
Website: studentaid.alberta.ca

Out-of-Province Students

Students who reside in a province other than Alberta are eligible for government student loan funding and can apply through their home province or territory of residence.

Students submit one loan application and may be eligible to receive any combination of Federal loans, provincial loans and grants.

Students with questions about loan eligibility and the application process can contact their provincial loan office directly for more information. Additional information can also be found on the CanLearn website.

National Student Loan Service Centre (NSLSC)
PO Box 4030
Mississauga, ON L5A 4M4
Telephone: 1-888-815-4514
Website: canlearn.ca

Part-Time Students

The Federal government offers loan and grant funding options for part-time students. Loans are interest bearing and can be approved to cover tuition, general fees, books and supplies (educational costs) only. Federal grants for part-time students are awarded on the basis of financial need and provide for tuition, fees, books, transportation, child care and incidentals. Visit the Federal CanLearn website for more information (canlearn.ca).

Alberta students must apply using a paper loan application and must have the University of Calgary complete one section of the application before it can be submitted to Student Aid Alberta for consideration. Visit the Student Aid Alberta website for more information and to obtain a paper application (studentaid.alberta.ca).

For all other provinces, part-time student loans may be available. Contact your provincial lender for further information.

Q.3.1.1 Loan Confirmation and Disbursements

Once approved, all students are notified of loan disbursement amounts and dates from their lender in writing. Student loan borrowers should review this information carefully to ensure that any approved loan amounts or disbursement dates conform to the

University of Calgary's published fee deadlines. Regardless of method of payment, all students must ensure they arrange to pay tuition and fees by the deadline.

At the time of confirmation, the Financial Aid Office will remit funds from the loan to pay any current and past-due fees at the time of confirmation. Students receiving multiple loan disbursements for the loan study period may have current term fees remitted from the loan to cover these educational costs. Students receiving only one loan disbursement for the loan study period may have both term fees remitted from the loan. All loan borrowers are responsible for monitoring the Student Centre when expecting a loan disbursement to ensure that all fee balances are paid in full by the fee deadline. If there are excess funds applied to a student account, a refund request form is available at ucalgary.ca/registrar/finances/tuition-fees/refunds. If there are excess funds on a student's account and the terms of the loan agreement have been breached, the credit will be refunded to the loan provider.

Students with a confirmed loan agreement prior to the published fee deadline for that term receive an automatic 30-day fee deferral. Any outstanding balance remaining after 30 days is subject to late interest and terms in accordance with the University of Calgary fee policy (see the Tuition and General Fees section of the Calendar). Students without a confirmed loan are not eligible for a fee deferral.

Q.3.1.2 Maintaining Previous Loans

Previously borrowed full-time student loans remain interest and payment free while studying full-time, even if student does not borrow subsequent loans. To ensure that interest-free status continues during full-time study, students must provide adequate proof of enrolment to their lenders. This is done by a) having a subsequent full-time loan confirmed by the school; or b) completing confirmation of enrolment for interest-free status completed by the school. Students who require the latter confirmation can visit <http://ucalgary.ca/registrar/finances/student-loans> for up to date information on how this can be requested.

Part-time students with previous Alberta student loans may reinstate their Alberta loans to interest-free status by having a paper Form B completed by Enrolment Services (MB 117).

Interest-free status can only be confirmed 30 days prior to the start of a study period (with the exception of BC (interest-free status can be confirmed 26 days prior to the start of a study period) and Ontario (interest-free status can be confirmed on the first day of the study period)). Interest-free status can only be requested for a current study period and cannot be completed retroactively.

Q.3.1.3 Loan Repayment

Student loan repayment begins six months after a borrower ceases full-time studies. Repayment is managed by the student and co-ordinated with the lender(s) who provided the student loan funding.

If a borrower is having difficulties repaying their student loans they should contact their lender(s) immediately. Borrowers may qualify for a repayment assistance plan to help them avoid defaulting on their loan repayment agreement.

Repayment Assistance Plan (RAP)

The Repayment Assistance Plan is provided to assist students in keeping their student loan debt at a manageable level. The plan provides students with short-term assistance if they have temporary financial challenges and long-term support if they have persistent financial challenges. Students can apply for RAP at any time during their repayment term. For more information contact the National Student Loan Service Center at 1-888-815-4514 or visit: studentaid.alberta.ca/repaying-your-loan/repayment-options/ (Alberta borrowers) or canlearn.ca/eng/after/repaymentassistance/rpp.shtml.

Q.3.2 U.S. Student Funding

Students who are citizens or permanent residents of the United States have several funding options while attending the University of Calgary. Students who are dual citizens of Canada and the United States are encouraged to explore opportunities through the Canada Student Loans (canlearn.ca) program first.

For more information visit our website at ucalgary.ca/registrar/finances or email usloans@ucalgary.ca.

William D. Ford Federal Direct Loans

As a Title IV eligible foreign school, University of Calgary is able to facilitate the disbursement of four types of loans under the Direct Loans Program.

- **Direct Subsidized Loans** are loans made to eligible undergraduate students who demonstrate financial need to help cover the costs of higher education at a college or career school.
- **Direct Unsubsidized Loans** are loans made to eligible undergraduate, graduate, and professional students, but in this case, the student does not have to demonstrate financial need to be eligible for the loan.
- **Parent PLUS Loans** are loans made to parents of dependent undergraduate students to help pay for education expenses not covered by other financial aid.
- **Graduate PLUS Loans** are loans made to graduate or professional students to help pay for education expenses not covered by other financial aid.

Students must first establish eligibility by completing a Free Application for Student Financial Assistance (FAFSA) on the Federal Student Aid website (fafsa.ed.gov). Once complete, students must submit a Direct Loans application to the Financial Aid Office for funding assessment and approval.

Sallie Mae

Students who are ineligible for Direct Loans, or who need to borrow additional funding to

meet the cost of attendance can apply for a Sallie Mae Smart Option Student Loan.

For more information visit our website at ucalgary.ca/registrar/finances.

Veterans Affairs GI Bill

The University of Calgary supports veterans of the US Armed Forces in obtaining their GI bill benefits while attending studies.

All programs must be approved through the Department of Veterans Affairs before a student is eligible for funding. As this process can take up to six months, VA funded students who have applied to the University of Calgary are encouraged to contact the US Financial Aid Office as soon as possible.

For more information visit our website at ucalgary.ca/registrar/finances or contact the US Financial Aid Office at usloans@ucalgary.ca.

Q.3.3 Student Budgeting

For the purposes of determining financial aid eligibility, the government uses a set standard of living costs for rent, utilities, food and clothing for each month of full-time study in the loan study period. In addition, educational expenses (tuition, fees, books and supplies) are calculated for the loan study period. Resources such as savings, part-time earnings, scholarships or bursaries, parental assistance, investment income, etc. may be used in calculating loan eligibility. Many provinces have an expected student contribution (resource) amount, regardless of actual contribution. All students are expected to have a financial plan (budget) in place for covering all necessary living and educational expenses before commencing studies. It is the students' responsibility to plan to meet all expenses not fully covered by approved student loan funding. Visit Enrolment Services (MB 117) to access a variety of budgeting tip sheets and handbooks, or visit: alis.alberta.ca/pdf/cshop/StretchYourDollars.

Any student who experiences an unexpected emergency expense or extenuating circumstance beyond their control that precludes them from meeting their pre-established financial plan while in studies should visit Enrolment Services (MB 117) to explore temporary emergency funding options, such as a Student Emergency Loan.

International Foundations Program

The International Foundations Program (IFP) focuses on students who meet the admission requirements for their University of Calgary degree faculty, except for the requirement of English language proficiency. IFP provides two admission options to the University of Calgary, as well as language and course support within the University's academic programs, for students whose first language may not be English. These two options are outlined below.

A. Students in **IFP Pathways** gain direct admission to the University of Calgary's Schulich School of Engineering, Haskayne School of Business, or Faculty of Science degree programs and complete academic English in IFP Pathways while they are studying their first year courses.

AND

B. **IFP Bridging** offers English language courses and support for those students who are academically qualified for admission to their faculty, with the exception of meeting the English Language Proficiency requirements. Students can take IFP Bridging courses before, during or after starting the application process for their degree program. Completion of IFP Bridging meets the University of Calgary's English Language Proficiency requirements for admission.

English language proficiency scores submitted during the admission process will be used for placement in the appropriate tier.

Beyond IF's focus on helping students meet the University's English language entry requirements, the program also offers additional academic programs as noted in R.2 IFP Program Option Chart.

R.1 Admission

Refer to A.11 English Language Proficiency in the Admission section of this Calendar for information regarding University of Calgary English Language Proficiency requirements.

Refer to A.11.1 International Foundations Program in the Admission section of this Calendar for information regarding IFP English Language Proficiency requirements.

A. IFP Pathways

Students who meet the admission requirements for the Haskayne School of Business, Schulich School of Engineering, or Faculty of Science degree programs, see A.5 and the minimum English language

proficiency scores as outlined in A.11.1, may be admitted to the first year of an undergraduate academic program concurrent with English language and support courses.

Refer to the IFP website: <http://werklund.ucalgary.ca/ifp/> for a step-by-step guideline on how to apply for IFP programs.

B. IFP Bridging

Students who meet the admission requirements for a faculty as outlined in A.5, except for the requirement of English Language Proficiency, can begin IFP Bridging after their degree application has been assessed for admission, with the condition of meeting the English language requirement prior to degree start. This route is available for the Faculties of Arts, Kinesiology, Schulich School of Engineering, Sciences and Graduate Studies. Students submit their application for admission for IFP Bridging by the deadlines as listed in A.3, as well as all required documentation in support of the application. Students begin this IFP Bridging program starting in September.

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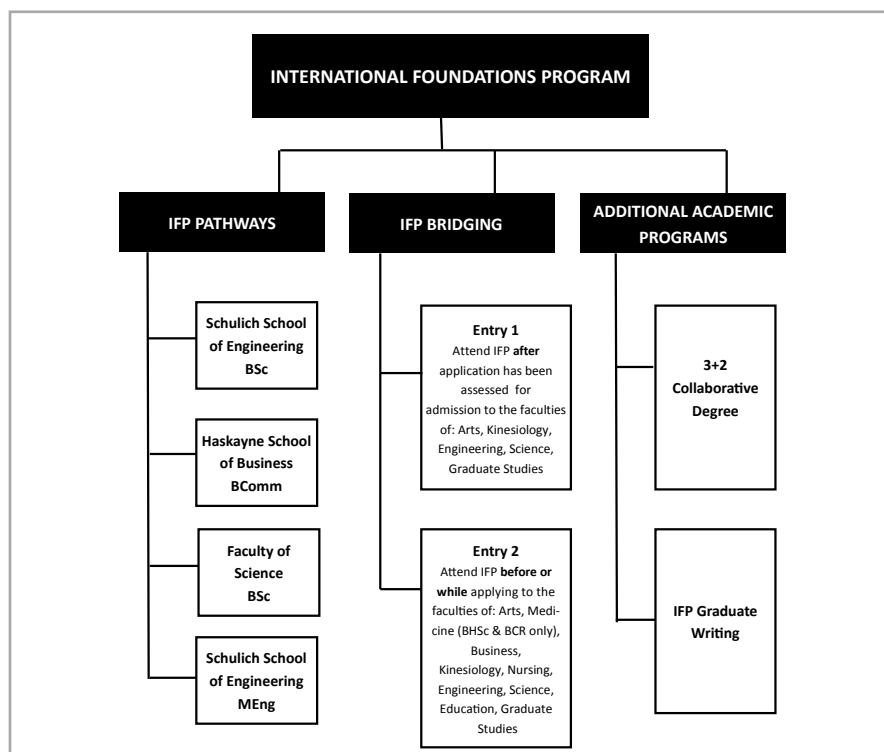
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Students can begin IFP Bridging before or while they are applying for their University of Calgary degree program. Students apply using the Open Studies Application for Admission and submit all required supporting documentation by the deadline. Refer to A.3.B for deadline dates. Students using this entry route can begin IFP Bridging starting in September, January or May.

Note that IFP Bridging does not guarantee admission to a degree program.

IFPX courses can only be used for admission or as prerequisites for a period of two years from course completion date.

Refer to the IFP website: <http://werklund.ucalgary.ca/ifp/> for a step-by-step guideline on how to apply to an IFP Bridging Program.



R.2 Program Option Chart

Click here to view the International Foundations Program Structure Chart.

R.3 International Foundations Program Fees

A. IFP Pathways

IFP Pathways students will be assessed regular tuition and general fees as listed in the Tuition and General Fees chart. For detailed information on tuition fees see section P. Undergraduate Tuition and General Fees.

B. IFP Bridging

IFP Bridging students will be assessed IFP tuition and general fees as listed in the Tuition and General Fees chart. For detailed information on tuition fees see section P. Undergraduate Tuition and General Fees.

R.4 Program Structure

R.4.1 IFP Pathways - Schulich School of Engineering

Students admitted to IFP Pathways with the Schulich School of Engineering complete a structured curriculum that includes engineering courses combined with intensive English language and academic course support.

IFP Pathways Engineering students will take first-year core engineering courses within the Schulich School of Engineering, concurrently with English language and support courses within IFP over a two-year period. Language and academic course support consists of 4 unpaired courses and 10 paired courses:

- Unpaired courses focus on foundational academic communication skills, including reading, listening, speaking, and composition.
- Paired courses focus on language and study skills for the successful completion of Engineering subject-specific courses.

Grades for IFP Pathways courses are not used in the calculation of grade point averages for degree programs unless specifically allowed by that program. In addition, IFP Pathways courses may not be used for credit toward a degree program unless specifically allowed by that program.

Students admitted to IFP Pathways Schulich School of Engineering must complete IFP Pathways and cannot submit English language proficiency scores for early exit.

Please refer to 4.16 International Foundations Program (IFP) Pathways in the Schulich School of Engineering section of the Calendar for detailed program of studies.

R.4.1.1 IFP Pathways – MEng

See Schulich School of Engineering section of the Graduate Academic Calendar.

R.4.2 IFP Pathways - Haskayne School of Business

Students admitted to IFP Pathways with the Haskayne School of Business complete a structured curriculum that include Bachelor

of Commerce courses combined with intensive English language and academic course support.

IFP Pathways Business students take first-year Bachelor of Commerce courses within the Haskayne School of Business, concurrently with English language and support courses within IFP over a two-year period. Language and academic course support consists of 7 unpaired courses and 5 paired courses:

- Unpaired courses focus on foundational academic communication skills, including reading, listening, speaking, and composition.
- Paired courses focus on language and study skills for the successful completion of Business subject-specific courses.

Grades for IFP Pathways courses are not used in the calculation of grade point averages for degree programs unless specifically allowed by that program. In addition, IFP Pathways courses may not be used for credit toward a degree program unless specifically allowed by that program.

Students admitted to IFP Pathways Haskayne School of Business must complete IFP Pathways and cannot submit English language proficiency scores for early exit.

Please refer to 4.1.1.1 International Foundations Program (IFP) Pathways to Business in the Haskayne School of Business section of the Calendar for detailed program of studies.

R.4.3 IFP Pathways – Faculty of Science

Students admitted to IFP Pathways with the Faculty of Science complete a curriculum that includes BSc courses combined with intensive English language and academic course support.

IFP Pathways Science students take first-year science courses within the Faculty of Science, concurrently with English language and support courses within IFP, commencing in the Summer Term. Students also take three courses in the Spring Intersession later in their degree. This allows students to complete the first year Science program without any delays. Language and academic course support consists of 7 unpaired courses:

- Unpaired courses focus on foundational academic communication skills, including reading, listening, speaking, and composition.

Grades for IFP Pathways courses are not used in the calculation of grade point averages for degree programs unless specifically allowed by that program. In addition, IFP Pathways courses may not be used for credit toward a degree program unless specifically allowed by that program.

Students admitted to IFP Pathways Faculty of Science must complete IFP Pathways and cannot submit English language proficiency scores for early exit.

Refer to 4.8 in the Faculty of Science section of the Calendar for detailed program of studies.

R.4.4 IFP Bridging

IFP Bridging consists of three tiers which teach advanced academic language and skills for use in university contexts. Each Tier (1-3) consists of a full term (approximately 208 hours) of instruction. Refer to R.3 for information on how students are placed in Tiers.

IFP Bridging students who have completed all required Tier 2 courses are permitted to register in up to two credit courses per term with the approval of the IFP Associate Dean. See the IFP Bridging Course Requirements chart for the course requirements of each Tier.

Results from the most recent English language proficiency scores provided during the admission process will be used to place IFP Bridging students into appropriate courses and Tier (Tiers 1-3). Students may be placed within one Tier, or across Tiers in different areas (writing, reading or listening comprehension).

Students must submit acceptable test results to the admissions office no later than the first day of classes. To meet English language proficiency requirements for admission to a degree program, students must complete all areas at the Tier 3 level.

All IFP Bridging students who achieve a grade of "C" or better in a course will be permitted to advance to the next tier level for that course. Students who achieve a grade of "C-" or lower in any course will be required to repeat that course. The transcript

IFP Bridging Course Requirements Chart

| Area | Tier 1 | Tier 2 | Tier 3 |
|-----------|--|---|--|
| Writing | IFPX 270 Academic Writing and Grammar I | IFPX 280 Academic Writing and Grammar II | IFPX 290 Academic Writing and Grammar III |
| Reading | IFPX 273 Reading Comprehension and Proficiency I | IFPX 283 Reading Comprehension and Proficiency II | IFPX 293 Reading Comprehension and Proficiency III |
| Listening | IFPX 277 Listening Comprehension and Oral Fluency I | IFPX 287 Listening Comprehension and Oral Fluency II | IFPX 297 Listening Comprehension and Oral Fluency III |

will indicate the grade for both the first attempt and the repeated course.

Grades for IFP Bridging courses are not used in the calculation of grade point averages for degree programs unless specifically allowed by that program. In addition, IFP Bridging courses may not be used for credit toward a degree program unless specifically allowed by that program.

Students admitted to IFP Bridging cannot submit English language proficiency scores for early exit from the program after the first day of IFP classes.

R.5 Degree Progression

A. IFP Pathways

Please refer to 4.16 in the Schulich School of Engineering section; 4.1.1.1 in the Haskayne School of Business section; or 4.8 in the Faculty of Science of the Calendar for detailed degree progression.

B. IFP Bridging

IFP Bridging students who successfully complete all IFP Bridging Tier 3 courses with a grade of 'C' or better will meet the English Language Proficiency requirement for admission into most University of Calgary undergraduate programs.

See the individual faculty sections of the Calendar for detailed admission and/or degree progression information in relation to studies after completion of the IFP Bridging Program.

R.6 Withdrawal from International Foundations Program Courses

The conditions of withdrawal from all IFP Pathways and Bridging courses are outlined in section B.14 and in the individual faculty sections. Withdrawals from IFP courses do not count toward the withdrawal limit outlined in section B.14.

R.7 Faculty Information

IFP Pathways and Bridging courses are listed in the Courses of Instruction section of this Calendar under International Foundations Program. For further information on admission to any IFP program, please contact the International Foundations Program office.

Detailed University of Calgary and International Foundations Program application guides are available in a number of languages on the International Foundations Program website.

Location: Werklund School of Education, Education Tower 340

Telephone: 403.220.3277

Fax: 403.210.8554

Email: ifp@ucalgary.ca

Website: werkklund.ucalgary.ca/ifp/

R.8 Administration

Dean, Werklund School of Education

D. Sumara

Associate Dean, International Foundations Program

H.D. Sewell

School of Architecture, Planning and Landscape

1. Summary of Degree Programs

Degrees Offered

Course-Based Degrees

Master of Architecture (MArch)

Master of Landscape Architecture (MLA)

Master of Planning (MPlan)

Thesis-Based Degrees

Master of Environmental Design (MEDes)

Doctor of Philosophy (PhD)

Embedded Certificate

Sustainability Studies

Minor Fields of Specialization

Architectural Studies

2. Faculty Information

Contact and Enquiries Information

Location:

Professional Faculties 2182

Student Information:

403.220.7070

Fax number:

403.284.4399

Email address:

evdsinfo@ucalgary.ca

Website:

evds.ucalgary.ca

Introduction

The School of Architecture, Planning and Landscape (established in 1971 as the Faculty of Environmental Design) prepares students for professional careers in the design of buildings, cities, and landscapes. It offers first professional course-based Master's degrees in Architecture, Planning, and Landscape Architecture and advanced thesis-based Master's and Doctoral degrees for candidates who wish to augment their professional training and career experience with problem-oriented research. This professional and research-based learning is framed within an interdisciplinary and transcalar approach to the built and natural environments. Students explore the disruptive strategies and social innovations of entrepreneurial design thinking and how they can be applied to the challenges of making cities that are resilient, vibrant, healthy, and equitable.

Opportunities

To practice in Canada as a licensed architect, planner, or landscape architect one must be registered with the professional association of the province or territory in which one practices. All three first professional

Master's degrees offered by the School of Architecture, Planning and Landscape are accredited by their respective professional accreditation authority. Students graduating from these programs fulfill the academic requirements for professional licensure with the province or territory where they choose to practice.

3. Faculty Regulations

3.1 Admissions

Admission to graduate degree programs in the School of Architecture, Planning and Landscape follows Faculty of Graduate Studies regulations and requirements found at: <http://www.ucalgary.ca/pubs/calendar/grad/current/gs-a.html>.

A recognized four-year undergraduate university degree is required for admission to the Master of Architecture, Master of Landscape Architecture, Master of Planning and the Master of Environmental Design pursuant to Faculty of Graduate Studies regulations. Senior undergraduates in other Faculties may be eligible to take courses in the School of Architecture, Planning and Landscape. However, prior approvals of the instructor and the Faculty are required.

For specific admission information into any of the programs, refer to: <http://www.ucalgary.ca/pubs/calendar/grad/current/environmental-design-evds.html>.

Admission to the Minor in Architectural Studies follows requirements identified below.

Because of limitations on enrolment, all applicants meeting admission requirements are not necessarily admitted.

Minor Field of Specialization in Architectural Studies

In order to be eligible for the Minor, students must have successfully completed a minimum of 24 units in post-secondary study by the end of the Fall Term in the year in which they apply. Admission to the Minor will be granted for the Fall Term only. Students must apply via their online Student Centre by February 1.

The Minor has a fixed number of places for students. Students will be admitted on a competitive basis. The application to the Minor will include consideration of the applicant's grade point average and a portfolio of their creative work.

A minimum grade point average of 3.20 is required for consideration for admission, but does not guarantee admission. The grade point average for admission purposes will be calculated over the most-recent course work to a maximum of 30 units inclusive of the University of Calgary courses and/or transferable courses taken at other institutions.

Applicants to the Minor must submit a digital portfolio that provides evidence of original or creative work in any field or medium, and includes a brief statement of their interest in the Minor. The requirements for digital portfolio submissions can be found on the School of Architecture, Planning and Landscape website: evds.ucalgary.ca/content/minor-architectural-studies-arst.

Application Procedures

The deadline date for applications to the Master of Architecture, the Master of Landscape Architecture, the Master of Planning and Master of Environmental Design programs is January 15, for admission to the following Fall Term. The deadline date for applications to the Minor Field of Specialization in Architectural Studies is February 1, for admission to the following Fall Term. Degree Program Admission Committees for the Master of Architecture, Master of Landscape Architecture, Master of Planning and Master of Environmental Design and the Minor of Architectural Studies evaluate the respective pool of eligible candidates and offers admission to the most-qualified applicants. New admissions to all programs may be limited in number as required on an annual basis.

The deadline date for applications to the Master of Environmental Design and PhD programs is February 1, for admission to the following Fall Term.

3.2 Accuracy of Registration

Students are responsible for the completeness and accuracy of their registration and for arranging their program to meet all requirements as detailed in this Calendar. Students should, however, seek advice from the School of Architecture, Planning and Landscape concerning their choice of courses. In cases of doubt about the interpretation of regulations, a student should consult the Graduate Program Administrator or the Associate Dean for their Program.

4. Program Descriptions

For program information for the following graduate programs, refer to the Graduate Calendar: <http://www.ucalgary.ca/pubs/calendar/grad/current/environmental-design-evds.html>.

Master of Architecture (MArch)

The Master of Architecture is a course-based first professional degree offering a three-year curriculum based on a two year MArch program, plus a Foundation Year when deemed appropriate. The Canadian Architectural Certification Board accredits the degree, and prepares students for practice as registered architects in North America.

Master of Environmental Design (MEDes)

The Master of Environmental Design is a thesis-based research degree normally intended for recent graduates and early career practitioners in architecture, planning, and landscape architecture who wish to research a particular topic, in greater depth, across the spectrum of faculty research expertise.

Master of Landscape Architecture (MLA)

The Master of Landscape Architecture is a course-based first professional degree program, offering a three-year curriculum, based on a two-year MLA program, plus a Foundation Year when deemed appropriate. The Canadian Society of Landscape Architects accredits the degree which prepares students for practice as registered Landscape Architects.

Master of Planning (MPlan)

The Master of Planning is a course-based first professional degree program, offering a studio-based two-year curriculum emphasizing sustainability, interdisciplinarity, physical planning and urban design. The Professional Standards Board of the Canadian Institute of Planners accredits the degree which prepares students for practice as registered Professional Planners.

Doctor of Philosophy (PhD)

The Doctor of Philosophy is a thesis-based degree normally involving advanced research inquiry in architecture, planning, and landscape architecture across the spectrum of faculty research expertise.

Doctor of Design (DDes)

The Doctor of Design is a thesis-based degree for mid-career architects, landscape architects, planners, and other creative professionals and educators with significant practice-based experience, who want to explore a focused area of applied creative design practice-based research.

Undergraduate Certificate, Sustainability Studies

The University of Calgary offers an interdisciplinary embedded Certificate in Sustainability Studies which can be taken in conjunction with most undergraduate degree programs¹. Any undergraduate student, in good academic standing, is eligible for admission to the certificate in Sustainability Studies. Undergraduate students must successfully complete their degree, and all other requirements for graduation, in order to receive their embedded certificate in Sustainability Studies.

¹Certain programs may not be eligible to take the certificate, and some may require additional time and courses in order to complete. Programs not eligible for the certificate include Law, Nursing, Undergraduate Medical Education (UME), Social Work, and Veterinary Medicine.

Requirements

Undergraduate students must successfully complete a minimum of 18 units from the Field of Sustainability Studies while fulfilling the following requirements:

- *Core courses*: 12 units from Sustainability Studies 201, 401, 403, 501.
- *Sustainability electives*: An additional 6 units from the Field of Sustainability Studies, of which a minimum of 3 units must be at the 300 level or above. The Academic Co-ordinator of Sustainability Studies must approve elective courses.

Program Information

Program office: School of Architecture, Planning and Landscape (APL), Professional Faculties Building, Room: 2182

Website: <http://www.ucalgary.ca/sustainability/certificate>

Email: sustainability.cert@ucalgary.ca

Minor Field of Specialization in Architectural Studies

The courses required for the Minor are equivalent to the courses in the MArch Foundation Year, and constitute the prerequisites for the University of Calgary's two-year MArch degree. Completion of this Minor does not guarantee admission to the MArch or to other degree programs in the School of Architecture, Planning and Landscape, but it may reduce the number of courses that are required for an MArch. Students completing the Minor must apply for admission to the MArch degree.

Students interested in pursuing an MArch at the University of Calgary should note that only those students who have completed a four-year degree are considered for admission. A three-year Bachelor of Communication and Culture coupled with the Minor is not sufficient.

Requirements

The following 30 units must be completed successfully to achieve the Minor:

- Architectural Studies 423
- Architectural Studies 444
- Architectural Studies 449
- Architectural Studies 451
- Architectural Studies 453
- Architectural Studies 457.01
- Architectural Studies 457.02
- Architectural Studies 484

Optional Electives

The following optional elective courses in Environmental Design are also available to students in the Minor:

- Environmental Design Block 697.33
- Other electives with approval of the Associate Dean (Academic – Architecture)

Undergraduate Elective Courses

Undergraduate elective courses, available to all students, that introduce topics in architecture, planning, and landscape architecture include:

- Architectural Studies 201
- Architectural Studies 421
- Architectural Studies 431
- Architectural Studies 441
- Sustainability Studies 201

- Environmental Design 401
- Environmental Design 402
- Environmental Design 502

5. Administration

Faculty Administrative Officers Dean

J. Brown

Associate Deans

J. Johnson, Academic – Architecture

M.E. Tyler, Academic – Landscape Architecture and Planning

J. Taron, Research and Innovation

Faculty of Arts

1. Summary of Degree Programs

Degrees Offered

Degrees in the Humanities and the Social Sciences

| Major Fields of Specialization | Undergraduate | | | Graduate |
|--|------------------------------------|----------------|---|--------------------|
| | Core | Enhancements | Other | |
| Ancient and Medieval History | BA ¹ | Honours, Co-op | - | - |
| Anthropology, Social and Cultural | BA ¹ | Honours, Co-op | - | MA, PhD |
| Anthropology | BSc ¹ | Honours, Co-op | - | MA, PhD |
| Archaeology | BA ¹ , BSc ¹ | Honours, Co-op | - | MA, PhD |
| Canadian Studies | BA ² | Honours, Co-op | BA/BEd ⁵ | MA, PhD |
| Communication and Culture ^{8**} | BSc | Co-op | - | - |
| Communication and Media Studies | BA ^{1,2} | Honours, Co-op | BCMS ⁴ | MA, MCS, PhD |
| Culture and Society | - | - | - | MA, PhD |
| Development Studies | BA ^{1,2} | Honours, Co-op | BA/BEd ⁵ | - |
| Earth Science | BSc ² | Honours, Co-op | - | - |
| East Asian Language Studies | BA ¹ | Co-op | - | - |
| East Asian Studies | BA ^{1,2} | Co-op | - | - |
| Economics | BA ¹ | Honours, Co-op | - | MA, PhD |
| English | BA ¹ | Honours, Co-op | BA/BEd ⁵ | MA, PhD |
| Film Studies | BA ^{1,2} | Honours, Co-op | BFS ⁷ | - |
| French | BA ¹ | Honours, Co-op | BA/BEd ⁵ | MA |
| Geography | BA ¹ , BSc ¹ | Honours, Co-op | BA/BEd ⁵ , BSc/BE ⁵ | MA, MSc, MGIS, PhD |
| German | BA ¹ | Honours, Co-op | - | MA |
| Greek and Roman Studies | BA ¹ | Honours, Co-op | - | MA |
| History | BA ¹ | Honours, Co-op | BA/BEd ⁵ | MA, PhD |
| History and Philosophy of Science* | - | - | - | MA |
| International Indigenous Studies | BA ¹ | Co-op | BA/BEd ⁵ | - |
| International Relations | BA ¹ | Co-op | BA/BEd ⁵ | - |
| Italian Studies | BA ¹ | Co-op | - | - |
| Latin American Studies | BA ^{1,2} | Co-op | - | - |
| Law and Society | BA ^{1,2} | Honours, Co-op | - | - |
| Linguistics | BA ¹ | Honours, Co-op | - | MA, PhD |
| Linguistics and Language | BA ^{1,2} | Co-op | - | - |
| Military and Strategic Studies | - | - | - | MSS, PhD |
| Multidisciplinary Studies ⁸ | BA | Co-op | BA/BEd ⁵ | - |
| Philosophy | BA ¹ | Honours, Co-op | - | MA, PhD |
| Political Science | BA ¹ | Honours, Co-op | BA/BEd ⁵ | MA, PhD |
| Psychology | BA ¹ , BSc ¹ | Honours | BCR/BA or BSc ⁶ | MSc, PhD |
| Religious Studies | BA ¹ | Honours, Co-op | - | MA, PhD |
| Religious Studies and Applied Ethics* | BA ¹ | Co-op | - | - |
| Russian | BA ¹ | Honours, Co-op | - | - |
| Science, Technology and Society* | BA ² , BSc ² | Honours, Co-op | - | - |
| Sociology | BA ¹ | Honours, Co-op | BA/BEd ⁵ | MA, PhD |
| Spanish | BA ¹ | Honours, Co-op | BA/BEd ⁵ | MA |
| Urban Studies | BA ¹ | Co-op | - | - |
| Women's Studies | BA ^{1,2} | Honours, Co-op | - | - |

*Program is currently suspended. No new admissions will be permitted.

**The BSc in Communication and Culture is currently suspended. No new admissions will be permitted.

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Degrees in the Fine Arts

| Major Fields of Specialization | Undergraduate Degrees | | | Graduate |
|--------------------------------|------------------------------------|----------------|---|-----------|
| | Core | Enhancements | Other | |
| Art - Art History | BA ² | - | - | - |
| Art - Visual Studies | BFA ⁴ | Honours, Co-op | BFA/BEd ⁵ | MFA |
| Dance | BA ² , BFA ⁴ | - | BFA/BEd ⁵ , BKin/BA ⁸ | - |
| Drama | BFA ³ | - | - | MFA |
| Drama Education | - | - | BFA/BEd ⁵ | - |
| Music | BA ^{1,2} | Honours | - | - |
| Music - Composition | BMus ⁴ | - | - | MMus, PhD |
| Music - Integrated Studies | BMus ⁴ | - | - | - |
| Music - Music Education | - | - | BMus/BEd ⁹ | MMus |
| Music - Musicology | - | - | - | MA, PhD |
| Music - Performance | BMus ⁴ | - | - | MMus |

1. Can be combined with: (a) an eligible BA, BSc, BFA or BMus within the Faculty of Arts, (b) an eligible BSc (Science) from the Faculty of Science, (c) a BSc (Engineering) from the Schulich School of Engineering, or (d) a BComm from the Haskayne School of Business.

2. Can be combined with: (a) an eligible BA, BSc, BFA or BMus within the Faculty of Arts, (b) an eligible BSc (Science) from the Faculty of Science, or (c) a BSc (Engineering) from the Schulich School of Engineering.

3. Can be combined with: (a) an eligible BA, BSc within the Faculty of Arts, (b) an eligible BSc (Science) from the Faculty of Science, or (c) a BSc (Engineering) from the Schulich School of Engineering.

4. Can be combined with an eligible BA or BSc within the Faculty of Arts.

5. Specialized Concurrent Degrees offered in conjunction with the Werklund School of Education.

6. Specialized Combined Degree offered in conjunction with the Cumming School of Medicine.

7. Degree programs that co-ordinate with related diploma programs at the Southern Alberta Institute of Technology and other similar institutions.

8. Multidisciplinary degrees without a Major Field of specialization.

9. Specialized Combined Degree offered in conjunction with the Faculty of Kinesiology.

Legend: Terminology and degree abbreviations are explained below.

Description of Undergraduate Degree Programs

The Faculty of Arts offers a wide spectrum of department-based, interdisciplinary and multidisciplinary undergraduate degree programs in the fine arts, the humanities and the social sciences. Except as otherwise noted below, details of the undergraduate programs summarized here are given in Sections 3 and 4 of this part of the Calendar.

Degree Programs within the Faculty of Arts:

Degree Programs with a Major Field of Study

The following degree programs normally require four years of study:

- Bachelor of Arts (BA), BA (Honours)
- Bachelor of Fine Arts (BFA), BFA (Honours)
- Bachelor of Music (BMus)
- Bachelor of Science (BSc), BSc (Honours)

Multidisciplinary Degree Programs

The following degree programs normally require four years of study:

- BA Multidisciplinary Studies
- BSc in Communication and Culture

Multi-Institution Degrees

The following degree programs normally require two and one half years of study at the University of Calgary and two years of work on a related diploma at SAIT Polytechnic or a similar institution:

- Bachelor of Communication and Media Studies (BCMS)
- Bachelor of Film Studies (BFS)

Combined or Concurrent Degree Programs

The following two-degree programs normally require at least five years of study:

- Within the Faculty of Arts: BA, BFA or BSc (Arts)/BA, BFA or BSc (Arts)
- With the Cumming School of Medicine: Bachelor of Community Rehabilitation (BCR) (Medicine)/BA or BSc (Psychology)
- With the Haskayne School of Business: Bachelor of Commerce (BComm)/BA (Arts) or BSc (Arts)
- With the Faculty of Kinesiology: BKin (Kinesiology)/BA (Dance)
- With the Schulich School of Engineering: BSc (Engineering)/BA (Arts) or BSc (Arts)
- With the Faculty of Science: BA or BSc (Arts)/BSc (Science)
- With the Werklund School of Education: BA (Arts — see 3.4.5 for a list of eligible majors) or BFA (Drama Education or Visual Studies) or BMus (Music Education) or BSc (Geography)/Bachelor of Education (BED)

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Second Baccalaureate Degree Programs

Second BA, BSc, BA (Honours) or BSc (Honours) degrees with a Major Field are available following an appropriate first degree and normally take two additional years.

Co-operative Education

For many BA, BA (Honours), BSc and BSc (Honours) Degree Programs, relevant work experience can be integrated with academic study through Co-operative Education. Degree programs with Co-op normally take at least five years.

Arts and Science Honours Academy

The Arts and Science Honours Academy provides an enriched undergraduate experience for highly motivated students in the Faculties of Arts and Science. See the Program Details section below.

Double Majors

BA or BSc Degrees may be awarded with two Major Fields.

Minor Fields of Study

Students in degree programs in the Faculty of Arts are generally eligible to declare established minors from Continuing Education, the School of Architecture, Planning and Landscape, the Haskayne School of Business, the Cumming School of Medicine and Science as well as from Arts.

Minor Fields offered by the Faculty of Arts:

- African Studies
- Anthropology
- Applied Energy Economics
- Arabic Language and Muslim Cultures
- Archaeology
- Canadian Studies
- Chinese
- Communication and Media Studies
- Dance
- Development Studies
- Drama
- Earth Science
- East Asian Studies
- Economics
- English
- Film Studies
- French
- Geography
- German
- Greek
- Greek and Roman Studies
- History
- History and Philosophy of Science
- International Indigenous Studies

- Italian Studies
- Japanese
- Latin
- Latin American Studies
- Law and Society
- Linguistics
- Medieval, Renaissance and Reformation Studies
- Museum and Heritage Studies
- Music
- Philosophy
- Political Science
- Psychology
- Religious Studies
- Russian
- Science, Technology and Society
- Security Studies
- Sociology
- Sonic Arts
- Spanish
- Speech-Language Sciences
- Urban Studies
- Visual Studies and Art History
- Women's Studies

Graduate Programs

All graduate degree programs fall under the jurisdiction of the Faculty of Graduate Studies. In the Arts fields, the Faculty of Graduate Studies offers the following degrees:

- Master of Arts (MA)
- Master of Communication and Media Studies (MCS)
- Master of Fine Arts (MFA)
- Master of Geographic Information Systems (MGIS)
- Master of Music (MMus)
- Master of Strategic Studies (MSS)
- Master of Science (MSc)
- Doctor of Philosophy (PhD)

Details can be found in the Faculty of Graduate Studies Calendar.

2. Information for Undergraduate Students

Undergraduate student programs in the Faculty of Arts are governed by the regulations in this part and other relevant parts of the Calendar. The Associate Deans, Undergraduate Programs and Student Affairs co-ordinates program development for the Faculty as well as acting as trouble-shooter if students have academic concerns.

2.1 Advising and Program Information

For guidance on where to go for assistance, students may consult the Faculty of Arts website under arts.ualgary.ca/undergraduate in addition to the following information.

Arts Students' Centre

The Faculty of Arts Students' Centre is the overall headquarters for undergraduate programs in the Faculty of Arts. The key

objective of this office is to connect students with whatever academic assistance that they require.

In addition to housing the Associate Dean, Undergraduate Programs and Student Affairs and the Associate Dean for Teaching and Learning, the Arts Students' Centre is the specific home to:

- Program advising
- The Faculty's Co-operative Education Program
- The Arts and Science Honours Academy
- The Faculty's Interdisciplinary Programs
- A Student Help Desk

Location: Social Sciences Room 102

Phone: 403.220.3580

Email: ascarts@ualgary.ca

Website: arts.ualgary.ca/undergraduate/

Degree Advisors

Degree advisors in the Arts Students' Centre assist undergraduate students in planning their overall degree programs. For example, they provide advice for students on:

- Contextual (big-picture) questions about the Major Field and honours programs
- Graduation checks and confirmation
- Changes of Program
- Letters of Permission for study at other institutions
- Assistance with Academic Requirements in the Student Centre
- After-degree program evaluation
- Honours applications and admissions
- New student registration

Location: Social Sciences Room 102

Phone: 403.220.3580

Email: ascarts@ualgary.ca

Website: arts.ualgary.ca/undergraduate/

Department Offices

Subject advisors in Department Offices deal with more specific inquiries related to courses and course content within a student's major. For example, these advisors assist students with:

- Course-related questions
- Details about the Major Field
- Details about honours programs
- Transfer-credit assessment
- Overloads
- Course time conflicts
- Credit by special assessment
- Course audits
- Initial grade appeals
- Prerequisite waivers

Note that the Faculty of Arts Students' Centre provides subject advising on the topics listed above for the interdisciplinary programs within the Faculty.

Contact information is provided for each Major and Minor program under 4. Program Details and a contact list is provided on the Faculty of Arts website: arts.ualgary.ca.

Enrolment Services

Enrolment Services helps with registration issues and problems, fee payments, awards, financial aid, admissions questions, visiting and exchange students, open studies, transcripts, deferred exams, etc.

Location: MacKimmie Block (MB) Lobby

Phone: 1.403.210.7625

Website: ualgary.ca/currentstudents/contact

Student Success Centre

The Student Success Centre (SSC) provides broad educational planning, learning support, assistance with academic difficulties, academic program guidance, writing support, success seminars, and peer support.

Location: Taylor Family Digital Library, 3rd Floor

Phone: 403.220.5881

Email: success@ualgary.ca

Website: ualgary.ca/ssc/

2.2 First-Year Options

Students are able to enter directly into the Faculty of Arts for first year. The following options are available to students:

1. Enter the Faculty of Arts and declare a degree program with a specific Major Field.
2. Enter the Faculty of Arts and declare a general or multidisciplinary degree program.
3. Enter the Faculty of Arts directly but do not declare a degree program immediately. (This is an interim measure prior to deciding on a degree program.)

Students intending to complete a degree program in the fine arts — i.e., programs in Art, Dance, Drama, or Music — should enter directly into their programs in first year so as to complete their undergraduate studies in a timely fashion. While most other degree programs in the Faculty of Arts can be completed in a four-year time frame if students declare their program or change into a new program by the end of their first year, students are advised to finalize a program as early as possible. Students must declare a program by the time they have completed 60 units or two years of study taking the normal course load. Admission to some programs is limited for transfer students as well as high-school applicants due to high demand and/or subject to additional selection criteria. See the Admissions section of this Calendar for details.

High-school applicants who are uncertain about their programs can choose either option 2 or 3. Subject to the constraints discussed above, there is considerable flexibility for subsequent program changes within the Faculty of Arts. Students may also be eligible to change to programs in other Faculties.

Students in the Faculty of Arts should be exposed to a range of academic disciplines throughout their program. Students in degree programs in Art History, Dance, Drama, Music and Visual Studies have prescribed first-year programs. All other Arts students, regardless of whether they have declared a

Major, are encouraged to complete at least 15 units from across the fields of study within the Faculty. Further guidance on first-year course selection is available from the University of Calgary Registration Guide.

3. Faculty Regulations

3.1 Admission

New applicants should refer to A.5 Undergraduate Admission Requirements in the Admissions section of this Calendar for regulations regarding University admission requirements.

Preparation

Prospective students wishing to enrol in any program of the Faculty of Arts need adequate preparation. High school matriculation or the equivalent is required and English Language Arts 30-1 as well as four other subjects, as specified in the Admissions section of this Calendar, must be included.

The following additional preparation items pertain to particular programs:

1. *Mathematics Preparation:* Students intending to major in Archaeology, Economics, Geography or the BSc program in Psychology should note that Alberta Education Mathematics 30-1 (or the equivalent from other jurisdictions) is a prerequisite for some required courses and should be completed prior to admission. Students intending to major in the BA program in Psychology should note that a grade 12 level mathematics course (or the equivalent from other jurisdictions) is required for Psychology 300, which is a required course for all Psychology majors.

2. Additional Grade 12 Preparation:

- For all Archaeology degrees with a concentration in Physical Anthropology, Biology 30 and Chemistry 30 are prerequisites for required courses.
- For all BSc degrees in Psychology, Biology 30 and Chemistry 30 are prerequisites for required courses. Physics 30 and Mathematics 31 are suggested as useful preparation.
- For the BSc in Anthropology and the BSc in Geography, Biology 30 and Chemistry 30 are strongly recommended as useful preparation because they are prerequisites for courses taken by most students.
- For all degrees in Economics, Mathematics 31 is suggested as useful preparation.

3. Additional Application Requirements for Programs in the Fine Arts:

- Applicants to the BFA (Visual Studies) program must submit a portfolio.
- Applicants to the BMus program must complete an online audition form (including background information and a statement of interest) and audition.
- Admission to the BMus, BA (Music) or Minor in Music programs requires evidence of successful completion of Grade II Royal Conservatory Theory/Advanced Rudiments or the departmental music theory diagnostic exam.

- Applicants to the BA (Dance) program must audition and submit a statement of interest.

Enrolment in the following majors may be limited: Communication and Media Studies, Dance, Drama, Economics, International Relations, Law and Society, Psychology, and Visual Studies. Whenever such limits are in effect, the admission average for a program will normally be higher than those for other programs in the Faculty of Arts.

Transfer Students

Students transferring from other faculties and institutions must meet the deadlines and competitive admission requirements in place for the program to which they are applying. For more information refer to A.5 Undergraduate Admission Requirements in the Admissions section of this Calendar.

Admission on Academic Probation

Students may be admitted or readmitted to the Faculty on probation if (a) they are on probation in another faculty at the time of admission to the Faculty of Arts, or (b) they previously have been required to withdraw from the University of Calgary or any other post-secondary institution (see 3.3.5 Readmission). Students admitted on probation must clear probation at their first academic review (see 3.3.4).

Second Baccalaureate Degree

Students who have received one or more approved undergraduate degrees (BA, BSc, BEd, etc.) may apply for admission to programs leading to a Second Baccalaureate Degree with a Major Field or a Second Baccalaureate Degree program with Honours in a Major Field.

Students must apply to the Admissions Office and meet all deadlines and requirements. For more information on admission to a second undergraduate degree, refer to A.5.5 in Admissions. For more information regarding program requirements for a second degree, refer to 3.4.6 Second Baccalaureate Degrees.

3.2 Registration and Courses

3.2.1 Accuracy of Registration

Students are responsible for the completeness and accuracy of their registration and for arranging their course selections to meet all degree and program requirements as detailed in this Calendar. Any departure from standard degree and program requirements specified in this Calendar must receive prior written authorization by the Associate Dean, Undergraduate Programs and Student Affairs or other designate of the Dean.

Registration at all times should be appropriate to a student's current degree program unless a student receives explicit permission from the Associate Dean, Undergraduate Programs and Student Affairs. Students with inappropriate course selections may

require extra courses and additional time to complete their degrees.

3.2.2 Registration Planning and Consultation

It is important for all students to check their records and registration regularly found in Academic Requirements through their Student Centre, and meet with the Arts Degree Advisors and relevant Subject Advisors for guidance on any questions. Students should acquaint themselves with the dates and deadlines for registration set by the University (see B. Registration in the Academic Regulations section of this Calendar) and allow sufficient time before these deadlines to plan their registration and consult with advisors.

As students approach the completion of their programs, it is strongly recommended that students meet with an Arts Degree Advisor for a graduation check.

Otherwise, a complete program audit is not done until a student applies for graduation when the consequences of any problems can be very serious.

3.2.3 Course Load

While five three-unit courses taken concurrently represent a normal full load, some programs prescribe additional courses. Students may elect to take up to six 3-unit courses in a term, but an extra course represents a substantial burden and may adversely affect overall performance.

In many programs, opportunities for accelerated progress also exist through credit courses in the Spring and Summer Intersession as well as credits obtained by Special Assessment.

3.2.4 Opportunities to Take Courses at Another Institution

Students may be authorized to take some course work at another university if registration as a visiting student is acceptable to that university. Students with poor academic performance, including those on probation or having a large number of withdrawals, will not be afforded this opportunity.

Students may apply online for such authorization by requesting a Letter of Permission through their online Student Centre. Students should check with program advisors in the Arts Students' Centre to ensure that such transfer credits advance their particular programs. Once approved students will be advised officially as to how the proposed courses will transfer and an appropriate letter will be sent to the Registrar of the other university. The Letter of Permission must be obtained before the student registers for the courses at the other institution.

It will be the responsibility of the student to ensure that an official transcript of grades is forwarded directly to the Registrar of this university in order that appropriate credit may be officially recorded.

Many grade point average calculations used by the Faculty of Arts do not include transfer courses.

3.2.5 Credit in Courses by Special Assessment

The Faculty of Arts allows students to challenge some courses or, in other words, gain credit by special assessment. Students are referred to B.10.1 Credit in Courses by Special Assessment (Challenge Examinations) in the Academic Regulations section of this Calendar. Application for such credit should be made on the appropriate form and requires the approval of both the Department offering the course and the office of the Associate Dean, Undergraduate Programs and Student Affairs.

Not more than 30 units completed by special assessment may be counted towards a degree.

3.2.6 Course Classification

Courses normally available for credit towards a baccalaureate degree carry numbers from 200 to 599. Courses numbered below 300 are termed junior courses; those numbered 300 or higher are senior courses.

The numbering of courses at the 200, 300, 400, and 500 levels in a particular field is intended to indicate the level of sophistication involved. Although some senior courses do not have prerequisites, it is very often the case that a 200-level course is a prerequisite for a 300-level course, a 300-level course is a prerequisite for a 400-level course, etc. The Faculty regularly publishes a list of senior courses that do not have prerequisites on its website.

Undergraduates may register in graduate courses at the 600 level only with the permission of the Department or Program offering the course.

3.2.7 First-Year Registration

Students may not register in courses at the 300 level or above until at least 18 units at the 200 level have been successfully completed unless the 300-level course is a first-year program requirement or they receive permission of the Associate Dean, Undergraduate Programs and Student Affairs.

3.2.8 Prerequisites, Corequisites and Progression

All prerequisites for courses offered by the Faculty of Arts must be met with a minimum grade of "C-".

Prerequisites are not normally waived. Minimum grades in prerequisite courses are required to ensure that students have the knowledge and skills necessary to succeed in more advanced courses. In exceptional cases, if students can demonstrate that they have equivalent knowledge to the prerequisites listed, they may seek consent from the Department offering the course to enrol in the course.

Students are responsible for ensuring that they have all of the prerequisites and corequisites for each course in which they register. While the online registration system is set up to help students avoid accidental registra-

tion in courses for which they lack prerequisites, situations arise where inappropriate course registrations can occur. If registration in any course is contrary to regulations, the Faculty may cancel such registration at any time before or during the term.

3.2.9 Writing Competence

Students who are identified as having deficient writing skills may be required to take steps to improve their writing.

3.2.10 Course Enrolment Limitations

Enrolment caps are in effect for many courses in the Faculty of Arts. Further, registration in some courses is initially limited to students in particular programs or stages of programs. Refer to the online Planning Guide for courses and dates.

3.2.11 Cross-Listed Courses

In the case of cross-listed courses within the Faculty of Arts, regardless of the title under which the course was taken, credit will be applied to a student's Major or Minor Field in the way that is most advantageous.

3.2.12 Withdrawal from Courses

Withdrawal from one or more courses or from all courses in a term can have serious consequences. Students are referred to B.14 Withdrawal from Courses and Withdrawal from the Term in the Academic Regulations section of this Calendar.

Before deciding to withdraw from courses, students are encouraged to seek advice from a program advisor in the Arts Students' Centre.

Students will normally be required to withdraw from the Faculty of Arts and the University if they have accumulated a total of more than 30 units withdrawals while in attendance at the University of Calgary (see 3.3.3 Excessive Course Withdrawals).

3.2.13 Repetition of Courses

Strict limitations apply to the repetition of courses. See B.9 Repeating Courses in the Academic Regulations section of this Calendar.

3.2.14 Unauthorized Concentrations

Regardless of their home Faculties and degree programs, students are not permitted to include more than 36 units from any group of courses constituting the Major Field of any program in the Faculty of Arts other than that to which a student has officially been admitted.

3.2.15 Declaration of a Major

Students have the option of entering the Faculty of Arts without declaring a Major. By the time 60 units are completed, however, students must either declare a Major for which they are eligible or enter a (general) multidisciplinary program.

3.2.16 Duration of Study

The Faculty and Major-Field requirements that pertain to degrees awarded by the Faculty of Arts may change with every Calendar issue. The time of entry into a program in the Faculty of Arts is defined as the first session after admission to the program during which

a student successfully completes any courses applicable to the program. A student's program is subject to the degree requirements that are in the Calendar current at the time of entry into the program. A student is allowed seven years counted from the time of entry into the program to graduate under these requirements.

Students who exceed this seven-year limit must consult with the Associate Dean, Undergraduate Programs and Student Affairs of the Faculty of Arts (or designate) who will decide on the degree requirements that will be applied for the proposed date of graduation.

3.3 Student Standing and Academic Review

3.3.1 Dean's List

The Dean's List, which is compiled annually at the end of the Winter Term, recognizes outstanding achievement by students in the Faculty. A statement of inclusion on the Dean's List will be recorded on the student's transcript.

To qualify for the Dean's List, a student must take a sufficient number of courses at the University of Calgary during the preceding Summer, Fall and Winter Terms and achieve a grade point average of 3.60 or above over all University of Calgary courses taken during that period. The alternative course load requirements are as follows:

- A minimum of 24 units taken at the University of Calgary, OR
- A minimum of 24 units taken at the University of Calgary plus successful completion of one four-month Co-operative Education work placement, OR
- A minimum of 12 units taken at the University of Calgary plus successful completion of two four-month Co-operative Education work placements, OR
- A minimum of 12 units taken at the University of Calgary plus successful completion of one or more approved full-time terms abroad, OR
- A program of study assessed by the Student Accessibility Services to be equivalent to (a), (b), (c) or (d) for a particular student.

Notes:

- Where it is appropriate for a student to be assessed under provisions (d) or (e), the student must arrange for all necessary documentation to be received by the Associate Dean, Undergraduate Programs and Student Affairs no later than May 15.
- Only University of Calgary grades for regular academic courses are used for the Dean's List; grades earned for Co-operative Education work placements or study-abroad terms do not enter into the grade point average calculations for (b), (c) or (d).
- Students on academic sanctions as outlined in section K (Statement on Principles of Conduct) of this Calendar are not eligible for the Dean's List.

- Students with deferred examinations and/or term work after Winter Term may not be eligible to be included on the Dean's List.

3.3.2 Academic Review

Students are referred to section F.3.2 on Unsatisfactory Standing in the Academic Regulations section of this Calendar.

The academic standing of students registered in the Faculty will be reviewed after each Winter Term provided that they have taken at least 18 units at the University of Calgary since their previous review. Students who have not taken 18 units since the previous review and are either in good standing or on regular academic probation will retain their existing status until their next review.

All University of Calgary credit courses that have been taken since the previous review are used to calculate the GPA for the purpose of academic review. Students placed on academic probation or required to withdraw as a result of the academic review will be so advised in writing.

Notwithstanding the specific regulations pertaining to Student Standing, students' academic standing may be reviewed at any time and those with generally poor academic records may be placed or continued on academic probation or required to withdraw at the discretion of the Associate Dean, Undergraduate Programs and Student Affairs, or other delegate of the Dean.

Students Standings

(a) A student will be considered in good standing if they achieve a GPA of at least 2.00 over all courses taken since their previous review.

(b) A student will be placed on academic probation if they achieve a GPA of at least 1.70 but less than 2.00 over all courses taken since their previous review and have not been on academic probation within the preceding five years.

(c) A student will be required to withdraw from the faculty if they achieve a GPA less than 2.00 over all courses taken since their previous review and have a probationary period within the last five years.

(d) A student will be required to withdraw from the faculty if they achieve a GPA of less than 1.70 over all courses taken since their previous review.

(e) A student who meets the criteria for (c) or (d) will be invited to participate in the Academic Turnaround Program (ATP) if they have not previously done so. ATP allows students to continue in their program on academic probation with special conditions and enhanced academic support.

Academic Turnaround Program (ATP)

For full details about the Academic Turnaround Program students are referred to

B.20 in the Academic Regulations section of this Calendar.

3.3.3 Excessive Course Withdrawals

At the time of the Academic Review after winter term, students who have withdrawn from more than 30 units will be required to withdraw from the Faculty of Arts unless they can demonstrate sufficient cause for their course withdrawals.

3.3.4 Mitigating Circumstances

Students who would normally be required to withdraw on the basis of their academic performance or excessive withdrawals may be placed on academic probation instead if they have experienced serious mitigating circumstances and can demonstrate that they have good prospects for future success. Students who believe that they fall into this category should discuss their situations with the Arts Students' Centre at the earliest possible opportunity and no later than the end of Winter Term.

3.3.5 Readmission

Students who have been required to withdraw from the Faculty of Arts, other Faculties at the University of Calgary or other post-secondary institutions due to unsatisfactory academic performance or excessive course withdrawals may be considered for (re)admission after 12 or more months have elapsed since the date of dismissal.

(Re)admission is not guaranteed. Applicants must apply by the deadlines stated in the current Calendar and meet the current admission requirements of the program to which they are seeking admission.

Readmission After Deficient Academic Performance

Students who have been required to withdraw due to deficient academic performance should note that it is not normally possible to be readmitted to the Faculty of Arts without first taking courses to improve their grade point averages to meet the required admission averages for their programs.

Students (re)admitted after having been required to withdraw from the Faculty of Arts due to unsatisfactory academic performance must maintain a grade point average of at least 2.00 on all courses taken in each academic review period after readmission. Failure to do so will result in permanent dismissal from the Faculty of Arts.

Readmission After Excessive Course Withdrawals

Students (re)admitted after having been required to withdraw from the Faculty of Arts due to excessive withdrawals from courses must obtain Faculty permission to withdraw from any further courses. Failure to do so will result in permanent dismissal from the Faculty of Arts.

Limitation on Readmission

Students who have twice been required to withdraw from any Faculties at the University of Calgary and/or any other post-secondary institution will not normally be considered for admission to the Faculty of Arts at any time.

3.4 Graduation

3.4.1 Degrees with a Major Field

Faculty of Arts Requirements for Degrees with a Major Field

The following requirements apply to all Bachelor of Arts, Bachelor of Fine Arts, Bachelor of Music and Bachelor of Science degrees with a Major Field:

1. *Overall Program*: Successful completion of an approved program consisting of 120 units.

2. *Program Focus*: Successful completion of the "Major-Field Requirements" and any associated "Other Requirements" for the relevant degree.

3. *Academic Achievement*:

(a) A minimum GPA of 2.00 must be achieved over all courses in the Major Field and over all courses in the program.

(b) A maximum of 6 units "D" or "D+" grade in the Major Field and a maximum of 18 units "D" or "D+" grades overall.

4. *University of Calgary Study*:

(a) A maximum of 60 units in eligible post-secondary transfer credits from other institutions may be counted toward the degree.

(b) A maximum of 24 units in eligible post-secondary transfer credits from other institutions may be counted toward the major field.

5. *Depth*: A maximum of 48 units at the junior or 200 level.

6. *Breadth*: All students, except those in the BMus or BFA Degrees, must take a minimum of 6 units from the Faculty of Science.

7. *Physical Activity Courses*: A maximum of 6 units may be taken from: Dance Education Activity/Theory, Outdoor Pursuits Activity/Theory, and Physical Education Activity/Theory.

Note: For each degree program, the "Major-Field Requirements" and any associated "Other Requirements" are defined under 4. Program Details. For each BA and BSc degree with a Major Field (and for the BCMS and BFS) at least 42 units and not more than 48 units in the Major Field are normally required. Students can choose to include additional courses in the Major Field to a maximum of 60 units. The Major Fields in BFA and BMus degrees typically require considerably more courses. The completion of some programs requires additional supporting courses from outside the Major Field.

Degrees with a Double Major

Students desiring a degree with a double Major must complete all of the Faculty, Major-Field and Other Requirements pertaining to both Majors. Permission to undertake a double major must be obtained from the Faculty of Arts.

Some restrictions apply to the pairing of majors as discussed under 4. Program Details. Note that to complete some double Majors, more than 120 units may be needed.

Major Fields "With Distinction"

The notation "With Distinction" will be inscribed on the permanent record and graduation parchment of any students completing a Major with a grade point average of at least 3.60 over the last 90 units taken for the degree. Courses from other institutions as well as the University of Calgary can be used in this calculation. In cases in which the last 90 units must include some but not all of a group of courses taken concurrently, the selection will be made in the manner most advantageous to the student.

3.4.2 Honours Degrees with a Major Field

Honours degrees provide students with an opportunity to pursue greater depth in a field of study. An important objective is to prepare the student for possible entry to graduate-level degree programs. High standards of performance are required.

Application Process and Deadline

While the point of their studies at which students are eligible to enter Honours varies considerably across programs, students are advised to apply for Honours as early as their programs permit. Delay may result in additional time to complete prerequisite courses and/or additional coursework beyond the normal 120 units.

Application deadlines fall between January 23 and May 1 annually, depending on the program. Consequently, interested students should consult with the Subject Advisor or Honours Co-ordinator for their program well in advance of January 23.

As part of an application to Honours, some programs require the submission of a research proposal, confirmation of supervisory and/or laboratory arrangements, etc. Students must submit all required materials to the Subject Advisor for their program and confirm their requests for Honours using the Change of Program option in the online Student Centre by the deadline. Using the Student Centre alone is generally not sufficient.

Notes:

- Programs may elect to consider late applications if they can accommodate additional students.
- It is generally an advantage to complete application items such as a research proposal, confirmation of supervisory and/or laboratory arrangements, etc. as early as possible, especially where space in an Honours program is limited.

Admission

Admission to Honours is based on three criteria:

1. *Completed Courses:* For each Honours program, a minimum number of courses must be successfully completed by the end of the Winter Term in the year that a student applies. This minimum number of courses for each program, which is reported in the 4. Program Details section, is between 30 and 75 units. Students may also be required to

have taken a minimum number of courses, or particular courses, in the Major Field.

2. *Academic Performance:* For each Honours program, a minimum grade point average must be attained on all courses subject to assessment and on all courses in the major among those subject to assessment. The minimum grade point average for each Program will be at least 3.30 and may be higher in Programs where student demand exceeds the program capacity. If between 30 and 60 units have been taken, then all courses are subject to assessment whereas if more than 60 units have been taken, then only the most recent 60 units are subject to assessment.

3. *Program Consent:* While Programs in the Faculty of Arts are committed to encouraging high-achieving students, the enrolment capacity of some Honours Programs may be limited by the availability of undergraduate thesis supervisors, laboratory spaces, etc. To obtain consent of a Program, students must also satisfactorily complete any application procedures set out in the 4. Program Details section. These procedures may include the submission of a research proposal, confirmation of supervisory and/or laboratory arrangements, etc.

Notes:

- Courses from other institutions as well as the University of Calgary can be used in a student's grade-point calculation.
- Programs will announce annually by October 1 on their websites if their qualifying averages for Honours will be set above 3.30 for the following academic year.

Performance Review

The academic standing of each Honours student will be reviewed each year following the Winter Term. Continuation in an Honours program is contingent upon students achieving a GPA of at least 3.30 over all courses completed and all courses completed in the major since the last review.

Faculty of Arts Requirements for Honours Degrees

The following requirements apply to all Bachelor of Arts Honours, Bachelor of Fine Arts Honours and Bachelor of Science Honours Degrees with a Major Field:

1. *Overall Program:* Successful completion of an approved program consisting of 120 units.

2. *Program Focus:* Successful completion of the "Major Field with Honours Requirements" and any associated "Other Requirements" for the relevant degree.

3. *Academic Achievement:*

(a) Over the final 90 units, a minimum GPA of 3.30 must be achieved on all courses and on all courses in the Major Field.

(b) A maximum of 6 units "D" or "D+" grade in the Major Field and a maximum of 18 units "D" or "D+" grades overall.

4. *University of Calgary Study:*

(a) A maximum of 60 units in eligible post-secondary transfer credits from other institutions may be counted toward the degree.

(b) A maximum of 24 units in eligible post-secondary transfer credits from other institutions may be counted toward the Major Field.

5. *Depth:* A maximum of 48 units at the junior or 200 level.

6. *Breadth:* All students, except those in the BMus or BFA Degree, must take a minimum of 6 units from the Faculty of Science.

7. *Physical Activity Courses:* A maximum of 6 units may be taken from: Dance Education Activity/Theory, Outdoor Pursuits Activity/Theory, and Physical Education Activity/Theory.

Note: For each degree program, the "Major-Field with Honours Requirements" and any associated "Other Requirements" are defined under 4. Program Details. For each BA, BFA or BSc Honours degree at least 54 units in the Major Field are normally required. Students can choose to include additional courses in the Major Field to a maximum of 72 units. The Major Fields in BFA Honours and BMus Honours degrees typically require considerably more courses. The completion of some programs requires additional supporting courses from outside the Major Field.

First Class Honours

The notation "First-Class Honours" will be inscribed on the permanent record and graduation parchment of any students completing an Honours Program with a grade point average of at least 3.60 over the last 90 units taken for the degree. Courses from other institutions as well as the University of Calgary can be used in this calculation. In cases in which the last fifteen must include some but not all of a group of courses taken concurrently, the selection will be made in the manner most advantageous to the student.

3.4.3 Minor Fields

Students may formally declare a Minor and have this officially recorded on their transcript of record. To obtain a Minor, students must complete at least 30 units from the Minor Field and any requirements specified for the particular Minor. Students are normally not permitted to count more than 36 units from their Minor fields in their degrees. See the sub-section on 3.2.14 Unauthorized Concentrations.

Students in the Faculty of Arts may be eligible to declare Minor Fields from Continuing Education, the Haskayne School of Business, the Cumming School of Medicine and the Faculty of Science as well as the Faculty of Arts. Students should consult the Calendar regulations for the Faculties within which they intend to declare a Minor. For Minors from the Faculty of Arts, see the section on 4. Program Details.

At least one Minor Field of study must be formally declared in conjunction with the Multidisciplinary Degree Programs. Some restrictions apply to the pairing of majors

and minors as discussed under 4. Program Details. Students are advised that course work in addition to the normal 120 units may sometimes be required if a formal Minor program is declared.

The declaration of a Minor must be made not later than the time of last registration. To receive further information, contact an Arts Degree Advisor in the Arts Students' Centre.

Note: In accordance with other parts of this Calendar, students pursuing degrees from other Faculties may or may not be eligible to declare Minors from the Faculty of Arts at the discretion of their home faculty.

3.4.4 Co-operative Education Programs

Introduction

In the Faculty of Arts, most degree programs, including honours degree programs, are offered with a Co-operative Education (Co-op) option. Co-op Programs normally take five years to complete and include 12 to 16 months of paid supervised work experience in various private companies, government agencies and non-profit organizations. After second year, three or four work terms are interspersed with regular academic terms. Co-operative Education Programs provide students with opportunities to experience the linkages between academic knowledge and a variety of appropriate job situations. Students completing the requirements of the Co-operative Education option will graduate with "Co-operative Education" designated on their transcripts and degree parchments.

Students who are interested in pursuing the Co-operative Education option are urged to discuss their plans and course selection with the Co-operative Education Co-ordinators in the Faculty of Arts Co-operative Education Office as early in their program as possible.

Faculty of Arts Co-operative Education Office

Location: Social Sciences 102, Arts Students' Centre

Phone: 403.210.8509 or 403.220.8636

Email address: artscoop@ucalgary.ca

Website: arts.ucalgary.ca/co-op/

Students should also consult with the subject advisor in the relevant Department or Program, particularly if they are considering combining Honours and Co-operative Education programs. In addition, students are referred to the Co-operative Education/ Internship section of this Calendar.

Notes:

- The Bachelor of Communication and Media Studies and the Bachelor of Film Studies may be taken with Co-op but students may face sequencing constraints and/or require extra time to complete their programs.
- Co-operative Education is not available in conjunction with BA, BFA and BSc Degrees with the following Major Fields: Art History, Dance, Drama, Music, and Psychology. It is also not available to the BMus degree program.

- Developing and implementing job-search skills is a part of the Co-operative Education Program. The Program does not guarantee that students will obtain work term placements.

Admission

Students must submit a completed application to the Faculty of Arts Co-operative Education program at arts.ucalgary.ca/co-op/home/apply-co-op by the deadline of October 15. The minimum eligibility criteria are as follows:

1. Students must meet all of the Requirements specified in the Co-operative Education/Internship section of this Calendar.
2. Students must have completed at least 30 units by October 15 (excluding the courses they are currently registered in), they must be engaged in full-time study, and they must have achieved a grade point average of 2.50 over their most recent 30 units.
3. A minimum of 30 units must be remaining in their degree after their first planned work term, including a plan to end on an academic semester.

Meeting the minimum eligibility requirements does not guarantee admission. Capacity in the program may be limited due to program resources and market conditions.

Progress Through the Program

Progress through the Co-operative Education Program is bound by the rules concerning Registration, Course Work, Student Standing, Fees and Expenses and Withdrawal Policies specified in the Co-operative Education/Internship section of this Calendar.

Sequence

Those students who successfully apply by October 15 normally undergo preparation in the Term they applied and search for placement during the following Winter Term and enter their first work term in Spring/Summer term or the following Fall Term. Subsequent work terms are interspersed with academic terms. A minimum of three work terms is required and a fourth may be approved at a student's request. Students must complete all of the academic requirements for their programs and must finish on a full-time academic term.

Development of Job-Search Skills

Approval for a student's first work term and registration in the accompanying course, Co-operative Education 511.01, is conditional on full participation in the pre-placement preparatory activities established by the Co-operative Education Office.

Prescribed Preparatory Courses

To provide a sound foundation for work terms related to a Major Field of study and to enhance the student's ability to compete for opportunities, academic Departments and Programs may also recommend courses to be completed by students in that Major. A list of the recommended courses for each Major Field is available through the Co-operative Education office. These courses

would be based on available courses in first and second year.

Work Term Activity

Students are expected to focus on their placements and do not normally take any academic courses during their work terms. Nevertheless, students may elect to take one three-unit course during a second and/or subsequent work term provided that they have a strong academic and placement records and the course does not occur during work hours or interfere with work term responsibilities.

Work Term Assessment

The mandatory work term courses, Co-operative Education 511.01, 511.02 and 511.03, and the additional course, Co-operative Education 511.04, are graded on a credit (CR) or fail (F) basis. A positive assessment requires satisfactory performance on each of the following items:

- (a) The Co-operative Education Co-ordinators evaluation of job performance, which is based on an on-site visit where practical.
- (b) The employer's evaluation of job performance.
- (c) The student's self-assessment of job performance and the overall job experience, which is normally based on participation in a debriefing or integrative session.
- (d) A work term report prepared by the student and evaluated by the Faculty.

Note: Upon the request of a student, the Faculty may approve registration in Co-operative Education 511.04 in conjunction with an extra (fourth) work term.

Completion

To graduate with the Co-operative Education designation, students must:

- (a) Successfully complete all of Co-operative Education 511.01, 511.02, 511.03.
- (b) Successfully complete Co-operative Education 511.04 if permission has been received to register in this course.
- (c) Achieve a minimum grade point average of 2.50 over their final 90 units of academic subjects.

Note: Students must also meet all of the regular academic requirements for graduation in their BA or BSc degree programs.

3.4.5 Combined Degrees

Combined Degrees programs lead to two degrees and normally take at least five years to complete. It is often possible to earn one or both of the Degrees with Honours.

Combined Degree programs require careful selection of courses to complete all requirements of the two Major Fields. For advising on Faculty of Arts component(s) of Combined Degrees, students should consult with both the program advisor in the Arts Students' Centre and the relevant Subject Advisor(s).

If courses have been chosen carefully, it may be possible for students to opt out of a combined degree program after the end of their third year and still complete a single degree program in four years. If courses have been

unevenly distributed, however, it may require more than four years to complete a single degree.

Note: As described in Section 3.4.1, a single degree with Double Major (i.e., two majors) requires at least 120 units. By contrast, a combined degree program yields two degrees and requires at least 150 units.

Faculty of Arts Requirements for Combined Degrees

The following faculty requirements apply to Combined Degrees programs that include a BA, BFA, BMus or BSc with a Major Field from the Faculty of Arts.

1. *Overall Program:* Successful completion of an overall program consisting of at least 150 units.

2. *Program Focus:* Successful completion of the Major Field Requirements and any associated "Other Requirements" for any/each BA, BFA, BMus or BSc from the Faculty of Arts.

3. *Academic Achievement:*

(a) A minimum GPA of 2.00 must be achieved over all courses in the Major Field and over all courses in the program.

(b) A maximum of 6 units "D" or "D+" grade in the Major Field and a maximum of 18 units "D" or "D+" grades overall.

4. *University of Calgary Study:*

(a) A maximum of 60 units in eligible post-secondary transfer credits from other institutions may be counted toward the degree.

(b) A maximum of 24 units in eligible post-secondary transfer credits from other institutions may be counted toward the Major Field.

5. *Depth:* A maximum of 54 units at the junior or 200 level.

6. *Breadth:* A minimum of 6 units from the Faculty of Science. (Students in the BA (Dance), BFA and BMus Degrees are exempt from this requirement only if the second degree is outside the Faculty of Arts.)

7. *Physical Activity Courses:* A maximum of 6 units may be taken from: Dance Education Activity/Theory, Outdoor Pursuits Activity/Theory and Physical Education Activity/Theory.

Notes:

- For each degree program, the "Major-Field Requirements" and any associated "Other Requirements" are defined below under 4. Program Details.
- The Faculty and Program Requirements of the partner Faculty must also be met.

Faculty of Arts Requirements for Combined Degrees with an Honours Component

The following faculty requirements apply to Combined Degrees programs that include an BA Honours or BSc Honours from the Faculty of Arts.

1. *Overall Program:* Successful completion of an overall program consisting of at least 150 units.

2. *Program Focus:* Successful completion of the Major Field with Honours Requirements and any associated "Other Requirements" for any/each BA or BSc Honours from the Faculty of Arts.

3. *Academic Achievement:*

(a) A minimum GPA of 3.30 must be achieved over the final 90 units.

(b) A maximum of 6 units "D" or "D+" grade in the Major Field and a maximum of 18 units "D" or "D+" grades overall.

4. *University of Calgary Study:*

(a) A maximum of 60 units in eligible post-secondary transfer credits from other institutions may be counted toward the degree.

(b) A maximum of 24 units in eligible post-secondary transfer credits from other institutions may be counted toward the Major Field.

5. *Depth:* A maximum of 54 units at the junior or 200 level.

6. *Breadth:* A minimum of 6 units from the Faculty of Science. (Students in the BA (Dance), BFA and BMus Degrees are exempt from this requirement only if the second degree is outside the Faculty of Arts.)

7. *Physical Activity Courses:* A maximum of 6 units may be taken from: Dance Education Activity/Theory, Outdoor Pursuits Activity/Theory and Physical Education Activity/Theory.

Notes:

- For each degree program, the "Major-Field with Honours Requirements" and any associated "Other Requirements" are defined below under 4. Program Details.
- The Faculty and Program Requirements of the partner Faculty must also be met.

Combined Degree Programs within the Faculty of Arts

BA, BFA, BMus or BSc (Arts)/BA or BSc (Arts)

This program leads to two degrees from the Faculty of Arts. One or both degrees may be awarded with Honours.

Students may either be admitted to both degree programs when they first apply to the University or may seek admission to a second Degree Program after being admitted. Students must satisfy the requirements for admission to the Faculty of Arts and each program therein. (See the Admissions section of this Calendar). Students applying for Honours must follow the Admission procedures specified for Honours Degrees with a Major Field and, once admitted, they are subject to the annual Performance Review for Honours.

In addition to the Faculty of Arts Requirements for Combined Degrees and/or Combined Degrees with an Honours Component listed above, students must adhere to the program requirements for each Major Field and/or each Major Field with Honours as described in 4. Program Details section.

Specialized Combined Degree Program with the Faculty of Kinesiology

Dance can be combined with Kinesiology:

- Bachelor of Kinesiology (Kinesiology)/Bachelor of Arts (Dance) — see Creative and Performing Arts under 4. Program Details

Specialized Combined Degree Program with the Cumming School of Medicine

Psychology can be combined with Community Rehabilitation and Disability Studies:

- Bachelor of Community Rehabilitation (Medicine)/Bachelor of Arts (Psychology) or Bachelor of Science (Psychology) — see Psychology under 4. Program Details.

Specialized Concurrent Degree Programs with the Werklund School of Education

In several specialized fields in the Faculty of Arts, Concurrent Degree programs are offered in conjunction with the Werklund School of Education:

- Bachelor of Arts Canadian Studies/Bachelor of Education
- Bachelor of Arts Communication and Culture (Multidisciplinary Studies)/Bachelor of Education
- Bachelor of Arts Dance (with Dance Pedagogy Concentration)/Bachelor of Education (secondary route only)
- Bachelor of Arts Development Studies/Bachelor of Education
- Bachelor of Arts English/Bachelor of Education
- Bachelor of Fine Arts Drama Education/Bachelor of Education
- Bachelor of Arts French/Bachelor of Education
- Bachelor of Arts or Bachelor of Science Geography/Bachelor of Education
- Bachelor of Arts History/Bachelor of Education
- Bachelor of Arts International Indigenous Studies/Bachelor of Education
- Bachelor of Arts International Relations/Bachelor of Education
- Bachelor of Arts Music/Bachelor of Education (elementary route only)
- Bachelor of Music Music Education/Bachelor of Education (secondary route only)
- Bachelor of Arts Political Science/Bachelor of Education
- Bachelor of Arts Sociology/Bachelor of Education
- Bachelor of Arts Spanish/Bachelor of Education
- Bachelor of Fine Arts Visual Studies/Bachelor of Education

For more information on the requirements of the Arts major, see 4. Program Details. For

the Education requirements see the Werk-lund School of Education.

Combined Degree Programs With Other Faculties

Bachelor of Arts and Bachelor of Science programs in the Faculty of Arts can be taken in combination with approved undergraduate programs from other Faculties. More than 150 units may be required to complete some degree combinations. The Faculty of Arts degree may often be awarded with Honours, but more than 150 units will frequently be needed for completion.

Students may either be admitted to both degree programs when they first apply to the University or may seek admission to a second Degree Program after being admitted. Students must satisfy the requirements for admission to both Faculties and Programs. (See the Admissions section of this Calendar.) Applicants for Honours must follow the Admission procedures specified for Honours Degrees with a Major Field.

The Graduation requirements of both Faculties and Programs must be met. On the Arts side, students must meet the Faculty of Arts Requirements for Combined Degrees or Combined Degrees with an Honours Component listed above as well as the program-specific requirements for the Major Field or Major Field with Honours as described in the 4. Program Details section.

While other Combined Degrees may be approved with the consent of both Faculties, students may apply directly for the three well-established Combined Degree Programs listed below:

Combined BComm/BA (Arts) or BSc (Arts)

This combined program leads to a Bachelor of Commerce from the Haskayne School of Business and either a Bachelor of Arts or a Bachelor of Science from the Faculty of Arts. The Haskayne School of Business provides complementary information on Combined Degrees in their section of this Calendar. The Haskayne School of Business limits combined degrees to specified majors within the Faculty of Arts.

Combined BSc (Engineering)/BA (Arts) or BSc (Arts)*

This combined program leads to a Bachelor of Science in Engineering from the Schulich School of Engineering and either a Bachelor of Arts or a Bachelor of Science from the Faculty of Arts. The Schulich School of Engineering provides complementary information on Combined Programs in their section of this Calendar.

Note: Because engineering degrees are highly structured, more than 150 units are typically required. Further, students who opt out of this Combined Degree program, particularly if they do so after first year, often require more than four years to complete a single degree.

Combined BA (Arts) or BSc (Arts)/BSc (Science)*

This combined program leads to a Bachelor of Science from the Faculty of Science and either a Bachelor of Arts or a Bachelor

of Science from the Faculty of Arts. The Faculty of Science provides complementary information on Second Degree Programs in their section of this Calendar.

**The BA (Dance) and the BFA (Drama) may also be used in these combinations, but scheduling constraints may pose difficulties and more than 150 units are likely to be required to complete both sets of degree requirements. The BFA (Visual Studies) and the BMus degrees can only be used in these combinations with special permission from both Faculties.*

3.4.6 Second Baccalaureate Degrees

Students will not normally be admitted to a Second Degree program in any field in which they already possess a degree. Some further restrictions apply to the pairing of majors in the first and second degree as discussed in the 4. Program Details section.

Upon admission to their program, students are advised to contact the Arts Students' Centre to discuss their academic plans, obtain general advice and receive an assessment of the remaining requirements.

Modified Rules and Regulations

The rules and regulations pertaining to 3.4.1 Degrees with a Major Field and 3.4.2 Honours Degree's with a Major Field remain applicable with the following modifications:

- Up to 60 units counted towards any previous degrees may be used towards requirements in the Second Degree. These may not include more than 24 units toward the new Major Field.
- Courses extra to previous degrees and so noted on transcripts may be counted towards the Second Degree if completed before enrolling in the Second Degree program and if consistent with Faculty regulations.
- Of all courses used toward the second degree, at least 60 units must be taken from the University of Calgary.
- The Second Degree will be awarded "With Distinction" or "First-Class Honours" as applicable if a GPA of at least 3.60 is achieved over the courses completed for the Second Degree excluding the previous credit allowed under (a) above.
- For a second BA with Honours, admission to Honours will be determined based on the overall grade point average obtained for the final 60 units in the first degree while the grade point averages required for graduation with Honours will be calculated using the courses completed for the Second Degree.

Co-operative Education

For Major Fields of specialization in which the Faculty of Arts offers Co-operative Education Programs, students may apply for a Second Degree or a Second Degree with Honours that includes Co-operative Education. Application for admission to the Co-operative Education program must be made when the student applies for admission to the Second Degree. Students who would have more than 84 units completed towards the Second Degree prior to their first Co-operative Education placement are normally not eligible.

Students in Second Degree programs with Co-operative Education are subject to:

- All of the requirements pertaining to Second Degrees with a Major Field or Second Degrees with Honours in a Major Field, and
- All of the requirements specified for Co-operative Education Programs.

4. Program Details

4.1 Arts and Science Honours Academy

Introduction

The Arts and Science Honours Academy (ASHA) is a program for students of demonstrated ability who aspire to a well-rounded education that combines the depth of an Honours degree with the breadth of dedicated interdisciplinary courses, a language requirement and an international experience.

Contact Information

Email: asha@ucalgary.ca

Website: ucalgary.ca/asha

Admission

Entrance to the program is competitive. Admission criteria include high academic achievement (a minimum high school average of 85 per cent) and evidence of community or academic involvement and leadership. Students must complete a separate online form and a brief writing piece. While admission is normally limited to incoming first-year students, students in the participating faculties can be considered for admission in their second year.

Program Requirements

- Academic Achievement:** Excellence in a degree program in the Faculty of Arts or the Faculty of Science demonstrated by either:
 - Successful completion of a BA or BSc with Honours, or
 - Students completing programs that do not offer Honours are required to complete their degree programs with a GPA of at least 3.30 over the final 90 units and over all courses completed in their major field, in addition to completing a significant independent research course in their field of study.
- Second Language:** 6 units in a language or languages other than English. Computer programming languages (Computer Science 217, 219, 231, 233 and Data Science 211) may be used to fulfil this requirement. Students taking courses taught in another language may seek approval from the ASHA co-ordinator to count such courses towards the language requirement.
- Embedded International/Intercultural Experience:** While students are strongly encouraged to go abroad for a full academic year, they must participate in an approved study abroad, volunteer abroad or work abroad program, or a suitable program that offers an intercultural experience within Canada. Students must submit a travel proposal appropriate for their program to the

program co-ordinator in December of their second year.

4. **Arts and Science Honours Academy Core Courses:** 18 units:

Arts and Science Honours Academy
220, 321, 421, 501*, 503*

**Registration in Arts and Science Honours Academy 501 and 503 is contingent upon admission to an honours program. Students completing programs that do not offer honours are required to achieve a GPA of at least 3.30 over the most recent 60 units and over all courses completed in their major field in order to continue in the program.*

Note: These courses may be used to satisfy the breadth requirements of courses outside the home faculty.

4.2 African Studies

See Anthropology.

4.3 Ancient and Medieval History

See Classics and Religion.

4.4 Anthropology and Archaeology

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Bachelor of Arts (BA) in Social and Cultural Anthropology

BA Honours in Social and Cultural Anthropology

BA in Social and Cultural Anthropology with Co-operative Education

BA Honours in Social and Cultural Anthropology with Co-operative Education

Bachelor of Science (BSc) in Anthropology

BSc Honours in Anthropology

BSc in Anthropology with Co-operative Education

BSc Honours in Anthropology with Co-operative Education

Bachelor of Arts (BA) in Archaeology

BA Honours in Archaeology

BA in Archaeology with Co-operative Education

BA Honours in Archaeology with Co-operative Education

Bachelor of Science (BSc) in Archaeology

BSc Honours in Archaeology

BSc in Archaeology with Co-operative Education

BSc Honours in Archaeology with Co-operative Education

Bachelor of Arts (BA) in Development Studies

BA in Development Studies with Co-operative Education

BA Honours in Development Studies

BA Honours in Development Studies with Co-operative Education

Concurrent BA in Development Studies and Bachelor of Education

Note: Minors are offered in African Studies, Anthropology, Archaeology, and Development Studies.

Introduction

The Department of Anthropology and Archaeology offers instruction in African Studies, Archaeology, Biological Anthropology, Social and Cultural Anthropology, and Development Studies.

The Department of Anthropology and Archaeology takes a comparative, cross-cultural, and cross-species perspective to understand human beings. Anthropologists and archaeologists consider how humans evolved, how they shape—and are shaped by—their culture, and seek to understand the records they have left behind. Students are encouraged to take one of the field schools to gain hands-on experience.

Students wishing to emphasize the social sciences and humanities in their Anthropology or Archaeology program should register for the BA degree. Those wishing to emphasize the natural and biological sciences should register for the BSc degree. It is recommended that first-year students in any of these programs register in Anthropology 201, 203, and Archaeology 201.

Archaeology: Archaeology courses address the development of complexity, paleopathology, ethnoarchaeology, lithic technology, geoarchaeology, human osteology, zooarchaeology, human-environment interaction, and cultural heritage management. Laboratory-based courses emphasize a hands-on approach to learning analytical techniques. Geographic areas include North and South America, Mesoamerica, North Africa, and the Arctic.

Biological Anthropology: The BSc in Anthropology (also known as physical anthropology) includes courses in paleoanthropology and bioanthropology, which investigate the origins of our species, variation, and adaptation in modern human populations, and the behaviour and ecology of other primate species. Laboratory-based courses examine casts of fossils from the earliest primates through to modern humans, and also human and primate genetics.

Social and Cultural Anthropology: The BA in Anthropology focuses on social and cultural anthropology and adopts a cross-cultural perspective. Courses seek to foster an understanding and appreciation of the wide variety of cultures in the world and provide critical insights into how people actually live and how they negotiate the challenges created by globalization.

Development Studies: The Development Studies program is an interdisciplinary program designed to provide students with an understanding of the issues, policies, and practices associated with sustainable global and community development in the context of both Canada and internationally. Courses examine social, economic, environmental, and political change as well as issues of poverty, hunger, social justice, colonialism, participatory development, cultural beliefs, human rights, and governance. Students gain practical skills for designing, implementing, and effectively managing community development projects which prepares them for further studies as well as employ-

ment in governmental, non-governmental, and other international development-related fields in Canada and abroad.

African Studies: The Department offers a minor in African Studies.

Contact Information

For Archaeology, Anthropology and Development Studies:

Location: Earth Sciences 620

Phone: 403.220.6516

Fax: 403.284.5467

Email: anth@ucalgary.ca; destprog@ucalgary.ca

Website: antharky.ucalgary.ca

For African Studies:

Program Co-ordinator: afstprog@ucalgary.ca

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: arts.ucalgary.ca/advising.

For more specific advice regarding course selection and requirements in the major field, students should consult the Undergraduate Program Director located in the Department of Anthropology and Archaeology (consult Department website for contact information).

Admission to the Major

Prospective students wishing to enter the BA (Social and Cultural Anthropology, or Archaeology), the BA (Development Studies), or the BSc (Anthropology or Archaeology) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Admission to Honours

Honours programs in Anthropology, Archaeology and Development Studies offer senior students the opportunity to participate in more inquiry-based studies than those undertaken by Majors. Entrance occurs after completion of at least 75 units. The Anthropology and Archaeology Honours programs both permit students to select either an Honours BA, or an Honours BSc.

The Faculty of Arts procedures for Admission to Honours established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Courses Constituting the Field of African Studies

- African Studies 301, 400, 501
- Anthropology 317, 319
- Archaeology 307, 335, 395, 399, 439
- French 549
- Greek and Roman Studies 345, 347
- History 397.01, 402, 573
- Political Science 371, 471
- Religious Studies 339, 353

Courses Constituting the Field of Anthropology

- All courses labelled Anthropology (ANTH)
- African Studies 301
- Archaeology 201, 345, 355, 399, 419, 437, 439, 453, 555, 595
- Development Studies 403

Courses Constituting the Field of Archaeology

- All courses labelled Archaeology (ARKY)
- Anthropology 201, 203, 305, 317, 319, 321, 329, 350, 355, 534, 589
- Geography 412

Courses Constituting the Field of Development Studies

- All courses labelled Development Studies (DEST)
- African Studies 301
- Anthropology 303, 313, 317, 319, 321, 323, 329, 331, 341, 343, 357, 385, 379, 393, 399, 411, 449, 467, 479, 523
- Architectural Studies 423
- Biology 307, 309
- Canadian Studies 361
- Communication and Media Studies 313
- Economics 201, 203, 321, 337, 339, 349, 365, 377, 425
- Geography 254, 324, 326, 328, 330, 428, 432, 452, 454, 456, 458, 483, 526, 528, 530, 532, 534, 536, 538, 553, 558, 565
- Health and Society 301
- History 307, 402, 494
- Indigenous Studies 201, 303, 305, 311, 312, 317, 397, 399, 407, 415, 502, 503
- Latin American Studies 311
- Political Science 279, 345, 359, 371, 379, 381, 399, 422, 470, 471, 481, 487, 502, 503, 506, 565, 579
- Sociology 303, 311, 313, 315, 375, 487
- South Asian Studies 203, 303
- Statistics 213
- Sustainability Studies 201, 401, 403
- University 201, 203
- Urban Studies 253, 311, 394, 395, 461, 451, 505

4.4.1 BA in Social and Cultural Anthropology

A. FACULTY OF ARTS REQUIREMENTS
Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 45 units to a maximum of 60 units in Courses Constituting the Field of Anthropology while fulfilling the following requirements:

1. *Core*: 15 units Anthropology 201, 203, 411, 490, Archaeology 201.
2. *Ethnography*: 6 units from African Studies 301, Anthropology 317, 319, 321, 323, 329, 355, 421*, 427*; Archaeology 345, 355, 399, 419, 439, Development Studies 403.

3. *Upper-Year Courses*: 6 units from Anthropology 400, 410, 421*, 427*, 441, 449, 467, 479, 501, 523, 541.

4. *Options*: 18 units from the Courses Constituting the Field of Anthropology.

**Anthropology 421 and 427 may not be used to satisfy both requirement 2 and requirement 3.*

C. DEGREE OPTIONS

The BA in Social and Cultural Anthropology can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.4.2 BA Honours Social and Cultural Anthropology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 57 to a maximum of 72 units in Courses Constituting the Field of Anthropology while fulfilling the following requirements:

1. *Core*: 15 units Anthropology 201, 203, 411, 490; Archaeology 201.
2. *Ethnography*: 6 units from African Studies 301; Anthropology 317, 319, 321, 323, 329, 355, 421, 427; Archaeology 345, 355, 399, 419, 439; Development Studies 403.
3. *Upper-Year Courses*: 6 units from Anthropology 400, 410, 421*, 427*, 441, 449, 467, 479, 501, 523, 541.
**Anthropology 421 and 427 may not be used to satisfy both requirement 2 and requirement 3.*
4. *Anthropology Options*: 27 units from Courses Constituting the Field of Anthropology.
5. *Capstone Honours Seminar*: 3 units Anthropology 573.

C. DEGREE OPTIONS

The BA Honours in Social and Cultural Anthropology can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.4.3 BSc in Anthropology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 45 to a maximum of 60 units in Courses Constituting the Field of Anthropology while fulfilling the following requirements:

1. *Core*: 21 units Anthropology 201, 203, 305, 309, 311, 350, Archaeology 201.
2. *Upper-Year Courses*: 12 units from Anthropology 400, 412, 413, 425, 435, 441, 449, 451, 505, 506, 534, 552, 553, 589; Archaeology 437, 453, 555, 595.
3. *Options*: An additional 12 units from Courses Constituting the Field of Anthropology.

C. OTHER REQUIREMENTS

Biology: 3 units from any 200- or 300-level Biology course.

D. DEGREE OPTIONS

The BSc in Anthropology can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.4.4 BSc Honours Anthropology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 57 to a maximum of 72 units in Courses Constituting the Field of Anthropology while fulfilling the following requirements:

1. *Core*: 21 units: Anthropology 201, 203, 305, 309, 311, 350, Archaeology 201.
2. *Upper-Year Courses*: 12 units from Anthropology 400, 412, 413, 425, 435, 441, 449, 451, 505, 506, 534, 552, 553, 589; Archaeology 437, 453, 555, 595.
3. *Options*: 21 units from Courses Constituting the Field of Anthropology.
4. *Capstone Honours Seminar*: 3 units Anthropology 571.

C. OTHER REQUIREMENTS

1. *Biology*: 3 units from any 200- or 300-level Biology course excluding Biology 315.
2. *Statistics*: 3 units from Biology 315; Geography 485, 585; Psychology 300; Sociology 311, 315; Statistics 213, 217.

D. DEGREE OPTIONS

The BSc Honours in Anthropology can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.4.5 Minor in Anthropology

The Minor in Anthropology is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Anthropology, including:

1. 6 units Anthropology 201, 203.
2. An additional 24 units from Courses Constituting the Field of Anthropology with at least 15 units at the 300 level or above.

4.4.6 BA in Archaeology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

BA students must successfully complete a minimum of 45 to a maximum of 60 units in Courses Constituting the Field of Archaeology while fulfilling the following requirements:

1. *Core*: 12 units Archaeology 201, 451, Anthropology 201, 203.

2. *Regional Archaeology*: 6 units from Archaeology 303, 317, 321, 335, 341, 343, 353, 357, 395, 401, 423, 437, 439, 455, 537.

3. *Archaeological Techniques*: 6 units from Archaeology 306*, 415, 417, 453, 471, 506, 515, 555, Geography 412.

**Archaeology 306 counts as 3 units for the Archaeological Techniques requirement, and the other 3 units count towards Archaeology Options.*

4. *Traditional Knowledge*: 6 units from Archaeology 307, 345, 355, 357, 399, 419; Anthropology 317, 319, 321, 329, 355.

5. *Archaeology Options*: At least 15 units from Courses Constituting the Field of Archaeology.

6. *500-level Courses*: Inclusive of the courses used to fulfill requirements 2-5 above, 6 units from Archaeology 503, 506, 515, 523, 531, 537, 555, 591, 593, 595, Anthropology 589.

C. DEGREE OPTIONS

The BA in Archaeology can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.4.7 BA Honours Archaeology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

BA students must successfully complete a minimum of 51 units to a maximum of 72 units in the Courses Constituting the Field of Archaeology while fulfilling the following requirements:

1. *Core*: 12 units: Archaeology 201, 451, Anthropology 201, 203.
2. *Regional Archaeology*: 9 units from Archaeology 303, 317, 321, 335, 341, 343, 353, 357, 395, 401, 423, 437, 439, 455, 537.
3. *Archaeological Techniques*: 6 units from Archaeology 306*, 415, 417, 453, 471, 506, 515, 555, Geography 412.

**Archaeology 306 counts as 3 units for the Archaeological Techniques requirement. The remaining 3 units count towards partial fulfillment of the Archaeology Options requirement.*

4. *Traditional Knowledge*: 6 units from Archaeology 307, 345, 355, 357, 399, 419, Anthropology 317, 319, 321, 329, 355.
5. *Archaeology Options*: At least 12 units from Courses Constituting the Field of Archaeology.

6. *Honours Thesis*: 6 units Archaeology 596 or 598.

C. OTHER REQUIREMENTS

1. *Statistics*: 3 units from Geography 485, 585; Psychology 300; Sociology 311, 315; Statistics 213, 217.

D. DEGREE OPTIONS

The BA Honours in Archaeology can be taken with Co-operative Education. See sec-

tion 3.4.4 Co-operative Education Programs for information and requirements.

Note: It is strongly recommended that Honours students take the field school courses, Archaeology 306 and Archaeology 506, or other department-approved field-school courses. Students must obtain a letter of permission from the Faculty of Arts through their Student Centre prior to attending a field school run by another university.

4.4.8 BSc in Archaeology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

BSc students must successfully complete a minimum of 48 to a maximum of 60 units in Courses Constituting the Field of Archaeology while fulfilling the following requirements:

1. *Core*: 15 units: Archaeology 201, 451, Anthropology 201, 203, 350.
2. *Regional Archaeology*: 6 units from Archaeology 303, 317, 321, 335, 341, 343, 353, 357, 395, 401, 423, 437, 439, 455, 537.
3. *Archaeological Techniques*: 6 units from Archaeology 306*, 415, 417, 453, 471, 506, 515, 555, Geography 412.

**Archaeology 306 counts as 3 units for the Archaeological Techniques requirement. The remaining 3 units count towards partial fulfillment of the Archaeology Options requirement.*

4. *Traditional Knowledge*: 6 units from Archaeology 307, 345, 355, 357, 399, 419, Anthropology 317, 319, 321, 329, 355.
5. *Archaeology Options*: At least 15 units from Courses Constituting the Field of Archaeology.
6. *500-level Courses*: Inclusive of the courses used to fulfill requirements 2-5 above, 6 units from Archaeology 503, 506, 515, 523, 531, 537, 555, 591, 593, 595, Anthropology 534, 589.

C. OTHER REQUIREMENTS

Natural Science Emphasis: Inclusive of the courses used to fulfill requirements B.1-6 above, students must include in their degree a minimum of 48 units from the **Courses with a Natural-Science Emphasis**.

Courses with a Natural-Science Emphasis

- Anthropology 201, 305, 309, 311, 341, 350, 412, 413, 425, 435, 449, 451, 505, 506, 534, 552, 553, 571, 589.
- Archaeology 201, 306, 415, 417, 437, 453, 471, 506, 515, 555, 595, 596.
- Earth Science 401.
- Geography 308, 310, 380, 408, 410, 412, 480, 482, 484, 500, 502, 503, 504, 506, 510, 567, 584, 586, 587, 588, 599.
- All courses offered by the Faculty of Science.

Note: The Department will determine whether Archaeology 490, 531, and 597 can be used as a Natural Sciences course, depending on the topic.

D. DEGREE OPTIONS

The BSc in Archaeology can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.4.9 BSc Honours Archaeology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

BSc students must successfully complete a minimum of 54 units and a maximum of 72 units in Courses Constituting the Field of Archaeology while fulfilling the following requirements:

1. *Core*: 15 units: Archaeology 201, 451, Anthropology 201, 203, 350.
2. *Regional Archaeology*: 9 units from Archaeology 303, 317, 321, 335, 341, 343, 353, 357, 395, 401, 423, 437, 439, 455, 537.
3. *Archaeological Techniques*: 6 units from Archaeology 306*, 415, 417, 453, 471, 506, 515, 555, Geography 412.

**Archaeology 306 counts as 3 units for the Archaeological Techniques requirement. The remaining 3 units count towards partial fulfillment of the Archaeology Options requirement.*

4. *Traditional Knowledge*: 6 units from Archaeology 307, 345, 355, 357, 399, 419, Anthropology 317, 319, 321, 329, 355.
5. *Archaeology Options*: At least 12 units from Courses Constituting the Field of Archaeology.
6. *Honours Thesis*: 6 units Archaeology 596 or 598.

C. OTHER REQUIREMENTS

1. *Natural Science Emphasis*: Inclusive of the courses used to fulfill requirements B. 1-6 above, students must include in their degree a minimum of 48 units from the **Courses with a Natural-Science Emphasis**.

Courses with a Natural-Science Emphasis

- Anthropology 201, 305, 309, 311, 341, 350, 412, 413, 425, 435, 449, 451, 505, 506, 534, 552, 553, 571, 589.
- Archaeology 201, 306, 415, 417, 437, 453, 471, 506, 515, 555, 595, 596.
- Earth Science 401.
- Geography 308, 310, 380, 408, 410, 412, 480, 482, 484, 500, 502, 503, 504, 506, 510, 567, 584, 586, 587, 588, 599.
- All courses offered by the Faculty of Science.

Note: The Department will determine whether Archaeology 490, 531, and 597 can be used as a Natural Sciences course, depending on the topic.

2. *Statistics*: 3 units from Geography 485, 585; Psychology 300; Sociology 311, 315; Statistics 213, 217.

D. DEGREE OPTIONS

The BSc Honours in Archaeology can be taken with Co-operative Education. See sec-

tion 3.4.4 Co-operative Education Programs for information and requirements.

Note: It is strongly recommended that Honours students take the field school courses, Archaeology 306 and 506, or other department-approved field-school courses. Students must obtain a letter of permission from the Faculty of Arts through their Student Centre prior to attending a field school run by another university.

4.4.10 Minor in Archaeology

The Minor in Archaeology is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete at least 30 units to a maximum of 36 units from Courses Constituting the Field of Archaeology, including:

1. 3 units Archaeology 201.
2. 27 units from Courses Constituting the Field of Archaeology, with at least 15 units at the 300 level or above.

4.4.11 BA in Development Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units in Courses Constituting the Field of Development Studies and fulfill the following requirements:

1. *Core Courses:* 15 units: Development Studies 201, 302, 393, Economics 201, 203.
2. *Research Methods:* 3 units from Anthropology 411, Communication and Media Studies 313, Geography 483, Political Science 399, Sociology 311, 313, Statistics 213, Sustainability Studies 401.
3. *Development Studies Options:* An additional 27 units chosen from Courses Constituting the Field of Development Studies.
4. *Upper-Year Options:* Inclusive of the courses used to fulfill requirements 2-3 above, at least 6 units must be at the 400 level or above including at least 3 units labelled Development Studies.
5. *Capstone Seminar:* 3 units Development Studies 591.

C. OTHER REQUIREMENTS

Language: 6 units in a modern language other than English. Students should select a language that will assist in their research or complement a regional focus.

D. DEGREE OPTIONS

The BA in Development Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.4.12 BA Honours in Development Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 54 units in Courses Constituting the Field of Development Studies and fulfill the following requirements:

1. *Core Courses:* 15 units Development Studies 201, 302, 393, Economics 201, 203.
2. *Research Methods:* 3 units from Anthropology 411, Communication and Media Studies 313, Geography 483, Political Science 399, Sociology 311, 313, Statistics 213, Sustainability Studies 401.
3. *Development Studies Options:* An additional 30 units from Courses Constituting the Field of Development Studies.
4. *Upper-Year Options:* Inclusive of the courses used to fulfill requirements 2-3 above, at least 6 units must be at the 400 level or above including at least 3 units labelled Development Studies.
5. *Capstone Seminar:* 3 units Development Studies 591.
6. *Honours Seminar:* 3 units Development Studies 593.

C. OTHER REQUIREMENTS

Language: 6 units in a modern language other than English. Students should select a language that will assist in their research or complement a regional focus.

D. DEGREE OPTIONS

The BA Honours in Development Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.4.13 Minor in Development Studies

The Minor in Development Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units from Courses Constituting the Field of Development Studies while fulfilling the following requirements:

1. 6 units Development Studies 201, 393.
2. An additional 24 units from Courses Constituting the Field of Development Studies with at least 18 units at the 300 level or above.

4.4.14 Minor in African Studies

The Minor in African Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units from Courses Constituting the Field of African Studies while fulfilling the following requirements:

1. *Core:* 3 units African Studies 301.
2. *Ethnography:* 6 units from Anthropology 317, 319, Archaeology 399, 439, Political Science 371.
3. *Senior-Level Courses:* At least 21 additional units from Courses Constituting the Field of African Studies at the 300 level or above.

Note: The Undergraduate Program Director may approve additional courses to fulfill requirement #3 when they have significant African emphasis.

4.5 Archaeology

See Anthropology.

4.6 Applied Energy Economics

See Economics.

4.7 Art

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Bachelor of Arts (BA) in Art History

Bachelor of Fine Arts (BFA) in Visual Studies

BFA Honours in Visual Studies

BFA in Visual Studies with Co-operative Education

BFA Honours in Visual Studies with Co-operative Education

Concurrent BFA in Visual Studies/Bachelor of Education

Notes:

- For the BFA or BFA Honours in Visual Studies students may choose a Concentration in Art Education or a Concentration in Media Arts*.
- A Minor is offered in Visual Studies and Art History.
- The Department of Art offers a Minor in Museum and Heritage Studies. This Minor program is intended to develop a critical and analytical perspective on the issues and future of museum and heritage resources. These encompass national parks and heritage sites, museums and art galleries, archives and historic buildings.

**Applications to this program are currently suspended. No new admissions will be permitted.*

Introduction

The Department of Art is committed to the study and practice of the visual arts as these relate to:

- (a) Creative research in art practices (studio);
- (b) Educational practice and theory (Art Education); and
- (c) Critical study of art in its diverse historical and cultural settings (Art History).

The Department offers the four-year BFA and BFA Honours (Visual Studies) degree, the four year BA in Art History, and a five-year concurrent degree program with the Werklund School of Education, leading to the BFA (Visual Studies) and Bachelor of Education degrees.

Students in the four year BFA and BFA Honours (Visual Studies) are involved in creative research and visual art practices that engage with contemporary society. The courses of study enable the student to develop conceptual understanding in the visual arts, to develop a foundation of knowledge and practice of artistic self-sufficiency, to develop creative processes of planning in order to carry out his or her various studio

interests, and to teach art in the elementary or secondary school systems or to work as art specialists in other settings. The program enables the individual student to determine through studio practice the understandings and insights that support his or her own artistic and intellectual development. Students interested in teacher certification may pursue the concurrent degree program with the Werklund School of Education, which offers three years of study in the Visual Studies program and two years in the Bachelor of Education program. The Visual Studies program provides a core of work in the theory and methodology of art education, as well as a foundation in studio art and Art History.

The BA (Art History) engages students in critical and creative analysis of art objects and cultural forms in a variety of historical, geopolitical, and cultural contexts.

Contact Information

Department Location: Art Building 612

Department Phone:
403.220.5251/403.220.6260

Department Fax: 403.289.7333

Department Email: artdept@ucalgary.ca

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: arts.ucalgary.ca/advising.

Students wishing to pursue the concurrent BFA (Visual Studies)/BEd degree program should also consult with an advisor at the Werklund School of Education. Advising contact information can be found online: werklund.ucalgary.ca/educ_info/contact-us.

For more specific advice regarding course selection and requirements in the major field, students should consult the Undergraduate Program Director of the Department of Art (consult Department website for contact information).

Admission to the BFA in Visual Studies

Admission to the BFA (Visual Studies) program is contingent on the evaluation of a portfolio, which must be received by the department by February 1. For information about the portfolio submission process, see the Department of Art website under art.ucalgary.ca/undergraduate/prospective-students#portfolio.

Prospective students must also meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Admission to Honours

Students wishing to be considered for admission into BFA Honours in Visual Studies must have completed 75 units and must meet the criteria established by the Faculty of Arts in section 3.4.2 Honours Degrees with a Major Field.

The Faculty of Arts procedures for Admission to Honours established in section 3.4.2

Honours Degrees with a Major Field are applicable and provide the overall framework.

Students majoring in Visual Studies are eligible to apply for Honours by the February 1 deadline only if they will complete the program during the following academic year. In addition to applying through the Student Centre for a change of program to Honours, students must submit a Letter of Intent and a portfolio of work to the Department of Art. Information on the supplemental components can be found on the Department of Art website. The department's application form must be signed by a thesis supervisor and include a preliminary thesis proposal. To meet the February 1 deadline, it is recommended that students wishing to enrol in the Honours program obtain guidelines and an application form from the Program Co-ordinator no later than December 1. Students are strongly advised to secure a thesis supervisor by December 15.

Limitation of Enrolment

Enrolment in the Visual Studies program is limited, and thus not all qualified applicants may be admitted.

Applicants will be accepted on the basis of their portfolios and their academic standing in high school and/or previous post-secondary education completed.

Students who are accepted must register by the deadline indicated in their letters of acceptance. Admission is not guaranteed to those who do not register by the specified date.

Admission to the BA in Art History

Prospective students wishing to enter the BA (Art History) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Overlapping Programs

Programs in Art History and Visual Studies cannot be taken in conjunction with other programs in Art History or Visual Studies. This restriction applies to Major-plus-Minor combinations, Double Majors, Combined Degrees, and Second Baccalaureate Degrees.

Courses Constituting the Field of Art

- All courses labelled Art (ART) and Art History (ARHI).

Courses Constituting the Field of Art History

- All courses labelled Art History (ARHI)
- Archaeology 327, 471
- Architectural Studies 201
- Canadian Studies 439
- Communication and Culture 201, 203, 305, 307
- Communication and Media Studies 203, 371, 381, 473
- Drama 345, 347
- Film 301, 305, 307
- Greek and Roman Studies 325, 327, 445, 447

- History 341
- Philosophy 333
- Religious Studies 346, 399

Courses Constituting the Field of Museum and Heritage Studies

- All courses labelled Museum and Heritage Studies (MHST)
- Anthropology 203
- Archaeology 201, 303, 306, 307, 415, 417, 419
- Art courses at the 300 level or above
- Art History 201, 203 and all Art History (ARHI) courses at the 300 level or above
- Astronomy 207, 209
- Biology 307
- All Canadian Studies (CNST) 300-level and above
- Communication and Culture 201, 203, 507
- Communication and Media Studies 313
- Development Studies 485
- Drama 223, 225, 313, 319
- Geography 352, 354
- Geology 201, 209, 202
- Greek and Roman Studies 321, 325, 327, 445
- History 333, 337, 340, 341, 347, 357, 437, 476
- Marketing 341
- Philosophy 333
- Political Science 357
- Religious Studies 205
- Tourism Management 409

Note: Students taking degrees with majors that require Communication and Culture 201, 203, or Communication and Media Studies 313 may not count these courses as part of the Museum and Heritage Studies Minor.

4.7.1 BFA in Visual Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

The BFA in Visual Studies requires the successful completion of a minimum of 75 units to a maximum of 87 units in Courses Constituting the Field of Art while fulfilling the following requirements:

48 units from the following required courses:

- 12 units Art 231, 233, 235, 241
- 3 units from Art History 201 or 203
- 6 units Art History 331, 333
- 12 units Art 301, 327, 329, 397, 399
- 3 units from Art 309, 342, 344
- 9 units Art 401, 465, 499
- 3 units Art 565

27 units from the following Art and Art History options:

- 6 units from Courses Constituting the Field of Art at the 300 level

- 6 units from courses labelled Art History at the 300 level or above
- 15 units from courses labelled Art History or Art 421, 438, 445, 455, 475, 485, 501

C. OTHER REQUIREMENTS

- 3 units in English

D. DEGREE OPTIONS

The BFA in Visual Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements. The BFA in Visual Studies can be taken with a concentration in Art Education (see section 4.7.5).

4.7.2 BFA Honours Visual Studies

The Honours degree in Visual Studies is an advanced undergraduate program for students seeking a more focused studio experience, aspiring to careers as practicing and professional artists, or considering further graduate level study in an MFA program. The Honours degree requires students to complete a minimum of an additional 15 units in Courses Constituting the Field of Art beyond the requirements for the general BFA in Visual Studies. A high standard of creative achievement is required for admission, continuation, and completion.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

The BFA Honours in Visual Studies requires the successful completion of a minimum of 87 to a maximum of 96 units in Courses Constituting the Field of Art while fulfilling the following requirements:

60 units from the following required courses:

- 12 units Art 231, 233, 235, 241
- 3 units from Art History 201 or 203
- 6 units Art History 331, 333
- 12 units Art 301, 327, 329, 397, 399
- 9 units Art 401, 465, 499
- 3 units from Art 309, 342, 344
- 15 units Art 560, 561, 563, 599

27 units from the following Art and Art History Options:

- 6 units from Courses Constituting the Field of Art at the 300 level
- 6 units from courses labelled Art History at the 300 level or above
- 15 units from courses labelled Art History or Art 421, 438, 445, 455, 475, 485, 501

C. OTHER REQUIREMENTS

- 3 units in English

D. DEGREE OPTIONS

The BFA Honours in Visual Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements. The BFA Honours in Visual Studies can be taken with

a concentration in Art Education (see section 4.7.5).

4.7.3 BA in Art History

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units to a maximum of 60 units in Courses Constituting the Field of Art History while fulfilling the following requirements:

1. *Core Courses*:
 - a. 15 units Art History 201, 203, 211, 431, 511.
 - b. 3 units from Art History 331 or 333.
2. *Art History*: 12 units in courses labelled Art History.
3. *Field of Art History Options*: 12 units in courses from Courses Constituting the Field of Art History.

C. OTHER REQUIREMENTS

1. *English*: 6 units in English.
2. *Arts*: 6 units in courses labelled Art.

Note: It is recommended that students take at least 3 units in a language other than English.

4.7.4 Concurrent BFA (Visual Studies)/BED

Introduction

This five-year program leads to a Bachelor of Education from the Werklund School of Education and a Bachelor of Fine Arts in Visual Studies from the Faculty of Arts. A minimum of 150 units must be successfully completed.

Admission

Students must meet the admissions requirements for the Werklund School of Education and the BFA (Visual Studies) program (see the Overview of Programs and Procedures) as well as the requirements of the Faculty of Arts (see A.5 Undergraduate Admission Requirements). Note that admission to the BFA (Visual Studies) program is contingent on the evaluation of a portfolio (see "Admission to the BFA in Visual Studies").

Faculty of Arts Requirements

A. FACULTY OF ARTS REQUIREMENTS FOR CONCURRENT DEGREES

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

BFA Visual Studies Requirements

Students must successfully complete a minimum of 69 units to a maximum of 90 units in Courses Constituting the Field of Art while fulfilling the following requirements:

45 units from the following required courses:

- 12 units Art 231, 233, 235, 241
- 3 units Art History 201 or 203
- 6 units Art History 331, 333
- 15 units Art 309, 327, 329, 342, 344, 399
- 3 units Art 301 or 401

- 3 units Art 491
- 3 units Art 509

24 units from the Courses Constituting the Field of Art at the 300 level or above

C. OTHER REQUIREMENTS

- 3 units in English

Werklund School of Education Requirements

Students in this program must meet the requirements for the BEd degree set by the Werklund School of Education.

4.7.5 Concentration in Art Education

Students may focus their BFA in Visual Studies by including a specified set of courses in their Major or Honours degree. The designation "Art Education Concentration" will appear on the transcripts of Majors who have completed the following courses in fulfillment of their BFA (Visual Studies) degree:

21 units from the following:

- 9 units Art 309, 342, 344
- 6 units Art 411, 491
- 3 units Art 509
- 3 units Communication and Culture 507

Notes:

- If students wish to enhance their experience in Art Education the following courses are recommended: Development Studies 201, Education 201, Museum and Heritage Studies 201 and Social Work 201.
- A concentration in Art Education does not provide students with the credentials required to teach in the public school system in Alberta. It is meant to provide students with skills and knowledge that would prepare them to teach art in informal, community-based settings. Those seeking teaching accreditation in Alberta should consider a degree option through the Werklund School of Education.

4.7.6 Minor in Visual Studies and Art History

The Minor in Visual Studies and Art History is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Art (including all courses labelled Art and Art History) with at least 18 units at the 300 level or above.

Note: Students are also encouraged to take Art History 201 and 203.

4.7.7 Concentration in Media Arts

Applications to this program are currently suspended. No new admissions will be permitted.

In addition to offering comprehensive programs in the visual and performing arts, the Faculty of Arts is committed to exploring relationships among the arts that are fostered by new media technologies. For students majoring in Dance, Drama, Music and Visual Studies the concentration must include

courses from at least two areas other than the student's major program. For students whose major is other than Dance, Drama, Music or Visual Studies the concentration must include courses from at least two of the areas listed below. Anyone interested in acquiring this concentration should consult with an advisor for art, dance, drama or music at an early stage of planning as some of the courses listed below have prerequisites and/or may not always be offered every year.

Requirements

Students can acquire a Concentration in Media Arts by selecting a minimum of 18 units from the following:

- Art 235, 311, 313, 315, 317, 319, 321, 323, 331, 334, 405, 421, 431, 501, 503
- Dance 571
- Drama 317
- Fine Arts 507
- Music 351, 451, 453

4.7.8 Minor in Museum and Heritage Studies

The Minor in Museum and Heritage Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must successfully complete a minimum of 30 units with at least 18 units at the 300 level or above, including:

1. 12 units Museum and Heritage Studies 201, 331, 433, 533.
2. An additional 18 units from Courses Constituting the Field of Museum and Heritage Studies.

4.8 Art History

See Art.

4.9 Canadian Studies

See History.

4.10 Chinese

See Languages, Linguistics, Literatures and Cultures.

4.11 Classics and Religion

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Degrees in Ancient and Medieval History
Bachelor of Arts (BA) in Ancient and Medieval History

BA in Ancient and Medieval History with Co-operative Education

BA Honours in Ancient and Medieval History
BA Honours in Ancient and Medieval History with Co-operative Education

Degrees in Greek and Roman Studies

Bachelor of Arts (BA) in Greek and Roman Studies

BA in Greek and Roman Studies with Co-operative Education

BA Honours in Greek and Roman Studies

BA Honours in Greek and Roman Studies with Co-operative Education

Degrees in Religious Studies

Bachelor of Arts (BA) in Religious Studies
BA in Religious Studies with Co-operative Education

BA Honours in Religious Studies

BA Honours in Religious Studies with Co-operative Education

Related Interdisciplinary Degrees (See separate listings)

BA in Religious Studies and Applied Ethics*

*Applications to this program are currently suspended. No new admissions will be permitted.

Notes:

- Minors are offered in Greek and Roman Studies, Greek, Latin, Religious Studies, and South Asian Studies.
- A Concentration is available in Philosophy and Religion.

Introduction

The Department of Classics and Religion offers instruction in Ancient and Medieval History, Greek and Roman Studies, and Religious Studies.

Ancient and Medieval History: The BA and BA Honours programs in Ancient and Medieval History are offered by the Department of Classics and Religion. There is no Minor program in Ancient and Medieval History. Students considering this Major should consult the Classics and Religion Advisor or Program Director.

The Ancient and Medieval History program examines pre-modern societies around the globe, from those of the Greeks and Romans of antiquity to the European Middle Ages, from the civilizations of the ancient Near East to those of southern and eastern Asia, Africa, and the Americas. To study Ancient and Medieval History is to discover cultures that, while they are unlike our own in many respects, have nevertheless provided the political, social, religious and intellectual foundations of the modern world.

Greek and Roman Studies: Greek and Latin language and literature, in Greek, Roman, and late antique history and archaeology, and in the more general area of ancient Mediterranean civilizations.

Both Greek and Latin may be started at the university. The relevant courses are Greek 201 and Greek 203, and Latin 201 and Latin 203. Advanced placement to Greek 301 or Latin 301 may be granted at the discretion of the Department to those students who have Greek 30, Latin 30 or an equivalent background.

Students majoring in the Department are encouraged to choose a related Minor Field. Related disciplines include: Anthropology, Art, English, French, German, History, Italian, Linguistics, Philosophy, Political Science, Religious Studies, Sociology and Spanish. There are also related interdisciplinary minor programs such as Medieval, Renaissance and Reformation Studies.

The Greek and Roman Studies program explores the ancient Mediterranean world

through its languages (principally ancient Greek and Latin), history, literature, religion, mythology, art and architecture. Students are introduced to methods of textual analysis as well as the careful examination of material remains. Since the traditions of ancient Greece and Rome are foundational to modern western culture, their study is invaluable not only for their own sake, but also because of their continued relevance today.

Religious Studies: Religious Studies seeks to foster an understanding of the wide variety of religions that have influenced the development of human cultures and that continue to be powerful forces in today's world. Courses examine religious worldviews and their associated texts and practices, movements and institutions, as they appear now and as they have developed over time in many cultures of the world. The Field of Religious Studies is multicultural, i.e., religions from all over the world are the subject of study, including the ancient traditions of Hinduism, Buddhism, Daoism, Confucianism, Judaism, Christianity, and Islam, as well as religious movements of more recent origin. Religious Studies is also multidisciplinary, which means that religion is studied with the use of methods and theories from various disciplines, including history, anthropology, philosophy, sociology, psychology, literary theory, and feminist theory.

Courses Constituting the Field of Religious Studies are divided into three streams: Western Religions, Eastern Religions, and the Nature of Religion. Students are required to take courses in each of the three streams. A student may define a focus of study within a stream or thematically across streams. Students are encouraged to consult with the Department's Undergraduate Advisor regularly throughout their Undergraduate careers.

Students are strongly advised to include in their programs relevant language courses (e.g., Classical Hebrew, Greek, Latin, Sanskrit, Tibetan, Chinese, Japanese, French, German) and relevant courses from other disciplines.

Contact Information

Department Office: Social Sciences 558

Phone: 403.220.5886

Fax: 403.210.9191

Email: clare@ucalgary.ca

Website: clare.ucalgary.ca

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: arts.ucalgary.ca/advising.

For more specific advice regarding course selection and requirements in the major field, students should consult the Undergraduate Program Director located in the Department of Classics and Religion (consult Department website for contact information).

Admission to the Major

Prospective students wishing to enter the BA (Ancient and Medieval History), BA (Greek and Roman Studies) or BA (Religious Studies) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Admission to Honours

The Faculty of Arts procedures for Admission to Honours established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Overlapping Programs

Programs in Greek and Roman Studies cannot be taken in conjunction with Ancient and Medieval History. This restriction applies to Double Majors, Combined Degrees and Second Baccalaureate Degrees and also to most Major-plus-Minor combinations.

Minors in Greek or Latin may be taken in conjunction with degrees in Ancient and Medieval History.

Minors in Greek or Latin can only be taken in conjunction with the program in Linguistics and Language if the Language Option for that program differs from the language of the Minor.

Programs in Religious Studies cannot be taken in conjunction with programs in Religious Studies and Applied Ethics. This restriction applies to Major-plus-Minor combinations, Double Majors, Combined Degrees and Second Baccalaureate Degrees.

Courses Constituting the Field of Ancient and Medieval History

- Archaeology 325, 341, 343, 345, 353, 357, 401, 419, 423, 439
- Greek and Roman Studies 305, 306, 315, 317, 335, 337, 339, 341, 345, 347, 413, 415, 417, 419, 421, 423, 425, 433, 491, 494, 499, 501, 504
- History 319, 321, 496
- Philosophy 301, 303, 401, 403, 501
- Religious Studies 303, 305, 313, 317, 319, 323, 327, 329, 357, 359, 369, 383, 385, 387, 451, 453, 461, 469, 484, 590

Courses Constituting the Field of Greek and Roman Studies

- All courses labelled Greek and Roman Studies (GRST), Greek (GREK), and Latin (LATI).

Courses Constituting the Field of Religious Studies

- All courses labelled Religious Studies (RELS)
- Philosophy 331, 335, 527
- Greek and Roman Studies 499

Courses are divided into Eastern, Western and Nature of Religion streams as indicated in the table under Religious Studies courses of instruction.

Religious Studies 373, 399, 491 and 595 will be designated as Western, Eastern or Nature of Religion depending on the topic covered. Religious Studies 377, 577 and 590 are not counted in any of the three streams.

Courses Constituting the Field of South Asian Studies

- South Asian Studies 203, 303, 499, 531
- Art History 323
- History 404, 406
- Religious Studies 203, 303, 307, 310, 312, 313, 317, 323, 327, 353, 451, 453

Notes:

- When the content is applicable and with permission of the Program Co-ordinator, Archaeology 325; History 205, 301, 307, 488; Political Science 359 and Religious Studies 491 may be used as courses with a focus on South Asia.
- Courses taken on a term abroad program may also be approved. Both individual-study and field-school programs in South Asia are potentially eligible.

4.11.1 BA in Ancient and Medieval History

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Ancient and Medieval History while fulfilling the following requirements:

1. *Core Courses:*
 - a. 12 units from Greek and Roman Studies 341, 345, 347; History 319, 321.
 - b. 12 units from Religious Studies 303, 313, 319, 323, 327, 329, 357, 359, 383, 385, 387.
3. *Advanced Courses:* 6 units from Greek and Roman Studies 415, 417, 419; Religious Studies 451, 453, 461, 469, 484.
4. *Ancient and Medieval History Options:* An additional 18 units from Courses Constituting the Field of Ancient and Medieval History. Courses listed under requirements 1 and 2 but not used to fulfill those requirements may be included.

C. DEGREE OPTIONS

The BA in Ancient and Medieval History can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- 6 units of Latin is recommended in first year.
- Greek and Roman Studies 205 and History 201 are recommended in first year.

4.11.2 BA Honours in Ancient and Medieval History

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 54 units to a maximum of 72 units in Courses Constituting the Field of Ancient and Medieval History while fulfilling the following requirements:

1. *Core Courses:*
 - a. 12 units from Greek and Roman Studies 341, 345, 347; History 319, 321.
 - b. 12 units from Religious Studies 303, 313, 319, 323, 327, 329, 357, 359, 383, 385, 387.
2. *Advanced Courses:* 6 units from Greek and Roman Studies 415, 417, 419; Religious Studies 451, 453, 461, 469, 484.
3. *Historiography Course:* 3 units Greek and Roman Studies 499.
4. *Honours Thesis:* 3 units from Greek and Roman Studies 504, Religious Studies 590.
5. *Ancient and Medieval History Options:* An additional 15 units from Courses Constituting the Field of Ancient and Medieval History. Courses listed under requirements 1 and 2 but not used to fulfill those requirements may be included.

C. OTHER REQUIREMENTS

Language Requirement to be satisfied by completing one of the following:

- 12 units courses labelled Greek, OR
- 12 units courses labelled Latin, OR
- 6 units in each of two of the following languages: Classical Chinese (Religious Studies 320, 322), Classical Hebrew (Religious Studies 300, 302), Sanskrit (Religious Studies 310, 312), Tibetan (Religious Studies 314, 316), for a total of 12 units

D. DEGREE OPTIONS

The BA Honours in Ancient and Medieval History can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Note: Greek and Roman Studies 205; History 201; Latin 201 and 203 are recommended in first year.

4.11.3 BA in Greek and Roman Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Greek and Roman Studies while fulfilling the following requirements:

1. *300-Level Courses:* 18 units labelled Greek and Roman Studies at the 300 level.
2. *Upper-Level Courses:* 12 units from Courses Constituting the Field of

Greek and Roman Studies (inclusive of courses in Greek and Latin) at the 400 or 500 levels.

3. *Greek and Roman Studies Options*: 18 units from Courses Constituting the Field of Greek and Roman Studies (inclusive of courses in Greek and Latin). Greek and Roman Studies 205 and 209 are recommended in first year.
4. *Language Requirement*: 6 units in a language other than English, which will normally be Greek or Latin. Courses taken in Greek (GREK) and/or Latin (LATI) also count toward requirements 2 or 3 as applicable.

C. DEGREE OPTIONS

The BA in Greek and Roman Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Note: For requirements 2 and 3, up to 6 units may be substituted from Philosophy 301 and 501 and History 319.

4.11.4 BA Honours in Greek and Roman Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 69 units to a maximum of 72 units in Courses Constituting the Field of Greek and Roman Studies while fulfilling the following requirements:

1. *300-Level Courses*: 18 units labelled Greek and Roman Studies at the 300 level.
2. *Capstone*: Greek and Roman Studies 504 and an additional 3 units (at the 500 level from Courses Constituting the Field of Greek and Roman Studies (inclusive of courses in Greek and Latin).
3. *Upper-Level Courses*: An additional 12 units at the 400 or above from Courses Constituting the Field of Greek and Roman Studies (inclusive of courses in Greek and Latin).
4. *Greek and Roman Studies Options*: 30 units from Courses Constituting the Field of Greek and Roman Studies (inclusive of courses in Greek and Latin). Greek and Roman Studies 205 and 209 are recommended in first year.
5. *Language Requirement*: 18 units in either Greek (GREK) or Latin (LATI) or 12 units in each of these languages. Courses taken in Greek and/or Latin also count toward requirements 2 or 3 as applicable.

C. DEGREE OPTIONS

The BA Honours in Greek and Roman Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Note: For requirements 3 and 4, up to 6 units may be substituted from Philosophy 301 and 501 and History 319.

4.11.5 Minor in Greek and Roman Studies

The Minor in Greek and Roman Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.4 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units in Greek and Roman Studies including:

1. *300-Level Courses*: 18 units labelled Greek and Roman Studies at the 300 level.
2. *Upper-Level Courses*: 6 units from Courses Constituting the Field of Greek and Roman Studies at the 400 or 500 levels.
3. *Greek and Roman Studies Options*: 6 units at the 200 level or above from Courses Constituting the Field of Greek and Roman Studies (inclusive of courses in Greek and Latin). Greek and Roman Studies 205 and 209 are recommended in first year.

4.11.6 Minor in Greek

The Minor in Greek is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Greek and Roman Studies, of which:

1. at least 18 units must be labelled as Greek (GREK); and
2. at least 18 units must be at the 300 level or above.

Note: The Minor in Greek is especially appropriate for students enrolled in Major programs such as English, French, History, Philosophy, and Religious Studies.

4.11.7 Minor in Latin

The Minor in Latin is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Greek and Roman Studies, of which:

1. at least 18 units must be labelled as Latin (LATI); and
2. at least 18 units must be at the 300 level or above.

Note: The Minor in Latin is especially appropriate for students enrolled in Major programs such as English, French, History, Philosophy, and Religious Studies.

4.11.8 BA in Religious Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 to a maximum of 60 units in Courses Constituting the Field of Reli-

gious Studies while fulfilling the following requirements:

1. *Western and Eastern Religions*: 6 units from the "Western Religions" Stream and 6 units from the "Eastern Religions" Stream. (See note below.)
2. *Nature of Religion*: 6 units from the "Nature of Religions" Stream including at least 3 units from Religious Studies 437 or 447.
3. *Research Methods*: Religious Studies 377.
4. *Religious Studies Options*: 21 units from Courses Constituting the Field of Religious Studies.
5. Inclusive of the courses used in requirements 1 – 4 above, at least 36 units must be at the senior level (300 and above) of which 12 units must be at the 400 level or above.

C. OTHER REQUIREMENTS

Language Requirement: 6 units in a language other than English.

D. DEGREE OPTIONS

The BA in Religious Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- The list of courses that fulfill the requirements for the "Eastern Religions" stream, the "Western Religions" stream and the "Nature of Religions" stream are located before the Religious Studies courses in the "Courses of Instruction" section of this calendar.
- Religious Studies 201 and 203 are recommended.
- Students are strongly advised to include in their programs relevant language courses (e.g., Classical Hebrew, Greek, Latin, Sanskrit, Tibetan, Chinese, Japanese, French, German) and relevant courses from other disciplines. Language courses labelled Religious Studies can be counted as part of the 42 units in Religious Studies.
- In planning their programs, students should bear in mind that language courses and some senior courses are not offered every year.

4.11.9 BA Honours in Religious Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Religious Studies while fulfilling the following requirements:

1. *Western and Eastern Religions*: 6 units from the "Western Religions" Stream and 6 units (from the "Eastern Religions" Stream. (See note below.)

2. *Nature of Religion*: 6 units from the "Nature of Religions" Stream including at least 3 units (from Religious Studies 437 or 447).
3. *Research Methods*: Religious Studies 377.
4. *Honours Thesis*: Religious Studies 590.
5. *Religious Studies Options*: 33 units in Courses Constituting the Field of Religious Studies.
6. Inclusive of the courses used in requirements 1-5 above, at least 42 units must be at the senior level (300 level and above) of which 18 units must be at the 400 level or above.

C. OTHER REQUIREMENTS

Language Requirement: 6 units in a language other than English.

D. DEGREE OPTIONS

The BA Honours in Religious Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- The lists of courses that fulfill the requirements for the "Eastern Religions" stream, the "Western Religions" stream and the "Nature of Religions" stream are located before the Religious Studies courses in the "Courses of Instruction" section of this calendar.
- Religious Studies 201 and 203 are recommended.
- By the beginning of a student's final year in the Honours program, a reading knowledge of a language other than English relevant to the topic of the Honours Thesis is normally required. Language courses labelled Religious Studies can be counted as part of the 60 units in Religious Studies.
- The Honours Thesis is written in Religious Studies 590, usually during the final year of a student's program, under the close supervision of a member of the Department. At the end of the year, the student defends the thesis before a committee that consists of three faculty members, of which normally at least two are members of the Department.
- The Honours Thesis in suitable form is to be submitted by the first day of the final examinations scheduled by the Registrar in the Winter Term.
- In planning their programs, students should bear in mind that language courses and some senior courses are not offered every year.

4.11.10 Minor in Religious Studies

The Minor in Religious Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Religious Studies with at least 18 units at the 300 level or above, including Religious Studies 377. In addition, in each of the three

streams — Western Religions, Eastern Religions and Nature of Religion — there must be at least 6 units (see note below).

Note: The lists of courses that fulfill the requirements for the "Eastern Religions" stream, the "Western Religions" stream and the "Nature of Religions" stream are located before the Religious Studies courses in the "Courses of Instruction" section of this calendar.

4.11.11 Concentration in Philosophy and Religion

Students completing a BA or BA Honours in Philosophy or Religious Studies can elect to complete a concentration in Philosophy and Religion. This option might be appropriate for students with an interest in the interdisciplinary study of philosophy and religion. The Concentration in Philosophy and Religion cannot be taken in conjunction with a combined or joint or double BA or BA Honours program in Philosophy and Religious Studies or a Major/Minor combination. Students must complete the following:

18 units selected from the following:

- Philosophy 201, 331, 335, 527
- Religious Studies 345, 363, 444, 463
- Other senior-level Philosophy or Religious Studies courses may be accepted when the topic is appropriate. Obtaining approval from the Department of Classics and Religion will be required.

4.11.12 Minor in South Asian Studies

The Minor in South Asian Studies requires students to complete 30 units in the field, and is intended for students who may be considering graduate studies with a specialization in the field or careers where more extensive knowledge of South Asia would be advantageous. Students should contact the Program Co-ordinator as early as possible for advice on the program.

Requirements for the Minor

The Minor in South Asian Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must successfully complete at least 30 units as follows:

1. South Asian Studies 203 and 531.
2. At least 24 units from: Art History 323; History 404, 406; Religious Studies 203, 303, 307, 310, 312, 313, 317, 323, 327, 353, 451, 453; South Asian Studies 303, 499.

4.12 Communication, Media and Film

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Communication and Media Studies

Bachelor of Arts (BA) in Communication and Media Studies

BA in Communication and Media Studies with Co-operative Education

BA Honours in Communication and Media Studies

BA Honours in Communication and Media Studies with Co-operative Education
Bachelor of Communication and Media Studies (BCMS)

BCMS with Co-operative Education

Film Studies

Bachelor of Arts (BA) in Film Studies

BA in Film studies with Co-operative Education

BA Honours in Film Studies

BA Honours in Film Studies with Co-operative Education

Bachelor of Film Studies (BFS)

BFS with Co-operative Education

Science, Technology and Society

Note: Admission to Science, Technology and Society programs has been suspended as of Fall 2015. Students in these programs should consult with the department's Director of Undergraduate Programs to ensure completion of program requirements in a timely manner.

Bachelor of Arts (BA) in Science, Technology and Society

Bachelor of Science (BSc) in Science, Technology and Society

BA in Science, Technology and Society with Co-operative Education

BSc in Science, Technology and Society with Co-operative Education

BA Honours in Science, Technology and Society

BSc Honours in Science, Technology and Society

BA Honours in Science, Technology and Society with Co-operative Education

BSc Honours in Science, Technology and Society with Co-operative Education

Note: Minors are offered in Communication and Media Studies and Film Studies.

Introduction

The Department of Communication, Media and Film hosts programs in Communication and Media Studies and Film Studies.

Communication and Media Studies

explores the ways in which communication constructs and reflects society and culture. The program emphasizes the theory, criticism, and history of communication through traditional media, new media and popular culture. It also focuses on the theory, critique and production of informative, persuasive and professional discourse in a range of public, media and organizational contexts (e.g., discourses related to identity, health, technology, food and food marketing and the environment).

The program aims to educate flexible and articulate analysts, researchers and practitioners for a wide range of academic, public and professional contexts. It provides graduates with the knowledge, skill and discernment to communicate ideas effectively and to investigate communication in and across a variety of media including speech, writing, television, film, radio and digital media. Our co-operative education and experiential

learning opportunities enable students to develop and apply their skills in non-academic contexts.

The Department offers a Bachelor of Arts (BA) in Communication and Media Studies and a Bachelor of Communication and Media Studies (BCMS). Opportunities for further concentration are available via the BA (Honours) in Communication and Media Studies. The BCMS is offered in partnership with SAIT Polytechnic and is intended for students who want the broad interdisciplinary base of knowledge provided by a university degree combined with practical skills in public relations, journalism, new media production, or radio, television, and broadcast news provided by a professional diploma program at SAIT or other approved program. A minor program is also offered. Degree requirements are outlined in 4.12.1 to 4.12.3.

Film Studies situates motion pictures within a wider culture of images and sounds, comprising both contemporary media and diverse historical practices. The program offers students the analytical skills and historical and theoretical frameworks to critically assess contemporary visual culture, and in this way helps to prepare them for careers in film and media criticism; film programming and production; work in cultural institutions; and university research and teaching.

The Department offers a Bachelor of Arts (BA) in Film Studies and a Bachelor of Film Studies (BFS). Students taking a BA in Film Studies will develop a broad understanding of the medium, considering film as an art form, as a cultural industry, and as an innovative and developing technology with social, cultural, and political significance. Opportunities for further concentration are available via the BA (Honours) in Film Studies program. The BFS is offered in partnership with SAIT Polytechnic and is intended for students who want the broad interdisciplinary base of knowledge provided by a university degree combined with practical skills in film, video and new media production. A minor program is also offered. Degree requirements are outlined in 4.12.5 to 4.12.7.

Admission to the Science, Technology and Society programs has been suspended as of Fall 2015. Students in these programs should consult with the department's director of undergraduate programs to ensure completion of program requirements in a timely manner.

Contact Information

Department Office: Social Sciences 320

Phone: 403.220.6207

Fax: 403.210.8138

Email: ccapmail@ucalgary.ca

Website: commfilm.ucalgary.ca/

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: arts.ucalgary.ca/advising.

For more specific advice regarding course selection and requirements in the major field, students should consult the Director of Undergraduate Programs in the Department of Communication, Media and Film.

Admission to Major

Prospective students wishing to enter any of the degree programs offered by the Department of Communication, Media and Film must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar. Annual application deadlines are found in A.3 Deadline Dates for Undergraduate Applications for Admission and Transcripts.

Limitation of Enrolment

When demand exceeds capacity, enrolment in the BA Communication and Media Studies will be restricted on a competitive basis.

Admission to Honours

The Faculty of Arts procedures for Admission to Honours established in section, 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1. Students taking Majors offered by the Department are eligible to apply for the Honours Program only if they have completed at least 63 units.

Honours program applications to the department must include a preliminary Honours thesis proposal and the signature of a faculty member who has agreed to serve as the student's Honours thesis supervisor. Students are strongly advised to secure a supervisor by January 20. The Honours program application form is available at <https://commfilm.ucalgary.ca/undergraduate/honours-program>.

Successful applicants to the Honours program must register in Communication and Media Studies 595 and 597 or Film 595 and 597. Further information is available on the department website. Students should also consult with the Honours Program Co-ordinator in the Department of Communication, Media and Film.

Overlapping Programs

The Bachelor of Communication and Media Studies and the Bachelor of Arts in Communication and Media Studies cannot be taken in conjunction with each other. The Bachelor of Film Studies and the Bachelor of Arts in Film Studies also may not be taken in conjunction with each other.

Courses Constituting the Field of Communication and Media Studies:

- All courses labelled Communication and Media Studies (COMS)
- All courses labelled Film Studies (FILM)
- All courses labelled Communication and Culture (CMCL)
- Anthropology 303
- Art 235, 251, 311.02, 321, 501, 503

- Art History 319
- Development Studies 485
- English 387, 523
- German 469
- History 341, 495
- Japanese 201, 323, 325
- Linguistics 223, 227, 309
- Marketing 341
- Museum and Heritage Studies 201, 331
- Organizational Behaviour and Human Resources 321
- Philosophy 314, 361
- Political Science 399, 430, 431
- Psychology 203, 345
- Science 311
- Sociology 341, 345, 403.09
- Urban Studies 313

Courses Constituting the Field of Film Studies

- All courses labelled Film (FILM)
- Communication and Media Studies 371, 435, 475, 367, 401.43, 581
- Chinese 357
- French 343, 543
- German 357
- Spanish 573
- Urban Studies 313

Courses Constituting the Field of Science, Technology and Society

Courses with a Focus on Science, Technology and Society

- All courses labelled Science, Technology and Society (STAS)
- Anthropology 341
- Biology 307
- Communication and Media Studies 201
- Economics 373, 377, 379
- Geography 321
- Greek and Roman Studies 321
- History 354, 372, 493.38*, 493.39*, 541
- Innovation 321, 323
- Philosophy 367, 467, 517, 567
- Sociology 331, 333, 435

**Applicable only when the content of the course is appropriate.*

Supporting Courses:

- Communication and Culture 201, 203, 305, 307
- Communication and Media Studies 595, 597

Courses in the Domain of Science for Science, Technology and Society

Courses from the "Domain of Science", for the Science, Technology and Society program, include the courses listed below:

- All courses offered by the Faculty of Science
- All courses offered by Schulich School of Engineering

- All courses labelled Earth Science (EASC) and Environmental Science (ENSC)
- Anthropology 201, 311, 413, 435, 451, 505, 523, 552, 553, 571, 589
- Archaeology 201, 306, 413, 415, 417, 437, 453, 471, 506, 515, 523, 533, 555, 595, 596
- Geography 211, 231, 305, 307, 313, 333, 339, 357, 391, 392, 393, 403, 411, 413, 415, 417, 433, 437, 439, 457, 503, 519, 533, 567, 599
- Psychology 300, 301, 407, 411, 469, 471, 473, 475, 477, 478, 479, 491, 497, 521, 531, 591

4.12.1 BA in Communication and Media Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS AND RECOMMENDED SEQUENCE

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Communication and Media Studies while fulfilling the following requirements:

1. *Core Courses*: 24 units Communication and Media Studies 201, 203, 313, 369, 371, 381, 591; Communication and Culture 305.
2. 18 units from courses labelled Communication and Media Studies or Film 451.
3. An additional 6 units from Courses Constituting the Field of Communication and Media Studies.

Note: Communication and Media Studies (COMS) courses were formerly named Communications Studies (COMS). All are COMS courses and considered equivalent for prerequisite purposes.

C. DEGREE OPTIONS

The BA in Communication and Media Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.12.2 BA Honours Communication and Media Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Communication and Media Studies while fulfilling the following requirements:

1. *Core Courses*: 24 units Communication and Media Studies 201, 203, 313, 369, 371, 381, 591; Communication and Culture 305.
2. 21 units from courses labelled Communication and Media Studies or Film 451.
3. An additional 9 units from Courses Constituting the Field of Communication and Media Studies.

4. *Undergraduate Thesis*: 6 units Communication and Media Studies 595 and 597, with a grade of "B-" or better in both courses.

Note: Communication and Media Studies (COMS) courses were formerly named Communications Studies (COMS). All are COMS courses and considered equivalent for prerequisite purposes.

C. DEGREE OPTIONS

The BA Honours in Communication and Media Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.12.3 Bachelor of Communication and Media Studies (BCMS)

The Bachelor of Communication and Media Studies degree is offered in partnership with SAIT Polytechnic or an equivalent approved program (see BCMS program requirements below for a list of approved diploma programs). The University of Calgary portion of the degree (72 units) may be taken either before or after the diploma portion of the degree (48 units).

Admission

Note: Students must apply separately to an approved diploma program and meet all its admission requirements and application deadlines.

When a student presents a SAIT or equivalent diploma for block transfer credit to the Bachelor of Communication and Media Studies degree, the grade point average for admission to the Communication and Media Studies program will be calculated using all courses taken to complete the diploma.

For the purposes of admission and graduation, no more than 9 units in the diploma may have a "D" or "D+" grade. Students with excess "D" or "D+" grades will need to upgrade before being considered for admission if the diploma is completed first. If the diploma is completed after the University of Calgary requirements and there are excess "D" or "D+" grades upgrading will be required in order to graduate.

Requirements

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the requirements set out in Faculty of Arts requirements in 3.4.1.

Exception to junior credit limit: Students in the BCMS program are permitted an extra 6 units in junior level courses for a maximum of 54 units at the junior or 200 level. Junior courses transferred as part of the diploma (24 units) count towards this maximum.

B. COMMUNICATION AND MEDIA STUDIES REQUIREMENTS

1. *Core Courses*: 24 units Communication and Media Studies 201, 203, 313, 369, 371, 381, 581, Communication and Culture 305.
2. 12 units from courses labelled Communication and Media Studies or Film 451,

of which 3 units must be at the 400 level or above.

C. OTHER REQUIREMENT

Applicable Diploma: Completion of one of the following two-year diploma programs from SAIT Polytechnic, or an approved equivalent, with a grade point average of 2.00 on all courses.

- Journalism (Print/Online Journalism; Photojournalism); New Media Production and Design; Radio, Television and Broadcast News; Film and Video Production; Graphic Communications and Print Technology

D. DEGREE OPTIONS

The Bachelor of Communication and Media Studies can be taken with Co-operative Education but students may face sequencing constraints and/or require extra time to complete their programs. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- Students who are unsuccessful in applying to the post-secondary institution offering the diploma may transfer to the four-year Bachelor of Arts in Communication and Media Studies at the University of Calgary, or any other University of Calgary program for which they qualify. Courses already completed toward the Bachelor of Communication and Media Studies may be applied toward the Bachelor of Arts in Communication and Media Studies.
- Students completing their diploma in the semester prior to graduation will need to ensure that a transcript recording the diploma conferral is received by the University of Calgary by the transcript deadline date. Due to the processing time required, transcripts received after the deadline will be considered for the next convocation period. Please contact the Arts Students' Centre for further information.

4.12.4 Minor in Communication and Media Studies

The Minor in Communication and Media Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Communication and Media Studies including:

1. *Core Courses*: 15 units:
 - 12 units Communication and Media Studies 201, 203, 371, 381
 - 3 units Communication and Media Studies 363, 369
2. *Communication and Media Studies Options*: 15 units from courses labelled Communication and Media Studies

(COMS), including 6 units at the 400 level or above or Film 451.

4.12.5 BA in Film Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Film Studies while fulfilling the following requirements:

1. *Core Courses*: 12 units as follows:
 - a. 9 units Film 201, 321, 591;
 - b. 3 units from Film 331 or 333.
2. *Advanced Courses*: 15 units from courses labelled Film at the 400 level or above.
3. *Film Options*: 21 units from Courses Constituting the Field of Film Studies, with a maximum of 6 units from courses not labelled Film.

C. DEGREE OPTIONS

The BA in Film Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.12.6 BA Honours Film Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Film Studies while fulfilling the following requirements:

1. *Core Courses*: 12 units:
 - a. 9 units Film 201, 321, 591;
 - b. 3 units from Film 331 or 333.
2. *Advanced Courses*: 15 units from courses labelled Film at the 400 level or above.
3. *Film Options*: 27 units from Courses Constituting the Field of Film Studies, with a maximum of 6 units from courses not labelled Film.
4. *Undergraduate Thesis*: 6 units Film 595 and 597, with a grade of "B-" or better in both courses.

C. DEGREE OPTIONS

The Honours BA in Film Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.12.7 Bachelor of Film Studies (BFS)

The Bachelor of Film Studies degree is offered in partnership with SAIT Polytechnic. The University of Calgary portion of the degree (72 units) may be taken either before or after the SAIT portion of the degree (48 units).

Admission

Note: Students must apply separately to SAIT Polytechnic and meet all its admission requirements and application deadlines.

When a student presents a SAIT or equivalent diploma for block transfer credit to the Bachelor of Film Studies degree, the grade point average for admission to the Film Studies program will be calculated over the entire diploma.

For the purposes of admission and graduation, no more than 9 units in the diploma may have a "D" or "D+" grade. Students with excess "D" or "D+" grades will need to upgrade before being considered for admission if the diploma is completed first. If the diploma is completed after the University of Calgary requirements and there are excess "D" or "D+" grades upgrading will be required in order to graduate.

Requirements

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the requirements set out in Faculty of Arts requirements in 3.4.1.

Exception to junior credit limit: Students in the BFS program are permitted an extra 6 units in junior level courses for a maximum of 54 units at the junior or 200 level. Junior courses transferred as part of the diploma (24 units) count towards this maximum.

B. FILM STUDIES REQUIREMENTS

In addition to 48 units of transfer credits from the diploma, students must fulfill the following requirements, with a minimum of 36 units and a maximum of 42 units from the Field of Film Studies while fulfilling the following requirements:

1. *Core Courses*: 12 units as follows:
 - a. 9 units: Film 201, 321; Communication and Media Studies 581.
 - b. 3 units from: Film 331 or 333.
2. *Advanced Courses*: 3 units from courses labelled Film at the 400 level or above.
3. *Film Options*: 21 units from Courses Constituting the Field of Film Studies, with a maximum of 6 units from courses not labelled Film.

C. OTHER REQUIREMENT

Applicable Diploma: Completion of the SAIT Film and Video Production diploma program, or approved equivalent, with a grade point average of 2.00 on all courses.

D. DEGREE OPTIONS

The Bachelor of Film Studies can be taken with Co-operative Education but students may face sequencing constraints and require extra time to complete their programs. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- Students who are unsuccessful in applying to SAIT may transfer to the four-year Bachelor of Arts in Film Studies at the University of Calgary, or to any other University of Calgary program for which they qualify. Courses already completed to-

ward the Bachelor of Film Studies (BFS) may be applied toward the Bachelor of Arts in Film Studies.

- Students completing their diploma in the semester prior to graduation will need to ensure that a transcript recording the diploma conferral is received by the University of Calgary by the transcript deadline date. Due to the length of processing time required, transcripts received after the deadline will be considered for the next convocation period. Please contact the Arts Students' Centre for further information.

4.12.8 Minor in Film Studies

The Minor in Film Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Film Studies including:

1. 6 units Film 201, 321.
2. 3 units from Film 331 or 333.
3. An additional 15 units from courses labelled Film of which 6 units must be at the 400 or 500 level.
4. An additional 6 units from Courses Constituting the Field of Film Studies.

4.12.9 BA or BSc in Science, Technology and Society

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

If a student accumulates 42 units or more in the "Domain of Science" in fulfilling the Faculty and Major-Field Requirements listed below, the degree will be awarded as a BSc. Otherwise the degree will be awarded as a BA.

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Science, Technology and Society while fulfilling the following requirements:

1. *Core Courses*: 33 units from Science, Technology and Society 327, 343 and 591; Philosophy 367; Communication and Culture 301, 303, 501, 503.
2. *History of Science*: 3 units from History 354, 372, 493.38*, 493.39* or 541. Additional courses may be used to satisfy the History of Science requirement. Please consult with the Department.
3. *Science, Technology and Society Options*: an additional 12 units chosen from Courses Constituting the Field of Science, Technology and Society. (Additional courses from the Faculty of Science approved by the Department.)

*With approval of the Department.

C. OTHER REQUIREMENTS

Science Requirement: 3 units at the 400 level from the Faculty of Science or from Faculty of Arts courses within the "Domain of Science" along with any relevant prerequisites.

D. DEGREE OPTIONS

The Bachelor of Arts in Science, Technology and Society can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.12.10 BA or BSc Honours Science, Technology and Society**A. FACULTY OF ARTS REQUIREMENTS**

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

If a student accumulates 42 units or more in the "Domain of Science" in fulfilling the Faculty and Major-Field Requirements listed below, the degree will be awarded as a BSc. Otherwise the degree will be awarded as a BA.

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Science, Technology and Society while fulfilling the following requirements:

1. *Core Courses*: 33 units from Science, Technology and Society 327, 343 and 591; Philosophy 367; Communication and Culture 301, 303, 501, 503.
2. *History of Science*: 3 units from History 354, 372, 493.38*, 493.39* or 541. Additional courses may be used to satisfy the History of Science requirement. Please consult with the Department.
3. *Science, Technology and Society Options*: an additional 12 units chosen from Courses Constituting the Field of Science, Technology and Society. (Additional courses from the Faculty of Science approved by the Department.)
4. *Undergraduate Thesis*: Communication and Media Studies 590.

**With approval of the Department.*

C. OTHER REQUIREMENTS

Science Requirement: 3 units at the 400 level from the Faculty of Science or from Faculty of Arts courses within the "Domain of Science" along with any relevant prerequisites.

D. DEGREE OPTIONS

The BA Honours in Science, Technology and Society can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.12.11 Minor in Science, Technology and Society

The Minor in Science, Technology and Society is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Science, Technology and Society with at least 18 units at the 300 level or above. The Science, Technology and Society Minor also requires:

1. 12 units from Science, Technology and Society 325 or 327, 591; Philosophy

367; and one of History 354, 372, 493.38, 493.39 or 541.

2. 9 units from Science, Technology and Society 201, 325 or 327 (if not used to satisfy item 1. above) 341, 343, 401, 421, 501, 505.
3. An additional 9 units from the list of "Courses with a Focus on Science, Technology and Society" within Courses Constituting the Field of Science, Technology and Society.

4.13 Creative and Performing Arts**Overview of Programs and Procedures****Baccalaureate Degrees Offered****Dance**

Bachelor of Arts (BA) in Dance

Bachelor of Fine Arts (BFA) in Dance

Combined Bachelor of Kinesiology (Kinesiology)/BA in Dance

Concurrent BA in Dance (with a Concentration in Dance Pedagogy)/Bachelor of Education

Note:

- A Minor is offered in Dance

Drama

Bachelor of Fine Arts (BFA) in Drama

Concurrent BFA in Drama Education/Bachelor of Education

Note:

- A Minor is offered in Drama.

Music

Bachelor of Arts (BA) in Music

BA Honours in Music

Bachelor of Music (BMus) in Performance, Composition, or Integrated Studies

Concurrent BMus in Music Education/Bachelor of Education

Note:

- Minors in Music and Sonic Arts are also offered.

Introduction

The School of Creative and Performing Arts (SCPA) provides both rigorous and distinct disciplinary programs and uncommon opportunities for interdisciplinary exchange and collaboration. Hosting programs in Dance, Drama and Music, the SCPA provides students a range of options for specialization and innovation, both within and across its participating divisions.

Dance provides a four-year BA (Dance) degree and a four-year BFA (Dance) degree that explores dance from multiple perspectives, as well as a five-year combined BKIN/BA degree that highlights the relationships between the sciences, arts and humanities and a five-year Concurrent Program with the Werklund School of Education that combines a Bachelor of Education with a BA Dance with a concentration in Dance Pedagogy. Students delve into choreography, performance, technique, improvisation, dance for the camera, dance science, global dance, history, and theory in order

to understand the place of dance in the twenty-first century. From ballet to contact improvisation, hip hop to contemporary, dance at the University of Calgary helps students gain in-depth experience as well as a broad understanding of a range of cultural forms. With emphasis on both practice and analysis, our program is designed to prepare graduates for careers in professional performance, choreography, scholarship, and education, as well as further dance study in graduate programs.

Drama offers a four-year Bachelor of Fine Arts Degree comprised of a broad curriculum including: acting, directing, scenography, playwriting, performance creation, drama education, theatre history and dramatic literature and criticism. The program allows the student to tailor their degree to their interests and their desired career path. Drama also offers a five-year concurrent BFA/BED degree with the Werklund School of Education. Many of our courses are available to non-Drama students and can contribute to an elective requirement.

Music offers a four-year Bachelor of Music (BMus) Degree that is designed for students wishing to enter a professional career in music, as performers, teachers, composers, sound designers, theorists, historians or musicologists. The BMus degree provides the opportunity for students to Major in Performance, Composition or Integrated Studies. In addition there is a major in Music Education that is available in the context of a five-year concurrent BMus/Bachelor of Education degree for students wishing to pursue the Secondary Route. Students wishing to pursue the Elementary Route should complete a BA Music/Bachelor of Education degree. All BMus programs have a common first year.

Music also offers four-year programs leading to Bachelor of Arts (Music) and Honours Bachelor of Arts (Music) degrees for the student who wishes to pursue a general liberal arts education with an emphasis on Music. It is an ideal degree for students who are interested in music but may wish to pursue careers in law, medicine, arts administration, media studies, elementary education, digital arts, and so on. In addition to music courses, BA (Music) students have the flexibility to take a large number of courses outside of the field of Music, allowing them to create degree plans that cater to their individual interests and needs.

In addition to the three discipline-specific divisions, the School of Creative and Performing Arts provides unique opportunities for interdisciplinary instruction and collaboration. Specifically, there are two interdisciplinary courses required of all students enrolled in a major program in SCPA. These courses provide historical and contextual understanding of interdisciplinary practices as well as both theoretical and practical instruction in interdisciplinary exchange and creative process. Beyond these required courses SCPA students enjoy a wide range of special topics electives and extra-curricular oppor-

tunities that explore a variety of interdisciplinary practices and subject material.

Contact Information

School of Creative and Performing Arts Office: Craigie Hall D100

Phone: 403.220.5313

Fax: 403.282.6925

Email: scpa@ucalgary.ca

Website: arts.ucalgary.ca/schools/creative-performing-arts/

Dance

Phone: 403.220.5313

Fax: 403.282.6925

Email: dance@ucalgary.ca

Website: arts.ucalgary.ca/schools/creative-performing-arts/dance

Drama

Phone: 403.220.5313

Fax: 403.282.6925

Email: drama@ucalgary.ca

Website: arts.ucalgary.ca/schools/creative-performing-arts/drama

Music

Phone: 403.220.5313

Fax: 403.282.6925

Email: music@ucalgary.ca

Website: arts.ucalgary.ca/schools/creative-performing-arts/music/undergraduate

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: arts.ucalgary.ca/advising

For more specific advice regarding course selection and requirements in the major field, students should consult the SCPA Undergraduate Program Administrator.

Admission

Prospective students wishing to enter any of the programs in the School of Creative and Performing Arts must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar. The application deadline is March 1.

Several of our programs require additional materials such as an audition and/or a statement of intent. These requirements are noted below.

Admission to the BA, BFA and BA/BKin in Dance

Applicants to the BA Dance, BFA Dance and BKin/BA combined degree programs will be assessed on the basis of a dance audition, an Entrance Audition Form and a Statement of Interest. For information about the Entrance Audition Form and application deadlines, refer to the BA/BFA Dance Entrance Auditions website: arts.ucalgary.ca/schools/creative-performing-arts/dance/admission-auditions-and-faqs.

Applicants to the BKin/BA combined degree program must meet the admissions require-

ments for both the Faculty of Arts and the Faculty of Kinesiology (see A.5 Undergraduate Admission Requirements).

Dance Audition

After submitting an Admission Application to the University of Calgary Admissions Office and an Entrance Audition Form to the Division of Dance by the deadlines, all applicants will be expected to audition.

Auditions are conducted by the Dance Committee and are held on the University of Calgary campus in March. During the audition, applicants will be required to participate in dance classes, written assignments and improvisation.

It is strongly suggested that applicants audition in person. Applicants who are unable to audition in person must submit a DVD audition by the deadline. Refer to the SCPA Audition website for further information and requirements for video auditions.

Limitation of Enrolment

Enrolment in the Dance program is limited. Therefore, all qualified applicants may not be admitted. Applicants will be admitted on the basis of the following criteria:

1. Academic standing in high school and/or previous post-secondary education (university admission requirements);
2. Written Statement of Interest;
3. Dance audition.

Admission to the BFA in Drama

An audition is not required for admission to the program.

Admission to the BA in Music

Admission requires evidence of successful completion of Royal Conservatory Level 8 Theory (formerly Advanced Rudiments) or the Division music theory diagnostic exam.

Admission to the BA Honours Music

Students wishing to be considered for admission into the BA Honours (Music) Program must have completed at least 30 units in the BA (Music) Program and must meet the criteria established by the Faculty of Arts in section 3.4.2 Honours Degrees with a Major Field. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Admission to BMus Degrees

Admission requires evidence of successful completion of Royal Conservatory Level 8 Theory (formerly Advanced Rudiments) or the Division music theory diagnostic exam. Admission to BMus Programs is also contingent on an audition and interview where applicants are assessed not only on actual performance, but also on talent, potential, and musicality.

Audition Dates

Auditions typically occur in late February and/or early March.

More information, deadlines and audition forms are available on the Admission Requirements and Auditions section of the

Music Undergraduate page: arts.ucalgary.ca/schools/creative-performing-arts/music/undergraduate.

Audition Requirements

Applicants should be prepared to perform two pieces (except for piano and voice, who should be prepared to perform three pieces), each from a different style period; singers and instrumentalists must provide their own accompanist. Applicants should be prepared to perform for approximately 10 minutes; in addition, they will be asked to sight-read a short piece of music appropriate to their instrument or voice.

Applicants audition on the instrument of their choice or in voice. Those who would like to audition on two instruments may do so. The jury will determine which instrument (or voice) will become the major when the applicant is admitted to a Music program.

Previously accepted students who have not been enrolled in a performance practicum course for a year or more may be required to re-audition in order to determine if the previous level of attainment has been maintained.

Guidelines

As an indication of the level for admission to Music, the following guidelines should be noted:

- Pianists and vocalists should be prepared to perform repertoire at the Grade X level.
- All others should be prepared to perform repertoire at the Grade VIII level. Students who have not reached the Grade VIII level, but who have a serious interest in a career in music, are encouraged to apply and to audition at the level of performance they have reached. Suggested audition repertoire guidelines are available on the Admission Requirements and Auditions section of the Music Undergraduate page: arts.ucalgary.ca/schools/creative-performing-arts/music/undergraduate.

Applicants Who Live Outside a 150 Km Radius of Calgary

BMus applicants who live further than 150 km from Calgary may submit a video or audio recording. If a recording is submitted, the student may be required to perform a live audition upon arrival. The recording should consist of approximately 10 minutes of music and conform to the requirements for auditions given above. The recording should have been made not more than two months prior to submission, should be of good quality and should be solo or solo with accompaniment. Deadlines for the receipt of video or audio recordings are on the Admission Requirements and Auditions section of the Music Undergraduate page: arts.ucalgary.ca/schools/creative-performing-arts/music/undergraduate.

Bachelor of Music (BMus) – Major Fields of Specialization

Bachelor of Music students take a common first-year program of study and then select one of the following Major Fields of specialization:

- Composition
- Integrated Studies
- Performance

Admission to each Major is conditional on:

1. The completion of Music 211, 213, 221, 223, 225, 255 and School of Creative and Performing Arts 290 with an average of "B-" (2.70) or better in those courses.
2. Grades of "B" (3.00) or better in courses in their area: Composition or Performance.
3. Approval of the Division Chair.

In order to continue in Performance, students must earn an average grade of "B-" or better in courses in that area of specialization in each academic year. Student who do not achieve this average will be required to choose a different field of specialization.

Music Students: Keyboard Proficiency Tests

Music has a required minimum level of keyboard proficiency, which all Bachelor of Music students must achieve in order to graduate. Applicants who have never played a keyboard instrument, or whose proficiency does not meet the required level, will be advised to take remedial work in keyboard, either through the Music Division or privately.

Courses and Registration

In planning their programs, students should bear in mind that some senior courses are not offered every year.

Fields of Study

Courses Constituting the Field of Dance

- All courses labelled Dance (DNCE).

Courses Constituting the Field of Drama

- All courses labelled Drama (DRAM), except Drama 203 and 205.

The following listing is provided to assist students in their selection of related groups of Drama courses:

Acting and Directing

209, 210, 301, 302, 400, 411, 413, 500, 511, 513

Design and Technical

223, 225, 313, 317, 319, 320, 321, 381, 419, 423, 481, 517

Dramatic Literature, Criticism, History, Theory

242, 243, 345, 346, 347, 348, 355, 440, 455, 483, 540

Theatre for Young Audiences and Developmental/Performance Drama

365, 367, 460, 560

Senior Option Courses

371, 471, 571, 572, 573

Production Courses

391, 393, 491, 493

Courses Constituting the Field of Music

- All courses labelled Music (MUSI), Music Performance (MUPF) and Music Education (MUED), which are categorized as follows:

Courses Designed for Non-Music Majors*: Music 203, 209, 306, 307, 308, 309**, and all ensembles under Music Performance (MUPF).

**BMUS students may count a maximum of 6 units from Music 306, 307, 308 toward their degree requirements. Music majors and Music minors may not count Music 209 and 309 toward their degree requirements.*

***Students in the Sonic Arts minor may count Music 309 towards their degree requirements.*

Music Theory and Musicianship: Music 211, 213, 225, 311, 313, 325, 329, 415, 417, 511, 513

Performance: Music 221, 223, 321, 323, 327, 421, 423, 427, 429, 462, 521, 523, 525, 527, 562, all courses labelled (MUPF)

Music History and Literature: Music 334, 336, 531, 533, 535

Composition: Music 341, 343, 441, 443, 445, 447

Sonic Arts: Music 255, 351, 355, 451, 453, 551

Music Education: all courses labelled (MUED)

4.13.1 BA in Dance

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

The BA in Dance requires the successful completion of a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Dance while fulfilling the following requirements:

1. 36 units from the following required courses:
 - Dance 207, 209, 235, 247, 267
 - Dance 305, 307, 331, 333, 347 and one of 309, 343, 503 or 581
 - Dance 481
2. 3 units from the following Studio Options:
 - Dance 311, 321, 405, 427
3. 9 units from the following Theory Options:
 - Dance 341, 359, 363, 391, 437, 447, 449, 465, 491

C. OTHER REQUIREMENTS

- SCPA Courses: 6 units from School of Creative and Performing Arts 290 and 399.

Note: Dance 481 is not offered every year. This course is required without exception. Students must arrange their schedules to accommodate the alternating timetable.

Concentrations

Students in the BA Dance program may elect to complete a concentration in Dance Pedagogy or Dance Production.

Dance Pedagogy

The Dance Pedagogy concentration requires the successful completion of the following 18 units:

Dance 235: Introduction to Safe Dance Practice and Complementary Training Techniques

Dance 359: Dance Anatomy

Dance 447: Dance Pedagogy: Community Populations

Dance 449: Dance Pedagogy: Children and Youth

Dance 465: Dance Psychology

Dance 493: Dance Teaching Practicum

Dance Production

The Dance Production concentration requires the successful completion of the following 18 units:

Drama 223: Introduction to Theatre Production

Drama 225: Introduction to Scenography

Dance 391: Dance and the Camera

Dance 437: Dance Dramaturgy

Dance 491: Design and Production for Dance

School of Creative and Performing Arts 401: Performing Arts Management

4.13.2 BFA in Dance

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

The BFA in Dance requires the successful completion of a minimum of 93 units to a maximum of 99 units in Courses Constituting the Field of Dance while fulfilling the following requirements:

1. 78 units from the following required courses:
 - Dance 207, 209, 235, 247, 267, 295
 - Dance 305, 307, 331, 333, 347, 359, 391, 395
 - Dance 405, 407, 427, 431, 433, 435, 481, 491
 - Dance 447 or 449
 - Dance 505, 507, 531
2. 12 units from the following Studio Options:
 - Dance 311, 313, 411, 413, OR
 - Dance 321, 323, 421, 423
3. 3 units from the following Dance Options:
 - Dance 309, 343, 365, 375, 475, 493, 503, 581

C. OTHER REQUIREMENTS

- SCPA Courses: 6 units from School of Creative and Performing Arts 290 and 399.

Note: Dance 427, 447/449 and 481 are not offered every year. These courses are

required without exception. Students must arrange their schedules to accommodate the alternating timetable.

4.13.3 Combined BKin (Kinesiology)/BA (Dance)

Introduction

This five-year program leads to a Bachelor of Kinesiology from the Faculty of Kinesiology and a Bachelor of Arts in Dance from the Faculty of Arts. A minimum of 150 units must be successfully completed.

Admission

Students must meet the admissions requirements for both the Faculty of Arts and the Faculty of Kinesiology (see A.5 Undergraduate Admission Requirements).

A. FACULTY OF ARTS REQUIREMENTS FOR COMBINED DEGREES

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation except that students are exempt from the requirement to take 6 units from the Faculty of Science.

The combined BKin (Kinesiology)/BA (Dance) requires at least 150 units and the successful completion of both degree requirements as outlined below. A maximum of 60 units may be at the junior level.

B. BA DANCE REQUIREMENTS

Dance Courses: a minimum of 42 units to a maximum of 60 units in Courses Constituting the Field of Dance while fulfilling the following requirements:

- 36 units from the following required courses:
 - Dance 207, 209, 235, 247, 267
 - Dance 305, 307, 331, 333, 347, 363
 - Dance 481
- 3 units from the following Studio Options:
 - Dance 311, 321, 405, 427
- 3 units from the following Theory Options:
 - Dance 341, 391, 427, 447, 449, 465, 491

C. OTHER REQUIREMENTS

- 6 units from courses labeled Art (ART), Art History (ARHI), Drama (DRAM), Film (FILM), Music (MUSI), Music Education (MUED), Music Performance (MUPF), or School of Creative and Performing Arts (SCPA).

Note: Dance 481 is not offered every year. This course is required without exception. Students must arrange their schedule to accommodate the alternating timetable.

D. BKin (KINESIOLOGY) PROGRAM REQUIREMENTS

Refer to 4.2.7 Combined BKin (Kinesiology)/BA (Dance) in the Faculty of Kinesiology section of this Calendar.

Note: The program requires careful selection of courses to complete all of the requirements of the two Faculties. When choosing their courses, students are urged to work closely with advisors in the Student Programs Office of Kinesiology, the Faculty of Arts program advisors located in the

Arts Students' Centre and Undergraduate Program Administrator for Dance.

4.13.4 Minor in Dance

The Minor in Dance is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Dance with at least 18 units at the 300 level or above.

4.13.5 BFA in Drama

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

The BFA in Drama requires the successful completion of a minimum of 69 units to a maximum of 75 units in Courses Constituting the Field of Drama while fulfilling the following requirements:

- Core Courses:* 33 units from Drama 209, 210, 223, 225, 242, 243, 345, 346, 347, 391, 393.
- Drama Option:* 36 units from Courses Constituting the Field of Drama at the 300 level or above.

C. OTHER REQUIREMENTS

- SCPA Courses:* 6 units School of Creative and Performing Arts 290, 399.
- 3 units in English
- 6 units selected from courses in Art, Art History, Dance, Film, Music, School of Creative and Performing Arts and/or courses at the 300 level or above in Drama.

Notes:

- Drama offers the opportunity for selected students to complete a professional theatre internship with local professional theatre organizations while registered in Internship 591 and 593 (see 4.13.8).
- Students intending to pursue graduate studies in Drama are reminded that most Canadian universities require a reading knowledge of at least one modern language other than English.
- The Drama Division encourages students to enrich their degree programs with complementary courses, workshops and collaborations with other areas of study within the School of Creative and Performing Arts.

4.13.6 Concurrent BFA (Drama Education)/BEd

Introduction

This five-year program leads to a Bachelor of Fine Arts in Drama Education from the Faculty of Arts and a Bachelor of Education from the Werklund School of Education. A minimum of 150 units must be successfully completed.

The BFA (Drama Education) program is a specialized program, which exists only in combination with the BEd. It is designed for students intending either to teach drama in schools or to work as drama specialists with

young people or community groups following certification. It provides opportunities for course work in performance creation and other aspects of the theatre, which relate directly to the particular needs of theatre with and for youth and communities.

Admission

Students must meet the admissions requirements for the Faculty of Arts as well as the Werklund School of Education as specified in the Admissions section of this Calendar.

A. FACULTY OF ARTS REQUIREMENTS FOR CONCURRENT DEGREES

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS FOR DRAMA

Students must successfully complete a minimum of 60 units to a maximum of 78 units in Courses Constituting the Field of Drama while fulfilling the following requirements:

- 18 units Drama 209, 210, 223, 225, 242, 243
- 3 units Drama 346
- 6 units Drama 564
- An additional 33 units labelled Drama at the 300 level or above

Note: Drama 348, 360, 365, 367 and 460 are recommended but not required.

C. BEd PROGRAM REQUIREMENTS

Refer to 4.3 Five-Year BEd (Concurrent) Program in the Werklund School of Education section of the Calendar.

Note: Students in this program must complete Education 201 before they can enter their first year in the Werklund School of Education.

4.13.7 Minor in Drama

The Minor in Drama is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Drama with at least 18 units at the 300 level or above.

Note: Drama 203 and 205 are not applicable towards the minor.

4.13.8 Professional Theatre Internship

Introduction

Qualified students may apply to be placed in internship positions with local professional theatre organizations. Students may be accepted as interns in areas such as Acting, Design, Stage Management, Playwriting, Dramaturgy, Theatre Administration, and Directing. Students uncertain as to their specific career goal may be accepted as General Interns. Students accepted as interns become full-time members of a professional theatre company and are expected to devote themselves full-time to this activity. Interns are paid a monthly salary by their theatre company for the duration of the eight-month internship.

Students who are selected for the internship enrol in Internship 591.01 Professional Theatre Internship I and Internship 591.02 Professional Theatre Internship II in the Fall and Winter Terms respectively.

Admission

To be eligible for consideration, applicants must be registered in the BFA Drama program and have completed 90 units before participating in the internship. Applications to be considered for the internship are due to Drama's internship supervisor in February. See Drama's website for more information: <https://arts.ucalgary.ca/schools/creative-performing-arts/drama>.

4.13.9 BA in Music

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Music while fulfilling the following requirements:

1. *Foundation Courses*: Music 211, 213, 255, 334, 336, and 6 units at the 300 level in Composition, Sonic Arts or Theory.
2. *Music Performance and Musicianship*: 9 units from Music 225, 325, and all courses labelled Music Performance.
3. *Upper-Level Courses*: An additional 18 units from Courses Constituting the Field of Music at the 400 or 500 level including:
 - a. A minimum of 6 units in Music History and Literature, and
 - b. A minimum of 3 units in Composition, Sonic Arts or Theory.

C. OTHER REQUIREMENTS

6 units School of Creative and Performing Arts 290 and 399.

Note: It is recommended that students choose Music 451 or 453 in partial fulfillment of the Upper-Level Courses requirement.

4.13.10 BA Honours Music

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Music while fulfilling the following requirements:

1. *Foundation Courses*: Music 211, 213, 255, 334, 336, and 6 units at the 300 level in Composition, Sonic Arts or Theory.
2. *Music Performance and Musicianship*: 9 units from Music 225, 325, and all courses labelled Music Performance.
3. *Honours Project*: Music 560.
4. *Upper-Level Courses*: An additional 24 units from Courses Constituting the Field of Music at the 400 or 500 level including:

- a. A minimum of 6 units in Music History and Literature; and
- b. A minimum of 3 units in Composition, Sonic Arts or Theory.

C. OTHER REQUIREMENTS

6 units School of Creative and Performing Arts 290, 399.

Notes:

- It is recommended that students choose Music 451 or 453 in partial fulfillment of the Upper-Level Course requirement.
- Music 531 is recommended for students who intend to do a scholarly paper for their Honours Project.

4.13.11 BMus in Composition

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

The BMus in Composition requires the successful completion of a minimum of 90 units to a maximum of 96 units in the Courses Constituting the Field of Music while fulfilling the following requirements:

1. *Common Core Program for BMus Majors*:
 - a. 42 units Music 211, 213, 221, 223, 225, 255, 311, 313, 321, 323, 325, 334, 336 and one of Music Performance* 201, 203, 205, 211, 213 or 215
 - b. Pass piano proficiency exam or successfully complete Music 127
 - c. Music 105.01, 105.02, 105.03, 105.04
2. *Composition Requirements*: 42 units from:
 - a. Music 341 and 343
 - b. Music 441, 443, 445, 447, and 451
 - c. Music 513 and 560
 - d. One of Music Performance 301, 303, 305, 311, 313, 315, 321, 325, 327 or 329
 - e. Music Performance 327
 - f. Music 415 or 417
 - g. Music 453 or 511
3. *Music History and Literature*: 6 units in Music History and Literature at the 300 level or above.

**Ensemble limit: No more than 24 units of courses labelled Music Performance can be counted toward degree requirements.*

C. OTHER REQUIREMENTS

6 units School of Creative and Performing Arts 290 and 399.

4.13.12 BMus in Integrated Studies

The Major is designed for students looking to build strong musical skills in a comprehensive music degree. The flexibility of years three and four allows students to gain a broad musical knowledge (for example, equal parts Music History, Music Performance and Music Theory and Composition) OR to fuse two or more areas of musical study in a way that they are unable to in the

other majors (for example performance and composition, music and technology, performance and early music studies). Admission to this major will depend on a statement of interest submitted to the Division Chair of Music at the end of the first year of studies.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

The BMus in Integrated Studies requires the successful completion of a minimum of 78 units to a maximum of 96 units in Courses Constituting the Field of Music while fulfilling the following requirements:

1. *Common Core Program for BMus Majors*:
 - a. 42 units Music 211, 213, 221, 223, 225, 255, 311, 313, 321, 323, 325, 334, 336 and one of Music Performance* 201, 203, 205, 211, 213, 215
 - b. Pass piano proficiency exam or successfully complete Music 127
 - c. Music 105.01, 105.02, 105.03, 105.04
2. *Integrated Studies Requirements*: 15 units from:
 - a. Music 421, 423
 - b. 9 units from the following: Music Performance* 301, 303, 305, 311, 313, 315, 321, 325, 327, 329
3. *Music Options*: 21 units from:
 - 6 units in Music History and Literature at the 300 level or above
 - 3 units in Composition, Sonic Arts, or Theory
 - Music 521 and 523 or 6 units in Music options
 - 6 units from one of the three options:
 - a. 3 units in Music History and Literature at the 300 level or above and 3 units in Composition, Sonic Arts, or Theory at the 300 level or above, or
 - b. 6 units Music 462, or
 - c. 6 units Music 560

**Ensemble limit: No more than 24 units of courses labelled Music Performance can be counted toward degree requirements.*

C. OTHER REQUIREMENTS

6 units School of Creative and Performing Arts 290 and 399.

4.13.13 BMus in Performance

This Major is for students with talent in performance who plan to become professional instrumentalists or singers. Admission as a Major in Performance will depend on an audition before a faculty jury at the end of the first or second year. In order to continue in Performance, students must earn an average grade of "B-" or better in courses in their area of specialization in each academic year. Students who do not achieve this average will be required to choose a different field of specialization.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

The BMus in Performance requires the successful completion of a minimum of 87 units to a maximum of 96 units in Courses Constituting the Field of Music while fulfilling the following requirements:

1. *Common Core Program for BMus Majors:*
 - a. 42 units Music 211, 213, 221, 223, 225, 255, 311, 313, 321, 323, 325, 334, 336, and one of Music Performance* 201, 203, 205, 211, 213, 215
 - b. Pass piano proficiency exam or successfully complete Music 127
 - c. Music 105.01, 105.02, 105.03, 105.04
2. *Music Performance Requirements:* 36 units from:
 - a. Music 427, 462
 - b. Music 527 and 562
 - c. 9 units from Music Performance* 321, 323, 325, 327, 329, 341, 345
 - d. 9 units from Music Performance* 301, 303, 305, 311, 313, 315
3. *Music Options:* 9 units from:
 - a. 6 units in Music History and Literature at the 300 level or above
 - b. 3 units in Composition, Sonic Arts or Theory at the 300 level or above

**Ensemble limit: No more than 24 units of courses labelled Music Performance can be counted toward degree requirements.*

C. OTHER REQUIREMENTS

1. 6 units School of Creative and Performing Arts 290 and 399.
2. *Voice Major Language Requirement:* Voice Majors are required to complete 6 units in a single language other than English.

Notes:

- Voice Majors are strongly encouraged to include Music 525.
- All Performance Majors are strongly encouraged to include 6 units in a single language other than English.
- Performance majors are strongly encouraged to take a Sonic Arts course as one of their 300 level or above options.

4.13.14 Concurrent BMus (Music Education)/BEd**Introduction**

This five-year program leads to a Bachelor of Education from the Werklund School of Education and a Bachelor of Music in Music Education from the Faculty of Arts. A minimum of 150 units must be successfully completed.

The BMus (Music Education) exists only in combination with the BEd program. It is designed for students intending to teach music (both instrumental and choral) in the schools at the secondary level. In addition to the core areas of performance, theory, history and musicianship, the program provides course work in conducting, vocal and

instrumental techniques and appropriate pedagogy for different age groups.

Admission

Students must meet the admissions requirements for both the Bachelor of Music program (see the Overview of Programs and Procedures) and the Faculty of Arts (see A.5 Undergraduate Admission Requirements), as well as the Werklund School of Education.

A. FACULTY OF ARTS REQUIREMENTS FOR CONCURRENT DEGREES

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS FOR MUSIC EDUCATION

Students must successfully complete a minimum of 75 units to a maximum of 81 units in the Field of Music while fulfilling the following requirements:

1. *Common Core Program for BMUS Majors:*
 - a. 42 units Music 211, 213, 221, 223, 225, 255, 311, 313, 321, 323, 325, 334, 336, and one of Music Performance 201, 203, 205, 211, 213, 215
 - b. Pass piano proficiency exam or successfully complete Music 127
 - c. Three of Music 105.01, 105.02, 105.03, 105.04
2. *Music Education Requirements:*
 - a. 18 units Music Education 331, 341, 401, 403, 413 or 415, 417
 - b. 6 units Music 421, 423
 - c. 6 units from Music Performance 301, 303, 305, 311, 313, 315
3. *Music Options*
 - a. 3 units in Music History and Literature at the 300 level and above

C. OTHER REQUIREMENTS

3 units School of Creative and Performing Arts 290

Note: School of Creative and Performing Arts 399 is strongly recommended.

4.13.15 Minor in Music

Admission to the Minor in Music requires evidence of successful completion of Royal Conservatory Level 8 Theory (formerly Advanced Rudiments) or the Division music theory diagnostic exam.

The Minor is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Music, with at least 15 units at the 300 level or above. The Music Minor also requires:

1. At least 3 units from an ensemble course: Music Performance 201, 203, 205, 211, 213, 215, 221, 223, 225, 227, 229, 241, 301, 303, 305, 311, 313, 315, 321, 323, 325, 327, 329, 341.

Note: Enrolment in Music 221 and 223 is by audition and subject to available resources. Students wishing to include these courses in their program of study should see "Audition Dates" under Overview of Programs and

Procedures or contact the Music Undergraduate Program Administrator for more information on when and how to apply for an audition.

4.13.16 Minor in Sonic Arts

The Minor in Sonic Arts is for students who have an interest in electroacoustic music, soundscape composition, computer music, multi-channel sound spatialization, interactive music involving instruments with computer, and sound design for video, film, media arts and stage production.

The Minor is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must successfully complete a minimum of 30 units to a maximum of 36 units from the Field of Music while fulfilling the following requirements:

1. *Core Skills:* 21 units Music 309, 351, 355, 451, 453, 551, Art 251.
2. *Aesthetics and History:* 3 units from Music 308*, 511*, 513*, 533*, when the topic offered is pertinent to Sonic Arts.
3. *Sonic Arts Options:* 6 units from Music Performance 327, Music 511*, 533*, Art 313, 315

**With approval of the Division Chair, Music.*

4.13.17 Concentration in Sonic Arts for Music Majors

The Concentration in Sonic Arts is for BMus and BA (Music) students who have an interest in electroacoustic music, soundscape composition, computer music, multi-channel sound spatialization, interactive music involving instruments with computer, and sound design for video, film, media arts and stage production. Of the required courses, at least five are studio-based.

Students can acquire a Concentration in Sonic Arts by successfully completing 18 units including:

1. 15 units Music 351, 355, 451, 453, 551
2. 3 units from Music 308*, 511*, 513*, 533* when the topic offered is pertinent to Sonic Arts.

**With approval of the Division Chair, Music.*

4.14 Dance

See Creative and Performing Arts.

4.15 Development Studies

See Anthropology.

4.16 Drama

See Creative and Performing Arts.

4.17 Earth Science

See Geography.

4.18 East Asian Language Studies

See Languages, Linguistics, Literatures and Cultures.

4.19 East Asian Studies

See Languages, Linguistics, Literatures and Cultures.

4.20 Economics

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Bachelor of Arts (BA) in Economics

BA in Economics with Co-operative Education

BA Honours in Economics

BA Honours in Economics with Co-operative Education

Notes:

- A Minor is offered in Economics.
- A Minor and a Concentration are offered in Applied Energy Economics

Introduction

The Department of Economics offers instruction in the Field of Economics. The BA Honours program is recommended for students planning to pursue a graduate degree in economics and for those who seek an enriched understanding of the subject at the undergraduate level.

Students are urged to consult regularly with the Economics Advisor and/or designated Faculty members concerning the selection of their courses. Many 300-level courses have an Economics 201 and 203 prerequisite and some have Mathematics or Statistics courses as prerequisites. Economics 301, 303, 357, 359, 387, 389 and 395 are prerequisites for many 400- and 500-level courses, especially those in the Honours program.

Contact Information

Department Office: Social Sciences 454

Phone: 403.220.5857

Fax: 403.282.5262

Email: econ@ucalgary.ca

Website: econ.ucalgary.ca/

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: <http://arts.ucalgary.ca/advising>.

For more specific advice regarding course selection and requirements in the major field, students should consult the Undergraduate Program Director located in the Department of Economics (consult Department website for contact information).

Admission to the Major

Prospective students wishing to enter the BA (Economics) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Limitation of Enrolment

Due to high demand, admission to the Economics Major is limited. Whenever demand exceeds capacity, enrolment will be limited and students will be admitted on a competitive basis. Admission averages are typically set above the minimum level for the Faculty of Arts. These higher admission standards

are applicable to high-school applicants, external transfer applicants from other post-secondary institutions and internal transfer applicants from other programs at the University of Calgary, whether inside or outside the Faculty of Arts.

Admission to Honours

The Faculty of Arts procedures for Admission to Honours established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Courses Constituting the Field of Economics

- All courses labelled Economics (ECON).

4.20.1 BA in Economics

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units to a maximum of 60 units in Courses Constituting the Field of Economics while fulfilling the following requirements:

1. *Core*: 21 units Economics 201, 203, 301, 303, 357, 359 and 395.
2. *Upper-Level Courses*: 12 units from the 400- or 500-level, which have one of Economics 301, 303, 357 or 359 as a prerequisite.
3. *Economics Options*: An additional 9 units in Economics.

C. OTHER REQUIREMENTS

1. *Mathematics Requirement*: Mathematics 249 or 265.
2. *Statistics Requirement*: Statistics 205 or 213.

D. DEGREE OPTIONS

- The BA in Economics can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.
- The BA Honours in Economics can be taken with a "Concentration in Applied Energy Economics" (see section 4.20.4).

Notes:

- Students are advised to complete Economics 357 and 395 early in their programs of study because these courses are prerequisites for many 400- and 500-level Economics courses.
- For other program advice students are encouraged to consult the Explicit Syllabus of the Department of Economics at: econ.ucalgary.ca/undergraduate/explicit-syllabus.

4.20.2 BA Honours in Economics

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Economics while fulfilling the following requirements:

1. *Core*: 21 units Economics 201, 203, 301, 303, 357, 359 and 395.
2. *Capstone*: Economics 387, 389, 495, 497, 557 and 559.
3. *Upper-Level Courses*: 9 units from the 400- or 500-level, which have one of Economics 301, 303, 357 or 359 as a prerequisite.
4. *Economics Options*: An additional 12 units in Economics.

C. OTHER REQUIREMENTS

1. *Mathematics Requirement*: (a) Mathematics 211 or 213; and (b) Mathematics 249 or 265.
2. *Statistics Requirement*: Statistics 205 or 213.

D. DEGREE OPTIONS

- The BA Honours in Economics can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.
- The BA Honours in Economics can be taken with a "Concentration in Applied Energy Economics" (see section 4.20.4).

Notes:

- If a student has an acceptable Minor Field or a concentration of at least 18 units, the Undergraduate Director may reduce the number of courses in Economics required for Honours below 60 units. In all cases, the student must have at least 48 units and meet requirements 1-3.
- Students are advised to take Mathematics 211, Economics 357 and 395 early in their programs of study because these courses are prerequisites for many 400- and 500-level economics courses.
- For program advice on recommended courses outside the Department, consult the Explicit Syllabus of the Department of Economics at: econ.ucalgary.ca/undergraduate/explicit-syllabus.

4.20.3 Minor in Economics

The Minor in Economics is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Economics with at least 18 units at the 300 level or above.

4.20.4 Minor and Concentration in Applied Energy Economics

Minor in Applied Energy Economics (available to non-Economics Majors)

Concentration in Applied Energy Economics (available to Economics Majors)

Note: Applied Energy Economics is not offered as a Major Field of study.

Introduction

The Faculty of Arts offers the Applied Energy Economics program. The Program provides the historical and institutional background and the basic tools necessary for an understanding of the operation of North American and world energy markets. The program includes the development of analytical and problem-solving skills. Students will benefit from expert instruction by academics at the university.

While it is anticipated that students who graduate with a Minor or Concentration in applied energy economics will enhance their prospects of securing relevant and rewarding employment in the energy sector, additional education and training is recommended for those wishing to take full advantage of the career opportunities in applied energy economics. This typically involves the completion of a master's degree. Students contemplating graduate work should consult the Department of Economics in the selection of courses.

There are two Applied Energy Economics programs. For the non-Economics major there is a Minor in Applied Energy Economics. For the Economics Major there is a Concentration in Applied Energy Economics. The Minor or Concentration in Applied Energy Economics Concentration will be recorded on a student's transcript.

Admission

Applications for admission to the program (either the Minor or Concentration in Applied Energy Economics) can be made to the Faculty of Arts. Prior to applying for admission, students must have completed Economics 201 and 203.

For additional information, see the Economics Advisor. For additional information about programs and the Department, visit econ.ucalgary.ca.

Requirements for the Minor in Applied Energy Economics

This Minor, which is available only to students with Major Fields other than Economics, requires the successful completion of a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Economics while fulfilling the following requirements:

Required Courses: Economics 201, 203, 301, 357, 395 and 493.

Applied Energy Economics Options: 12 units from Economics 323, 325, 327, 329, 377, 475, 477, 487, 527.

Note: Versions of the decimalized courses Economics 399, 499 and 599, which are designated by the Department of Economics, may be used toward the requirement for Applied Energy Economics options.

Requirements for the Concentration in Applied Energy Economics

This Concentration is available only to students pursuing a Degree in Economics. In addition to the requirements for the BA or Honours BA in Economics, students must meet the additional following requirements:

Required Courses: Economics 427, 493.

Applied Energy Economics Options: 18 units from Economics 323, 325, 327, 329, 377, 453, 475, 477, 487, 495, 527.

Notes:

- Students may count the courses used to satisfy the requirements of the concentration toward either the BA or BA Honours in Economics. Depending on the choice of courses for the concentration, students may or may not be able to complete the BA or BA Honours in Economics with the minimum number of courses.
- Students may be able to take additional "Applied Energy Economics Options" subject to the constraint that those in the BA in Economics are only permitted to take a maximum of 60 units from Courses Constituting the Field of Economics in total while those in the BA Honours in Economics are only permitted to take a maximum of 72 units.
- Students should choose their courses and course sequence in consultation with the Department of Economics. This is particularly important for students who are combining the Concentration in Applied Energy Economics with BA Honours, Co-operative Education, or Combined Degree programs.
- Versions of the decimalized courses Economics 399, 499 and 599, which are designated by the Department of Economics, may be used toward the requirement for Applied Energy Economics options.

4.21 English

Overview of Programs and Procedures in English

Baccalaureate Degrees Offered

Bachelor of Arts (BA) in English

BA in English with Co-operative Education

BA Honours in English

BA Honours in English with Co-operative Education

Concurrent BA in English/Bachelor of Education

Note:

- Minors are offered in English and Medieval, Renaissance and Reformation Studies.
- An Embedded Certificate is offered in Creative Writing. For more information, see the Embedded Certificates section of the Calendar.

Introduction

Students choosing to major in English may choose to complete either a BA in English or an Honours BA in English. Both are four-year programs. The BA in English and Honours BA in English provide students with a broad education in the history of literature in English and encourage wide exploration of indigenous and global traditions as well as theoretical contexts. Both programs are excellent preparation for careers in education, law, writing, business, and government. Students wanting to enhance their studies with non-academic experience may pursue their degree in tandem with the Co-operative Education program. The Honours BA in English is considered the best preparation for those wanting to pursue graduate studies in English.

The Department of English offers an Embedded Certificate in Creative Writing, which can be taken in conjunction with most undergraduate degree programs at the University of Calgary including the BA and BA Honours English. For more information see Embedded Certificate in Creative Writing.

The Faculty of Arts offers a Minor Field of specialization in Medieval, Renaissance and Reformation Studies. Students intending to pursue this Minor are encouraged to consult with the Undergraduate Program Advisors for advice on selecting courses appropriate to the Minor and to their interest and background.

This Minor is designed to provide a multi-disciplinary knowledge of the history, culture and thought of two key periods in the development of the Western European world. At the same time, it allows for specialization in areas of interest such as medieval art and literature, medieval and early modern France, the growth of European empires, or medieval and early modern performance cultures.

The Minor is intended to complement Major programs in related fields, such as History, English and Religious Studies. The Minor is desirable for students contemplating graduate-level work in related fields.

Contact Information

Department Office: Social Sciences 1152

Phone: 403.220.5470

Fax: 403.289.1123

Email: adveng@ucalgary.ca

Website: english.ucalgary.ca/

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements.

For more specific advice regarding course selection and requirements in the major field, students should consult the subject advisor located in their home Department (consult Department website for contact information).

Admission to the Major

Prospective students wishing to enter the BA (English) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Admission to Honours

The Faculty of Arts procedures for Admission to Honours established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Courses Constituting the Field of English

- All courses labelled English (ENGL)
- Drama 371, 471
- Linguistics 221

Note: English Composition (ENCO) courses do not count towards Courses Constituting the Field in English.

Courses Constituting the Field of Medieval, Renaissance and Reformation Studies

1. *The Fine Arts*

(Department of Art; School of Creative and Performing Arts)

Art History 201, 203, 327, 357

Drama 345

2. *History*

(Department of History)

History 319, 321, 326, 327

3. *Literature*

(Department of English; School of Languages, Linguistics, Literatures and Cultures)

English 311, 401, 403, 405, 406, 410, 411, 412, 413

French 453, 455

Spanish 563, 567

4. *Philosophy, Politics and Religion*

(Departments of Philosophy; Classics and Religion; Communication, Media, and Film)

Communication and Culture 201, 203

Philosophy 301, 303, 403

Religious Studies 385, 387, 484

5. *Languages*

(Departments of English; Classics and Religion)

A maximum of 6 units towards the Minor can be taken from:

Courses labelled Greek

Courses labelled Latin

English 401, 403 (Old English)

4.21.1 BA in English

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units

in Courses Constituting the Field of English while fulfilling the following requirements:

1. *Historical Survey of Literature in English*: 6 units English 305, 307.
2. *Literary Theory*: 6 units from English 302, 303, 426, 481 515*, 517.
3. *Canadian Literature*: 3 units from English 372, 471, 473, 509.
4. *Global and Indigenous Perspectives*: 3 units from English 376, 378, 491, 493, 515*.
**English 515 may be used towards either Literary Theory or Global and Indigenous Perspectives, but not both.*
5. *Historical Courses pre-1850*: 6 units from English 401, 403, 405, 406, 410, 411, 412, 413, 429, 431, 438, 441, 461, 495, 499**, 519**.
***With approval of the Associate Head, Undergraduate Student Affairs.*
6. *English Options*: An additional 24 units from Courses Constituting the Field of English including at least 15 units at the 300 level or above, and no more than 6 units in Drama or Linguistics.
7. *Upper-Year Courses*: Inclusive of the courses used to satisfy requirements 2-5 above, 21 units must be from courses labelled English at the 400 level or above, of which at least 3 units must be at the 500 level.

C. DEGREE OPTIONS

The BA in English can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- English 203 is the recommended first-year course for English Majors.
- English 302 (Introduction to Literary Theory) is the recommended theory course for English Majors and Honours students.
- Students should note that competency in a second language is often required for graduate studies in the field.

4.21.2 BA Honours English

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of English while fulfilling the following requirements:

1. *Historical Survey of Literature in English*: 6 units English 305, 307.
2. *Literary Theory*: 9 units from English 302, 303, 426, 481, 515*, 517. Only 6 units may be chosen from the 300 level.
3. *Canadian Literature*: 3 units from English 372, 471, 473, 509.
4. *Global and Indigenous Perspectives*: 3 units from English 376, 378, 491, 493 and 515*.

**English 515 may be used towards either Literary Theory or Global and Indigenous Perspectives, but not both.*

5. *Historical Courses pre-1850*: 9 units from English 401, 403, 405, 406, 410, 411, 412, 413, 429, 431, 438, 441, 461, 495, 499**, 519**.

***With approval of the Associate Head, Undergraduate Student Affairs*

6. *Honours Project*: 6 units English 504.
7. *English Options*: An additional 24 from Courses Constituting the Field of English, including at least 18 units at the 300 level or above, and no more than 6 units in Drama or Linguistics.
8. *Upper-Year Courses*: Inclusive of the courses used to satisfy requirements 2-6 above, 24 units must be from courses labelled English at the 400 level or above, of which at least 12 units must be at the 500 level.

C. DEGREE OPTIONS

The BA Honours in English can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- English 203 is a recommended first-year course for English Majors.
- English 302 (Introduction to Literary Theory) is the recommended theory course for English Majors and Honours students.
- Honours students intending to pursue graduate studies in English Literature should take at least one course in each of the following historical periods: Medieval, Renaissance, Eighteenth Century, and Nineteenth Century. For program advice and course recommendations, please consult with the departmental advisor.
- Students should note that competency in a second language is often required for graduate studies in the field.

4.21.3 Minor in English

The Minor in English is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of English, including at least 18 units labelled English at the 300 level and above.

Inclusive of the regulations above, all English Minors must take:

1. 6 units of *Historical Survey of Literature in English*: English 305, 307
2. 3 units of *Literary Theory*: English 302, 303, 481, 426, 515 or 517
3. 3 units of *Canadian Literature*: English 372, 471, 473 or 509, and
4. 3 units of *Global and Indigenous Perspectives*: English 376, 378, 491, 493 or 515
5. 15 units from Courses Constituting the Field of English with a maximum of 3

units from Drama 371, 471; Linguistics 221.

4.21.4 Minor in Medieval, Renaissance and Reformation Studies

The Minor in Medieval, Renaissance and Reformation Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must successfully complete a minimum of 30 units to a maximum of 36 units with at least 18 units at the 300 level or above. In addition, at least 6 units must be completed in each of three of the five Subject Areas comprising Courses Constituting the Field of Medieval, Renaissance and Reformation Studies. No more than 6 units can be counted from Area 5, Languages.

4.22 Film Studies

See Communication, Media and Film.

4.23 French

See Languages, Linguistics, Literatures and Cultures.

4.24 Geography

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Degrees in Geography:

Bachelor of Arts (BA) in Geography

BA in Geography with Co-operative Education

Bachelor of Science (BSc) in Geography

BSc in Geography with Co-operative Education

BA Honours in Geography

BA Honours in Geography with Co-operative Education

BSc Honours in Geography

BSc Honours in Geography with Co-operative Education

Concurrent BA in Geography and Bachelor of Education

Concurrent BSc in Geography and Bachelor of Education

Degrees in Earth Science

Bachelor of Science (BSc) in Earth Science

BSc in Earth Science with Co-operative Education

BSc Honours in Earth Science

BSc Honours in Earth Science with Co-operative Education

Degrees in Urban Studies

Bachelor of Arts (BA) in Urban Studies

BA in Urban Studies with Co-operative Education

Note: Minors are offered in Geography, Earth Science and Urban Studies.

Introduction

The Department offers programs in Geography, Earth Science and Urban Studies. The Department of Geography also participates in the Environmental Science program, which is housed in the Faculty of Science.

Geography

Geography is the study of people, places and patterns on the Earth's surface. Students learn how to analyze the meaning of patterns formed on the Earth's surface by natural processes and human activity. Geographers apply these concepts and information to manage and use Earth's resources to advance human civilization in a sustainable manner. Geography has many facets, and undergraduates learn about all of them: human geography, physical geography, and techniques and methods. They also learn the basics of how to conduct research to answer the many unsolved questions in Geography. Because Geography is so broad in scope, geographers work in a wide variety of jobs. They are, above all, specialists in putting together information from a wide variety of disciplines to arrive at solutions to problems involving location and spatial relationships — such as planning (urban, transportation or tourism, for example), environmental impact, transportation or resource management.

Earth Science

Earth Science is the study of earth materials in addition to the natural and human processes that shape the landscape. Many of the environmental issues facing our planet are related to the interaction between natural systems and our society. The Earth Science Program integrates the strengths of four disciplines to better understand these interactions. Integrating theory and methods from each discipline gives a broader perspective and therefore more powerful problem-solving skills. The four disciplines that comprise the Earth Science Program are: Geography, which integrates the natural and the human (social) sciences by stressing how location influences both natural and human phenomenon on the Earth's surface; Archaeology, which investigates past human activities by analyzing material remains and makes links between cultural changes associated with climate change; Geology, which is the study of the materials and processes that form the Earth; and Geophysics, which uses the laws and techniques of physics to acquire knowledge about the Earth's dynamic systems and subsurface structures.

Earth Science and APEGA Regulations

The practice of geology and geophysics in Alberta is governed by Provincial law and regulated by the Association of Professional Engineers and Geoscientists of Alberta (APEGA). The Earth Science program is not designed to meet those requirements. Persons intending to pursue geology or geophysics as a profession should obtain a BSc or BSc Honours in Geology or Geophysics.

Urban Studies

Urban Studies is a broad interdisciplinary program designed to provide an integrated understanding of the social, political, economic, cultural, and geographic processes that shape urban life. Cities are sites of great cultural and ethnic diversity, economic innovation, cultural expression, resource consumption, wealth generation, and political conflict and co-operation. Today most

developed societies are predominantly urban, even as global processes increasingly shape them. The processes that shape urban life play a critical role in shaping the sustainability of societies. Indeed, it is impossible to understand sustainability issues without understanding the organization of cities. The Urban Studies program provides a strong background for students interested in working in public and private sector fields including urban and regional planning, architecture, environmental design, economic development, city administration, social services and policy, cultural programming, urban politics, and education.

Contact Information

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Website: geog.ucalgary.ca/

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements.

For more specific advice regarding course selection and requirements in the major field, students should consult the subject advisor located in their home Department (consult Department website for contact information).

Admission to the Major

Prospective students wishing to enter the BA or BSc (Geography) Program, the BSc (Earth Science) Program or the BA (Urban Studies) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Admission to Honours

The Faculty of Arts procedures for admission to the BA or BSc Honours (Geography) and the BSc Honours (Earth Science) are established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Overlapping Programs

Programs in Geography cannot be taken in conjunction with programs in: Earth Science; Environmental Science or Urban Studies. This restriction applies to Major-plus-Minor combinations, Double Majors, Combined Degrees and Second Baccalaureate Degrees.

Programs in Earth Science can be taken in conjunction with Environmental Science, Geology, Applied and Environmental Geology or Geophysics with approval from the Faculty of Arts. Consent is required for Major-plus-Minor combinations, Double Majors, Combined Degrees and Second Baccalaureate Degrees.

Courses Constituting the Field of Earth Sciences

- Archaeology 201, 417, 453, 515, 531, 596
- Earth Science 301, 401, 501
- Geography 204, 280, 308, 310, 324, 380, 390, 391, 403, 408, 410, 412, 432, 436, 480, 482, 484, 485, 500, 502, 503, 504, 506, 510, 599
- Geology 201, 202, 307, 313, 337, 343, 353, 381, 401, 441, 471, 475, 510, 555, 561
- Geophysics 351, 355, 375, 509, 565

Courses Constituting the Field of Geography

- All courses labelled Geography (GEOG). Geography courses are subdivided as follows:

List A Human Geography: Geography 254, 352, 354, 452, 454, 456, 458, 553, 554, 558, 565, 596, 597

List B Integrative Geography: Geography 254, 324, 326, 328, 330, 426, 428, 430, 432, 434, 436, 526, 528, 530, 532, 534, 536, 538, 596, 597

List C Geographical Methods: Geography 280, 380, 390, 391, 480, 482, 483, 484, 485, 567, 582, 583, 584, 585, 586, 587, 588, 596

List D Physical Geography: Geography 204, 308, 310, 408, 410, 412, 500, 502, 503, 504, 506, 510, 512, 596, 599

Courses Constituting the Field of Urban Studies

- All courses labelled Urban Studies (UBST)
- Anthropology 379, 411, 479;
- Archaeology 325;
- Communication and Media Studies 313, 371;
- Canadian Studies 355,
- Economics 365, 395;
- English 302;
- Geography 452, 454, 456, 480, 482, 483, 485, 526, 532, 534, 536, 538, 553, 554, 558, 565, 567, 582, 583, 585, 586, 588;
- Greek and Roman Studies 325, 327, 445, 447;
- History 300, 354;
- Political Science 357, 399, 425, 433, 447, 451;
- Sociology 311, 313*, 315, 353, 355, 375, 413, 453, 467, 471, 499;
- Courses labelled Statistics.
- Students admitted to the Architectural Studies minor may use Architectural Studies 457.01, 457.02. Up to 6 units from Geography Overseas Field Schools may be considered when content is Urban focused. Sociology 499 may also be considered when content is Urban focused.

Core Courses

Anthropology 379; Canadian Studies 355; Economics 365; Geography 452, 454, 526, 553, 554, 558, 565; History 354; Politi-

cal Science 425, 433; Sociology 353, 453; Urban Studies 253, 311, 591

Research Methods for Urban Studies

A. Qualitative Methods:

Anthropology 411; Communication and Media Studies 313, 371; English 302; Geography 483, 583; History 300; Political Science 357; Sociology 313*, 413.

B. Quantitative Methods:

Economics 395; Geography 485, 585; Political Science 399; Sociology 311, 313*, 315; Courses labelled Statistics

**Sociology 313 is taught as either Qualitative or Quantitative. The Urban Studies Program Co-ordinator will determine the methods list into which the particular section will be counted.*

C. Geospatial Methods

Geography 480, 482, 567, 582, 586, 588

4.24.1 BA in Geography

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of units 48 units to a maximum of 60 units in Courses Constituting the Field of Geography while fulfilling the following requirements:

1. *Foundation:* 18 units
 - 3 units from Geography 204, 254, 280, 324, 326, 328, 330
 - 12 units Geography 352, 354, 380, 391
 - 3 units from Geography 308, 310
2. *Depth:* 12 units
 - 6 units Geography 483, 485
 - 6 units at the 400 level from List A
3. *Advanced:* 12 units
 - 9 units at the 500 level from List A or B
 - 3 units at the 500 level from List C
4. *Upper-level options:* 6 units at the 400 level or above from List A or B

C. OTHER REQUIREMENTS

Academic Writing: 3 units from Communication and Media Studies 363, 369, Science 311.

D. DEGREE OPTIONS

The BA in Geography can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.24.2 BSc in Geography

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Geography while fulfilling the following requirements:

1. *Foundation:* 18 units
 - 3 units from Geography 204, 254, 280, 324, 326, 328, 330
 - 12 units Geography 308, 310, 380, 391

- 3 units from Geography 352, 354

2. *Depth:* 12 units

- 6 units Geography 483, 485
- 3 units Geography 408
- 3 units from Geography 410, 412

3. *Advanced:* 12 units

- 9 units at the 500 level from List D
- 3 units at the 500 level from List C

4. *Upper-level options:* 6 units at the 400 level or above from List C or D

C. OTHER REQUIREMENTS

1. *Academic Writing Requirement:* 3 units from Communication and Media Studies 363, 369, Science 311.

2. *Science Requirement:* 6 units from Biology 241, 243, 307; Chemistry 201 or 211, 203 or 213, 301; Computer Science 217, 219, 231, 233; Data Science 201, 211; Mathematics 211 or 213; Mathematics 249 or 265 or 275; Mathematics 267; Physics 211, 221, 223, 271; any senior courses offered by the Faculty of Science and having one of these as a prerequisite.

D. DEGREE OPTIONS

The BSc in Geography can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.24.3 BA Honours Geography

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Geography while fulfilling the following requirements:

1. *Foundation:* 18 units
 - 3 units from Geography 204, 254, 280, 324, 326, 328, 330
 - 12 units Geography 352, 354, 380, 391
 - 3 units from Geography 308, 310
2. *Depth:* 12 units
 - 6 units Geography 483, 485
 - 6 units at the 400 level from List A
3. *Advanced:* 15 units
 - 9 units at the 500 level from List A or B
 - 6 units at the 500 level from List C
4. *Upper-level options:* 9 units at the 400 level or above from List A or B
5. *Honours Thesis:* 6 units Geography 595, 598

C. OTHER REQUIREMENTS

Academic Writing Requirement: 3 units from Communication and Media Studies 363, 369 and Science 311.

D. DEGREE OPTIONS

The BA Honours in Geography can be taken with Co-operative Education. See section

3.4.4 Co-operative Education Programs for information and requirements.

4.24.4 BSc Honours Geography

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Geography while fulfilling the following requirements:

- Foundation:** 18 units
 - 3 units from Geography 204, 254, 280, 324, 326, 328, 330
 - 12 units Geography 308, 310, 380, 391
 - 3 units from Geography 352, 354
- Depth:** 12 units
 - 6 units Geography 483, 485
 - 3 units Geography 408
 - 3 units from Geography 410, 412
- Advanced:** 15 units
 - 9 units at the 500 level from List D
 - 6 units at the 500 level from List C

4. **Upper-level options:** 9 units at the 400 level or above from List C or D

5. **Honours Thesis:** 6 units Geography 595, 598

C. OTHER REQUIREMENTS

- Academic Writing Requirement:** 3 units from Communication and Media Studies 363, 369, Science 311.
- Science Requirement:** a total of 12 units from the following:
 - 9 units from Biology 241, 243, 307; Chemistry 201 or 211, 203 or 213, 301; Physics 211, 221, 223, 271;
 - 3 units from Computer Science 217, 219, 231, 233; Data Science 201, 211; Mathematics 211, 213, 249, 265, 267, 275.

Any senior courses offered by the Faculty of Science and having one of these as a prerequisite may be substituted for a course in this list.

D. DEGREE OPTIONS

The BSc Honours in Geography can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.24.5 Minor in Geography

The Minor in Geography is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Geography with at least 18 units at the 300 level or above.

4.24.6 BSc in Earth Science

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete exactly 60 units in Courses Constituting the Field of Earth Science while fulfilling the following requirements:

- Core Courses:**
 - 3 units Archaeology 201
 - 3 units from Archaeology 453, 515, 531;
 - 12 units Geography 308, 310, 380, 391;
 - 3 units from Geography 410, Geology 353;
 - 9 units Geology 201, 202, 313;
 - 3 units from Geophysics 351, 355;
 - 3 units from Geology 307, Geography 510, Archaeology 417, 515;
 - 3 units Geophysics 375, Geography 432;
 - 9 units Geology 337, 343, 381.
- Upper-Level Earth Science Options:** 9 units chosen freely from:
 - Earth Science 301, 401, 501
 - Geography 324, 412, 432, 500, 502, 503, 506, 510, 512, 530, 538, 567, 584, 586, 587
 - Geology 401, 555, 561
 - Geophysics 565
- Methods:** 3 units from Geography 482, 484.

C. OTHER REQUIREMENTS

- Mathematics:** 6 units
 - 3 units Mathematics from 249, 265, 275;
 - 3 units Mathematics from 267, 277
- Chemistry:** 3 units from Chemistry 201, 211;
- Physics:** 6 units
 - 3 units from Physics 211, 221;
 - 3 units Physics 223

D. DEGREE OPTIONS

The BSc in Earth Science can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.24.7 BSc Honours Earth Science

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 66 units in Courses Constituting the Field of Earth Science and fulfill the following requirements:

- Core Courses:**
 - 3 units Archaeology 201
 - 3 units from Archaeology 453, 515, 531, 596;
 - 12 units Geography 308, 310, 380, 391;
 - 3 units from Geography 410, Geology 353;
 - 9 units Geology 201, 202, 313;

- 3 units from Geophysics 351, 355;
- 3 units from Geology 307, Geography 510, Archaeology 417, 515;
- 3 units Geophysics 375, Geography 432;
- 9 units Geology 337, 343, 381.

2. **Upper-Level Earth Science Options:** 9 units from:

- Earth Science 301, 401, 501
- Geography 324, 412, 432, 500, 502, 503, 506, 510, 512, 530, 538, 567, 584, 586, 587
- Geology 401, 555, 561
- Geophysics 565

3. **Methods:** 3 units from Geography 482, 484.

4. **Honours Thesis:** 6 units from Archaeology 596, Geography 595, 598, Geology 510.

C. OTHER REQUIREMENTS

- Mathematics:**
 - 3 units Mathematics from 249, 265, 275
 - 3 units Mathematics from 267, 277
- Chemistry:** 3 units from Chemistry 201, 211
- Physics**
 - 3 units from Physics 211, 221
 - 3 units Physics 223

D. DEGREE OPTIONS

The BSc in Earth Science can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.24.8 Minor in Earth Science

The Minor in Earth Science is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units from Courses Constituting the Field of Earth Science including:

- 3 units Archaeology 201;
- 9 units from Geography courses within Courses Constituting the Field of Earth Science;
- 6 units Geology 201, 202;
- 6 units from Geology and/or Geophysics courses within Courses Constituting the Field of Earth Science (with the exception of Geology 510);
- 6 additional units from Courses Constituting the Field of Earth Science.

4.24.9 BA in Urban Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Urban Studies while fulfilling the following requirements:

- Core Courses:**
 - 15 units Urban Studies 253, 591; Geography 452, 454, 558;

- b. 6 units from Anthropology 379; Canadian Studies 355; Economics 365; Geography 526, 553, 554, 565; History 354; Political Science 425, 433; Sociology 353, 453; Urban Studies 311.

2. *Research Methods*: 12 units from the "Research Methods for Urban Studies" (listed under Courses Constituting the Field of Urban Studies) with:

- a. 6 units from any one of the Qualitative Methods*, Quantitative Methods or Geospatial Methods lists;

**Students may be permitted to use two courses of language instruction in a single language other than English or courses conducted in that language. Students wishing to fulfil their Qualitative Methods requirement in this way must contact the Department for approval. If two language courses are used, an additional 6 units will need to be taken from the Field of Study.*

- b. 6 units selected from the other two Methods lists.
3. An additional 15 units from Courses Constituting the Field of Urban Studies including:
- a. 9 units at the 300 level or above
 - b. 6 units at the 400 level or above

C. DEGREE OPTIONS

The BA in Urban Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.24.10 Minor in Urban Studies

The Minor in Urban Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units from Courses Constituting the Field of Urban Studies with at least 18 units at the 300 level or above, while fulfilling the following requirements:

1. 6 units Urban Studies 253, 591.
2. 12 units from the Core courses in Courses Constituting the Field of Urban Studies, excluding Urban Studies 253 and 591.
3. 12 units from Courses Constituting the Field of Urban Studies.

4.25 German

See Languages, Linguistics, Literatures and Cultures.

4.26 Greek

See Classics and Religion.

4.27 Greek and Roman Studies

See Classics and Religion.

4.28 History

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Degrees in History:

Bachelor of Arts (BA) in History

BA in History with Co-operative Education

BA Honours in History

BA Honours in History with Co-operative Education

Concurrent BA in History and Bachelor of Education

Degrees in Canadian Studies:

Bachelor of Arts (BA) in Canadian Studies
BA in Canadian Studies with Co-operative Education

BA Honours in Canadian Studies

BA Honours in Canadian Studies with Co-operative Education

Concurrent BA in Canadian Studies and Bachelor of Education

Degrees in Latin American Studies:

Bachelor of Arts (BA) in Latin American Studies

BA in Latin American with Co-operative Education

Note: Minors are offered in History, Canadian Studies, and Latin American Studies.

Introduction

The Department of History offers instruction in a broad range of historical fields. The Programs in History provide a broad liberal arts education, with widespread application. The BA Honours in History deepens the foundation in historical studies and provides excellent preparation for graduate studies in history as well as fields such as education, law, journalism and public administration.

The Department strongly recommends that History students do not concentrate their studies in one period or thematic area. The Department encourages breadth in History and advises students to take courses about different chronological eras, in different geographic areas, and from different analytical perspectives.

The Canadian Studies program offers an introduction to Canadian literature, the arts, politics and society. It is designed for those who might wish to pursue careers in government, law, education, communications or in other areas where a thorough knowledge of Canada is necessary. The program is interdisciplinary, which allows students to benefit from exposure to faculty members and ideas and developments from different fields.

First-year students in Canadian Studies are encouraged to explore courses in a variety of areas. It is recommended that a first-year program include: Canadian Studies 201 and at least an additional 9 units from the Faculty of Arts. Competency in a second language is highly recommended. Degree programs in Canadian Studies include optional senior-level courses offered by various Departments. It is therefore useful to take first-year courses from a variety of related areas such as history and political science.

The Latin American Studies program offers students diverse learning environments and seeks to maximize opportunities for students to experience Latin America first-hand. The program stresses the development of a critical and informed view of Latin America, linguistic skills, independent research and writing abilities, and cultural sensitivity. This major program prepares students for work in the public and private sectors in Canada that deal with Latin American

countries and cultures. Graduates may find work opportunities in the diplomatic and the civil service, business, journalism, teaching and tourism.

Students considering graduate degrees should combine the Latin American Studies Major with a major or minor in a language relevant to their program.

Contact Information and Program Advice

Department Office: Social Sciences 656

Phone: 403.220.6401

Fax: 403.289.8566

Email: histdept@ucalgary.ca

Website: hist.ucalgary.ca

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements.

For more specific advice regarding course selection and requirements in the major field, students should consult the subject advisor located in their home Department (consult Department website for contact information).

Admission to the Major

Prospective students wishing to enter the BA Programs (Canadian Studies, History, or Latin American Studies) must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Admission to Honours

The Faculty of Arts procedures for Admission to BA Honours (History or Canadian Studies) established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

History: In addition to having successfully completed at least 30 units of post-secondary study, students must have completed at least 3 units in History to enter the Honours program. The Honours Advisor will advise anyone who might be interested in joining the program. In addition to completing the online application in the Student Centre by the application deadline, a supplemental application must be submitted by January 15. The supplemental application can be found on the Department of History website (hist.ucalgary.ca/). Students are encouraged to consult with the Honours Advisor well before the deadline to determine their eligibility.

Canadian Studies: Students majoring in Canadian Studies who have completed a minimum of 75 units are eligible to apply for Honours. In addition to completing the online application in the Student Centre by the application deadline, a supplemental application for Canadian Studies 598 must be submitted to the Program Co-ordinator by January 15. The application form must be signed by a thesis supervisor and include

a preliminary thesis proposal. To meet the deadline, it is recommended that students wishing to enrol in the Honours program obtain guidelines and an application form from the Program Co-ordinator no later than January 15. Students are strongly advised to secure a thesis supervisor by January 15.

Overlapping Programs

Programs in History cannot be taken in conjunction with programs in Ancient and Medieval History. This restriction applies to Major-plus-Minor combinations, Double Majors, Combined Degrees and Second Baccalaureate Degrees.

Courses Constituting the Field of History

- All courses labelled History except History 200.
- Greek and Roman Studies 315, 337, 339, 341, 345, 347, 425, 433*.

**A maximum of 6 units of Greek and Roman Studies courses may be used towards the major field. Greek and Roman Studies courses do not count towards the minor field.*

The following two categories are provided for use in selecting courses to meet program requirements:

Canadian History: History 211, 213, 337, 340, 341, 345, 347, 349, 351, 357, 431, 435, 436, 437, 438, 439*, 442, 443, 447, 450, 520, 521, 523, 526, 528, 529, 530, 551.

History Before 1850: History 203, 204, 211, 303, 305, 319, 321, 326, 327, 332*, 359, 365, 406, 422, 425, 426, 464, 473, 510, 514, 540, 565.

**May be counted with the approval of the Program Co-ordinator when the topic is appropriate.*

Courses Constituting the Field of Canadian Studies

- All courses labelled Canadian Studies (CNST)
- Anthropology 346, 355
- Archaeology 303, 321, 419
- Art 301
- Art History 367
- Business and Environment 401
- Communication and Media Studies 435
- Development Studies 403
- Drama 355, 455
- Economics 201, 203, 321, 323, 325, 339, 355, 431, 465, 473, 475, 477
- English 372, 471, 473, 509
- Film 351, 451
- French 209, 211, 213, 225, 227, 399.02, 439
- Geology 301
- Geography 326, 454
- History 211, 213, 337, 340, 341, 345, 347, 349, 351, 357, 431, 435, 436, 437, 438, 439, 442, 443, 447, 450, 520, 521, 523, 526, 528, 529, 530
- Indigenous Languages 301, 303
- Indigenous Studies 201, 303, 305, 312, 317, 343, 397, 415, 502
- Law and Society 201, 203, 335

- Museum and Heritage Studies 201, 331
- Political Science 321, 342, 425, 426, 427, 428, 431, 432, 435, 444, 451, 521, 523, 525, 531, 551
- Sociology 303, 307, 309, 327, 353, 355, 365, 375, 399, 405, 421.10, 423, 427, 467, 475.03
- Urban Studies 451
- Women's Studies 201

Methodology Courses

- Art 361
- Communication and Media Studies 313
- History 300
- Political Science 399
- Sociology 313.

Note: Other courses may be approved by the Program Co-ordinator when their content is appropriate.

Courses Constituting the Field of Latin American Studies

Courses with a Focus on Latin America

- All courses labelled Latin American Studies (LAST)
- Anthropology 321, 421
- Archaeology 341, 343, 345, 347, 353, 355, 357, 503*, 537
- History 365, 367, 467, 471, 472, 487, 565, 569
- Political Science 455*, 473, 481*, 565, 579*
- Spanish 421, 423, 441*, 471*, 473*, 499*, 553, 555, 571*, 599*

Context Courses

- Development Studies 375, 393, 405
- Economics 337
- Geography 456
- History 305
- Indigenous Studies 312*, 399*, 407*
- Political Science 279, 359

**Subject to approval by the Program Co-ordinator when focused on Latin American topics.*

4.28.1 BA in History

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units to a maximum of 60 units in Courses Constituting the Field of History while fulfilling the following requirements:

1. *Practice of History:* 3 units History 300.
2. *Canadian History:* 6 units in *Canadian History*. See Courses Constituting the Field of History.
3. *History before 1850:* 6 units in *History before 1850*. See Courses Constituting the Field of History.
4. *History Options:* An additional 27 units from Courses Constituting the Field of History.

Senior-Level Courses: Inclusive of the courses used to fulfill the above requirements, 36 units from Courses Constituting

the Field of History must be at the 300 level or above, of which:

- A minimum of 12 units at the 400 level
- A minimum of 6 units at the 500 level
- A minimum of 18 units at the 300 level or above

C. DEGREE OPTIONS

The BA in History can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.28.2 BA Honours in History

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 54 units and a maximum of 72 units in Courses Constituting the Field of History while fulfilling the following requirements:

1. *Practice of History:* 3 units History 300.
2. *Canadian History:* 6 units in *Canadian History*. See Courses Constituting the Field of History.
3. *History before 1850:* 6 units in *History before 1850*. See Courses Constituting the Field of History.
4. *Honours Seminar, Readings and Essay:* 12 units History 496, 597, 598.
5. *History Options:* An additional 27 units from Courses Constituting the Field of History.

Senior-Level Courses: Inclusive of the courses used to fulfill the above requirements, students must complete 48 units from Courses Constituting the Field of History at the 300 level or above, of which:

- 12 units must be at the 400 level
- 12 units must be at the 500 level
- 24 units must be at the 300 level or above

C. OTHER REQUIREMENTS

Language Requirement: 6 units in a single language other than English relevant to a student's studies. The choice of language must be approved by the Honours Co-ordinator.

D. DEGREE OPTIONS

The BA Honours in History can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.28.3 Minor in History

The Minor in History is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of History with at least 18 units at the 300 level or above. A minimum 3 units must be at the 400 or 500 level.

Note: Greek and Roman Studies courses cannot count toward a Minor in History.

4.28.4 BA in Canadian Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units in Courses Constituting the Field of Canadian Studies while fulfilling the following requirements:

1. *Core Courses:*
 - a. 6 units Canadian Studies 201, 591.
 - b. 9 units from Canadian Studies 333, 337, 355, 361, 401, 439, 451, 501.
2. *Canadian Studies Options:* 33 units from Courses Constituting the Field of Canadian Studies. No more than 12 units from a single subject, other than Canadian Studies, can be used to fulfill this requirement. No more than 6 units of language courses included in the Field of Canadian Studies may be used to fulfill this requirement. Languages other than French or Indigenous Languages may be accepted with approval of the Program Co-ordinator.
3. *Depth in Canadian Studies:* At least 12 units at the 400 level or above from Courses Constituting the Field of Canadian Studies inclusive of the courses used in requirement 1 and 2 above.

C. OTHER REQUIREMENTS

Research Methods Requirement: 3 units from Art 361, Communication and Media Studies 313, History 300, Political Science 399 or Sociology 313.

D. DEGREE OPTIONS

The BA in Canadian Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.28.5 BA Honours Canadian Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in the Courses Constituting the Field of Canadian Studies while fulfilling the following requirements:

1. *Core Courses:*
 - a. 6 units Canadian Studies 201, 591.
 - b. 9 units from Canadian Studies 333, 337, 355, 361, 401, 439, 451, 501.
 - c. *Language Requirement:* 6 units of French or Indigenous Languages or demonstration of proficiency to the equivalent level of 6 units, as approved by the School of Languages, Linguistics, Literatures and Cultures. Languages other than French or Indigenous Languages may be accepted with approval of the Program Co-ordinator.

2. *Canadian Studies Options:* 30 units from the Courses Constituting the Field of Canadian Studies. No more than 12 units from a single subject, other than Canadian Studies, can be used to fulfill this requirement. No more than 6 units of language courses included in the Field of Canadian Studies may be used to fulfill this requirement.
3. *Honours Readings and Essay:* 9 units Canadian Studies 597, 598.
4. *Depth in Canadian Studies:* Inclusive of the courses used in requirements 1 and 2 above (but not requirement 3), at least 12 units must be at the 400 level or above.

C. OTHER REQUIREMENTS

Research Methods Requirement: 3 units from Art 361, Communication and Media Studies 313, History 300, Political Science 399, or Sociology 313.

D. DEGREE OPTIONS

The BA Honours in Canadian Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.28.6 Minor in Canadian Studies

The Minor in Canadian Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units from Courses Constituting the Field of Canadian Studies with at least 18 units at the 300 level or above, including:

- 3 units Canadian Studies 201
- 9 units in courses labelled Canadian Studies.
- No more than 6 units of language courses included in the Field of Canadian Studies may be used toward the minor.*

*Languages other than French or Indigenous Languages may be accepted with approval of the Program Co-ordinator.

4.28.7 BA in Latin American Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units in Courses Constituting the Field of Latin American Studies while fulfilling the following requirements:

1. *Core Courses:* 9 units Latin American Studies 211, 311, 401.
2. *Seminar or Research Course:* 3 units from Archaeology 503*, 537; History 565, 569; Latin American Studies 501; Political Science 579*; Spanish 553, 555, 571*, 599*. (*Subject to approval by the Program Co-ordinator when focused on Latin American topics.)
3. *Latin American Studies Options:* 30 units from the field of Latin American Studies including at least 24 units chosen from the list of "Courses with a

Focus on Latin America" with at least 6 units from each of two disciplines listed.

C. OTHER REQUIREMENTS

1. *Language:* Successful completion of Spanish 303 or demonstration of proficiency to that level as assessed by the School of Languages, Linguistics, Literatures and Cultures. This requirement can be fulfilled by a similar level of proficiency in Portuguese; consult with the Program Co-ordinator of Latin American Studies regarding assessment.
2. *Research Methodology:* 3 units from Communication and Media Studies 313, History 300, Political Science 399, Psychology 300, Sociology 313.

D. Degree Options

The BA in Latin American Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Note: Students who fulfill the minimum language requirement prior to entering the university are strongly urged to take additional courses in Spanish to improve their language skills.

4.28.8 Minor in Latin American Studies

The Minor in Latin American Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete at least 30 units from Courses Constituting the Field of Latin American Studies including:

1. 9 units Latin American Studies 211, 311, 401.
2. 21 units from Courses Constituting the Field of Latin American Studies.

Note: In addition to the requirements for the minor, competence in Spanish and/or Portuguese is highly desirable.

4.29 History and Philosophy of Science

See Philosophy.

4.30 Indigenous Studies

See Political Science.

4.31 International Indigenous Studies

See Political Science.

4.32 International Relations

See Political Science.

4.33 Italian Studies

See Languages, Linguistics, Literatures and Cultures.

4.34 Japanese

See Languages, Linguistics, Literatures and Cultures.

4.35 Languages, Linguistics, Literatures and Cultures

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Degrees in East Asian Language Studies

Bachelor of Arts (BA) in East Asian Language Studies

BA in East Asian Language Studies with Co-operative Education

Degrees in East Asian Studies

Bachelor of Arts (BA) in East Asian Studies

BA in East Asian Studies with Co-operative Education

Degrees in French

Bachelor of Arts (BA) in French

BA in French with Co-operative Education

Concurrent BA in French/Bachelor of Education

BA Honours French

BA Honours French with Co-operative Education

Degrees in German

Bachelor of Arts (BA) in German

BA in German with Co-operative Education

BA Honours in German

BA Honours in German with Co-operative Education

Degrees in Italian Studies

Bachelor of Arts (BA) in Italian Studies

BA in Italian Studies with Co-operative Education

Degrees in Linguistics

Bachelor of Arts (BA) in Linguistics

BA in Linguistics with Co-operative Education

BA Honours in Linguistics

BA Honours in Linguistics with Co-operative Education

Degrees in Linguistics and Language

Bachelor of Arts (BA) in Linguistics and Language

BA in Linguistics and Language with Co-operative Education

Degrees in Russian

Bachelor of Arts (BA) in Russian

BA in Russian with Co-operative Education

BA Honours in Russian

BA Honours in Russian with Co-operative Education

Degrees in Spanish

Bachelor of Arts (BA) in Spanish

BA in Spanish with Co-operative Education

Concurrent BA in Spanish/Bachelor of Education

BA Honours Spanish

BA Honours Spanish with Co-operative Education

Notes:

- Minors are offered in Arabic Language and Muslim Culture, Chinese, East Asian

Studies, French, German, Italian, Japanese, Linguistics, Russian and Spanish.

- A Minor in Speech-Language Sciences is offered to students with a declared Major in either Linguistics or Psychology.
- Concentrations are offered in Applied Linguistics and Speech-Language Sciences to students with a declared Major in Linguistics.

Introduction

The School of Languages, Linguistics, Literatures and Cultures offers programs that focus on Arabic, Chinese, French, German, Italian, Japanese, Russian, Spanish and the literatures and cultures associated with these languages, as well as programs in general linguistics. It also offers an interdisciplinary program in East Asian Studies.

The language programs challenge students to think critically about the relationship between language and culture, theories of language competency, cross-cultural awareness, including literature and film studies, and the socio-linguistic histories involved.

The School recognizes the special role and place that French, as one of our country's two official languages, has played and continues to play in the socio-historical context of Canada. The French programs encompass French Canada, French-speaking Europe, francophone African literatures, critical theories, sociolinguistics and second language teaching.

Linguistics programs educate students in the scientific study of language. Linguistic analysis and theory (syntax, morphology, semantics, phonology, phonetics, historical linguistics) constitute the core, which is enriched by the focal areas of language acquisition and processing and the analysis of Indigenous languages of Canada. Students in Linguistics can pursue a concentration in Applied Linguistics or Speech-Language Sciences.

Placement in Language Courses

It is essential that students register in the appropriate level of language course to ensure that they are suited for the level of language instruction in the course and to ensure that all students enrolled in a course are at a similar level of language competence. See Placement in Language Courses on the School of Languages, Linguistics, Literatures and Cultures website.

Students who misrepresent their language competence will be subject to a charge of academic dishonesty under the regulations on academic misconduct outlined in K.5 in the Academic Regulations section of the University Calendar.

Native speakers are not eligible to take courses in their native language by special assessment or to receive advanced credit. They are eligible to take literature, linguistics, and culture courses.

Placement in Introductory Courses in German, Italian, Japanese, Russian, and Spanish

Students who register in introductory courses in German, Italian, Japanese, Russian, and Spanish are required to complete an online placement form to indicate whether they have taken a previous course in the language or lived in an environment where that language is spoken. A link to the online placement form will be sent to registered students before the first day of class.

Students who indicate on the online placement form that they have taken a previous course in the language or lived in an environment where that language is spoken may be required to meet with the program's undergraduate advisor and will be informed of the appropriate course in which to register. Students who do not complete the online placement form, or who are asked to consult with the advisor but fail to do so, will be removed from the course by the drop deadline.

Placement in Arabic and Chinese Courses

All students wishing to take a course in Arabic or Chinese for the first time must consult the School of Languages, Linguistics, Literatures and Cultures to be placed at the appropriate level.

Placement in French Courses

Les étudiants doivent choisir comme premier demi-cours celui qui correspond à leurs connaissances de la langue française. Les étudiants qui ont suivi French 30 ou French N30 s'inscriront d'habitude au cours French 213. Ceux qui ont suivi French 30N, 30S, 31, French Language Arts 30 ou leur équivalent s'inscriront d'habitude au cours French 225. Il est fortement recommandé, en cas de doute, de s'adresser à l'École de langues, linguistique, littéraires et cultures avant la période des inscriptions.

Les étudiants de langue maternelle française et ceux dont le niveau d'études dans ces langues est supérieur à celui du diplôme de fin d'études secondaires (y compris les étudiants provenant d'un programme bilingue ou d'immersion) doivent obligatoirement consulter l'École de langues, linguistique, littéraires et cultures pour se faire diriger vers le(s) cours conforme(s) à leur niveau.

Students should choose a first course in French appropriate to their command of the language. Students with French 30 or French N30 should enrol in French 213. Those with credit in French 30N, 30S, 31, French Language Arts 30, or equivalent should enrol in French 225. In all cases of doubt as to proper placement, students are strongly urged to seek the advice of the School of Languages, Linguistics, Literatures and Cultures before the registration period.

French-speaking students or students with some prior knowledge of the language (including graduates of a bilingual or immersion program) must consult the School of Languages, Linguistics, Literatures and Cul-

tures to be placed in a course corresponding to their level of language competence.

Additional Information for Students with High School German

Students who have completed German 30 normally begin with German 331.

Additional Information for Students with High School Spanish

Students who have completed Spanish 30 normally begin with Spanish 203.

Spanish-speaking students or students with previous knowledge of the language (including graduates of a bilingual or immersion program) must consult the School of Languages, Linguistics, Literatures and Cultures to be placed in a course corresponding to their level of language competence.

Study Abroad

The School of Languages, Linguistics, Literatures and Cultures encourages its students to take advantage of possibilities for studying off-campus, wherever one of its target languages is spoken. Detailed information on exchange programs and Study Abroad programs in Arabic, Chinese, French (in Quebec or elsewhere), German, Italian, Japanese, Russian, and Spanish is available from the School of Languages, Linguistics, Literatures and Cultures and/or University of Calgary International.

Students planning to study at another institution must obtain a letter of permission from their faculty. They are strongly advised to consult the School of Languages, Linguistics, Literatures and Cultures beforehand to discuss details concerning course selection and transfer of credit.

Le Centre français/The French Centre

Le Centre français est situé à Craigie Hall (C301). Le Centre propose un choix d'activités culturelles et gère "Le franco-fonne," lieu de rencontre et centre multi-média où l'on peut se détendre dans une ambiance francophone.

Le Centre gère aussi des cours accrédités donnés en français dans différentes disciplines (French Language Instruction Program ou FLIP) permettant à l'étudiant de renforcer sa maîtrise de la langue. Pour de plus amples renseignements, prière de s'adresser au Centre français, 403.220.7226, ucalgary.ca/frenchcentre/.

The French Centre is located in Craigie Hall (C301). The Centre offers a variety of cultural activities, and operates "Le franco-fonne," a drop-in and media learning centre for those wishing to relax in a francophone atmosphere.

Through the French Language Instruction Program (FLIP), credit courses are offered in various disciplines providing students with opportunities to use and improve their French. Detailed information may be obtained from the Centre at 403.220.7226 or ucalgary.ca/frenchcentre/.

Contact Information

Office Location: Craigie Hall D310

Phone: 403.220.5293 and 403.220.5300

Fax: 403.284.3634

Email: slllc@ucalgary.ca

Website: slllc.ucalgary.ca/

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: arts.ucalgary.ca/advising.

For more specific advice regarding course selection and requirements in the major field, students should consult the appropriate Undergraduate Advisor in the School of Languages, Linguistics, Literatures and Cultures (consult School of Languages, Linguistics, Literatures and Cultures website for contact information).

Admission to the Majors

Prospective students wishing to enter one of the BA programs offered by the School of Languages, Linguistics, Literatures and Cultures must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Admission to Honours in French, German, Linguistics, Russian and Spanish

The Faculty of Arts procedures for Admission to Honours established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework for entry into the Honours Programs in French, German, Linguistics, Russian and Spanish. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Overlapping Programs

Programs in East Asian Language Studies cannot be taken in conjunction with programs in East Asian Studies. This restriction applies to Major-plus-Minor combinations, Double Majors, Combined Degrees and Second Baccalaureate Degrees. Students cannot combine the East Asian Language Studies major with either a Chinese or Japanese minor.

Programs in Linguistics cannot be taken in conjunction with the program in Linguistics and Language. This restriction applies to Major-plus-Minor combinations, Double Majors, Combined Degrees and Second Baccalaureate Degrees.

A Linguistics major may not be combined with both the Minor and the Concentration in Speech-Language Sciences.

Language programs (i.e., majors or minors) offered by the School of Languages, Linguistics, Literatures and Cultures can only be taken in conjunction with the major program in Linguistics and Language if the language or languages in the former program differ from the chosen Language Option for the latter. This restriction applies to Major-plus-Minor combinations, Double Majors, Combined Degrees and Second Baccalaureate Degrees.

Courses Constituting the Field of Arabic Language and Muslim Cultures

- All courses labeled Arabic Languages and Muslim Cultures (ALMC)
- History 397.02, 406
- Political Science 369,469, 479, 569
- Religious Studies 353, 357

Courses Constituting the Field of East Asian Language Studies

Chinese Language: Chinese 205, 207, 229, 279, 301, 303, 311, 313, 331, 333, 341, 353, 371, 373, 401, 403, 431, 561.

Japanese Language: Japanese 205, 207, 301, 303, 311, 313, 331, 333, 441, 451, 471.

Chinese Studies: Art History 325; Chinese 309, 317*, 341, 353, 355, 357*, 363, 371, 373, 431, 461, 561.

Japanese Studies: Japanese 201, 309, 317, 323, 325, 327, 341, 461.

Capstone: East Asian Language Studies 501.

Subject to approval by the School of Languages, Linguistics, Literatures and Cultures, courses in Chinese Studies and Japanese Studies from other disciplines will be accepted towards the Field of Study.

**Only 6 units may be counted towards major field requirements.*

Courses Constituting the Field of East Asian Studies

Courses with a Focus on East Asia

- Anthropology 303*, 323, 427
- Art History 325, 365
- Chinese 309, 311, 313, 317**, 341, 353, 355, 357**, 363, 371, 373, 431, 461, 561
- East Asian Studies 201, 531
- History 209, 317, 404, 406, 547
- Japanese 201, 309, 311, 313, 317, 323, 325, 327, 341, 461
- Philosophy 335
- Political Science 465, 502*
- Religious Studies 203, 313, 323, 327, 329, 359, 453, 491*, 595*
- Strategy and Global Management 573

**With approval of the School of Languages, Linguistics, Literatures and Cultures.*

***Only 6 units may be counted towards major field requirements.*

Language Courses

- Chinese 205, 207, 229, 279, 301, 303, 311, 313, 331, 333, 341, 353, 371, 373, 401, 403, 431, 561
- Japanese 205, 207, 301, 303, 311, 313, 331, 333, 441, 451, 471

Courses Constituting the Field of French

- All courses labelled French (FREN).

French Literature Courses: French 449, 453, 455, 457, 463.

Students with advanced placement may use Romance Studies 499 to fulfil one of the exempted Major Field requirements.

Courses Constituting the Field of German

- All courses labelled German (GERM).

Berlin Energies Group Study Program courses can be included in the Field of German. Please consult the Undergraduate Advisor (German) for details.

German 200, 305, 317, 349, 357, 359, 451 are taught in English and no knowledge of German is required.

Courses Constituting the Field of Italian Studies

Courses with an Italian Focus

- All courses labelled Italian (ITAL)
- Romance Studies 299, 341, 399, 499

Contextual Courses

- Art History 327, 357
- Greek and Roman Studies 209, 315, 327, 345
- Religious Studies 383

Courses Constituting the Field of Linguistics

- All courses labelled Linguistics (LING).

Courses Constituting the Field of Linguistics and Language

- All courses labelled Linguistics (LING) and all courses in the chosen language.

Students in this program select a particular language option (e.g., French or German or Russian, etc.). Students are not permitted to mix their languages except in the Ancient and Classical Languages option.

Courses Constituting the Field of Russian

- All courses labelled Russian (RUSS)
- Slavic 356
- Anthropology 329.04
- History 333, 412, 545.09
- Language 451*

**With approval of the School of Languages, Linguistics, Literatures and Cultures.*

Courses Constituting the Field of Spanish

- All courses labelled Spanish (SPAN).
- *Spanish Literature Courses:* Spanish 421, 423, 437, 499.

Note: Students with advanced placement may use Romance Studies 499 to fulfil one of the exempted Major Field requirements.

4.35.1 Minor in Arabic Language and Muslim Cultures

Language Placement information see 4.35 Placement in Language Courses.

The Minor in Arabic Language and Muslim Cultures is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Arabic Language and Muslim Cultures, including:

- 6 units Arabic Language and Muslim Cultures 331 and 333.

4.35.2 BA in East Asian Language Studies

Language Placement information see 4.35 Placement in Language Courses.

Eligibility

Students who receive advanced placement at the 331 level or higher in both Chinese and Japanese are ineligible for this program.

Requirements

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students choose either Chinese or Japanese as the primary language of study and the other as their secondary language of study. Students who receive advanced placement in Chinese or Japanese at the 331 level or higher must choose the language in which they have not received advanced placement as their primary language of study.

Students must successfully complete a minimum of 45 units to a maximum of 60 units in Courses Constituting the Field of East Asian Language Studies while fulfilling the following requirements:

1. *Primary Language of Study:* 24 units from the list of either "Chinese Language" or "Japanese Language" courses. (See Courses Constituting the Field of East Asian Language Studies.) Students whose primary language is Japanese must take one of Japanese 441, 451 or 471.
2. *Secondary Language of Study:* 6 units from the list of either "Japanese Language" or "Chinese Language" courses in the language not chosen for Requirement 1 above.
3. *Primary Area of Studies:* 9 units from the list of either "Chinese Studies" or "Japanese Studies" courses, whichever corresponds to the primary language of study.
4. *Secondary Area of Studies:* 3 units from the list of either "Japanese Studies" or "Chinese Studies" courses, whichever corresponds to the secondary language of study.
5. *Capstone:* 3 units East Asian Language Studies 501.

C. DEGREE OPTIONS

The BA in East Asian Language Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.35.3 Minor in Chinese

Language Placement information see 4.35 Placement in Language Courses.

The Minor in Chinese is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must complete a minimum of 30 units to a maximum of 36 units in "Chinese Language" and "Chinese Studies" courses

(see Courses Constituting the Field of East Asian Language Studies).

Subject to School of Languages, Linguistics, Literatures and Cultures approval, a maximum of 6 units from Chinese Studies in a different discipline may be credited towards the major field.

4.35.4 Minor in Japanese

Language Placement information see 4.35 Placement in Language Courses.

The Minor in Japanese is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units in "Japanese Language" and "Japanese Studies" courses (see Courses Constituting the Field of East Asian Language Studies).

4.35.5 BA in East Asian Studies

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units in Courses Constituting the Field of East Asian Studies while fulfilling the following requirements:

1. *Core Courses:* East Asian Studies 201, 531, and one of Chinese 317, 355 or Japanese 317.
2. *Language:* 12 units from either: (a) Chinese 205, 207, 229, 279, 301, 303, 311, 313, 331, 333, 341, 353, 371, 373, 401, 403, 431, 561; or (b) Japanese 205, 207, 301, 303, 311, 313, 331, 333, 441, 451, 471.
3. *East Asian Studies Options:* an additional 21 units chosen from Courses Constituting the Field of East Asian Studies with at least 15 units chosen from the list of courses with a Focus on East Asia.

C. OTHER REQUIREMENTS

Methods and Frameworks:

1. 3 units from: Philosophy 201, Religious Studies 205;
2. 3 units from: Anthropology 203, Linguistics 201, Political Science 201, Sociology 201.

D. DEGREE OPTIONS

The BA in East Asian Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.35.6 Minor in East Asian Studies

Language Placement information see 4.35 Placement in Language Courses.

The Minor in East Asian Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units from Courses Constituting the Field of East Asian Studies with

at least 18 units at the 300 level or above, including:

1. 6 units East Asian Studies 201 and one of Chinese 317 or 355 or Japanese 317.
2. *Language*: 6 units from language courses in Courses Constituting the Field of East Asian Studies from either: (a) Chinese 205, 207, 229, 279, 301, 303, 311, 313, 331, 333, 341, 353, 371, 373, 401, 403, 431, 561; or (b) Japanese 205, 207, 301, 303, 311, 313, 331, 333, 441, 451, 471.
3. At least 18 units chosen from Courses Constituting the Field of East Asian Studies with at least 12 units from list of courses with a Focus on East Asia.

4.35.7 Baccalauréat en français/BA in French

Information sur le test de placement, voir 4.35 Placement in Language Courses.

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. EXIGENCES POUR LE BACCALAURÉAT EN FRANÇAIS/MAJOR-FIELD REQUIREMENTS

La Section française de l'École de langues, linguistique, littératures et cultures de l'Université de Calgary offre un programme d'étude complet de la langue et de la littérature françaises. Ce programme, de nature multidisciplinaire, est entièrement enseigné en français. Le programme de Baccalauréat (BA) est conçu pour développer les aptitudes linguistiques de l'étudiant jusqu'à un niveau très élevé. L'étudiant au BA apprendra la structure de la langue française, découvrira ses variations, et gagnera, ce faisant, un vaste fond de connaissances littéraires et culturelles dont le contenu traversera les siècles (du Moyen Âge à aujourd'hui), les cultures (la France, le Canada et toute la francophonie) et les médias (la littérature et le cinéma notamment). Le Baccalauréat spécialisé (BA Honours) permet à l'étudiant d'approfondir ses connaissances linguistiques et culturelles tout en le préparant adéquatement pour les études supérieures, que ce soit en littérature, en linguistique, en éducation ou en traduction. Enfin, le Baccalauréat conjoint en Français et en Éducation (BA/BEEd) prépare les étudiants à enseigner le français dans les réseaux d'enseignement primaires et secondaires tandis que les programmes de Baccalauréat conjoints en français/italien et en français/espagnol intéresseront particulièrement les étudiants qui souhaitent jumeler leurs compétences en français à des compétences dans une deuxième langue romane.

Exigences: La concentration en français comprend un minimum de 48 unités et un maximum de 60 unités, dont les suivants:

1. *Niveau 200*: 9 unités French 213, 225 et 227.
2. *Niveau 300*: 6 unités French 329, 369, plus 9 unités additionnelles.

3. *Niveau 400*: 15 unités.

4. *Niveau 500*: 9 unités.

Remarques:

- Les étudiants qui sont placés un niveau supérieur au cours French 225 dans la série des cours de langue doivent remplacer les cours dont ils sont dispensés par d'autres cours French (FREN) ou Romance Studies (ROST) de niveau 300 ou supérieur.
- Le Département recommande aux étudiants dont le français est la langue seconde de choisir French 489.01 (Phonologie).
- L'École de langues, linguistique, littératures et cultures recommande aux étudiants d'inclure parmi leurs options des cours FLIP (French Language Instruction Program) enseignés en français dans l'd'autres départements. Un cours FLIP (French Language Instruction Program) peut compter pour 3 unités.
- L'École de langues, linguistique, littératures et cultures recommande fortement aux étudiants de baccalauréat spécialisé d'effectuer un voyage d'études d'au moins un semestre dans un environnement francophone.

The French Section of the School of Languages, Linguistics, Literatures and Cultures offers a comprehensive, multidisciplinary instruction in French language, linguistics and literature, using the target language. The BA program is designed to help students learn and achieve proficiency in French, understand its structure and variations, and gain a broad knowledge of French and Francophone literatures, by studying texts from different centuries, different countries, as well as by studying French-language films. The BA Honours deepens the foundation in French studies and provides excellent preparation for graduate studies in literatures or linguistics, as well as in education and translation. The BA/BEEd, and the double-majors (French/Italian, French/Spanish), should be of particular value to students seeking to combine French with another degree.

Major-Field Requirements: Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of French while fulfilling the following requirements:

1. *200-Level Courses*: 9 units French 213, 225 and 227.
2. *300-Level Courses*: 6 units French 329, 369, and 9 additional units.
3. *400-Level Courses*: 15 units.
4. *500-Level Courses*: 9 units.

Notes:

- Students who place higher than the French 225 level in the language-course sequence must replace those language courses by other senior French (FREN) or Romance Studies (ROST) courses.
- The School of Languages, Linguistics, Literatures and Cultures recommends that non-francophone students choose

French 489.01 (Phonology) as the required course at the 400 level.

- The School of Languages, Linguistics, Literatures and Cultures recommends that students include among their options FLIP (French Language Instruction Program) courses taught in French in other departments. Three units FLIP (French Language Instruction Program) may be counted toward the French Major.

C. DEGREE OPTIONS

The BA in French can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.35.8 Baccalauréat spécialisé en français/BA Honours French

Information sur le test de placement, voir 4.35 Placement in Language Courses.

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. EXIGENCES POUR LE BACCALAURÉAT SPÉCIALISÉ EN FRANÇAIS/MAJOR-FIELD WITH HONOURS REQUIREMENTS

Exigences: La concentration en français comprend un minimum de 60 unités et un maximum de 72 unités, dont les suivants:

1. *Niveau 200*: 9 unités French 213, 225 et 227.
2. *Niveau 300*: 6 unités French 329, 369 plus 9 unités additionnelles.
3. *Niveau 400*: 18 unités.
4. *Niveau 500*: 3 unités French 511 ainsi que 9 unités.
5. *Le Mémoire de Baccalauréat spécialisé*: 6 unités French 598. (Le mémoire de baccalauréat spécialisé sera rédigé en français).

Remarques:

- Les étudiants qui sont placés un niveau supérieur au cours French 225 dans la série des cours de langue doivent remplacer les cours dont ils sont dispensés par d'autres cours, French (FREN) ou Romance Studies (ROST) de niveau 300 ou supérieur.
- Le Département recommande aux étudiants dont le français est la langue seconde de choisir French 489.01 (Phonologie).
- L'École de langues, linguistique, littératures et cultures recommande aux étudiants d'inclure parmi leurs options des cours FLIP (French Language Instruction Program) enseignés en français dans d'autres départements.
- Un cours FLIP (French Language Instruction Program) peut compter pour 3 unités.
- L'École de langues, linguistique, littératures et cultures recommande fortement aux étudiants de baccalauréat spécialisé d'effectuer un voyage d'études d'au moins un semestre dans un environnement francophone.

Major-Field with Honours Requirements:

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of French while fulfilling the following requirements:

1. *200-Level Courses*: 9 units French 213, 225 and 227.
2. *300-Level Courses*: 6 units French 329, 369 and 9 additional units.
3. *400-Level Courses*: 18 units.
4. *500-Level Courses*: 3 units French 511 and 9 additional units.
5. *Honours Thesis*: 6 units French 598.

Notes:

- Students who place higher than the 225 level in the language-course sequence must replace those language courses by other senior French (FREN) or Romance Studies (ROST) courses.
- The School of Languages, Linguistics, Literatures and Cultures recommends that non-francophone students choose French 489.01 (Phonology) as the required course at the 400 level.
- The School of Languages, Linguistics, Literatures and Cultures recommends that students include among their options FLIP (French Language Instruction Program) courses taught in French in other departments. Three units FLIP (French Language Instruction Program) may be counted toward the French Honours Program.
- The School of Languages, Linguistics, Literatures and Cultures strongly recommends that students in the Honours Program study for at least one semester in a Francophone environment.

C. DEGREE OPTIONS

The BA Honours French can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.35.9 Concurrent BA (French)/BEd Introduction

This five-year program leads to a Bachelor of Education from the Werklund School of Education and a Bachelor of Arts in French from the Faculty of Arts. A minimum of 150 units must be successfully completed.

Admission

Students must meet the admissions requirements for both the Faculty of Arts and the Werklund School of Education (see A.5 Undergraduate Admission Requirements).

A. FACULTY OF ARTS REQUIREMENTS FOR CONCURRENT DEGREES

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation. Students must complete a minimum of 42 units from Courses Constituting the Field of French and are exempt from 3 units at the 400 level and 3 units at the 500 level of the major-field requirements of the BA in French. Students in this program must meet the

requirements for the BEd degree set by the Werklund School of Education.

4.35.10 Minor in French

Language Placement information see 4.35 Placement in Language Courses.

The Minor in French is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must complete a minimum of 30 units to a maximum of 36 units in French, including at least 18 units at the 300 level or above.

Note: 6 units from the French Language Instruction Program (FLIP) may be counted toward the minor.

Information sur le test de placement, voir 4.35 Placement in Language Courses.

Les exigences de la mineure en français sont précisées dans la section 3.4.3 des règlements de la faculté des Arts. Les étudiants doivent suivre un minimum de 30 unités et un maximum de 36 unités en français. Ce programme doit inclure au moins 18 unités au niveau 300 ou supérieur.

Les cours FLIP (French Language Instruction Program) peuvent compter pour 6 unités.

4.35.11 BA in German

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units from Courses Constituting the Field of German while fulfilling the following requirements:

1. *Core Courses*:
 - 3 units German 349 or 353
 - 6 units German 501 and 503.
2. *German Options*: An additional 39 units from Courses Constituting the Field of German with a maximum of 6 units from German 357, 359.

C. DEGREE OPTIONS

The BA in German can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Note: A maximum of 6 units from German Studies in a different discipline, subject to approval by the School of Languages, Linguistics, Literatures and Cultures, may be credited towards the major-field requirements.

4.35.12 BA Honours German

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 54 units to a maximum of 72 units

in Courses Constituting the Field of German while fulfilling the following requirements:

1. *Core Courses*:
 - 3 units German 349 or 353;
 - 6 units German 501, 503.
2. *Honours Thesis*: 3 units German 591.
3. *German Options*: An additional 42 units from Courses Constituting the Field of German with a maximum of 6 units from German 357, 359.

C. DEGREE OPTIONS

The BA Honours German can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- Students interested in applying for Honours should discuss their plans with and seek the advice of the Undergraduate Director. Upon admission each student will be assigned an undergraduate program advisor who will assist with program planning and course selection, and the designation of the thesis supervisor.
- It is strongly recommended that students develop a supporting area of focus consisting of at least 12 units in a closely related Field (such as History 413).
- Students will find it to their advantage to have background in one or more of the following Fields: English, Greek and Roman Studies, History, Linguistics, Philosophy and Romance Languages.
- A maximum of 6 units from German studies in a different discipline, subject to approval by the School of Languages, Linguistics, Literatures and Cultures, may be credited towards the major field requirements.

4.35.13 Minor in German

Language Placement information see 4.35 Placement in Language Courses.

The Minor in German is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units in courses labelled German, including at least 18 units at the senior level, including:

- 3 units German 349 or 353.

Notes:

- A maximum of 6 units of German 357 and/or 359 may be credited towards the minor.
- A maximum of 6 units from German studies in a different discipline, subject to approval by the School of Languages, Linguistics, Literatures and Cultures, may be credited towards the minor.

4.35.14 BA in Italian Studies

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units to a maximum of 60 units in Courses Constituting the Field of Italian Studies while fulfilling the following requirements:

1. *200-Level Courses*: 6 units Italian 201 and 203.
2. *300-Level Courses*: 6 units Italian 301 and 303, plus 6 additional units.
3. *400-Level Courses*: 6 units.
4. *500-Level Courses*: 6 units.
5. *Italian Studies Options*: 12 units from Courses Constituting the Field of Italian Studies, of which: (a) a maximum of 6 units of Romance Studies, and (b) a maximum of 6 units from the Contextual Courses in the field of Italian Studies.

C. DEGREE OPTIONS

The BA in Italian Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.35.15 Minor in Italian Studies

Language Placement information see 4.35 Placement in Language Courses.

The Minor in Italian is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.4 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Italian Studies while fulfilling the following requirements:

1. A maximum of 6 units can be labelled Romance Studies,
2. A maximum of 6 units can be from the *Contextual Courses* in Courses Constituting the Field of Italian Studies, and
3. At least 18 units must be at the senior level.

4.35.16 BA in Linguistics**A. FACULTY OF ARTS REQUIREMENTS**

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units to a maximum of 60 units from Courses Constituting the Field of Linguistics while fulfilling the following requirements:

1. *Core*: 27 units Linguistics 201, 301, 303, 319, 341, 353, 401, 403, 407.
2. *Experiential Course*: 3 units from: Linguistics 316, 416, 441, 453, 467, 505, 571.
3. *Linguistics Options*: 12 units from Courses Constituting the Field of Linguistics including at least 6 units at the 300 level or above.

C. OTHER REQUIREMENTS

1. *Language*: At least 6 units from courses in languages other than English including the following courses on programming languages: Computer Science 217, 219, 231, 233.

2. *Methods*: At least 3 units from the following list of formal-methods courses: Linguistics 560, Philosophy 279, 377, Psychology 300, Sociology 311, Statistics 205.

D. DEGREE OPTIONS

The BA in Linguistics can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

The BA in Linguistics can be taken with a concentration in Applied Linguistics or Speech-Language Sciences (see 4.35.18 or 4.35.19).

Notes:

- In special circumstances, the Undergraduate Advisor may approve the following substitute methods courses: Anthropology 411, Political Science 399 or Sociology 313.
- All students, especially those interested in the Honours program, are strongly encouraged to meet specific degree requirements as early in their program as possible.
- Students are strongly advised to take the 301/401 sequence in a single academic year, and the 303/403 sequence in a single academic year.

4.35.17 BA Honours Linguistics**A. FACULTY OF ARTS REQUIREMENTS**

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 51 units to a maximum of 72 units from Courses Constituting the Field of Linguistics while fulfilling the following requirements:

1. *Core*: 27 units Linguistics 201, 301, 303, 319, 341, 353, 401, 403, 407.
2. *Capstone*: 6 units Linguistics 598.
3. *Experiential Course*: 3 units from: Linguistics 316, 416, 441, 453, 467, 505, 571.
4. *Linguistics Options*: At least 15 units from Courses Constituting the Field of Linguistics including at least 9 units at the 300 level or above.
5. *Advanced Linguistics*: Of the courses used to fulfill requirements 3-4 above:
 - a. at least 9 units must be at the 400 level or above, and
 - b. at least 3 units must be at the 500 level or above.

C. OTHER REQUIREMENTS

1. *Language*: At least 6 units from courses in languages other than English including the following courses on programming languages: Computer Science 217, 219, 231, 233.
2. *Methods*: At least 3 units from the following list of formal-methods courses: Linguistics 560, Philosophy 279, 377, Psychology 300, Sociology 311, Statistics 205.

3. *Supporting Courses*: 9 units, with 3 units from each of the following three disciplines: Anthropology, Philosophy and Psychology.

D. DEGREE OPTIONS

The BA Honours in Linguistics can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

The BA in Linguistics can be taken with a concentration in Applied Linguistics or Speech-Language Sciences (see 4.35.18 or 4.35.19).

Notes:

- In special circumstances, the Undergraduate Advisor may approve the following substitute methods courses: Anthropology 411, Political Science 399 or Sociology 313.
- Students are strongly advised to take the Linguistics 301/401 sequence in a single academic year, and the Linguistics 303/403 sequence in a single academic year.
- Honours Thesis Guidelines are available from the School of Languages, Linguistics, Literatures and Cultures website: https://sllc.ucalgary.ca/LING_Hon_Thesis.

4.35.18 Concentration in Applied Linguistics

Any student who has declared a Linguistics Major is also eligible to declare a Concentration in Applied Linguistics. Applied Linguistics is a wide-ranging field involving career paths in a variety of areas including Second Language Teaching, and Indigenous Studies.

Requirements

At least 18 units from the following lists:

- *Applicable General Course*: Linguistics 373
- *Courses with a Language Teaching and Learning Focus*: Linguistics 221, 225, 309, 316, 381, 416, 516
- *Courses with an Indigenous Studies Focus*: Indigenous Languages 301, 303, Linguistics 505, 531, Sociology 307

Note: Those most interested in the "Language Teaching and Learning Focus" should include appropriate language and culture courses among their electives.

4.35.19 Concentration in Speech-Language Sciences

Any student who has declared a Linguistics Major is also eligible to declare a Concentration in Speech-Language Sciences. This Concentration provides an opportunity for students intending to pursue a career path in Speech-Language Pathology.

A graduate program in Speech-Language Pathology is not offered at the University of Calgary. Graduate programs are offered at the University of Alberta, University of British Columbia, Dalhousie University, McGill University, Université de Montréal, University of Ottawa, University of Toronto, and University of Western Ontario. Students considering

graduate study in Speech-Language Pathology are advised to investigate the entrance requirements of these programs, as these may differ across universities. A document with general information on Canadian programs in Speech-Language Pathology and Audiology may be obtained from the Linguistics, Languages, and Culture website: https://slllc.ucalgary.ca/Linguistics/S_LP.

1. *Speech-Language Science Courses:*

At least 15 units from the following list, of which at least 6 units must be in Linguistics: Linguistics 316, 337, 416, 441, 516, 467/ Psychology 467, Psychology 200, 201, 351, 353, 471.

2. *Quantitative Methods Course:* At least 3 units from the following: Linguistics 560, Psychology 300, Sociology 311, 315, Statistics 213, 217.

Notes:

- First-year courses in Biology, Calculus and Physics are also highly recommended.
- Students are advised to check the prerequisites for Psychology 400-level courses. There are enrolment limits in these courses and enrolment priority is given to Psychology Majors.

4.35.20 Minor in Linguistics

The Minor in Linguistics is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Linguistics with at least 18 units at the 300 level or above including

- 9 units Linguistics 201, 301 and 303.

4.35.21 Minor in Speech-Language Sciences for Linguistics Majors

Linguistics Majors become eligible to declare this Minor once they have completed Linguistics 201.

The Minor in Speech-Language Sciences for Linguistics Majors is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields. Students must successfully complete a minimum of 30 units to a maximum of 36 units while fulfilling the following requirements:

1. 21 units Psychology 200, 201, 300, 301, 351, 375, 467.
2. 3 units from Psychology 365 or 369.
3. 6 units from Psychology 451, 471, 479.

4.35.22 BA in Linguistics and Language

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

1. *Linguistics Requirements:* Students must successfully complete a minimum of 24 units to a maximum of 30 units in Linguistics while fulfilling the following requirements:

- a. 15 units Linguistics 201, 301, 303, 341, 353.

- b. 3 units from: Linguistics 319, 407 and 455.
- c. An additional 6 units in Linguistics.
- d. At least 6 units, inclusive of the courses used to fulfill requirements (a)-(c) above, must be at the 400 level or above.

2. *Language Requirements:* Students must successfully complete a minimum of 24 units to a maximum of 30 units in accordance with the requirements for one of the following language options:

French Option: A program of study including French 329 or 415 and at least an additional 6 units at the 400 and/or 500 level, of which 3 units must be in literature from Courses Constituting the Field of French. French 489.01 is strongly recommended when available.

Spanish Option: A program of study including Spanish 405 and at least an additional 6 units at the 400 and/or 500 level, of which 3 units must be in literature from Courses Constituting the Field of Spanish. Spanish 475 is strongly recommended when available.

Italian Option: A program of study including at least 6 units at the 400 and/or 500 level.

German Option: A program of study including German 413 and 415 and at least an additional 3 units at the 400 or 500 level.

Russian Option: A program of study including Russian 333 and at least 6 units at the 400 and/or 500 level.

Japanese Option: A program of study including Japanese 333 and at least 6 units at the 400 and/or 500 level.

Chinese Option: A program of study including Chinese 333 and at least 6 units at the 400 and/or 500 level.

Ancient and Classical Languages Option:

From the courses listed below in a maximum of two languages, students must successfully complete a minimum of 24 units to a maximum of 30 units, including a minimum of 3 units at the 400 or 500 level:

- Greek Language: Greek 201, 203, 301, 303, 401, 403, 551
- Latin Language: Latin 201, 203, 205, 207, 301, 303, 401, 403, 551
- Hebrew Language: Religious Studies 300, 302, 491*
- Sanskrit Language: Religious Studies 310, 312, 491*
- Tibetan Language: Religious Studies 314, 316, 491*
- Classical Chinese: Religious Studies 320, 322, 491*

**Applicable only when the content of the course is appropriate.*

C. DEGREE OPTIONS

The BA in Linguistics and Language can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- It is recommended that students who are interested in language teaching take Linguistics 316 and 416.
- Students are also encouraged to consider a study abroad program to gain international experience and improve language exposure.
- For each language option, it is strongly recommended that students choose their program of study and course sequence in consultation with the appropriate language Advisor.
- Students choosing the French option and beginning in French 213 should be aware that 30 units will normally be required to complete the French option requirements.
- Romance Studies 399 may be used to satisfy part of this requirement in lieu of a language course in the French, Spanish or Italian options.

4.35.23 BA in Russian

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units to a maximum of 60 units from Courses Constituting the Field of Russian while fulfilling the following requirements:

1. *Upper-Level Courses:* 9 units from Courses Constituting the Field of Russian at the 400 level or above.
2. *Russian Options:* An additional 33 units from Courses Constituting the Field of Russian.

C. DEGREE OPTIONS

The BA in Russian can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.35.24 BA Honours Russian

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 54 units to a maximum of 72 units from Courses Constituting the Field of Russian while fulfilling the following requirements:

1. *Upper-Level Courses:* 9 units from Courses Constituting the Field of Russian at the 400 level or above.
2. *Russian Options:* An additional 42 units from Courses Constituting the Field of Russian.
3. *Honours Thesis:* 3 units Russian 591.

C. DEGREE OPTIONS

The BA Honours in Russian can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- Students interested in applying for Honours should discuss their plans with and seek the advice of the Undergraduate Advisor. Upon admission to Honours in Russian each student will be assigned an undergraduate program advisor who will assist with program planning and course selection.
- An area of focus consisting of at least 12 units in the area of Social Analysis or Linguistics is strongly recommended (see the School of Languages, Linguistics, Literatures and Cultures website for details). A background in one or more related fields such as History, Philosophy, Linguistics, and English is considered an advantage for Honours students.

4.35.25 Minor in Russian

Language Placement information see 4.35 Placement in Language Courses.

The Minor in Russian is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Russian including at least 18 units at the senior level.

4.35.26 BA in Spanish

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

The BA program is designed to help students learn and achieve proficiency in Spanish. Instruction will consist of courses in language, linguistics, literature and film, using the target language. Students will acquire a broad knowledge of the Spanish language, Hispanic films, as well as of the literatures of Spain and Latin-America. The BA Honours strengthens the foundation in Spanish and is an excellent preparation for graduate studies. The BA/BEEd and double-majors (Spanish/Italian, Spanish/French), should be of particular interest to students seeking to combine Spanish with another major.

Students must successfully complete a minimum of 42 units to a maximum of 60 units from Courses Constituting the Field of Spanish while fulfilling the following requirements:

1. *Core Language Sequence*: 21 units
 - 12 units Spanish 201, 203*, 301*, 303;
 - 3 units from Spanish 321 or 323;
 - 6 units Spanish 405, 505.

*Spanish 205 can be substituted for Spanish 203 and 301.

2. *Upper-Level Courses*:

- 12 units from courses labelled Spanish at the 400 level
- 9 units from Courses Constituting the Field of Spanish at the 500 level.

C. DEGREE OPTIONS

The BA in Spanish can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Note: It is strongly recommended that students choose an area of focus consisting of at least 12 units from disciplines related to their interests in the Hispanic world (from areas such as Political Science, History, Latin American Studies or Women's Studies).

4.35.27 BA Honours Spanish

Language Placement information see 4.35 Placement in Language Courses.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 54 units to a maximum of 72 units from Courses Constituting the Field of Spanish while fulfilling the following requirements:

1. *Core Language Sequence*: 21 units
 - 12 units Spanish 201, 203*, 301*, 303
 - 3 units from Spanish 321 or 323
 - 6 units Spanish 405, 505.

*Spanish 205 can be substituted for Spanish 203 and 301.

2. *Upper-Level Courses*:

- 15 units from Courses Constituting the Field of Spanish at the 400 level.
 - 12 units from Courses Constituting the Field of Spanish at the 500 level.
3. *Capstone*: 6 units Spanish 598.

C. DEGREE OPTIONS

The BA Honours Spanish can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- It is strongly recommended that students choose at least 12 units in an area of focus from disciplines related to their interests in the Hispanic world (from areas such as Political Science, History, Latin American Studies or Women's Studies).
- Students in the Honours Program are strongly encouraged to study for at least one semester in a Hispanophone environment.
- Students are encouraged to complete Spanish 475 as part of the 54 units required for the Honours Program.

4.35.28 Concurrent BA (Spanish)/BEEd Introduction

This five-year program leads to a Bachelor of Education from the Werklund School of Education and a Bachelor of Arts in Spanish from the Faculty of Arts. A minimum of 150 units must be successfully completed.

Admission

Students must meet the admissions requirements for both the Faculty of Arts and the Werklund School of Education (see A.5 Undergraduate Admission Requirements).

A. FACULTY OF ARTS REQUIREMENTS FOR CONCURRENT DEGREES

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation. Students must complete a minimum of 42 units from Courses Constituting the Field of Spanish.

Students in this program must meet the requirements for the BEEd degree set by the Werklund School of Education.

4.35.29 Minor in Spanish

Language Placement information see 4.35 Placement in Language Courses.

The Minor in Spanish is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units in Spanish including at least 18 units at the senior level.

Note: Students who place higher than Spanish 201 level must replace those language courses from which they have been exempted by any Spanish non-language courses or any senior Romance Studies (ROST) courses.

4.35.30 Double Majors within the School of Languages, Linguistics, Literatures and Cultures

Language Placement information see 4.35 Placement in Language Courses.

Students are encouraged to consider double majors in: French and Italian, French and Spanish, or Italian and Spanish.

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units to a maximum of 60 units in both of the selected Major Fields and meet the appropriate requirements:

- Where French is one of the two majors, students follow the requirements in section 4.35.7, except that for requirement 3 only 12 units (rather than 15 units) are required at the 400 level and for requirement 4 only 6 units (rather than 9 units) is required at the 500 level.
- Where Italian is one of two majors, students follow the requirements in section 4.35.14.
- Where Spanish is one of the two majors, students follow the requirements in section 4.35.26.

Notes:

- Students are strongly advised to study for at least one semester each in a Francophone, Italophone or a Hispanophone environment as applicable to their double major.
- It is understood in the Double Major programs that the 42 units is a minimum

requirement. Students are encouraged to take additional courses in their areas of specialization.

C. DEGREE OPTIONS

The BA with Double Majors in French and Italian, French and Spanish or Italian and Spanish can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.36 Latin

See Classics and Religion.

4.37 Latin American Studies

See History.

4.38 Law and Society

See Sociology.

4.39 Linguistics

See Languages, Linguistics, Literatures and Cultures.

4.40 Linguistics and Language

See Languages, Linguistics, Literatures and Cultures.

4.41 Medieval, Renaissance and Reformation Studies

See English.

4.42 Multidisciplinary Studies

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Bachelor of Arts (BA) in Multidisciplinary Studies

Bachelor of Science (BSc) in Communication and Culture (suspended)

Concurrent BA in Multidisciplinary Studies/
Bachelor of Education

Notes:

- Admission to the Bachelor of Science in Communication and Culture program has been suspended.
- Students in the Concurrent program should consult with an advisor in the Arts Students' Centre to ensure completion of Education program requirements in a timely manner.

Introduction

The Faculty of Arts' multidisciplinary degree programs provides an opportunity for students to design their own programs to include a primary and a secondary focus. The primary area of focus consists in the completion of a minor program in Arts. The secondary focus can be selected from the offerings available in any faculty.

Contact Information and Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their program requirements.

Admission

Prospective students wishing to enter a Multidisciplinary Program must meet the

criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar. Annual application deadlines are found in A.3 Deadline Dates for Undergraduate Applications for Admission and Transcripts.

Program Combinations

The BA in Multidisciplinary Studies is not available with Honours.

The BA can be combined with another Bachelor's degree provided that the courses used towards the primary and secondary areas of focus are not used towards the major field requirements of the other degree program.

The BA can be completed as a subsequent (second) Bachelor's degree provided that the primary and secondary areas of focus are different from the credentials (major and minor) obtained in the previous degree.

Multidisciplinary Degrees With Distinction

The notation "With Distinction" will be inscribed on the permanent record and graduation parchment of any student achieving a grade point average of 3.60 over the final 90 units of a 120 unit BA (multidisciplinary) degree, or the final 60 units of a 90 unit BCC (multidisciplinary) degree. A student who has taken part of their work at another university or who has transferred into the Faculty may be granted a degree "With Distinction" at the discretion of the Faculty.

4.42.1 BA in Multidisciplinary Studies

A. Faculty of Arts Requirements

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. Multidisciplinary Studies Requirements

Student must successfully complete a minimum of 51 units while fulfilling the following requirements:

1. *Primary Focus*: 30 units completion of a minor program in the Faculty of Arts. Note: No more than 36 units may be taken from the field of study of the minor program.
2. *Secondary Focus*: Either completion of a second minor program from any faculty or completion of a minimum of 18 units to a maximum of 36 units in a single set of courses with the same label from any faculty. Note: Courses used to fulfil this requirement cannot be used to fulfil requirement 1, i.e. courses cannot be double counted toward both the primary and secondary areas of focus.
3. *Advanced Study*: 12 units at the 400 level or above, inclusive of requirements 1 and 2 above.
4. *Capstone Course*: 3 units Arts 503.

4.42.2 BSc in Communication and Culture

Note: Applications to this program are currently suspended while the program is under review. Students currently in the BSc in Communication and Culture should continue to follow the program as described below.

The Bachelor of Science in Communication and Culture is a four-year multidisciplinary degree focusing on courses in the Domain of Science, which includes all courses offered by the Faculty of Science and many additional science-based courses from disciplines within the Faculty of Arts. For more information, see the list of courses in the "Domain of Science".

Students interested in a multidisciplinary program with a focus on science should also consider the BSc (Natural Sciences) Program offered by the Faculty of Science.

Note: The BSc in Communication and Culture is not available with Honours and it may not be used in a Combined Degree Program or subsequently completed as a Second Baccalaureate Degree with any of the following programs:

- Bachelor of Communication and Culture degree or equivalent
- BA or BSc (Major) program
- BA or BSc in Communication and Culture
- Bachelor of Communication and Media Studies
- Bachelor of Film Studies

A. Faculty of Arts Requirements

1. *Overall Program*: Successful completion of an approved program consisting of 120 units.
2. *Program Focus*: Successful completion of the multidisciplinary requirements listed below.
3. *Academic Achievement*:
 - a. A minimum GPA of 2.00 must be achieved over all courses.
 - b. A maximum of 18 units "D" or "D+" grades overall.
4. *University of Calgary Study*: A maximum of 60 units in eligible post-secondary transfer credits from other institutions may be counted toward the degree.
5. *Depth*: A maximum of 48 units at the junior or 200 level.
6. *Breadth*: A minimum of 6 units from the Faculty of Science.
7. *Physical Activity Courses*: A maximum of 6 units may be taken from: Dance Education Activity/Theory, Outdoor Pursuits Activity/Theory and Physical Education Activity/Theory.

B. Multidisciplinary Requirements

1. *Minor Field*: Successful completion of an approved Minor Field.

Note: It may be difficult to complete Minors that require limited enrolment courses. Not more than 36 units may be from any one Department or from any group of courses that would comprise a Major Field.
2. *Interdisciplinary Course*: General Studies 300.
3. *Literature*: 3 units in English literature or other literature, including Comparative Literature.

4. *Writing*: 3 units chosen from Communication and Media Studies 363, 369 or Science 311.
5. *Intercultural Requirement* to be fulfilled in one of the following two ways:
 - a. Successful completion of at least 6 units from an approved post-secondary Term Abroad, Group Travel Study or Individual Travel Study program. See the Centre for International Students and Study Abroad for programs that are currently offered.
OR
 - b. Successful completion of 12 units from the Domain of Intercultural Courses.
6. *Science Requirement*: At least 63 units must be from the courses in the "Domain of Science".

4.43 Museum and Heritage Studies

See Art.

4.44 Music

See Creative and Performing Arts.

4.45 Philosophy

Overview of Programs and Procedures in Philosophy

Baccalaureate Degrees Offered

Degrees in Philosophy

Bachelor of Arts (BA) in Philosophy

BA in Philosophy with Co-operative Education

BA Honours in Philosophy

BA Honours in Philosophy with Co-operative Education

Degrees in Women's Studies

Bachelor of Arts (BA) in Women's Studies

BA in Women's Studies with Co-operative Education

BA Honours in Women's Studies

BA Honours in Women's Studies with Co-operative Education

Related Interdisciplinary Degrees (See separate listings)

BA in Religious Studies and Applied Ethics*

*Applications to this program are currently suspended. No new admissions will be permitted.

Notes:

- Minors are offered in Philosophy and Women's Studies.
- A related interdisciplinary Minor is offered in the History and Philosophy of Science.
- A concentration is available in Philosophy and Religion.

Introduction

In philosophy we ask fundamental questions about ourselves and the world, as well as practical questions about how to live a good life and how to construct a just society. As an academic discipline, philosophy is subdivided into areas such as ethics and political philosophy, aesthetics, epistemol-

ogy (the theory of knowledge), metaphysics (the theory of reality or being), logic and the philosophy of logic, philosophy of language, philosophy of mind, philosophy of science, philosophy of religion, and the history of philosophy. Philosophy graduates pursue careers in business, law, the arts, and politics.

The Women's Studies Major program is designed to provide students with knowledge of the rapidly developing disciplinary and interdisciplinary literature in the field, while providing them with an understanding of the reasons for the development of a feminist scholarship. From its activist and academic perspective, the program will help prepare students for careers in government, social work, and business, while also providing them with a mode of analysis applicable to related fields, and to their own lives.

Contact Information

Department Office: Social Sciences 1256

Phone: 403.220.5531/5533

Fax: 403.289.5698

Email: phildept@ucalgary.ca

Website: phil.ucalgary.ca

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: arts.ucalgary.ca/advising.

For more specific advice regarding course selection and requirements in the major field, students should consult the Undergraduate Program Director located in the Department of Philosophy (consult Department website for contact information).

Admission to the Major

Prospective students wishing to enter the BA (Philosophy or Women's Studies) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar. Annual application deadlines are found in A.3 Deadline Dates for Undergraduate Applications for Admission and Transcripts.

Admission to Honours

The Faculty of Arts procedures for Admission to Honours established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework.

Philosophy: Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Women's Studies: Students majoring in Women's Studies are eligible to apply only if they will complete the program during the following academic year. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Overlapping Programs

The Minor in History and Philosophy of Science cannot be taken in conjunction with programs in Philosophy.

Courses Constituting the Field of Philosophy

- All courses labelled Philosophy (PHIL)
- Religious Studies 363, 444, 445, and 463.

Illustrative Philosophy Course Groupings

This listing is provided to assist students in their selection of related groups of Philosophy courses. Detailed descriptions of all courses and sections of courses may be obtained from the Department Office.

Introductory:

201, 249†, 259, 264†, 279†

History of Philosophy:

301, 303, 305, 307, 309, 311, 401, 403, 405, 407†, 408†, 411, 501, 505, 507

Moral Philosophy:

249†, 313†, 314, 329†, 330, 345, 347, 397, 449, 451, 547, 549

Legal Philosophy, and Social and Political Philosophy:

313†, 325, 329†, 425, 453, 525, 553

Metaphysics and Philosophy of Mind:

383, 395, 407†, 408†, 423, 483, 523, 583

Logic:

279†, 377, 379, 479, 579

Philosophy of Logic, Philosophy of Language:

307†, 407†, 408†, 471, 571

Epistemology and Philosophy of Science:

264†, 361, 367, 461, 467, 517, 561, 565, 567

Other Courses:

315, 317, 331, 333, 335, 337, 359, 409, 412, 435, 499, 527, 589, 595, 597, 599

†Courses which appear in more than one category.

Courses Constituting the Field of Women's Studies

- All courses labelled Women's Studies (WMST)
- Anthropology 331, 349, 427
- Archaeology 503
- Canadian Studies 361
- Communication and Media Studies 479
- Development Studies 375
- English 387 (when topic is relevant)
- Film 307
- German 317.04
- Greek and Roman Studies 315
- History 308, 438, 442, 511, 551
- Indigenous Studies 395
- Law and Society 335
- Linguistics 309
- Philosophy 337
- Political Science 417, 453, 551, 554
- Religious Studies 381, 479
- Sociology 303, 371, 403
- Urban Studies 311

Courses Constituting the Field of History and Philosophy of Science

- Art History 411.01

- History 372, 395, 427, 476, 493.38, 493.39, 541.02, 541.05, 597, 598
- Philosophy 279, 301, 303, 305, 307, 309, 361, 367, 377, 379, 405, 407, 467, 479, 501, 505, 507, 517, 565, 567, 571, 590, 595
- Anthropology 341, 361, 391, 441
- Computer Science 409
- Economics 483
- English 393
- Geology 201
- Greek and Roman Studies 321
- Health and Society 401
- Medical Science 205, 307
- Neuroscience 421
- Psychology 305
- Religious Studies 397

4.45.1 BA in Philosophy

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of Philosophy while fulfilling the following requirements:

1. *Logic*: 3 units from Philosophy 279 or 377.
2. *Core Courses*: 6 units Philosophy 395, 397.
3. *Upper-Level Courses*: An additional 24 units from Courses Constituting the Field of Philosophy at the 400 level or above.
4. *Philosophy Options*: An additional 15 units from Courses Constituting the Field of Philosophy.

C. OTHER REQUIREMENTS

Language Requirement: 6 units in a single language other than English.

D. DEGREE OPTIONS

The BA in Philosophy can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.45.2 BA Honours Philosophy

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Philosophy while fulfilling the following requirements:

1. *Logic*: 3 units Philosophy 279 or 377; and 3 units Philosophy 379.
2. *Core Courses*: 6 units Philosophy 395, 397.
3. *Honours Seminar*: 3 units Philosophy 597.

4. *Honours Thesis*: 6 units Philosophy 590.
5. *Upper-Level Courses*: An additional 24 units from Courses Constituting the Field of Philosophy at the 400 level or above.
6. *Philosophy Options*: An additional 15 units from Courses Constituting the Field of Philosophy.

C. OTHER REQUIREMENTS

Language Requirement: 6 units in a single language other than English.

D. DEGREE OPTIONS

The BA Honours in Philosophy can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.45.3 Minor in Philosophy

The Minor in Philosophy is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Philosophy with at least 18 units at the 300 level or above.

4.45.4 Concentration in Philosophy and Religion

Students completing a BA or BA Honours in Philosophy or Religious Studies can elect to complete a concentration in Philosophy and Religion. This option might be appropriate for students with an interest in the interdisciplinary study of philosophy and religion. The Concentration in Philosophy and Religion cannot be taken in conjunction with a combined or joint or double BA or BA Honours program in Philosophy and Religious Studies or a Major/Minor combination. Students must complete the following:

18 units selected from the following:

- Philosophy 201, 331, 335, 527
- Religious Studies 345, 363, 444, 463
- Other senior-level Philosophy or Religious Studies courses may be accepted when the topic is appropriate. Approval from the Department of Classics and Religion will be required.

4.45.5 BA in Women's Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units in Women's Studies while fulfilling the following requirements:

1. *Core Courses*: 12 units Women's Studies 201, 311, 315 and 405.
2. *Women's Studies Options*: an additional 36 units chosen from Courses Constituting the Field of Women's Studies. Students may apply to the Program Co-ordinator to have a pertinent course not on the list counted toward their degree.

C. DEGREE OPTIONS

The BA in Women's Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- Students entering the program in their third or fourth year of study may apply to the Program Co-ordinator to have an additional Women's Studies Option counted in lieu of Women's Studies 201.
- Students may apply to the Program Co-ordinator to have Communication and Culture 507 (Collaborative Learning and Peer Mentoring) counted as a Women's Studies option if they are mentoring in a Women's Studies course.

4.45.6 BA Honours Women's Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 54 units in Courses Constituting the Field of Women's Studies while fulfilling the following requirements:

1. *Core Courses*: 12 units Women's Studies 201, 311, 315, 405.
2. *Women's Studies Options*: An additional 36 units chosen from Courses Constituting the Field of Women's Studies. Students may apply to the Program Co-ordinator to have a pertinent course not on the list counted toward their degree.
3. *Undergraduate Thesis*: 6 units Women's Studies 590.

C. DEGREE OPTIONS

The BA Honours in Women's Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- Students entering the program in their third or fourth year of study may apply to the Program Co-ordinator to have an additional Women's Studies Option counted in lieu of Women's Studies 201.
- Students may apply to the Program Co-ordinator to have Communication and Culture 507 (Collaborative Learning and Peer Mentoring) counted as a Women's Studies option if they are mentoring in a Women's Studies course.

4.45.7 Minor in Women's Studies

The Minor in Women's Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Women's Studies with at least 18 units at the 300 level or above, while fulfilling the following requirements:

1. *Core Courses*: 9 units chosen from Women's Studies 201, 311, 315, 405.

2. *Breadth in Women's Studies*: 21 units chosen from Courses Constituting the Field of Women's Studies.

4.45.8 Minor in the History and Philosophy of Science

The Minor in History and Philosophy of Science is aimed in the first instance at students in the BSc Programs in the Faculty of Science, the Schulich School of Engineering, the Cumming School of Medicine, and the Faculty of Arts. This Minor complements disciplinary studies in the sciences with the study of the historical and philosophical background and foundation of the sciences.

The Minor in the History and Philosophy of Science is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of the History and Philosophy of Science, while fulfilling the following requirements:

1. *History of Science*: 6 units from History 372, 476, 493.38, 493.39, 541, Neuroscience 421.
2. *Philosophy of Science*: 6 units from Philosophy 367, 467, 517, 565, 567.
3. An additional 18 units, with at least 3 units at the 400 level or above.

4.46 Political Science

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Bachelor of Arts (BA) in Political Science
BA in Political Science with Co-operative Education

BA Honours in Political Science

BA Honours in Political Science with Co-operative Education

Concurrent BA in Political Science and Bachelor of Education

BA in International Relations

BA in International Relations with Co-operative Education

Concurrent BA in International Relations and Bachelor of Education

BA in International Indigenous Studies

BA in International Indigenous Studies with Co-operative Education

Concurrent BA in International Indigenous Studies and Bachelor of Education

Note: Minors are offered in Political Science, Security Studies, and International Indigenous Studies.

Introduction

The Department of Political Science offers courses in the principal fields of the discipline: Canadian government, political theory, comparative politics, and international relations. The BA (Political Science) program is designed to expose students to each of these fields, as well as to encourage an appreciation of the broader themes and issues that cut across them (see Courses

Constituting the Field of Political Science for list of categories).

The Department of Political Science offers an Interdisciplinary Major in International Relations. The BA (International Relations) is designed to expose students to the diversity of approaches to the study of international relations while also providing an opportunity for individualized programs that reflect student interests. The program is structured around a common core set of courses, a regional cluster focused on a specific area of the world, and a thematic specialization focused on major approaches to the study of international relations.

The BA (International Relations) requires careful selection of courses to meet its requirements. Students should consult with the Program Co-ordinator concerning their course selection. There is neither a Minor nor an Honours program available in International Relations.

The Department offers an interdisciplinary major in International Indigenous Studies. Students must carefully select their courses to meet the requirements of this degree and should consult with the Program Co-ordinator of the International Indigenous Studies program regarding course selection. A minor program is available in International Indigenous Studies but not an Honours program.

Contact Information

Department Office: Social Sciences 756

Phone: 403.220.5950

Fax: 403.282.4773

Email: poli@ucalgary.ca

Website: poli.ucalgary.ca/

International Relations Program Co-ordinator: intrprog@ucalgary.ca

Indigenous Studies Co-ordinator: indgprog@ucalgary.ca

Website: <http://idp.ucalgary.ca/indg>

Security Studies: ssminor@ucalgary.ca.

Website: <http://idp.ucalgary.ca/ssminor>

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: arts.ucalgary.ca/advising.

Advice and information about Political Science courses and programs may be obtained from the Political Science Advisor, the Undergraduate Director, International Relations Program Co-ordinator or International Indigenous Studies Co-ordinator.

Admission to the Major

Prospective students wishing to enter the BA (Political Science) Program, the BA (International Relations) Program or the BA (International Indigenous Studies) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar. Annual application deadlines are found in A.3 Deadline Dates for Undergraduate Applications for Admission and Transcripts.

Limitation of Enrolment

Due to high demand, admission to the BA (International Relations) may be limited. Whenever demand exceeds capacity, enrolment will be limited and students will be admitted on a competitive basis. Admission averages may be set above the minimum level for the Faculty of Arts. These higher admission standards are applicable to high-school applicants, external transfer applicants from other post-secondary institutions and internal transfer applicants from other programs at the University of Calgary, whether inside or outside the Faculty of Arts.

Overlapping Programs

The Minor in Security Studies cannot be taken in conjunction with minors in History or Political Science.

Admission to Honours

The Faculty of Arts procedures for Admission to BA Political Science (Honours) established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework. Students wishing to be considered for admission into BA Political Science (Honours) program must have completed at least 30 units. The GPA for admission and continuation is typically higher than the 3.30 minimum set by the Faculty. Please see Department website for current admission and continuation GPA for Honours. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Courses Constituting the Field of Political Science

- All courses labelled Political Science (POLI).

The following categories are provided for use in selecting courses to meet program requirements:

Canadian Politics: Political Science 321, 345, 422, 425, 426, 427, 428, 431, 432, 440, 444, 521, 524, 525, 531, 551.

Comparative Politics: Political Science 279, 342, 359, 369, 371, 379, 417, 429, 430, 433, 447, 453, 455, 463, 464, 465, 469, 470, 471, 473, 477, 554, 561, 565, 569, 579.

International Relations: Political Science 283, 381, 435, 439, 479, 481, 483, 485, 487, 491, 523, 543, 575, 581, 585, 587, 586.

Political Theory: Political Science 213, 310, 406, 407, 409, 411, 413, 503, 505, 506, 515, 519.

Other: Political Science 201, 357, 397, 398, 399, 415, 451, 590, 591, 597.

Note: Political Science 302, 402 and 502 will be designated as Canadian Politics, Comparative Politics, International Relations, Political Theory and Other depending on the topic covered.

Courses Constituting the Field of International Relations

A. Core Courses: Anthropology 203, Economics 201, 203, Geography 254, History 307, Political Science 381, International Relations 301 and 501.

B. Thematic Clusters

The thematic clusters reflect major approaches to and foci within International Relations:

1. *International Political Economy*

This cluster focuses on the economic relations of states and other actors in the world economy, and the ramifications of these relations, including their political aspects.

Strongly Recommended Courses: Economics 321, 423, Political Science 485.

Additional Courses: Anthropology 303, 357, 379, 385, 393; Development Studies 375, 393, 403, 405, 485, 591; Economics 327, 337, 371, 377, 425, 427, 527, 537; Geography 454, 456, 553, 558; History 354, 395, 494; Philosophy 329; Political Science 379, 463, 579, 586; Sociology 487, 493.

2. *Security and Strategy*

This cluster focuses on the traditional core concerns of International Relations, including the use and threat of force, and the interaction of states.

Strongly Recommended Course: History 491.01.

Additional Courses: Anthropology 343, 467; History 303, 333, 349, 381, 383, 402, 483, 485, 486, 488, 489, 490, 491.02, 530, 544, 545; Political Science 435, 439, 470, 479, 491, 519, 575, 585.

3. *International Institutions and Governance*

This cluster focuses on efforts by states to manage their co-existence through legal, institutional and other devices, both formally and informally.

Strongly Recommended Courses: Political Science 483 and 487.

Additional Courses: Anthropology 371; Geography 354, 530; History 491.01, 491.02; Indigenous Studies 407; Law and Society 415, Linguistics 309; Political Science 447, 451, 453, 463, 481, 485, 506, 523, 561, 581, 587; Religious Studies 349; Sociology 487.

C. Regional Clusters

The regional clusters group courses to give students a deeper understanding of contemporary historical, cultural, political, economic and geographical force at work within a principal area of the world:

1. *North America*: Anthropology 355; Economics 325, 339; Canadian Studies 333; Geography 326; History 337, 351, 361, 463, 467, 530, 535; Political Science 321, 359, 435, 477, 491, 521, 523.

2. *Latin America*: Anthropology 321, 421; Archaeology 345, 355, 357; Economics 337; History 367, 467, 471, 472, 487, 569; Latin American Studies 311, 401, 501; Political Science 359, 473; Spanish 321.

3. *Europe*: Central and East European Studies 313; Economics 337; French 391; Geography 330; German 317; History 333, 338, 412, 413, 427; Political Science 359, 463, 464, 561; Russian 317; Romance Studies 399; Spanish 321.

4. *Asia/Pacific*: Anthropology 323, 427; Arabic Language and Muslim Culture 317, 319, 358; Chinese 317, 461; East Asian Studies

531; Economics 337; Geography 328; History 317, 397.03, 404; Japanese 317, 461; Political Science 359, 465; Religious Studies 303, 307, 317, 329, 357, 359; South Asian Studies 203, 303, 499, 531.

5. *Middle East and North Africa*: Anthropology 319; Arabic Language and Muslim Culture 317, 319, 358; Economics 327, 337, 427, 527; History 397.02; Political Science 359, 369, 469, 479, 569; Religious Studies 353, 357.

6. *Africa*: African Studies 301, 400, 501; Anthropology 317; Arabic Language and Muslim Culture 317, 319, 358; Archaeology 395, 399; Economics 337; History 397.01, 402, 573; Political Science 359, 371, 471; Religious Studies 339, 353.

Note: Development Studies 401 and 501 may be used towards either the International Institutions and Governance or International Political Economy clusters depending on the topic and subject to approval by the Program Co-ordinator.

Courses Constituting the Field of International Indigenous Studies

A. *Core Courses*: Anthropology 346; English 376; History 345, 443; Indigenous Studies 201, 303, 305, 407, 415; Indigenous Languages 301; Political Science 345; Sociology 307.

B. *Canadian Focus*: Anthropology 346, 355, 410, 541*; Archaeology 419, 423; Art 365.03; Art History 367; Development Studies 403; English 376; History 345, 443, 493.19, 529; Indigenous Languages 301, 303; Indigenous Studies 312, 317, 343, 397, 400, 492, 502; Linguistics 505, 531; Law and Society 335; Political Science 321, 345, 422, 523, 524; Sociology 307, 401*, 421*.

C. *International Focus*: African Studies 301, 400, 501; Anthropology 317, 319, 321, 355, 357, 399*, 421; Archaeology 341, 343, 345, 351, 353, 355, 357; Development Studies 393, 401*, 403, 485; English 493, 515*; History 439, 447, 461, 467, 472; Indigenous Studies 399, 503; Latin American Studies 311, 401.13; Linguistics 531; Political Science 279, 371, 381, 470, 471, 473, 565, 579; Religious Studies 339, 373*; Spanish 473*, 499*.

*With approval of the Program Director.

Note: Special topics courses not listed may be approved and categorized by the Program Director.

Courses Constituting the Field of Security Studies

- Anthropology 343, 467;
- Computer Science 329, 418;
- Development Studies 201;
- Geography 426, 432, 456, 530;
- History 202, 333, 383, 471, 489, 490, 530, 544, 545, 547;
- Philosophy 314;
- Political Science 381, 439, 455, 470, 481, 487, 491, 523, 575, 585;
- Religious Studies 349, 367;

- Sociology 325, 375, 421, 425

4.46.1 BA in Political Science

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 45 units to a maximum of 60 units in Courses Constituting the Field of Political Science while fulfilling the following requirements:

1. *Introduction*: 6 units in Political Science at the 200 level.
2. *Canadian Politics*: 3 units Political Science 321.
3. *Research Methods*: 3 units Political Science 397.
4. *Breadth in Political Science*: 33 units from Courses Constituting the Field of Political Science, which must include any three of the following:
 - a. 6 units Political Science 310.
 - b. 3 units Political Science 359 and an additional 3 units in "Comparative Politics" at the 300 level or above.
 - c. 3 units Political Science 381 and an additional 3 units in "International Relations" at the 300 level or above.
 - d. 3 units Political Science 398 or 399.
5. *Advanced-Level Political Science*: Inclusive of the courses used to fulfill requirement 4, at least 12 units must be at the 400 level or above, including at least 3 units at the 500 level.

C. DEGREE OPTIONS

The BA in Political Science can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.46.2 BA Honours Political Science

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 57 units to a maximum of 72 units in Courses Constituting the Field of Political Science while fulfilling the following requirements:

1. *Introduction*: 6 units in Political Science at the 200 level.
2. *Canadian Politics*: 3 units Political Science 321.
3. *Research Methods*: 6 units Political Science 397 and 399.
4. *Breadth in Political Science*: 36 units from Courses Constituting the Field of Political Science, including:
 - a. 6 units Political Science 310.
 - b. 3 units Political Science 359 and an additional 3 units in "Comparative Politics" at the 300 level or above.
 - c. 3 units Political Science 381 and an additional 3 units in "International Relations" at the 300 level or above.

5. *Advanced-Level Political Science*: Inclusive of the courses used to fulfill requirement (a)-(c) above, at least 9 units must be at the 400 level or above, including at least 6 units at the 500 level.
6. *Honours Seminar and Thesis*: 6 units Political Science 590 and 591. A grade of "B+" or higher in both Political Science 590 and 591 is required for graduation with the BA Honours degree.

C. OTHER REQUIREMENTS

Language: 6 units in a Language other than English.

D. DEGREE OPTIONS

The Honours BA in Political Science can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.46.3 Minor in Political Science

The Minor in Political Science is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Political Science with at least 18 units at the 300 level or above.

4.46.4 BA in International Relations

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 60 units in Courses Constituting the Field of International Relations while fulfilling the following requirements:

1. *Core Courses*: 24 units Anthropology 203, Economics 201, 203, Geography 254, History 307, Political Science 381, International Relations 301 and 501.
2. *Thematic Cluster*: 12 units, of which at least 6 units must be at the 400 level or above, from a single one of the three thematic clusters: International Political Economy, Security and Strategy, or International Institutions and Governance. (See Courses Constituting the Field of International Relations for more information.)
3. *Regional Cluster*: 12 units, of which at least 6 units must be at the 400 level or above, from a single one of the six regional clusters: North America; Latin America; Europe; Asia/Pacific; Middle East and North Africa; and Africa.

C. OTHER REQUIREMENTS

1. *Language Requirement*: 12 units in a single language other than English.
2. *Statistics Requirement*: 3 units Political Science 399, Statistics 205, 213, or equivalent.

D. DEGREE OPTIONS

The BA in International Relations can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Notes:

- It is recommended that students select a language related to their chosen regional cluster.
- Students may take International Relations 597 (Independent Study) or existing Departmental independent study courses from their declared clusters, but only 3 units may be counted towards the Major. Any proposed syllabus for such independent study, whether International Relations 597 or existing departmental independent study courses, must be approved by the Program Director.

4.46.5 BA in International Indigenous Studies

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 48 units in Courses Constituting the Field of International Indigenous Studies while fulfilling the following requirements:

1. *Core Courses*: 24 units including:
 - a. 15 units Indigenous Studies 201, 303, 305, 407, 415;
 - b. 6 additional units from the Core Courses in Courses Constituting the Field of International Indigenous Studies, excluding the courses in (a) above;
 - c. 3 units Language Requirement: Indigenous Languages 301.
2. *Supporting Courses*: An additional 24 units from Courses Constituting the Field of International Indigenous Studies, of which:
 - a. 6 units from Canadian Focus;
 - b. 9 units from International Focus;
 - c. At least 6 units of the courses used to fulfill requirement #2 must be at the 400 level or above.

C. DEGREE OPTIONS

The BA in International Indigenous Studies can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.46.6 Minor in International Indigenous Studies

The Minor in International Indigenous Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units from Courses Constituting the Field of International Indigenous Studies with at least 18 units at the 300 level or above including:

1. *Core Courses*: 6 units Indigenous Studies 201, 407.
2. *Supporting Courses*: An additional 24 units from Courses Constituting

the Field of International Indigenous Studies.

4.46.7 Minor in Security Studies

The Minor in Security Studies is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units from Courses Constituting the Field of Security Studies while fulfilling the following requirements:

1. 9 units from the following: Political Science 381, 439, 455, 470, 481, 487, 491, 523, 575, 585.
2. 9 units from the following: History 202, 333, 383, 471, 489, 490, 530, 544, 545, 547.
3. 9 units from the following: Sociology 325, 375, 421, 425; Anthropology 343, 467; Development Studies 201; Computer Science 329, 418; Geography 426, 432, 456, 530; Philosophy 314; Religious Studies 349, 367.
4. 3 additional units from Courses Constituting the Field of Security Studies.

4.47 Psychology

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Bachelor of Arts (BA) in Psychology

Bachelor of Science (BSc) in Psychology

BA Honours in Psychology

BSc Honours in Psychology

Combined Bachelor of Community Rehabilitation (BCR)/BA or BSc in Psychology

Related Interdisciplinary Degrees (See separate listings):

BSc Honours in Neuroscience (Faculty of Science)

Note:

- A Minor is offered in Psychology
- A Minor in Speech-Language Sciences is available to students majoring Psychology

Introduction

Psychology is both a science and a profession. As scientists, psychologists work in a variety of settings like universities, hospitals, government, and corporations and carry out both basic and applied research. As a profession, psychology includes a number of different types of practitioners who apply psychological knowledge to solve personal, social, and practical problems. These include clinical psychologists who specialize in the identification and treatment of psychological disorders but also provide psychological assessments, health-related services, and psychological interventions. Practitioners also include industrial/organizational psychologists who work in recruitment, selection, training, and other business practice areas. Career options depend on students' goals and interests and the level and type of training acquired. With a BA or BSc, students may find employment in a variety of settings and a range of occupa-

tions such as human resources manager, addictions counsellor, researcher, consultant, case worker, etc. A degree in psychology can also be the first step in the pursuit of a variety of careers in fields that require an undergraduate degree such as law, medicine, management, social work, speech pathology, and audiology. Students wishing to work as a clinical or counselling psychologist will require additional university training in Psychology beyond the BA or BSc degree. Students wishing to take a Psychology degree that emphasizes the social sciences and humanities should register for the BA degree; those who wish to emphasize the biological and natural sciences should register for the BSc degree. Students who are interested in pursuing graduate study in Psychology should consider the Psychology BA or BSc Honours Program.

Contact Information

Department Office: Administration 275

Phone: 403.220.5561

Fax: 403.282.8249

Undergraduate Program Email: psycugrd@ucalgary.ca

Graduate Program Email: psycgrad@ucalgary.ca

Website: psychology.ucalgary.ca

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements. Advising contact information can be found online: arts.ucalgary.ca/advising.

For more specific advice regarding course selection and requirements in the major field, students should consult the Undergraduate Programs Advisor located in the Department of Psychology (consult Department website for contact information).

Admission to the Major

Prospective students must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar.

Limitation of Enrolment

Due to high demand, admissions to the BA and BSc Degree programs in Psychology are limited. Students will be admitted on a competitive basis. Admission averages are typically set above the minimum level for the Faculty of Arts. These higher admission standards are applicable to high-school applicants, external transfer applicants from other post-secondary institutions and internal transfer applicants from other programs at the University of Calgary, whether inside or outside the Faculty of Arts.

For the BSc and BSc Honours programs in Psychology, students are required to complete seven first-year science courses (see Other Requirements for the BSc in Psychology and the BSc Honours). To enter these courses students must have previously completed Mathematics 30-1 or equivalent; and Biology 30 and Chemistry 30 or equivalents. Mathematics 31 and Physics 30 are recommended.

Admission to Honours

The Faculty of Arts procedures for Admission to Honours established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework. Psychology Majors are eligible to apply for Honours upon completion of at least 72 units, with at least 3 units from Psychology 400, 415, 425, 427, 430, 435, 478, 504, or 505.

Due to high demand, the qualifying grade point average for eligibility for admission to Honours Psychology is typically set higher than the minimum 3.30 level for the Faculty of Arts. When this is the case, the qualifying average for the following year is announced on the Department website by October 1. For the purpose of admission to Honours, a student's grade point average is calculated over the most recent course work to a maximum of 60 units inclusive of courses from other institutions as well as the University of Calgary.

Psychology Majors must apply through their Student Centre for a change of program to Honours no later than January 23 of the year prior to their final year. Admission is contingent on the availability of an eligible thesis supervisor, as well as the availability of the resources (laboratory space, equipment, etc.) needed to complete the thesis. Students are encouraged to consult with the Psychology Advisor well before the January 23 deadline to determine their eligibility.

Courses and Registration

Registration in 400- and 500-level Psychology courses is restricted to Psychology Majors.

Collaborative Programs in Psychology at Red Deer College

This program allows students to transfer up to two years of Red Deer College work and to qualify for the BA or BSc in Psychology by completing the required University of Calgary courses at Red Deer College. For further information, see arts.ucalgary.ca/rdc or contact the Department of Psychology.

Students admitted to the Psychology Major in the University of Calgary program at Red Deer College may not register in Psychology courses offered on the Calgary campus without the permission of the Associate Dean, Undergraduate Programs and Student Affairs.

Overlapping Programs

Programs in Psychology cannot be taken in conjunction with programs in Neuroscience. This restriction applies to Major-plus-Minor combinations, Double Majors, Combined Degrees and Second Baccalaureate Degrees.

Courses Constituting the Field of Psychology

All courses labelled Psychology (PSYC).

Note: While Psychology 203 may be taken for overall degree credit, it does not count

toward the minimum requirements for the Major or Honours in Psychology.

4.47.1 BA in Psychology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 45 units to a maximum of 60 units in Courses Constituting the Field of Psychology while fulfilling the following requirements:

1. Introduction: 6 units Psychology 200, 201.
2. Research Methods and Statistics: 6 units Psychology 300, 301.
3. Foundation Courses:
 - 6 units Psychology 345, 375
 - 9 units from Psychology 321, 349*, 351*, 353*, 365, 369, 373, 383, 385.

**A maximum of 3 units from Psychology 349, 351, 353 may be used to fulfill this requirement.*

4. Applying Research Methods: 3 units from Psychology 400, 415, 425, 427, 430, 435, 478.
5. Upper-Level Courses: An additional 15 units at the 400 or 500 level from Courses Constituting the Field of Psychology.

4.47.2 BSc in Psychology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 45 units to a maximum of 60 units in Courses Constituting the Field of Psychology while fulfilling the following requirements:

1. Introduction: 6 units Psychology 200, 201.
2. Research Methods and Statistics: 6 units Psychology 300, 301.
3. Foundation Courses:
 - 6 units Psychology 345, 375;
 - 9 units from Psychology 321, 349*, 351*, 353*, 365, 369, 373, 383, 385.

**A maximum of 3 units from Psychology 349, 351, 353 may be used to fulfill this requirement.*

4. Applying Research Methods: 3 units from Psychology 400, 415, 425, 427, 430, 435, 478.
5. Upper-Level Courses: An additional 15 units at the 400 or 500 level from Courses Constituting the Field of Psychology.

C. OTHER REQUIREMENTS

Science Courses: 21 units including:

- Biology 241 and 243;
- Chemistry 201 or 211 and 203 or 213;
- Mathematics 249 or 265 and one of 211, 213, 253, 267;

- Physics 211 or 221 or 227.

4.47.3 BA Honours Psychology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Psychology while fulfilling the following requirements:

1. *Introduction*: 6 units Psychology 200, 201.
2. *Research Methods and Statistics*: 6 units Psychology 300, 301.
3. *Foundation Courses*:
 - 6 units Psychology 345, 375;
 - 9 units from Psychology 321, 349*, 351*, 353*, 365, 369, 373, 383, 385.

*A maximum of 3 units from Psychology 349, 351, 353 may be used to fulfill this requirement.

4. *History of Psychology*: 3 units Psychology 305 or 405.
5. *Applying Research Methods*: 3 units from Psychology 400, 415*, 425, 427, 430, 435, 478.
6. *Advanced Research Methods*: 3 units from Psychology 407, 411, 415*.

*Psychology 415 cannot be used to satisfy both requirement 5 and 6.

7. *Honours Courses*: 9 units Psychology 501 and 598, which must be completed during the final year of program.
8. *Psychology Options*: An additional 15 units from Courses Constituting the Field of Psychology.
9. Inclusive of the courses above, at least 30 units must be at the 400 level or above.

4.47.4 BSc Honours Psychology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 60 units to a maximum of 72 units in Courses Constituting the Field of Psychology while fulfilling the following requirements:

1. *Introduction*: 6 units Psychology 200, 201.
2. *Research Methods and Statistics*: 6 units Psychology 300, 301.
3. *Foundation Courses*:
 - 6 units Psychology 345, 375
 - 9 units from Psychology 321, 349*, 351*, 353*, 365, 369, 373, 383, 385.

*A maximum of 3 units from Psychology 349, 351, 353 may be used to fulfill this requirement.

4. *History of Psychology*: 3 units from Psychology 305 or 405.

5. *Applying Research Methods*: 3 units from Psychology 400, 415*, 425, 427, 430, 435, 478.

6. *Advanced Research Methods*: 3 units from Psychology 407, 411, 415*.

*Psychology 415 cannot be used to satisfy both requirement 5 and 6.

7. *Honours Courses*: 9 units Psychology 501 and 598, which must be completed during the final year of program.

8. *Psychology Options*: An additional 15 units from Courses Constituting the Field of Psychology.

9. Inclusive of the courses above, at least 30 units must be at the 400 level or above.

C. OTHER REQUIREMENTS

Science Courses: 21 units including:

- Biology 241 and 243;
- Chemistry 201 or 211 and 203 or 213;
- Mathematics 249 or 265 and one of 211, 213, 253, 267;
- Physics 211 or 221 or 227.

4.47.5 Combined BCR (Medicine)/BA or BSc (Psychology)

This five-year program leads to a Bachelor of Community Rehabilitation from the Cumming School of Medicine and either a Bachelor of Arts or Science in Psychology from the Faculty of Arts. A minimum of 150 units must be successfully completed.

Students pursuing this program may enter the combined degree in first year in either the Faculty of Arts or the Cumming School of Medicine. To qualify for the combined degree program, students must satisfy the admission requirements for both Faculties, for the Department of Psychology and for Community Rehabilitation.

The program requires careful selection of courses to complete all requirements of the two Faculties. Interested students should consult with the Arts Students' Centre Program Advisors and the Psychology Advisor for the Faculty of Arts as well as the Student Advisor in the Community Rehabilitation program. If courses have been chosen carefully, it is normally possible for students to opt out of their combined degree program until the end of their third year and still complete a single degree program in four years. If courses have been unevenly distributed, however, it may require more than four years to complete a single degree.

Program details are listed in the Cumming School of Medicine section of this Calendar under 3. Community Rehabilitation and Disability Studies.

4.47.6 Minor in Psychology

The Minor in Psychology is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Psychology including Psychology 200, 201, 300 and 301. Spaces in Psychology courses are limited and cannot be guaranteed for

Minors. Registration in 400- and 500-level Psychology courses is normally restricted to Psychology Majors.

4.47.7 Minor in Speech-Language Sciences for Psychology Majors

Psychology Majors become eligible to declare this Minor once they have completed Psychology 200 and 201.

1. Required courses: 24 units Linguistics 201, 301, 303, 316, 337, 341, 441, 467.
2. 6 units from Linguistics 416, 516, Psychology 349.

4.48 Religious Studies

See Classics and Religion.

4.49 Religious Studies and Applied Ethics

Applications to this program are currently suspended. No new admissions will be permitted.

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Bachelor of Arts (BA) in Religious Studies and Applied Ethics

BA in Religious Studies and Applied Ethics with Co-operative Education

Introduction

The Major in Religious Studies and Applied Ethics is offered jointly by the Department of Philosophy and the Department of Classics and Religion. Students wishing to enrol in this program should consult the Philosophy Advisor or the Program Director. A Minor Field of Specialization is not offered in Religious Studies and Applied Ethics.

In the program of study that leads to the Bachelor of Arts in Religious Studies and Applied Ethics, students learn to identify moral problems that arise in contemporary society and develop skills to evaluate responses. Students learn about religious worldviews that may inform moral decisions and develop sensitivity to cultural and religious contexts of ethical decision-making.

Contact Information

Website: phil.ualgary.ca/undergrad/barrels.

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements.

For more specific advice regarding course selection and requirements in the major field, students should consult the subject advisor located in their home Department (consult Department website for contact information).

Admission to the Major

Prospective students wishing to enter the BA (Religious Studies and Applied Ethics) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar. Annual application deadlines are found in A.3 Deadline Dates

for Undergraduate Applications for Admission and Transcripts.

Overlapping Programs

The program in Religious Studies and Applied Ethics cannot be taken in conjunction with programs in Philosophy or Religious Studies. This restriction applies to Major-plus-Minor combinations, Double Majors, Combined Degrees and Second Baccalaureate Degrees. A maximum of 60 units is allowed in any discipline within the Major Field of Religious Studies and Applied Ethics.

Courses Constituting the Field of Religious Studies and Applied Ethics

All courses labelled Philosophy (PHIL) and Religious Studies (RELS).

4.49.1 BA in Religious Studies and Applied Ethics

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 51 units to a maximum of 60 units in the Courses Constituting the Field of Religious Studies and Applied Ethics while fulfilling the following requirements:

1. *Introduction*: Religious Studies 203, 205, and 3 units from Religious Studies 201, 273.
2. *Western and Eastern Religion*: 3 units at the 300 level or above from the Western Religion Stream and 3 units at the 300 level or above from the Eastern Religion Stream. (See the "Religious Studies" courses.)
3. *Nature of Religion*: Religious Studies 331 and 343.
4. *Research in Religious Studies*: Religious Studies 377 and 577.
5. *Moral Philosophy*:
 - a. Philosophy 347, 449, 451; AND
 - b. 6 units from Philosophy 313, 325, 329, 337, 345, 453; AND
 - c. 3 units from Philosophy 547, 549.
6. *Philosophy Options*: An additional 6 units in Philosophy.

C. OTHER REQUIREMENTS

Language Requirement: 6 units in a language other than English.

D. DEGREE OPTIONS

The BA in Religious Studies and Applied Ethics can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

Note: With the approval of the Program Director, higher-level courses dealing with similar topics may be substituted for the required courses.

4.50 Russian

See Languages, Linguistics, Literatures and Cultures.

4.51 Science, Technology and Society

See Communication, Media and Film.

4.52 Sociology

Overview of Programs and Procedures

Baccalaureate Degrees Offered

Bachelor of Arts (BA) in Sociology

BA in Sociology with Co-operative Education

BA Honours in Sociology

BA Honours in Sociology with Co-operative Education

Concurrent BA in Sociology and Bachelor of Education

Bachelor of Arts (BA) in Law and Society

BA in Law and Society with Co-operative Education

BA Honours in Law and Society

BA Honours in Law and Society with Co-operative Education

Notes:

- A Minor is offered in Sociology and in Law and Society.
- Concentrations are available to Sociology Majors in: (a) Criminology, Deviance and Social Control; (b) Gender, Family and Work; (c) Social Inequalities and Social Justice.

Introduction

Sociology contributes to understanding our social world by studying how groups, organizations, societies, and their cultural products are produced, reproduced and transformed by the actions and interactions of people in social contexts. The Sociology program cultivates students' sociological imaginations by offering a wide range of opportunities to think sociologically and to use different theoretical approaches, research methods and data-analysis techniques so students gain experience thinking with and using a sociological perspective.

The program in Law and Society is designed to provide a broad exposure to the nature of law and its role in society. The overall aim of the program is not only to provide students with a deep understanding of the law but also to demonstrate that the law is not an isolated discipline but is a part of an integrated culture of which we all partake. The program is not specifically a "pre-law" program. Nevertheless, the perspectives that it offers are likely to be of great benefit to those who hope to be lawyers, as well as to those considering a career in politics, the civil service, law enforcement, the social sciences, business and industry, or public-interest advocacy.

First-year students in Law and Society are encouraged to explore courses in a variety of areas. It is recommended that a first-year program include: Law and Society 201, 203

and at least an additional 9 units from the Faculty of Arts. Degree programs in Law and Society include senior-level courses offered by various Departments either as core requirements or as options. It is therefore useful to take first-year courses from a variety of related areas such as Political Science and History. In planning their first-year programs, students should look ahead to later years and make sure they take courses that are prerequisites to the courses they may subsequently wish to take.

Courses that are required for the Law and Society major can generally be double-counted toward minor programs: students are advised to consult with the Arts Students' Centre for confirmation. The following minor programs are particularly good fits with a Law and Society major: Political Science, History, Economics, Philosophy, Sociology, Indigenous Studies, Canadian Studies, Women's Studies.

Contact Information

Department Office: Social Sciences 956

Phone: 403.220.6502

Fax: 403.282.9298

Email: Sociology: sociundergrad@ucalgary.ca or Law and Society: ejmccoy@ucalgary.ca

Website: soci.ucalgary.ca/

For Program Advice

Students should consult a program advisor in the Arts Students' Centre for information and advice on their overall program requirements.

For more specific advice regarding course selection and requirements in the major field, students should consult the subject advisor located in their home Department (consult Department website for contact information).

Sociology Students Association

The Sociology Students Association (SSA) is actively engaged in promoting the academic, social and political interests of students who Major or Minor in Sociology. The SSA fosters a sense of community within the Department and represents the interests of undergraduate Sociology students at appropriate councils and committees. All Sociology students are encouraged to become members.

Admission to the Major

Prospective students wishing to enter the BA (Sociology) Program or the BA (Law and Society) Program must meet the criteria listed in section A.5 Undergraduate Admission Requirements of this Calendar. Annual application deadlines are found in A.3 Deadline Dates for Undergraduate Applications for Admission and Transcripts.

Limitation of Enrolment

Due to high demand, admission to the Law and Society Major may be limited. Whenever demand exceeds capacity, students will be admitted on a competitive basis. Admission averages may be set above the minimum level for the Faculty of Arts. These

higher admission standards are applicable to high-school applicants, external transfer applicants from other post-secondary institutions and internal transfer applicants from other programs at the University of Calgary, whether inside or outside the Faculty of Arts.

Admission to Honours

The Faculty of Arts procedures for Admission to Honours established in section 3.4.2 Honours Degrees with a Major Field are applicable and provide the overall framework.

Students wishing to be considered for admission into the BA Sociology (Honours) program must have successfully completed Sociology 313, 315, 333, and at least 30 units of course work. All beginning students who contemplate working towards a Sociology Honours degree should consult with the Department as soon as possible. Students wishing to apply to an Honours program must apply through their Student Centre for a change of program to Honours by February 1.

Students majoring in Law and Society are eligible to apply for Honours by the deadline only if they will complete the program during the following academic year. To meet the deadline, it is recommended that students wishing to enrol in the Honours program consult with the intended supervisor in January and obtain guidelines and an application form from the Law and Society Program Co-ordinator as early as possible.

University of Calgary Collaborative BA in Sociology at Red Deer College

This program allows students to transfer up to two years of College work and to qualify for the BA in Sociology by completing the remaining required University of Calgary courses at Red Deer College. For further information, please visit the collaborative website <https://arts.ucalgary.ca/rdc>.

Courses Constituting the Field of Sociology

- All courses labelled Sociology (SOCI).

Courses Constituting the Field of Law and Society

Courses with a Focus on Law and Society

- All courses labelled Law and Society (LWSO)
- Anthropology 210
- Business and Environment 395, 595
- Canadian Studies 333, 361
- Economics 345, 349, 355, 373, 377, 379
- History 337, 345, 351, 438, 443, 450, 462, 473
- Indigenous Studies 201, 343
- Law 595
- Philosophy 313, 325, 329, 337, 345, 347, 361, 425, 451, 453, 525
- Political Science 283, 321, 342, 425, 426, 444, 470 483, 581
- Sociology 307, 325, 327, 375, 421, 423, 425, 427, 429
- Women's Studies 311

Context Courses

- Canadian Studies 201, 355, 439
- Communication and Culture 201, 203, 305, 307
- Communication and Media Studies 369
- Development Studies 375
- Indigenous Studies 415
- Museum and Heritage Studies 331
- Religious Studies 343, 349
- South Asian Studies 203
- Statistics 205

Research Methods Courses

- Communication and Media Studies 313
- Geography 483
- History 300
- Law and Society 313
- Political Science 399
- Psychology 300, 301
- Sociology 313

4.52.1 BA in Sociology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD REQUIREMENTS

Students must successfully complete a minimum of 42 units to a maximum of 60 units in Courses Constituting the Field of Sociology while fulfilling the following requirements:

1. *Core*: 18 units Sociology 201, 311, 313, 315, 331, 333.
2. *Sociology Options*: A minimum of 12 units from Courses Constituting the Field of Sociology.
3. *Advanced-Level Sociology*: 12 additional units at the 400 level or above.

C. DEGREE OPTIONS

The BA in Sociology can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

The BA in Sociology can be taken with a concentration in (a) Criminology, Deviance and Social Control; (b) Gender, Family and Work; (c) Social Inequalities and Social Justice (see section 4.61.3).

4.52.2 BA Honours Sociology

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR-FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 48 units to a maximum of 72 units in Courses Constituting the Field of Sociology while fulfilling the following requirements:

1. *Core*: 18 units Sociology 201, 311, 313, 315, 331, 333.
2. *Honours Thesis*: 6 units Sociology 590.
3. *Sociology Options*: A minimum of 6 units from Courses Constituting the Field of Sociology.

4. *Advanced-Level Sociology*: 18 additional units at the 400 level or above.

C. DEGREE OPTIONS

The BA Honours in Sociology can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

The BA Honours in Sociology can be taken with a concentration in (a) Criminology, Deviance and Social Control; (b) Gender, Family and Work; (c) Social Inequalities and Social Justice (see section 4.61.3).

4.52.3 Concentrations

Criminology, Deviance and Social Control

Required: 6 units Sociology 325, 327.

Four of: 12 units from Sociology 421*, 423, 425, 427, 429.

**A maximum of 6 units of Sociology 421 may be counted toward the fulfillment of the requirements for the concentration in Criminology, Deviance and Social Control.*

Gender, Family and Work

Required: 9 units Sociology 303, 371, 393.

Three of: 9 units from Sociology 365, 373, 399, 403*, 461, 471*, 493*.

**A topics course which may be taken a maximum of twice for credit toward the fulfillment of the requirements for the concentration in Gender, Family and Work.*

Social Inequalities and Social Justice

Required: 12 units Sociology 303, 307, 365, 375.

Two of: 6 units Sociology 403, 467, 475, 483.

4.52.4 Minor in Sociology

The Minor in Sociology is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete at least 30 units and not more than 36 units from Courses Constituting the Field of Sociology with at least 18 units at the 300 level or above.

4.52.5 BA in Law and Society

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR FIELD WITH REQUIREMENTS

Students must successfully complete a minimum of 48 units in Courses Constituting the Field of Law and Society while fulfilling the following requirements:

1. *Core Courses*: 24 units including:
 - a. 21 units: Law and Society 201, 203, 335, 337, 413, 415, 591;
 - b. 3 units from Political Science 342, Philosophy 425 or Sociology 429.
2. *Courses with a Focus on Law and Society*: 15 units, selected from the list of Courses with a Focus on Law and Society within Courses Constituting the Field of Law and Society.
3. *Context Courses*: 6 units selected from the list of Context Courses within

Courses Constituting the Field of Law and Society.

4. *Research Methods Requirement*: 3 units from the list of Research Methods Courses within Courses Constituting the Field of Law and Society

C. DEGREE OPTIONS

The BA in Law and Society can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.52.6 BA Honours Law and Society

A. FACULTY OF ARTS REQUIREMENTS

Students must adhere to the applicable Faculty of Arts requirements in 3.4 Graduation.

B. MAJOR FIELD WITH HONOURS REQUIREMENTS

Students must successfully complete a minimum of 54 units in Courses Constituting the Field of Law and Society while fulfilling the following requirements:

1. *Core Courses*: 24 units including:
 - a. 21 units Law and Society 201, 203, 335, 337, 413, 415, 591;
 - b. 3 units from: Political Science 342, Philosophy 425, Sociology 429.
2. *Courses with a Focus on Law and Society*: 15 units, selected from the list of Courses with a Focus on Law and Society within Courses Constituting the Field of Law and Society.
3. *Context Courses*: 6 units selected from the list of Context Courses within Courses Constituting the Field of Law and Society.
4. *Research Methods Requirement*: 3 units from the list of Research Methods Courses within Courses Constituting the Field of Law and Society.
5. Law and Society 590.

C. DEGREE OPTIONS

The BA Honours in Law and Society can be taken with Co-operative Education. See section 3.4.4 Co-operative Education Programs for information and requirements.

4.52.7 Minor in Law and Society

The Minor in Law and Society is regulated by the section of the Faculty of Arts Graduation Requirements entitled 3.4.3 Minor Fields.

Students must successfully complete a minimum of 30 units to a maximum of 36 units from Courses Constituting the Field of Law and Society with at least 18 units at the 300 level or above, while fulfilling the following requirements:

1. 3 units Law and Society 201.
2. 9 additional units from courses labelled Law and Society.
3. An additional 18 units from the list of *Courses with a Focus on Law and Society* with no more than 6 units from courses in a single subject area.

4.53 South Asian Studies

See Classics and Religion.

4.54 Spanish

See Languages, Linguistics, Literatures and Cultures.

4.55 Urban Studies

See Geography.

4.56 Visual Studies

See Art.

4.57 Women's Studies

See Philosophy.

5. Administration

Arts Students' Centre

Location: Social Sciences Building, Room 102

Phone: 403.220.3580

Email address: ascarts@ucalgary.ca

Faculty of Arts Co-operative Education Office

Location: Social Sciences Building Room 110

Phone: 403.210.8509 or 403.220.8636

Fax: 403.282.8606

Email: artscoop@ucalgary.ca

Website: arts.ucalgary.ca/co-op/

Faculty of Arts Dean's Office

Location: Social Sciences Building, 13th Floor

Phone: 403.220.6151

Fax: 403.282.8606

Email: arts@ucalgary.ca

Website: arts.ucalgary.ca

Faculty Leadership

Dean

R. Sigurdson

Vice Dean

F. Strzelczyk

Associate Deans

D. Johnston, Teaching & Learning/Student Engagement

B. Moorman, Research & Infrastructure

R. Oxoby, Research & Graduate Programs

V. Tumas, Undergraduate Programs & Student Affairs

Cumming School of Medicine

1. Summary of Degree Programs

Degrees Offered

| Undergraduate | | |
|----------------------------|-----------------|--------------|
| Community Rehabilitation | Health Sciences | Professional |
| BCR | | |
| | BHSc Honours | |
| BCR/BA or BSc ¹ | | |
| | | MD |

¹Combined Degree with the Faculty of Arts (Psychology)

| Graduate |
|----------------------------|
| Graduate Science Education |
| MBT |
| MCM |
| MDCS |
| MPath |
| MSc |
| PhD |

Undergraduate

The Cumming School of Medicine offers a four-year Bachelor of Health Sciences Honours (BHSc Honours) degree.

The Cumming School of Medicine offers a four-year Bachelor of Community Rehabilitation (BCR) degree as well as a two-year BCR program after an approved college diploma.

Doctor of Medicine

The Cumming School of Medicine offers a three-year professional degree leading to a Doctor of Medicine (MD).

Postgraduate (Residency)

The Cumming School of Medicine offers various postgraduate (residency) programs that are only available to those with professional MD training. Full details can be found on the Cumming School of Medicine Postgraduate Medical Education website at cumming.ucalgary.ca/pgme.

Graduate

Graduate work leading to the Master of Biomedical Technology, Master of Community Medicine, Master of Disability and Community Studies, Master of Pathologists' Assistant, Master of Science and Doctor of Philosophy degrees is offered by the Cumming School of Medicine under the administration of the Faculty of Graduate Studies. Details of these programs appear in the Faculty of Graduate Studies calendar.

2. Faculty Information

Contact Information

Community Rehabilitation and Disability Studies

Location: Teaching, Research & Wellness (TRW) 3rd Floor

Student Information: 403.220.2985

Fax Number: 403.220.6494

Website: cumming.ucalgary.ca/bcr/

Bachelor of Health Sciences

Location: Health Sciences Centre G503

Student Information: 403.210.9730

Email address: bhsc@ucalgary.ca

Website: cumming.ucalgary.ca/bhsc/

Doctor of Medicine

Location: Health Sciences Centre G212

Student Information: 403.220.4262

Email address: ucmedapp@ucalgary.ca

Website: cumming.ucalgary.ca/md/

3. Community Rehabilitation and Disability Studies

Introduction

Community Rehabilitation and Disability Studies offers a full range of interdisciplinary professional educational opportunities:

- A bachelor's degree in Community Rehabilitation (BCR). The BCR degree is offered both on campus and through an off-campus program by distance delivery (post-diploma only).
- An undergraduate 30-unit minor in Community Rehabilitation and Disability Studies.
- A combined degree BCR/BA or BSc (Psychology).
- A minor in Adapted and Therapeutic Physical Activity for Kinesiology students.
- Graduate master's and doctoral degree programs through the Department of Community Health Sciences, Cumming School of Medicine.

3.1 Undergraduate Programs

Bachelor of Community Rehabilitation (BCR)

The Bachelor of Community Rehabilitation (BCR) program is available to:

- Students coming directly from high school;
- Students who have completed a Community College Diploma in Rehabilitation Studies or a related field;

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- Students transferring from another university or have already completed a degree.

The BCR is an interdisciplinary degree both in the courses it provides and the students it serves.

Students are expected to achieve a foundation in health, leadership, human services, policy, community action, and critical disability studies, and will work with individuals of diverse ages and disabling conditions. Through specialized interdisciplinary study, practical experience and project work, they gain professional skills in individual counseling and personal planning, team co-ordination, design and management of community services, advocacy and small business development.

Students can specialize in areas such as career development, working with seniors, brain injury, community mental health or early intervention. Students specialize by choosing appropriate health and senior social science course options and doing their projects and practica in their chosen area.

Minor Programs

A Minor in Community Rehabilitation and Disability Studies is open to on-campus

students in other faculties. A specialized Minor in Adapted and Therapeutic Physical Activity is offered for Kinesiology students by Community Rehabilitation and Disability Studies in conjunction with the Faculty of Kinesiology.

3.2 Opportunities

Certification

Students may be eligible for the following accreditation and/or certification:

- Registered Rehabilitation Professionals (RRP) through the Vocational Rehabilitation Association of Canada (VRAC)
- Certified Vocational Evaluator through Canadian Assessment of Vocational Evaluation and Work Adjustment (CAVEWA)

Study Abroad

The Community Rehabilitation and Disability Studies program has a long-established arrangement with Flinders University in Adelaide, South Australia that allows selected students to gain transfer credit for their BCR degree through a term abroad program. Interested students should speak with a CRDS Student Advisor or to consult with the Study Abroad/International Learning Office.

3.3 Student Affairs

Student Advising

Inquiries related to Faculty Regulations, BCR Admissions and BCR course requirements should be directed to the Student Advisor for Community Rehabilitation and Disability Studies.

For the precise interpretation of any statement or regulation, students should contact the Associate Dean (Undergraduate Health and Science Education), Cumming School of Medicine. The Associate Dean (UHSE) is responsible for all BCR student affairs in the School.

3.4 Resources

CRDS and Desire2Learn

All CRDS distance education Internet courses are now being offered through Desire2Learn, a tool that facilitates the creation of sophisticated Internet-based educational environments.

3.5 Admissions (BCR)

Applicants should refer to A.5 in the Admissions section of this Calendar for regulations regarding University admission requirements.

Admission to the program is competitive and meeting the minimum admission requirement does not guarantee admission.

Admission from High School

Students must present five Alberta high school courses (or equivalent) including English Language Arts 30-1 (or equivalent) and Biology 30 (or equivalent).

For more detailed information, see A.5.1.1 Admission Requirements.

Post-Diploma Students

Students who have completed an approved Community College Diploma in Rehabilita-

tion Studies or related field may apply for admission with a block transfer of credit to complete two years of study to earn a Bachelor of Community Rehabilitation.

Transfer Students

Transfer cumulative grade point average is calculated over the most recent course work to a maximum of 30 units (includes University of Calgary courses and/or transferable courses taken at other institutions). All grades within a term will be included except where the number of courses taken within a term exceeds that required to fulfill (to a maximum of) 30 units, in which case the highest grades will be used.

Students with fewer than 12 units of post-secondary courses, will have their admission based on high school standing only.

For more detailed information, see A.5.3.1 Transfer Admission Requirements

Application Deadlines

Refer to the Admissions section of the Calendar: A.3 Deadline Dates for Undergraduate Applications for Admission and Transcripts.

3.6 Registration (BCR)

Continuity of Program

Students whose registration has been inactive for two years must reapply for admission and will be required to meet current BCR program requirements if readmitted.

The required courses for the degree must have been completed within ten years of the date of enrolment in the BCR program in order for the degree to be awarded.

Permission to Complete Courses at an Outside Institution

A letter of permission must be obtained from the Student Advisor, Community Rehabilitation and Disability Studies prior to registering at another university. Please be aware that there are limits to the number of courses that can be taken at another university.

Repeating Courses

Students may repeat a course previously attempted (including withdrawals) only once without permission of the Faculty office. Practicum courses offered by Community Rehabilitation and Disability Studies may not be repeated after a failing grade has been received without:

- The prior consent of the Director, Bachelor of Community Rehabilitation;
- Presenting evidence of having made an attempt to overcome previous difficulties encountered;
- Waiting a reasonable period of time (one semester to one calendar year) prior to repetition.

Excessive Number of Withdrawals

Students will not be permitted to withdraw more than once from a particular course. Students will be required to withdraw from the Cumming School of Medicine if they have accumulated a total of more than 30

units withdrawals while in attendance at the University of Calgary.

Immunization Requirements

All Alberta-based BCR students and students taking Community Rehabilitation (CORE) courses involving practicum placements in Alberta are required to meet an immunization standard as outlined on the Student Immunization Form checklist. Documented proof of completion must be provided to the Cumming School of Medicine Immunization Co-ordinator or delegate prior to commencement of the program (for BCR students) or first practicum placement (for non-BCR students).

Throughout the BCR program, students are required to ensure that immunizations are current and must provide proof of updates to the Cumming School of Medicine Immunization Co-ordinator. Failure to do so will result in students being removed from practicum courses, or being placed in an alternate environment until such time as adequate proof has been provided. In the event of extenuating medical circumstances impacting immunization status, students may be accommodated in non-Alberta Health Services-affiliated environments. Please note that requirements may change during the program as determined by Alberta Health Services guidelines.

Police Information Check

Some practicum placements arranged for select CORE courses may require students to obtain a current Police Information Check, which may also include a Vulnerable Sector Search.

3.7 Student Standing (BCR)

Academic Standing

Performance Review, Probationary Status and Dismissal

The academic standing of each student registered in the Bachelor of Community Rehabilitation program will be reviewed annually following the Winter Term as per the GPA requirements table.

GPA Requirements:

2.50 or above: Satisfactory standing

1.70 – 2.49: Continuation in BCR on probation

0.00 – 1.69: Required to withdraw from the school

The academic standing of students registered in the Faculty will be reviewed after each Winter Term provided that they have completed at least 15 units at the University of Calgary since their previous review. Students who have not completed 15 units since the previous review will retain their existing status until the next subsequent review. All University of Calgary credit courses that have been completed since the previous review are used for the purpose of academic review. Students placed on academic probation or required to withdraw as a result of the academic performance review will be so advised in writing.

University regulations permit students a maximum of one probationary period while registered as an undergraduate student. Students who are on academic probation will have to maintain a GPA of at least 2.50 in each subsequent year in order to continue in the BCR program. Students who are Required to Withdraw may be able to enter another program.

Notwithstanding the specific regulations pertaining to Student Standing, students' academic standing may be reviewed at any time and those with generally poor academic records may be placed or continued on academic probation or required to withdraw at the discretion of the Dean (or delegate).

Any students wishing to appeal an academic ruling please see I. Reappraisal of Graded Term Work and Academic Assessments (final grades) in the Academic Regulations section for details.

Dean's List

The Dean's List recognizes the outstanding academic achievement of students. To be included, a student must achieve a grade point average of at least 3.60 over all University of Calgary courses taken in the preceding Fall and Winter Terms, with a minimum of 30 units to be counted. A statement of inclusion on the Dean's List will be recorded on the student's transcript. Students on academic sanctions as outlined in section K (Statement on Principles of Conduct) of this Calendar are not eligible for the Dean's List.

3.8 Graduation (BCR)

Graduation Requirements

1. Successful completion of the approved program with a minimum overall grade point average of 2.00. In addition, students must achieve a minimum grade point average of 3.00 in each practicum course (Community Rehabilitation 207, 487, 594, 595, 597, 598).
2. The 120 units required for graduation must all have been completed within 10 years of first enrolment for the degree to be awarded. For post-diploma students, the 60 units required for graduation must all have been completed within 10 years of first enrolment for the degree to be awarded.

Degrees "With Distinction"

The notation "With Distinction" will be inscribed on the permanent record and graduation parchment of any BCR student with a grade point averages of at least 3.60 over the last 60 units taken for the degree. Courses from other institutions as well as the University of Calgary can be used in this calculation.

3.9 BCR Requirements

There are two routes within the Bachelor of Community Rehabilitation Program:

1. Four-year (on-campus)
2. Two-year post-diploma (distance delivery or on-campus)

Five-year Combined Degree:

3. Combined BCR/BA or BSC (Psychology)

Two minors are available to students in other faculties:

4. Minor in Community Rehabilitation and Disability Studies
5. Minor in Adapted and Therapeutic Physical Activity (for Kinesiology students only)

3.9.1 Four-Year BCR Degree

- 27 units: Community Rehabilitation 205, 207, 209, 435, 541, 547, 553, 569, 583
- 9 units *Practica*: Community Rehabilitation 487, 594, 595
- 9 units chosen from: Community Rehabilitation 321, 471, 473 or 475
- 3 units Academic Writing 303
- 12 units *Health Options* chosen from: Anthropology 341, Biology 305, Economics 379, Greek and Roman Studies 211, Health and Society 201, 301, 311, Kinesiology 201, 203, 213, 237, 251, 253, 259, 260, 339, 367, 397, Philosophy 313, Psychology 375, Sociology 321, 419*
- 12 units *Senior Social Science Options* chosen from: Anthropology 305, 311, 331, 355, 410, Community Rehabilitation 471, 473, 475, 536, 537, 538, 573, 591, Communication and Culture 507, 509, Canadian Studies 361, Development Studies 393, History 493, Indigenous Studies 303, 312, 317, 343, 395, 415, Interprofessional Health Education 501, 503, Linguistics 301, 303, 309, 337, 341, 353, 373, 377, 381, 401, 403, 407, Medical Science 507, 528, Psychology 300, 301, 305, 321, 345, 349, 351, 353, 365, 369, 375, 383, 385, Sociology 303, 307, 309, 311, 313, 315, 321, 325, 327, 341, 345, 365, 371, 373, 375, 393, University 401*, Women's Studies 311, 315
- 6 units *Management Options* chosen from: Business and Environment 395, 401, Communication and Culture 507, 509, Communication and Media Studies 363, Entrepreneurship and Innovation 201, 381, Environmental Design 401, Innovation 321, Law and Society 201, 203, 335, Management Studies 359, Marketing 341, Organizational Behaviour and Human Resources 321, Political Science 321, 342, 357, 381, Psychology 321, Sociology 345, University 201, 401*
- 42 units *Open Options*

*May be used when the topic is appropriate.

Notes:

- Some of the courses listed above have prerequisites and may be in high demand. Registration in these courses is not assured. It is the student's responsibility to ensure that prerequisites are completed.
- Psychology 200 and 201 are strongly recommended, but not required.
- Students considering senior courses in a given discipline are strongly encouraged to complete foundation courses in their first two years of study in order to meet prerequisites for senior courses.

3.9.2 Two-Year Post-Diploma BCR Degree Route

For students who have completed an approved post-secondary diploma in Rehabilitation Studies or related field.

- 18 units: Community Rehabilitation 435, 541, 547, 553, 569, 583
- 6 units *Practica* chosen from either: Community Rehabilitation 594 and 595, or Community Rehabilitation 597 and 598
- 9 units chosen from: Community Rehabilitation 321, 471, 473 or 475
- 3 units Academic Writing 303
- 9 units *Health Options* chosen from: Anthropology 341, Biology 305, Economics 379, Greek and Roman Studies 211, Health and Society 201, 301, 311, Kinesiology 201, 203, 213, 237, 251, 253, 259, 260, 339, 367, 397, Philosophy 313, Psychology 375, Sociology 321, 419*
- 9 units *Senior Social Science Options* chosen from: Anthropology 305, 311, 331, 355, 410, Community Rehabilitation 471, 473, 475, 536, 537, 538, 573, 591, Communication and Culture 507, 509, Canadian Studies 361, Development Studies 393, History 493*, Indigenous Studies 303, 312, 317, 343, 395, 415, Interprofessional Health Education 501, 503, Linguistics 301, 303, 309, 337, 341, 353, 373, 377, 381, 401, 403, 407, Medical Science 507, 528, Psychology 300, 301, 305, 321, 345, 349, 351, 353, 365, 369, 375, 383, 385, Sociology 303, 307, 309, 311, 313, 315, 321, 325, 327, 341, 345, 365, 371, 373, 375, 393, University 401*, Women's Studies 311, 315
- 6 units *Management Options* chosen from: Business and Environment 395, 401, Communication and Culture 507, 509, Communication and Media Studies 363, Entrepreneurship and Innovation 201, 381, Environmental Design 401, Innovation 321, Law and Society 201, 203, 335, Management Studies 359*, Marketing 341, Organizational Behaviour and Human Resources 321, Political Science 321, 342, 357, 381, Psychology 321, Sociology 345, University 201, 401*

*May be used when the topic is appropriate.

Note: Some of the courses listed above have prerequisites and may be in high demand. Registration in these courses is not assured. It is the student's responsibility to ensure that prerequisites are completed.

3.10 Combined BCR/BA or BSC (Psychology)

This five-year program leads to both the Bachelor of Community Rehabilitation (offered by the Cumming School of Medicine) and Bachelor of Arts or Bachelor of Science in Psychology (offered by the Faculty of Arts) degrees, and is jointly sponsored by the two faculties. Completion of the program requires a minimum of 150 units.

Admission

Students pursuing this program may enter the combined degree in year one or a subsequent year. Admission requirements of

both Faculties, the Department of Psychology and Community Rehabilitation Studies, must be satisfied in order to qualify for the combined degree program.

The program requires careful selection of courses to complete all requirements of the two Faculties. Interested students are urged to contact Arts Students' Centre (Student Inquiries) and the Student Advisor in the Community Rehabilitation and Disability Studies Program. It will be possible for students to opt out of the combined program until the end of their third year and complete either a BA or BSc in Psychology or a BCR degree in four years. Students should note, however, that if courses have been unevenly distributed, more than four years may be required to complete the degree.

Requirements

1. The Faculty of Arts requires the successful completion of both:

(a) the "Faculty of Arts Requirements for Combined Degree" or "Faculty of Arts Requirements for Combined Degrees with an Honours Component" listed in the Faculty of Arts, section 3.4.5 Combined Degrees, and
(b) the requirements for the BA or BSc Psychology listed in section 4.47 Psychology. Students should seek Psychology course registration advice from a program advisor in the Arts Students' Centre.

2. Students in the BCR/BA or BA Honours Psychology program must complete Biology 205 and 305. Students in the BCR/BSc or BSc Honours Psychology program must complete Biology 241 and 243.

3. The Cumming School of Medicine requires successful completion of all courses required for graduation with a BCR degree as listed in section 3.9 Graduation (BCR).

4. The following required Community Rehabilitation courses must be completed. At least 42 units from this list must be taken at the University of Calgary. Students are strongly encouraged to meet with an Academic Advisor regarding the sequencing of course work.

- 39 units Community Rehabilitation 205, 207, 209, 321, 435, 487, 541, 547, 553, 569, 583, 594, 595
- 6 units chosen from: Community Rehabilitation 471, 473, 475
- 3 units any Community Rehabilitation course
- 6 units Biology 205 and 305; or Biology 241 and 243 (see note)
- 3 units Academic Writing 303
- 12 units any option
- 21 units any senior option

Note: The options and senior options may be used to complete the Psychology portion of the combined degree.

3.11 Minor in Community Rehabilitation and Disability Studies

A Minor in Community Rehabilitation and Disability Studies is available to students registered in other Faculties (e.g. Arts, Kine-

siology, Science). All students are required to take:

- *Introductory Courses:* 9 units Community Rehabilitation 205, 209, 435.
- *Practica:* 6 units from Community Rehabilitation 207 and 487, or 594 and 595.
- 15 units from Community Rehabilitation 471, 473, 475, 535, 541, 553, 569, 573, 583, 594, 595.

Contact the program or program website (cumming.ucalgary.ca/crds) for information.

3.12 Minor in Adapted and Therapeutic Physical Activity

This Minor is offered by Community Rehabilitation and Disability Studies for students in Kinesiology.

Requirements

1. 6 units Community Rehabilitation 205, 209.
2. 6 units practica from: Community Rehabilitation 207 and 487 or 594 and 595.
3. 9 units required courses: Community Rehabilitation 435, 475 and Kinesiology 367, or 369, or 495.
4. 9 units Community Rehabilitation 471, 473, 547.

4. Bachelor of Health Sciences Honours

4.1 Summary of Programs

Co-ordinated by the Cumming School of Medicine and in co-operation with the Faculties of Science and Arts, the Cumming School of Medicine offers an undergraduate degree in Health Sciences, the Bachelor of Health Sciences Honours (BHSc Honours), consisting of three majors (Bioinformatics, Biomedical Sciences, and Health and Society). (Details on majors are given in 4.5 Program Details.) Because of the admissions standard and GPA requirements, it is expected that most students will attain Honours standing. However, those students who progress to the fourth year but do not attain a cumulative GPA of 3.30 over the last 90 units will graduate with a BHSc. The BHSc Honours degree will normally take four years. Students are selected through an admissions process and have direct entry into the first year. The deadline to apply for admission is March 1. Admission offers will normally be made by mid-April.

A Health Sciences Minor is available in Health and Society. (Details are given in 4.5.5 Program Details.)

A Bioinformatics Minor is also available. (Details are given in 4.5.3 Program Details.)

4.2 Faculty Student Affairs

Inquiries related to Faculty Regulations (section 4.3), BHSc Admissions (section 4.4) and BHSc course requirements (section 4.5) should be directed to the Program Co-ordinator for the BHSc Office. Contact information may be found at: cumming.ucalgary.ca/bhsc/contact-us.

4.3 Faculty Regulations

Students in the Cumming School of Medicine are governed by the regulations in this section of the Calendar as well as by the general University regulations in the sections titled Admissions and Academic Regulations. For the precise interpretation of any statement or regulation, students should feel free to contact the Associate Dean (Undergraduate Health and Science Education), the O'Brien Centre for the BHSc Office, Cumming School of Medicine. The Associate Dean (UHSE) is responsible for all undergraduate BHSc student affairs in the School.

Enrolment Limitations

Enrolment limits may be in effect for some courses in the Cumming School of Medicine and the Faculties of Science and Arts.

Immunization Requirements

All BHSc students are required to meet an immunization standard as outlined on the Student Immunization Form checklist. Documented proof of completion must be provided to the Immunization Co-ordinator or delegate prior to commencement of the program.

Throughout the BHSc program, students are required to ensure that immunizations are current and must provide proof of updates to the Cumming School of Medicine Immunization Co-ordinator. Failure to do so will result in students being removed from course-based research environments, or being placed in an alternate environment until such time as adequate proof has been provided. In the event of extenuating medical circumstances impacting immunization status, students may be accommodated in non-Alberta Health Services-affiliated environments. Please note that requirements may change during the program as determined by Alberta Health Services guidelines.

4.3.1 Degree Requirements

The following general requirements apply to all undergraduate BHSc degree programs in the Cumming School of Medicine:

Degree Programs

In order to graduate, a student must present an approved list of courses completed with passing grades. This list will be referred to as the Major. The Major must satisfy the following conditions:

- (a) The Major must contain at least 120 units with at least 66 units numbered 300 or above.
- (b) Only 3 units in the Major may be graded a "D" or "D+."
- (c) A minimum GPA of 3.60 over the last 90 units will be eligible for a First Class Honours designation. Refer to "First Class Honours" requirements.
- (d) A minimum GPA of 3.30 must be maintained over the last 90 units for an Honours designation.
- (e) Please refer to 4.3.4 Student Standing for a description of "satisfactory standing".

(f) No more than 60 units taken at other institutions and acceptable for transfer credit may be included in the degree. Normally, transfer credit will be allowed only for coursework completed in the preceding ten years.

(g) Candidates for Honours have a maximum of five years in which they are registered in courses to complete the required programs.

Notes:

- These requirements may change with every Calendar issue. A given Calendar entry applies to the academic year beginning on July 1 and ending on the following June 30. The time of entry into a Major in the Cumming School of Medicine is defined as the first term after admission to the Major during which a student successfully completes any courses applicable to the Major. A student's Major is subject to the course requirements that are in the Calendar current at the time of entry into the BHSc Honours, and a student is allowed five years counted from the time of entry into the Major, to graduate under these requirements. Students who exceed the allotted time limit must consult with the Associate Dean (UHSE), who will decide on an acceptable set of course requirements for graduation.
- A student who fails to maintain the necessary performance standards or who decides not to continue in the Honours degree may transfer to another faculty program, subject to that program's admission requirements.

First Class Honours

In addition to the Honours requirements, first class designation requires successful completion of a program major equivalent to 120 units with a GPA of at least 3.60 over the last 90 units. A student who has taken part of their course work at another university may be granted a degree with First Class Honours at the discretion of the School.

Minor Programs

A Minor is available in Health and Society. The course requirements are listed in 4.5.5 Program Details. The GPA over all courses counting towards the Minor must be at least 2.00.

A Minor is available in Bioinformatics. The course requirements are listed in 4.5.3 Program Details. The GPA over all courses counting towards the Minor must be at least 2.00.

4.3.2 Course Selection and Registration

Accuracy of Registration

Students are responsible for ensuring that their annual course selections are in accordance with all Calendar requirements, including the completion of prerequisite courses with a satisfactory grade and registration in corequisite courses as appropriate. Students are advised not to register in a course unless they have achieved a grade of at least "C-" in each prerequisite course.

It is the responsibility of students to ensure that they meet all prerequisite requirements. A student who has received credit for a course without having the normal prerequisite course(s) may not subsequently register in the prerequisite course(s) for program credit. Taking or repeating a course that is a prerequisite for a higher level course after having completed the higher level course with a grade of "C-" or better will only be allowed with the permission of the Associate Dean (UHSE). Registration in any course(s) contrary to regulations may be cancelled by the School after the beginning of classes. Registration must be appropriate to the major being followed. Students with inappropriate course selections may have their registration cancelled by the Associate Dean (UHSE). Students should seek advice from the Associate Dean (UHSE) or the BHSc Program Co-ordinator.

Students are responsible for ensuring that they meet degree and program Major requirements. Although the BHSc Office endeavours to assist all students as they proceed in the various Majors, a final and thorough check is not done until application for graduation. Any departure from standard requirements must receive prior authorization in writing from the Associate Dean (UHSE). It is strongly recommended that students consult with the Associate Dean (UHSE) or the BHSc Program Co-ordinator before submitting their final registration.

First-year students should obtain a copy of the Course Registration and Planning Guide from the Office of the Registrar or visit ucalgary.ca/registrar/registration/first-year-students.

Withdrawal from Courses

Students will not be permitted to withdraw more than once from a particular course. Students will be required to withdraw from the Cumming School of Medicine if they have accumulated a total of more than 30 units withdrawals while in attendance at the University of Calgary. A student who wishes to withdraw from a course must do so before the deadline specified in the Academic Schedule. Students should consult with the BHSc program prior to withdrawing from a course.

Repetition of Courses

A student will be permitted to repeat a particular course only once. This regulation applies not only to individual courses but also to sets of courses where it is stated that credit for more than one of the sets is not allowed. A withdrawal counts as an attempt.

Opportunities to Take Courses at Another Institution for Transfer of Credit

Students may request to take some program course work at another university. Students are advised to meet with the Program Co-ordinator to receive the necessary approved Letter of Permission to undertake course work at another university. It will be the responsibility of the student to ensure that an official transcript of grades is forwarded

directly to the Registrar of this University in order that appropriate credit may be officially recorded.

Credit in Courses by Special Assessment

Students who feel that they know the material covered in a certain course without having received formal University credit may apply for special assessment in the course. Students should obtain the form headed "Permission to Take Courses by Special Assessment" from the Office of the Registrar and submit their application to the faculty offering the course. A course in which the student was previously registered may not be taken subsequently by special assessment, nor may any course be attempted more than once in this way. The School will not allow more than 30 units completed by special assessment to count towards a degree. See also the general University regulations concerning special assessment (see B.10.1 in Academic Regulations).

4.3.3 Assessment

Missed Components of Term Work

Any student who is absent from a test or fails to complete a laboratory assignment or similar work for legitimate reasons must discuss an alternative course of action with the instructor. The regulations covering such circumstances are outlined in the sections E.3 Attendance and G.7 Deferral of Term Work in the Academic Regulations section of this Calendar. In such cases, the instructor must be notified within 48 hours.

Deferral of Final Examination

See section G.6 in Academic Regulations for the general University regulations governing the deferral of final examinations. Misreading the examination timetable is not a valid reason for requesting a deferred final examination.

4.3.4 Student Standing

Performance Review, Probationary Status and Dismissal

The academic standing of each student registered in the BHSc program will be reviewed annually following the Winter Term as per the GPA Requirements table.

GPA Requirements

| End of Year 1 | Year 2 and 3 | Year 4 and Graduation |
|---|---|---|
| 3.30 or above: satisfactory standing | 3.30 or above: satisfactory standing | 3.30 or above: BHSc Honours degree |
| 2.75 – 3.29: continuation in BHSc | 2.75 – 3.29: continuation in BHSc | 2.75 – 3.29: BHSc degree |
| 1.70 – 2.74: continuation in BHSc on probation (see note 1) | 1.70 – 2.74: On Probation (see note 1) | 1.70 – 2.74: no degree (see note 2) |
| 0.00 – 1.69: Required to withdraw from the School | 0.00 – 1.69: Required to withdraw from the School | 0.00 – 1.69: Required to withdraw from the School |

Notes:

1. University regulations permit students to be on probation only once during their degree. Therefore, students who merit placement on academic probation will have to maintain a GPA of at least 2.75 in each subsequent year in order to continue in their chosen program. Students who do not meet this will be required to withdraw from the Bachelor of Health Sciences program and, if qualified, may be able to enter another program at the University of Calgary.

2. At the time of graduation, students who have not achieved a GPA of 3.30 over the last 90 units will be awarded a BHSc (i.e., without the Honours designation), provided that the minimum cumulative GPA attained (over the last 90 units) is greater than or equal to 2.75.

3. Any students wishing to appeal an academic ruling please see I. Reappraisal of Graded Term Work and Academic Assessments (final grades) in the Academic Regulations section for details.

Dean's List

The Dean's List recognizes the outstanding academic achievement of students. To be included, a student must achieve a grade point average of at least 3.60 over all University of Calgary courses taken in the preceding Fall and Winter Terms, with a minimum of 30 units to be counted. A statement of inclusion on the Dean's List will be recorded on the student's transcript. Students on academic sanctions as outlined in section K (Statement on Principles of Conduct) of this Calendar are not eligible for the Dean's List.

4.4 Admissions

There are approximately 100 first-year students granted admissions each year to the various Majors. Admission is based both on the admission requirements listed below and the Supplementary Application results.

Applicants must submit both a completed Bachelor of Health Sciences Supplementary Application and a University of Calgary Application for Admission. Students are directed to the online Supplementary Application after the Application for Admission to the Bachelor of Health Sciences program is submitted.

Year 1 Admission

Admission to Year 1 is normally limited to those who meet the requirements set out below and have completed no more than 6 units transferable courses from a recognized post-secondary institution. Those with more than 6 units may be required to apply to Year 2.

(a) To be considered for admission applicants must present the admission requirements as outlined in section A.5.1.1 Admission Requirements and complete the Online Supplementary Application by the deadlines indicated in section A.3 (Deadline Dates for Undergraduate Admission).

(b) Admission is competitive. Therefore, meeting the minimum standards as set out in (a) does not guarantee admission.

(c) **Applications will only be accepted electronically.** The supplementary application is to be submitted online.

(d) All applicants will be informed of their status through the applicant's Student Centre at my.ucalgary.ca.

(e) BHSc applicants will be considered for Early Admission. Incomplete files will not be reviewed. Applicants currently in high school should refer to Early Admission Process for High School Students in A.5.1.3 in the Admissions section of this Calendar for details. It is to the applicant's advantage to apply for admission and submit the supplementary information as early as possible.

Year 2 Admission

(a) Meet the deadlines as outlined in section A.3 (Deadline Dates for Undergraduate Admission).

Summer Term (Spring/Summer Intersession) courses completed in the year of application will not be considered.

(b) Admission is competitive and seats are limited. Students must have completed at least 24 units by the end of the Winter Term in the year of application (12 units completed by the end of the Fall Term) of which a minimum of 12 units must be from the following courses corresponding to the major applied to.

Biomedical Sciences Major

Biology 241, 243, Chemistry 201, 203, Mathematics 249 (or 265), Physics 211 (or 221), 223

Bioinformatics Major

Biology 241, 243, Computer Science 231 (or 217), 233 (or 219), Mathematics 265 (249), 267, Chemistry 201, 203

Health and Society Major

Biology 241, 243, Health and Society 201, any 200-level 3-unit English course, Psychology 200, 201, Sociology 201, Anthropology 203, Geography 254, Economics 201*, 203*, any 200-level Political Science course, Community Rehabilitation 205, 207

**Students considering the Health Economics concentration in the BHSc Honours are strongly encouraged to complete both Economics 201 and 203, as they are prerequisites for most 300-level Economics courses.*

(c) **Applications will only be accepted electronically.** The supplementary application is to be submitted online.

(d) All applicants will be informed of their status through the applicant's Student Centre at my.ucalgary.ca.

(e) BHSc applicants will be reviewed once a completed application (transcripts and supplementary application) has been received. Incomplete files will not be reviewed. It is to the applicant's advantage to apply for admission and submit all necessary transcripts, including the supplementary information, as early as possible.

(f) Transfer students who are admitted must take all required courses except for Medical Science 203 and 205, which will each be replaced with an open option.

4.5 Program Details**4.5.1 Biomedical Sciences Major****Required Courses:**

- Biology 241, 243
- Chemistry 201, 203, 351, 353
- Physics 211 or 221, 223
- 3 units English: any 200-level English or Comparative Literature 203
- Mathematics 249 or 265
- Biochemistry 393
- Medical Science 341, 351, 407
- Medical Science 203, 205, 308, 408 (inquiry-based courses to be taken in sequence through years one to three)
- Medical Science 508 (Research Project to be taken in final year). The research project is worth 12 units and is only offered in fall and winter terms.
- 3 units Humanities Elective*
- 9 units Open Options
- 9 units Biomedical Option: any senior-level course offered by the Cumming School of Medicine, Faculty of Science or select senior-level courses offered by the Faculty of Arts**
- 15 units Core Option: Medical Science 321, 401, 402, 404, 415, 417, 419, 501, 503, 515, 519, 521, 541, 543, 545, 561, 565, 567, 569 and any Biochemistry course or any Cellular, Molecular and Microbial Biology course.
- **Note:** Medical Science 402 and 417/419 cannot be taken in the same year as Medical Science 508.
- 12 units Senior Option: any course at the 300 level or above

**Acceptable courses from the Faculty of Arts to satisfy the Humanities Elective may be selected from the following departments:*

Classics and Religion; English; Philosophy; School of Languages, Linguistics, Literatures and Cultures; and Medical Science 307.

***Acceptable courses from the Faculty of Arts to satisfy the Biomedical Option are:*

Anthropology 305, 311, 413, 435, 451, 523, 552, 553, 589

Archaeology 417, 523

Geography 482, 485, 585

Psychology 300, 301, 365, 369, 375, 407, 411, 451, 455, 463, 467, 469, 471, 473, 475, 477, 478, 479, 497.

Other courses from the Faculty of Arts may be considered on a case-by-case basis with the approval of the Biomedical Sciences Director.

4.5.2 Bioinformatics Major**Required Courses:**

- Biology 241, 243
- Chemistry 201, 203, 351, 353
- Mathematics 265 or 249, 267
- Statistics 321, 323
- Computer Science 102 (Block Week — highly recommended), 217 and 219; or 231 and 233; 319
- 6 units senior-level Computer Science Option
- Medical Science 341, 351, 401, 403, 519, 545

- Biochemistry 393
- Medical Science 203, 205, 308, 408 (inquiry-based courses to be taken in sequence through years one to three)
- 3 units Humanities Elective*: English 200-level, Philosophy 279 or Medical Science 307 (highly recommended)
- Medical Science 508: Research project to be taken in final year. The research project is worth 12 units and is offered only offered in fall and winter terms.
- Software Engineering 300
- 6 units Core Option: Medical Science 402, 404, 417, 419, 507, 509, 528, Biochemistry 443 and Computer Science 433, 449, 481, 503, 531, 572, 583
- **Note:** Medical Science 402 and 417/419 cannot be taken in the same year as 508.
- 3 units Open Option
- 6 units Senior Option: any course at the 300 level or above
- 3 units Bioinformatics Option: any course at the 300 level or above offered by the Faculty of Science, or senior level Medical Science course

¹Students with programming experience may register in Computer Science 235 in place of 231, 233. Students selecting this option must have approval from the Department of Computer Science. If a student does complete Computer Science 235, 3 units may be taken as an open option.

*Acceptable courses from the Faculty of Arts to satisfy the Humanities Elective may be selected from the following departments: Classics and Religion; English; Philosophy; School of Languages, Linguistics, Literatures and Cultures; or Medical Science 307.

4.5.3 Bioinformatics Minor

A Minor in Bioinformatics is available for students in the following programs:

- Bachelor of Health Sciences (Biomedical Sciences or Health and Society majors)
- Bachelor of Science in majors offered through the Department of Biological Sciences (Biological Sciences, Biochemistry, Cellular, Molecular and Microbial Biology, Ecology, Zoology or Plant Biology)
- Bachelor of Science in Computer Science

The GPA over all courses counting towards the minor must be at least 2.00.

In order to be admitted to the Minor, students must have successfully completed a minimum of 24 units with a minimum GPA of 2.50 over the preceding 24 units. Students must apply online via their Student Centre.

The Minor has a fixed number of places for students (maximum 15 per calendar year). Students will be considered for admission on a competitive basis. The application to the Minor will include consideration of the applicant's grade point average and a statement of interest explaining why they wish to complete a Minor in Bioinformatics. Information on document submission can be found on the Bachelor of Health Sciences website (www.cumming.ucalgary.ca/bhsc) [information to be inserted following approval]. Where the number of qualified applicants exceeds the number of available places, consideration will be given to

a distribution of students from all eligible disciplines (Health Sciences (BMED, HSOC); Biological Sciences (multiple majors); and Computer Science).

Students interested in a Minor in Bioinformatics should meet with a program advisor as early in their program as possible. Students should be aware that some courses have prerequisites and must be taken into consideration when planning their program.

Bioinformatics Minor for BHSc Students (Biomedical Sciences major)

- 6 units: Computer Science 217 and 219; or Computer Science 231 and 233
- 3 units: Computer Science 319 or 331
- 3 units: any Computer Science course at the 300 level or above
- 9 units chosen from: Biology 401; Cellular, Molecular and Microbial Biology 411, 413, 461, 511, 523; Ecology 529; Plant Biology 401; Medical Science 541, 543, 545, or 507¹
- 6 units: Medical Science 401 and 403
- 3 units: Medical Science 519 or 507²

¹Medical Science 507 is an independent study course that may be repeated for credit. May be applicable when the topic is in the field of Bioinformatics and with consent of the Bioinformatics Co-Directors.

²May be applicable with a project from the field of Bioinformatics and with consent from the Bioinformatics Co-Directors.

Bioinformatics Minor for BHSc Students (Health and Society major)

- 6 units: Computer Science 217 and 219; or Computer Science 231 and 233
- 3 units: Computer Science 319 or 331
- 3 units: any Computer Science course at the 300 level or above
- 3 units: Medical Science 341 or Biology 311
- 6 units chosen from: Biology 401; Cellular, Molecular and Microbial Biology 411, 413, 461, 511, 523; Ecology 529; Plant Biology 401; Medical Science 541, 543, 545, or 507¹
- 6 units: Medical Science 401 and 403
- 3 units: Medical Science 519 or 507²

¹Medical Science 507 is an independent study course that may be repeated for credit. May be applicable when the topic is in the field of Bioinformatics and with consent of the Bioinformatics Co-Directors.

²May be applicable with a project from the field of Bioinformatics and with consent from the Bioinformatics Co-Directors.

Bioinformatics Minor for BSc Students in the Department of Biological Sciences (BISC, BCEM, CMMB, PLBI majors)

- 6 units: Computer Science 217 and 219; or Computer Science 231 and 233; or Computer Science 235 and 3 units of Computer Science at the 300 level or above
- 3 units: Computer Science 319 or 331
- 3 units: any Computer Science or Mathematics course at the 300 level or above

- 3 units: Medical Science 341 or Biology 311
- 3 units chosen from: Biology 401; Cellular, Molecular and Microbial Biology 411, 413, 461, 511, 523; Ecology 529; Plant Biology 401; Medical Science 541, 543, 545, or 507¹
- 3 units: Biology 315 or Statistics 321
- 6 units: Medical Science 401 and 403
- 3 units: Medical Science 519 or 507²

¹Medical Science 507 is an independent study course that may be repeated for credit. May be applicable when the topic is in the field of Bioinformatics and with consent of the Bioinformatics Co-Directors.

²May be applicable with a project from the field of Bioinformatics or an equivalent project-based 507 course offered by the Department of Biological Sciences and with consent from the Bioinformatics Co-Directors.

Bioinformatics Minor for BSc Students in the majors offered by the Department of Biological Sciences (ECOL and ZOOL majors)

- 6 units: Computer Science 217 and 219; or Computer Science 231 and 233 or Computer Science 235 and 3 units of Computer Science at the 300 level or above
- 3 units: Computer Science 319 or 331
- 3 units: any Computer Science or Mathematics course at the 300 level or above
- 3 units: Medical Science 341 or Biology 311
- 6 units chosen from: Biology 401; Cellular, Molecular and Microbial Biology 411, 413, 461, 511, 523; Ecology 529; Plant Biology 401; Medical Science 541, 543, 545, or 507¹
- 6 units: Medical Science 401 and 403
- 3 units: Medical Science 519 or 507²

¹Medical Science 507 is an independent study course that may be repeated for credit. May be applicable when the topic is in the field of Bioinformatics and with consent of the Bioinformatics Co-Directors.

²May be applicable with a project from the field of Bioinformatics or an equivalent project-based 507 course offered by the Department of Biological Sciences and with consent from the Bioinformatics Co-Directors.

Bioinformatics Minor for BSc Students majoring in Computer Science

- 6 units: Statistics 321 and 323; or 6 units of Statistics courses at the 300 level or above
- 6 units: Biology 241 and 243
- 3 units: Medical Science 341 or Biology 311
- 3 units: Medical Science 351 or Biology 331
- 3 units: chosen from Biology 401; Cellular, Molecular and Microbial Biology 411, 413, 461, 511, 523; Ecology 529; Plant Biology 401; Medical Science 541, 543, 545, Medical Science 507¹ (CPSC 403)
- 6 units: Medical Science 401 and 403
- 3 units: Medical Science 519 or 507²

¹Medical Science 507 is an independent study course that may be repeated for credit. May be applicable when the topic is in the field of Bioinformatics and with consent of the Bioinformatics Co-Directors.

²May be applicable with a project from the field of Bioinformatics or an equivalent project-based 507 course offered by the Department of Computer Science and with consent from the Bioinformatics Co-Directors.

Notes:

1. Students may use a maximum of 9 units of coursework to fulfill the requirements of both their Major field and the Minor program.
2. Students should note that many of these courses have prerequisites and must be taken into consideration when planning their program.
3. Some of the above courses may be restricted to Majors in the field and students may not have enrolment priority in heavily subscribed courses.
4. Students who are pursuing an Honours degree may consider a cross-disciplinary Honours thesis and should consult with a program advisor regarding opportunities in the area.
5. Other courses may be approved to fulfill the requirements of the Bioinformatics minor at the discretion of the Co-Directors of Bioinformatics. Students should contact the BHSc Program Coordinator for more information.

4.5.4 Health and Society Major

Upon completion of Year 1, Health and Society students are required to declare an "Area of Concentration". This must be selected from Anthropology, Community Rehabilitation and Disability Studies, Economics, Psychology, Geography, Sociology, or Political Science. Course selection must correspond to the student's chosen concentration discipline and must be chosen from the "Concentration Courses" listed below.

Required Courses:

- Health and Society 201, 301, 311, 401, 591
- Biology 241, 243
- 9 units Major Option: Anthropology 203, Community Rehabilitation 205, 207, Economics 201, 203², Geography 254, any 200-level Political Science, Psychology 200, 201¹, Sociology 201
- 3 units Life Sciences Option: any Biology course or Medical Science 341 or Kinesiology 251 or Anthropology 201
- 3 units English: any 200-level English or Comparative Literature 203
- 21 units Concentration Courses (see below)
- 9 units Open Option
- Medical Science 203, 205, 308, (inquiry-based courses to be taken in sequence through years one to two); Health and Society 408 (to be taken in year three)
- Medical Science 407
- Medical Science 508: Research project to be taken in final year. The research project is worth 12 units and is only offered in fall and winter terms.
- 3 units Humanities Elective*
- 12 units Health Science Option: any senior-level course offered by the Fac-

ulty of Science, the Cumming School of Medicine or courses selected from Anthropology, Archaeology, Economics, Geography, History, International Relations, Linguistics, Indigenous Studies, Political Science, Psychology, Sociology, Urban Studies

- 6 units Senior Option

¹Students considering concentrating in psychology should take Psychology 200 and 201. It is strongly recommended that this course is completed during the first year of study to facilitate enrolment in senior-level Psychology course come the student's second year.

²Students considering concentrating in economics should take Economics 201 and 203. It is strongly recommended that these two courses are completed during the first year of study to facilitate enrolment in senior-level Economics course come the student's second year.

*Acceptable courses from the Faculty of Arts to satisfy the Humanities Elective may be selected from the following departments: Classics and Religion; English; Philosophy; School of Languages, Linguistics, Literatures and Cultures; Medical Science 307.

CONCENTRATION COURSES**

ANTHROPOLOGY

Anthropology 341, 393, 411, 490 and 9 units from Archaeology 595 or senior-level courses offered by the Department of Anthropology and Archaeology.

COMMUNITY REHABILITATION AND DISABILITY STUDIES

Community Rehabilitation 209, 435, one of 471 or 473 or 475 and 12 units senior-level Community Rehabilitation courses.

ECONOMICS

Economics 337, 355, 379 and 12 units senior-level courses by offered by the Department of Economics.

Students considering a concentration in Economics should take Economics 201 and 203 as Major options. It is strongly recommended that these two courses be completed during the first year of study to facilitate in senior-level Economics courses come the student's second year.

GEOGRAPHY

Geography 280, 352, 380, 485 and 9 units senior-level courses offered by the Department of Geography

POLITICAL SCIENCES

Political Science 310, 359, 381, 399 and 6 units senior-level courses offered by the Department of Political Sciences

PSYCHOLOGY

Psychology 300, 301, 305 or 405 and 12 units senior-level courses offered by the Department of Psychology.

Students considering a concentration in Psychology should take Psychology 200 and 201 as Major options. It is strongly recommended that this course be completed during the first year of study to facilitate in senior-level Psychology courses come the student's second year.

SOCIOLOGY

Sociology 311, 313, 315, 321, 331, 333, 413

**The above concentration courses are subject to the changes and restrictions of the department offering the course.

4.5.5 Health and Society Minor

A Minor is available in Health and Society. The GPA over all courses counting towards the minor must be at least 2.00.

A maximum of 50 students will be admitted into the Minor each calendar year. Students will be selected top down based on GPA over their last 30 units. Admission to the Minor will be offered to students once Fall and Winter Term grades have been received.

Students must declare their intention to Minor in Health and Society after having taken a minimum of 24 units.

Students should apply to the Minor program through their Student Centre. Students should refer to the application deadline in the Admissions section of the Calendar.

12 units:

Health and Society 201, 301, 311, 401

18 units selected from:

Anthropology 203, 341, 449, 490

Archaeology 595

Community Rehabilitation 205, 207, 209, 415, 435, 471, 473, 475, 485, 487, 591.26, 591.28,

Economics 201, 203, 337, 349, 355, 377, 379

Geography 254, 280, 352, 354, 380, 485

Health and Society 403

Psychology 200, 201, 351, 353, 375, 385

Sociology 201, 321

Notes:

1. Students may not use courses in fulfillment of both Major and Minor requirements.
2. Students must complete enough senior-level courses to fulfill the requirements of their Major.
3. Students should note that many of these courses have prerequisites and must be taken into consideration when planning their program.
4. Some of the above courses may be restricted to Majors in the field and students may not have enrolment priority in heavily subscribed courses.
5. Students who are pursuing an Honours degree may consider a cross-disciplinary Honours thesis and should consult with their supervisor regarding opportunities in this area.
6. Other courses may be approved to fulfill the 18 units at the discretion of the Director of Health and Society. Students should contact the BHSc Program Co-ordinator for more information.

5. Doctor of Medicine

The Cumming School Medicine of the University of Calgary offers a three-year professional degree leading to a Doctor of Medicine (MD).

Following completion of the undergraduate medical program students must complete postgraduate medical training prior to starting independent practice. They need to obtain certification from the College of Family Physicians of Canada (a minimum of two

additional years of training) or a Royal College of Physicians and Surgeons of Canada program (a minimum of four additional years of training). The University of Calgary has more than 60 residency training programs.

Full details can be found on the Cumming School of Medicine Postgraduate Medical Education website at ucalgary.ca/pgme.

Leaders in Medicine Combined MD/PhD or MD/MSc Program

The Cumming School of Medicine offers a combined degree program with the Faculty of Graduate Studies leading to various MD/graduate degrees (i.e. MD/MSc, MD/MBA and MD/PhD) in all Cumming School of Medicine graduate programs and with permission in other University of Calgary graduate programs. Information can be obtained under the Leaders in Medicine heading in the Faculty of Graduate Studies section of this calendar, and in the sections describing the individual CSM graduate programs. Supplementary application forms can be obtained from the Leaders in Medicine Program office (Graduate Sciences Education) in the Cumming School of Medicine.

5.1 Faculty Information

Contact Information

Location: Undergraduate Medical Education Office, Health Science Centre G701

MD Program main reception number: 403.210.3841

Website: ucalgary.ca/mdprogram/

Student Advising and Wellness (SAW)

Student Advising and Wellness (SAW) encourages students to strive for balance in their academic and personal lives. Our office is here to help support you throughout the next three years of training and we encourage students to utilize our completely confidential services. We offer medical, emotional, academic and career counseling assistance; we are always available to help you. We strive to create a supportive environment to help promote positive growth and development as students transition into well-rounded medical professionals.

Contact Information:

Location: Health Sciences Centre G740

Main Reception Number: 403.220.3796

Office Hours: 8:30 am – 4:30 pm

Website: ucalgary.ca/mdprogram/current-students/student-advising-wellness

Parking and Transportation Services

Students can apply for on-site parking through the Alberta Health Services Parking Office as follows:

Women's Health Centre, Room 060

Foothills Medical Centre

Business Hours: 8:00 a.m. – 4:00 p.m.

Monday to Friday (closed on holidays)

Phone: 403.944.1014

Alberta Health Services also operates a parking call centre with assistance from live operators available 24 hours per day, seven days per week. The toll-free call centre number is included on the parking information sheets and is also posted on all parking equipment. Please call us anytime to obtain general parking information, report a maintenance or equipment problem, or to obtain assistance with equipment operation. Call 1-855-535-1100.

Email: ProvincialParking@albertahealthservices.ca

Website: albertahealthservices.ca/5505.asp

Map of Foothills Site: albertahealthservices.ca/info/Page12576.aspx

5.2 Pattern of Education

The curriculum at the Cumming School of Medicine follows an innovative "Clinical Presentation" curriculum. Curriculum content including basic and clinical sciences is organized around the 120 +/- 5 ways a patient can present to a physician. These clinical presentations can take the form of historical points (e.g. chest pain), physical examination signs (e.g. hypertension), or laboratory abnormalities (e.g. elevated serum lipids).

The organization by clinical presentations allows for a comprehensive approach to patient problems. Collaboration with multidisciplinary colleagues is incorporated, with emphasis on the physician as a member of the health-care team. Elective opportunities allow students to explore areas of interest in greater depth, including clinical interests, research topics, and international health.

Medical students are exposed to patient care from the time they enter the Cumming School of Medicine. This begins with exposure to "standardized patients" (actors who portray patients to facilitate early learning of clinical skills). Subsequent exposure to real patients, with faculty supervision is facilitated by the Cumming School of Medicine's associations with inpatient and outpatient settings throughout Calgary and Alberta. In these settings, students are able to participate in patient care and a team approach to health-care delivery from the beginning of medical school.

The curriculum maintains an active learning environment. In the first two academic years, more than 25 per cent of scheduled instructional activities are spent in small group, case-based learning sessions. These small group sessions allow a unique opportunity for students to create an approach to problem solving using diagnostic classification schemes, to analyze the objectives and content from lectures in an in-depth fashion, and to communicate and exchange feedback with faculty and peers. Student attendance at small group sessions is considered mandatory.

The third and final academic year is called the Clinical Clerkship. During this time, students work on hospital wards, in ambulatory care clinics and doctors' offices as well as in the Emergency Department in Calgary and Southern Alberta. Students rotate through a variety of specialties including Emer-

gency Medicine, Family Medicine, Internal Medicine, Surgery, Psychiatry, Paediatrics, Anaesthesia, and Obstetrics and Gynaecology. Students also have 12 weeks of elective experience in the clerkship year. A small number of students will complete a rural, longitudinal clerkship experience with some rotations in the aforementioned disciplines.

The Undergraduate Medical Education program employs electronic-based materials in lectures, small groups, and other learning events. As such a laptop computer or similar device (e.g. tablet) is strongly recommended for all students.

Participation in Rural Rotations: In the School's response to rural social accountability, the program provides teaching at several regional centres such as Medicine Hat, Lethbridge, Red Deer, Yellowknife and rural sites such as Brooks, High Level and Pincher Creek, etc. Students should expect to do a minimum of 5–10 weeks of their clinical experience (pre-clerkship and clerkship) outside the city of Calgary except in unusual circumstances. A longitudinal placement at a rural site in the clerkship year provides a further option for a longer rural training experience for interested students.

5.3 Admissions

The details contained in the following sections constitute the definitive account of the regulations relating the admission to the MD program at the University of Calgary. Applicants will also find helpful resources and clarification on the MD admissions website (ucalgary.ca/mdprogram/admissions). The Application Manual includes more detailed descriptions of the admissions processes related to the regulations outlined within the Calendar.

Pre-Medicine

The Cumming School of Medicine welcomes applications from individuals with a wide variety of educational backgrounds. It does not require that a student undertake a formal pre-medical program or specified prerequisite courses. There is no preferred degree.

Eligibility for Admission

As a provincial university, the University of Calgary has a primary obligation to Canadian citizens residing in Alberta. Although priority will be given to Alberta residents, the School also invites applications from residents of other provinces. A maximum of 15 per cent of all available positions may be offered to non-Alberta residents.

The Cumming School of Medicine has a policy on the admission of candidates who are neither Canadian citizens nor permanent residents. The School does not accept applications from individual international students. Seats for international students are currently limited to students from institutions or countries that have formal, contractual agreements with the Cumming School of Medicine.

The Cumming School of Medicine is committed to providing an inclusive learning environment. In selecting students, no consideration is given to factors irrelevant to

academic performance such as gender, age, race, or religion. Nor will the vocation of an applicant's parent, guardian, or spouse be a consideration in the selection process.

The Cumming School of Medicine is committed to providing appropriate accommodations to students with disabilities in accordance with University of Calgary policy. Physical and learning disabilities must not prevent the student, upon graduation, from communicating with patients, making observations, gathering and analyzing data necessary to arrive at medical judgments, and from performing in a safe and timely manner the therapeutic interventions expected of a physician who has completed the educational program leading to an MD degree. Potential applicants with a disability who are concerned that their disability may impact their ability to complete or apply successfully to the MD program are encouraged to contact Student Accessibility Services (ucalgary.ca/access/) or the MD Admissions Office to discuss their particular situation.

The Cumming School of Medicine will not normally accept applications from students who have withdrawn, who have been required to withdraw, or who have been expelled from any school or college of medicine.

Educational Background

Students must have completed, at the time of application, a minimum of two full-time years of university education. See section 3.7 of the Applicant Manual. A full-time year is defined for the purposes of application as a minimum of 24 units (credits), completed over the fall and winter terms or equivalent. These courses must be completed at an MD/PhD granting institution or be transferable to such an institution. The admissions committee will also consider, on a case-by-case basis, applications from individuals who have been unable to complete undergraduate studies on a full-time basis for well-established medical or financial reasons. Such individuals must first petition the Admissions Committee for permission to apply by contacting the Director of Admissions prior to August 1st of the application year.

The Cumming School of Medicine does not require that students undertake a formal pre-medical program. No specific courses are required for application or acceptance to the MD program. The admissions committee recommends that applicants consider taking courses in as many of the following disciplines as their schedules allow, as the content of these courses will be helpful in preparing for the Medical College Admission Test and during the MD program: biology, chemistry, organic chemistry, literature, indigenous studies, ethics, statistics, biochemistry, physiology, psychology and research methods. Whether or not an applicant has taken these courses at the time of application will not be taken into consideration in scoring the academic record. Students should ensure that the courses they choose satisfy the degree requirements

of the undergraduate faculty in which they are registered.

Definition of Alberta Residency for MD Admission

The Cumming School of Medicine Admissions Committee considers an applicant to be "Albertan" if they have been physically present in Alberta on a day-to-day basis for 24 consecutive months at some point between their 15th birthday and the first day of classes of the year for which they are applying. The residency requirement shall not be considered broken when the Admissions Committee is satisfied that the applicant has been temporarily out of the province for vacation, educational exchange or employment.

Applications

Applications for the MD program are done online at ucan.ucalgary.ca. The deadline for receipt by the Office of Admissions of the online application, all official transcripts, official MCAT scores, three letters of reference, and the application fee of \$150.00 is October 1.

Applicants should note that the Office of Admissions will not accept facsimile transmission copies of transcripts. Candidates are encouraged to submit their applications early in the process, preferably well before the deadline. It is the responsibility of the applicant to ensure that the application is complete and that all necessary forms and the application fee are received by the MD Office of Admissions by the deadline. Completed applications include the following information: a list of courses taken and grades obtained; MCAT scores (if available) and the date of writing; a brief description of past experiences; employment activities, three letters of reference, and original transcripts for all post-secondary education to date.

Applicants will be notified of the Admissions Committee's decision on or before May 15. All applicants accepted into the Cumming School of Medicine will be required to forward a \$1000.00 deposit within the time specified in the acceptance letter. Details regarding the submission of the deposit are included in the acceptance letter. Failure to do so may result in the position being assigned to an applicant on the waiting list. The deposit is applied to first-year fees. An applicant who accepts a position and later withdraws it will forfeit the deposit.

Deferred matriculation may be granted on a case-by-case basis at the sole discretion of the Director of Admissions. Students granted a deferral must submit a supplemental deposit of a further \$2,000.00 which is credited against first-year fees. Deferrals will generally only be granted for a single year.

All medical students must commence a program of immunization before registration day. The Cumming School of Medicine reserves the right to refuse admission to any candidate whose condition of health indicates that medical studies could be prejudicial to their well-being.

Application Assessment

Applications are evaluated by the Admissions Committee and up to four members of the Admissions File Review Sub-Committee. Each application is given an application score which consists of the following components:

- 20 per cent GPA
- 10 per cent CARS subsection of the Medical College Admissions Test (2015 version)
- 10 per cent for each of the following attributes, as scored by the members of the File Review Subcommittee: Academic Merit, Communication Skills, Collaboration, Maturity and Insight, Advocacy on Behalf of Others, Scholarship and Research, Leadership Skills.

Invitations to interview for a position in the MD program are then made based on the file review score obtained.

GPA Calculation and Minimum GPA

The GPA used for the purpose of the application to the MD program is calculated automatically by the online application system once applicants have entered all their undergraduate and graduate grades. It is calculated using the average of all full-time undergraduate years, defined as 24 units (credits) of which 18 units or more must have received a numerical or letter grade completed between September and April. Each such academic year is considered equivalent for the purposes of this calculation, regardless of how many units were completed within it.

This calculated GPA is then modified as follows:

- Applicants who have completed or will have completed their undergraduate degree prior to matriculation into the MD program will have their lowest GPA year removed from the above calculation.
- Applicants who have completed or will have completed a graduate degree prior to matriculation into the MD program will have their cumulative GPA for that graduate degree included in the calculation as equivalent to a single full-time undergraduate year.
- Applicants with both remote and recent post-secondary studies may elect to invoke a 10 year exclusion rule, and in doing so exclude from the GPA calculations any academic work completed more than 10 years previously. Applicants electing to do so, however, must meet the eligibility requirements based on academic work done in the immediately preceding 10 years.

Albertan applicants, indigenous applicants, regardless of their province of residence, individuals currently on active duty with the Canadian Forces or the RCMP, and current students or graduates of the Rural Pre-medicine Program at Selkirk College in Castlegar, B.C., must have an admissions GPA of 3.20 or greater in order to be eligible to apply.

Non-Albertan applicants must have an admission GPA of 3.80 or greater in order to be eligible to apply.

Applications from individuals who do not meet these GPA minimums will not be considered.

Medical College Admission Test

All applicants must write the Medical College Admission Test in sufficient time to ensure that their MCAT scores will then be available to the Admissions Committee by the application deadline. This usually means that writing the test by mid-August of the year of application. The MD Admissions Office will update on its website on an annual basis the last possible MCAT sitting for the current application cycle. Applicants should contact the MCAT Program Office (aamc.org/mcat) for details about the test and they must instruct the organization to release their MCAT results to the University of Calgary.

Applicants to the Cumming School of Medicine should also be aware that all applicants must complete the 2015 MCAT. The results of pre-2015 version of the MCAT, if available, will still be considered by the committee as part of the overall assessment of academic merit.

There is no MCAT minimum for Albertan Applicants or for individuals to whom the 3.20 GPA minimum applies.

Non-Albertan applicants must achieve a score of 128 on the CARS sub-section of the MCAT in order to be eligible to apply.

Interviews

Applicants will be notified in February regarding whether or not they will be invited to attend a series of short interviews. The interviews take place at the University of Calgary in February or March.

Applicants must attend the interviews at their own expense. Applicants must take part in a series of short, back-to-back interviews, which the Committee will use to assess the candidates' non-academic qualifications.

The number of interviews offered varies from year to year, but usually ranges between 500 and 550 interview invitations.

Each interviewed applicants is assigned an interview score based on performance in the interview. The final admission offer decisions are made based on the final application score, which consists of 50 per cent File Review Score and 50 per cent Interview Score.

Indigenous Applicants

The Cumming School of Medicine recognizes the marked under-representation of indigenous individuals within the medical profession and the importance of producing a medical workforce that represents the demographic diversity of the population we serve. In recognition of these facts, certain modifications to the application process for indigenous applicants are currently in place. Any applicant may self-declare as indigenous and will be invited to submit a supplemental short essay describing their con-

nection to their community and the impact of their heritage on both their preparation for medical school and their plans following completion of the MD. All self-declared indigenous applicants are required to submit proof of status or indigenous ancestry. All Indigenous applicants will also be invited to interview.

Alternative Admissions Process

In a limited number of cases, the Admissions Committee reserves the right to admit eligible individuals to the MD program regardless of their Final Application Score, if the committee is sufficiently convinced that the applicant has the academic and personal qualities necessary to succeed, and that doing so will assist the Cumming School of Medicine in meeting the health needs of the Canadian public.

Admission/Registration Refusal

Admission to the MD program is competitive. Meeting the admission requirements does not guarantee admission to the program or allow students to register in courses. The University of Calgary reserves the right, the published regulations notwithstanding, to deny applicants admission or registration in courses on the basis of their overall academic records, or if, during the course of the application process, the applicant has demonstrated behaviours or characteristics deemed to be incompatible with the practice of medicine. Admissions decisions are final and not subject to appeal.

Admissions Committee

The Admissions Committee of the Cumming School of Medicine consists of representatives of the School, physicians-in-training, other health care disciplines, and the community at large. The committee is charged with the final selection of medical students on the basis of academic and non-academic qualifications.

Admission of Students by Transfer

The Committee is able to consider requests for students from another university to take clerkship education at the University of Calgary in mandatory clerkship courses, or their equivalents, for the entire clerkship year provided that:

1. There is support from the Associate Dean UME at the University of Calgary and the counterpart at the Canadian university from which the student is transferring. This must include justification for the request and confirmation of good academic and professional standing in the university from which the student is transferring.
2. There are sufficient resources at the University of Calgary, such that the transfer student will not displace University of Calgary students.

These requests can be considered in the same manner that the Committee will consider requests from University of Calgary students for extensions to clerkships and special leaves of absence.

Students accepted for transfer will become a University of Calgary student, and will, upon completion of all the requirements for an MD degree, be conferred a University of Calgary medical degree.

For more information on Medical Student Transfers, refer to: ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference.

Pathways to Medicine

The Cumming School of Medicine offers a Pathways to Medicine program to individuals entering an undergraduate program at the University of Calgary. The program includes a scholarship and guaranteed admission to the MD program upon completion of the undergraduate degree, provided specific conditions are met. Eligibility for the Pathways to Medicine program is restricted to individuals from low-income backgrounds, with a particular focus on rural and indigenous students. For details, visit: cumming.ucalgary.ca/pathways.

Admission to the MD program upon completion of the undergraduate degree is conditional upon the following:

- Maintenance of an overall GPA of 3.40 or greater over the course of their undergraduate studies.
- Achievement of the minimum MCAT score required of regular applicants at the time of application, if such minimums are in place at the time.
- Completion of the application process in the same manner as regular applicants with a score on the file review and the interview above the twentieth percentile.

5.4 Program Details

Schedule of Classes and Timetable

The schedule of classes offered in each year of the MD Program is available online in the student scheduling system OSLER. In exceptional circumstances changes may be made to a student's timetable to meet the schedule of the program. Schedule of detailed class information is available in the online student schedule in OSLER at: osler.ucalgary.ca/.

Students should refer to the online schedule in OSLER to ensure that they are not scheduling extracurricular events or overlapping with scheduled class time. In addition, master timetables of the curriculum can be found online. Refer to this link for the most updated version of the general timetable: ucalgary.ca/mdprogram/current-student/timetables-0.

Timelines

Year 1: July – March (9 Months)

Year 2: April – January (10 Months)

Year 3: January – April (14 Months)

Curriculum Requirements (Core Courses)

Year 1: Medicine 320, 330, 340, 350, 360, 370

Year 2: Medicine 402, 410, 420, 430, 440, 450, 460, 470, 480, 490

Year 3: Medicine 502, 504, 506, 508, 510, 512, 514, 516, 520, 522

For a complete listing and description of all courses offered in the MD Program, refer to the Courses of Instruction section of the University Calendar.

Program Extensions

Students are allowed to request a program extension through the Student Academic Review Committee (SARC). Process for these requests is outlined in the SARC Terms of Reference, Appendix, Section E as found in:

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference.

Extensions may be allowed in the clerkship year (Year 3 of Program) as a result of a student failing to be matched in the Canadian Resident Matching Service (CaRMS) residency match.

Maximum Time Allowance to Complete the Curriculum

Students are required to complete the first two years of the MD curriculum within no more than four years from the initiation of studies, and complete the third clerkship year within two years after the completion of the first two years of study. Exceptions are made for students formally enrolled in the MD/PhD or MD/MSc Programs, where the maximum time allowed for the completion of the combined programs is eight and six years respectively. Exceptions may be made in other unusual circumstances.

Approved leaves of absence (single or cumulative) may extend the time to complete the curriculum by no more than two years beyond the maximum time allowances.

Please refer to the Student Academic Review Committee (SARC) Terms of Reference for further information at: ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference.

5.5 Faculty Regulations

Immunization Requirements

All MD students are required to complete a series of immunization and diagnostic tests as outlined on the Medical Student Immunization Form Worksheet. Documented proof of completion must be provided to the Associate Dean or designate prior to commencement of the program.

Throughout the MD program, students are required to ensure that immunizations are current and must provide proof of updates to the Cumming School of Medicine. Failure to do so will result in students being removed from clinical courses/site until such time as adequate proof has been provided. Please note requirements may change during the program as determined by Alberta Health Services and AFMC guidelines.

In addition, the College of Physicians of Alberta describes medical conditions that may require surveillance; these regulations apply to students who are registered with the CPSA as a condition of attend-

ing the program. <http://www.cpsa.ca/standardspractice/self-reporting-college/>.

N-95 Fit Testing

All MD students must be fit tested for an N-95 mask prior to commencement of Medicine 402 (Summer Electives). Students may be required to wear this mask in the practice setting to help protect against certain communicable diseases. Documented proof of a fit test will be available in the Undergraduate Medical Education office. Fit testing is only valid for two years; therefore students must present proof of a second fit testing at the time of expiration.

Security Clearance/Criminal Record Check

All applicants to the MD Program in the Cumming School of Medicine are required to provide a current Police Information Check (also referred to as a Criminal Record Check or Security Clearance). In order to be considered "current", the Police Information Check must be completed during the three months prior to admission to the program. The original Police Information Check must be presented, in person, to an Undergraduate Medical Education staff for confirmation. Without this documentation, admission to the Medical Doctor Program will be rescinded.

Students who are concerned about the presence of a criminal record should contact the police department to discuss the process for eliminating or erasing such a record. It is important that students keep the original Police Information Check for future employment purposes.

Failure to present a clear Police Information Check may result in admission being denied/rescinded. An internal University appeal process is available to applicants who are refused admission for this reason.

Subsequent to admission and at any time during the program, a student may be required to produce a current Police Information Check, the results of which could require their withdrawal from the program, in the sole discretion of the University. Students are obligated to inform the School immediately of any change in status of their criminal record.

Policies Relative to Clinical Experience

Students are advised to read the general University regulations regarding attendance (see E.3 Attendance) in the Academic Regulations section of this Calendar.

Students may be required to complete clinical experience at sites other than the location of their residence. Students' clinical experience may also be scheduled at various hours, including evenings, nights and weekends, **Monday through Sunday**. Medical Doctor students are responsible for all travel, parking and accommodation costs related to clinical experiences except for University of Calgary Longitudinal Integrated Clerkship (UCLIC) students.

Students must demonstrate satisfactory performance as delineated in the objectives of the course. Participation in all activities that involve patients is mandatory.

Students who miss one or more clinical days, must comply with the Undergraduate Medical Education (UME) attendance policies.

An instructor may prohibit a student from attending or completing a clinical experience if there is evidence that the student has acted in a manner that is detrimental to patient care or that patient safety is at risk. The Associate Dean will be consulted or informed about any such situation or action. A student who wishes to appeal such a decision will follow the appeals process as outlined in the Calendar under section 5.8 Reappraisals and Appeals.

Policy Relative to Student Attendance

Students are advised to read the general University regulations regarding attendance (see E.3 Attendance) in the Academic Regulations section of this Calendar.

In addition to the academic regulations, the following attendance policies and guidelines will apply to all students in the Medical Doctor program:

- Medical Student Attendance Policy (Related to Years 1 and 2 of the MD Program)
- Guidelines for Attendance in Clerkship Located in the "Clerkship Policies and Procedures Manual" (Related to Year 3 of the MD Program)
- Medical Student Leave of Absence/Time Away Policy (Related to all three years of the Program)

All documents listed above can be located on the Medical Doctor Program website as follows:

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference
ucalgary.ca/mdprogram/current-students

Academic Accommodation Policy

It is important for students with documented disabilities, who have met the admission criteria, to note that the Academic Accommodation Policy does not require the University to lower or substantially modify standards in order to accommodate students with disabilities. Adaptive technology and/or academic accommodations are available to facilitate learning; however, they do not relieve students of their responsibilities to develop the essential skills and abilities expected of all other students.

All students who believe that they may benefit from academic accommodations must contact Student Accessibility Services (<https://www.ucalgary.ca/access/>) to arrange for an assessment.

Fees and Expenses

Tuition

Please refer to the Tuition and General Fees section of the Calendar for a breakdown of tuition and general fees for the MD Program.

Other Expenses

In addition to textbooks and course packages, students can expect other additional charges. Examples include but are not limited to:

- Uniforms
- Stethoscope
- Police Information Check
- CPR Certification/Re-certification
- Immunizations
- Travel to and from practice sites
- Parking Fees at practice sites
- Name badges
- Medical Council of Canada Examination Fees

Tuition Fee Credits

A tuition credit will be calculated by the Undergraduate Medical Education Office (UME) when a student has gone on an approved Leave of Absence from the program or has been requested to withdraw from the program. Students will not receive a refund but rather a credit note for future tuition or general fee expenses. Please note that general fees cannot be adjusted.

Student Awards

Student Awards Office

Location: MacKimmie Block 124

Telephone: 403.210.7625

Undergraduate Awards Email: ucawards@ucalgary.ca

Financial Assistance and Loans Email: financialaid@ucalgary.ca

Website: ucalgary.ca/registrar/finances/

The Student Awards Office provides scholarships, bursaries and awards information to entering and continuing undergraduate students, linking them with valuable financial resources for their post-secondary studies.

Students should review the cost of attending university from their very first term through to the completion of their program. Paying for a university education is ultimately the responsibility of the student. To access financial assistance, make the necessary applications well before the start of the academic year. Be aware of the application deadlines for grants, awards and government student loans. Although each student's needs and resources differ, the University provides a list of general fees and expenses. Refer to the Tuition and General Fees section in this Calendar for details.

Awards specifically for medical students can be found online at:

ucalgary.ca/registrar/finances/awards/professional

cumming.ucalgary.ca/ruralmedicine/awards

Graduation

Students must have successfully completed all required components of the MD program in order to Graduate.

Students will not be allowed to graduate with any failed course. The Student Academic Review Committee (SARC) of the MD Program will establish appropriate remedia-

tion requirements that must be fulfilled in order for students to obtain the standing of satisfactory performance. These remediation requirements may include repeating one or more practicum rotations, one or more entire courses, or the entire year.

Policy Resources

Clerkship Policy & Procedures Handbook

ucalgary.ca/mdprogram/current-students

Student Evaluation Committee (SEC): Policy for Development & Maintenance of Student Evaluations & Policy for Reappraisals and Appeals of Student Evaluations

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference

Undergraduate Medical Education Policies & Guidelines

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference

Student Academic Review Committee: Terms of Reference

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference

5.6 Course Registration

Accuracy of Registration

The Undergraduate Medical Education Office will register successful applicants admitted to the Medical Doctor Program and ongoing students into all required yearly courses. Payment of fees is the student's responsibility through the Online Student Centre via MyUofC web portal. For more information refer to B.15 Payment of Fees or Notification of Financial Assistance in the Academic Regulations section of this Calendar.

Withdrawal from Courses

Students can withdraw from courses for the following reasons:

- Academic Issues and Student Academic Review Committee (SARC) Recommendations
- Approved Leave of Absences including Medical Leaves
- Approved Withdrawal from the MD Program

Prior to the add/drop deadline, students will have the course(s) removed from their permanent record and will not be required to pay tuition fees for the course.

After the course change period, a student will have the withdrawal recorded on their permanent record and will not receive a tuition fee credit.

Leave of Absence

In cases of leave of absence, the Student Academic Review Committee (SARC) reserves the right to review all students who have taken leaves of absence prior to resumption of studies. The maximum duration of leave of absence without compulsory review of the student's progress by SARC is one year. If the leave of absence is in excess of one year, the student will be reviewed by SARC prior to resumption of studies. SARC may ask for the student to be reassessed

prior to resumption of studies and may request the student repeat any portion of the preceding curriculum if found unsatisfactory before continuing further studies.

For more information on Leaves of Absence or Time Away, refer to:

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference.

5.7 Assessment

Exceptions and further information to Assessment, evaluations and appeals can be located in the following online documentation:

- Policy for Development and Maintenance of Student Evaluations
- Policy for Academic Assessment Reappraisal

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference

Scheduling of Examinations

Examinations are scheduled within regular class time except in those special cases where prior approval has been obtained from the Associate Dean of the Undergraduate Medical Education Office (UME).

Grading

The following grades/notations will be used by the Cumming School of Medicine for courses completed in the Cumming School of Medicine for courses completed in the MD Program.

CR — Completed Requirements

RM — Remedial Work Required

I — Incomplete

MT — Multi-Term

F — Fail

Grades in a course are reported according to the grading scheme of the faculty offering the course, regardless of the faculty in which a student is registered.

Satisfactory/Unsatisfactory standing is used to assess each course. Students will be declared Satisfactory or Unsatisfactory in the complete (overall) evaluation. Students cannot be declared Satisfactory overall on some of the course evaluation components.

To obtain credit for a course, a student must be certified as satisfactory on the course evaluation by achieving a score at or above the minimum performance level (MPL).

Results from Year 1 and 2 will be reported as either "Satisfactory" or "Unsatisfactory".

Results from Year 3 will be reported as "Satisfactory", "Unsatisfactory", or "Satisfactory with performance deficiency".

Satisfactory: The student has met or exceeded the level of performance minimally acceptable for promotion. A satisfactory standing will appear on the transcript as "CR".

Unsatisfactory: The student has not met the minimum performance level for the evaluation. A student can also be deemed unsatisfactory in a situation where a serious professionalism breach has occurred. An unsatisfactory standing will be recorded

on the student's transcript as an "F". A repeated course/rotation will be noted on the transcript with a different course number.

A student who receives an "unsatisfactory" standing may wish to review their result sheet with the examination key to aid in recognition of areas of deficiencies and assist in planning remedial studies or to identify an error in the marking. Should a student feel that an error has occurred in the marking of a non-multiple choice question (MCQ) they may submit a Request for Academic Assessment Reappraisal.

Satisfactory with performance deficiency: Used in Clerkship for the following situations.

1. Failure of one component of a clerkship evaluation with subsequent completion of required remedial work and satisfactory performance on rewrite of that component.
2. Overall rating of satisfactory performance in a clerkship rotation but with one or more specific areas of deficiency noted including professional and ethical behaviour.
3. A course/rotation signed-off as "Satisfactory with Performance Deficiencies" will appear as a "CR" on the transcript.

Minimum Performance Levels (MPL)

The MPL for examinations is established using one of two methods: modified Nedel-sky technique or the Hofstee compromise methods as described in the following policy document:

Policy for Development and Maintenance of Student Evaluations (ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference).

Distribution of Results

Results are available to students through Dolphin which can be accessed through the Central Authentication System (CAS). These results include the overall score and minimum performance level for the exam.

Results are confidential. Individual student results will be made available to:

1. the student
2. the student's permanent file
3. the office of the Associate Dean, UME
4. members of faculty committees responsible for student promotion and/or appeals
5. course chair and evaluation co-ordinator for relevant course or clerkship. Anonymized group evaluation results may be released to the course chair and evaluation co-ordinator for the relevant course and to faculty responsible for program evaluation in the Undergraduate Medical Education Program.

Individual student grades and class standings are not reported on student transcripts or provided as part of Canadian Resident Matching Service (CaRMS) applications.

Consequences of an Unsatisfactory Performance

Students should refer to the Student Evaluation Committee's (SEC) Policy for Development and Maintenance of Student Evaluations for consequences of unsatisfactory performance in any given year of the MD Program. This policy is located online as follows:

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference.

Student File

The Office of Medical Education maintains a file for each student in the MD Program one academic file and one non-academic file. The file is a combination of Years 1 and 2 (Pre-clerkship) and Year 3 (Clerkship) academic documentation.

For further information regarding a student's file, please refer to the online policy:

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference.

Promotions

On behalf of the Faculty Council, Student Academic Review Committee (SARC) determines whether or not students should be promoted to the next stage of the MD program, and ultimately receive the MD degree.

In accordance with The Terms of Reference for the Student Academic Review Committee, SARC is a delegated body of Faculty Council responsible for the review and ratification of undergraduate medical student performance. SARC makes recommendations to Faculty Council and the Dean concerning the promotion of students and discipline related to the academic performance (knowledge, skills and professional attitudes) of students who, by reason of unsatisfactory performance, cannot be promoted.

The Terms of Reference of the Student Academic Review Committee are located on the MD Programs website at: ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference. Students experiencing any academic difficulty should refer to this document and become fluent with the faculty rules regarding policies and procedure of promotion. Guidance regarding an appearance is available from Student Affairs, Faculty Advisors and the UME office.

Final decision for graduation is made by Faculty Council, under the advisement of SARC.

5.8 Reappraisals and Appeals

Appeal Process

Students may request a reappraisal or appeal for any evaluation decision within the MD Program. Students should be familiar with I. Reappraisal of Graded Term Work and Academic Assessments (final grades) and J. Student Appeals to the University Appeals Committee and University Appeals Tribunal in the Academic Regulations Section of the Calendar as well as the MD Program's Policy for Student Evaluation: Academic Assessment Reappraisals posted online at:

ucalgary.ca/mdprogram/about-us/ume-policies-guidelines-forms-terms-reference.

Appeals – University Appeals Committee

Procedures for appealing a final grade reappraisal beyond the departmental level are detailed in J. Student Appeals to the University Appeals Committee and University Appeals Tribunal and are the same for a final grade as for a piece of graded term work.

6. Postgraduate (Residency Programs)

6.1 Course Registration

The Postgraduate Medical Education Office will register all new and ongoing students in residency programs with the Registrar's Office. Payment of fees is the responsibility of the student. Information is available through the Online Student Portal via MyUofC web portal. No specific course registration is required for postgraduate medical education except in the following circumstances:

Individuals registered in the Public Health Preventive Medicine (PHPM) Residency Program may register in a maximum of 8 graduate credit courses at no additional charge. These comprise three mandatory courses and five courses selected based on future career plans. For applicable courses please see 6.2 Academic Requirements.

All other individuals registered in postgraduate (residency) training who wish to complete graduate courses must register and pay applicable tuition fees.

Any individual pursuing postgraduate (residency) training that wishes to register for a Master's or PhD degree must register with the Faculty of Graduate Studies and pay the applicable tuition fees.

6.2 Academic Requirements

Students registered in the Public Health and Preventative Medicine (PHPM) Residency Program must complete a minimum of 21 units, as described below.

Mandatory Courses

Students must complete 9 units of the following:

- Community Health Sciences 600
- Community Health Sciences 610
- Community Health Sciences 640

Option Courses

Students must complete a minimum of 12 units selected from graduate courses offered in Community Health Sciences, or other relevant graduate courses as approved by the PHPM Program Director.

7. Administration

Faculty Administrative Officers

Dean

J.B. Meddings

Vice Dean

G.M. MacQueen

Senior Associate Deans

B.L. Adams, Education

R.J. Bridges, Faculty Affairs

M. Tonelli, Health Research

G.W. Zamponi, Research

Associate Deans

S. Wiebe, Clinical Research

D.V. Exner, Clinical Trials

K.W. Burak, Continuing Medical Education and Professional Development

A. Johnston, Distributed Learning and Rural Initiatives

D.A. Keegan, Faculty Development

T.L. Beattie, Graduate Sciences Education

L. Welikovitch, Postgraduate Medical Education

P. Chu, Professionalism, Equity and Diversity

R.W. Turner, Research Grants

P.P.M. Schnetkamp, Research Infrastructure

D. Mosher, Strategic Partnerships and Community Engagement

E.U. Kurz, Undergraduate Health and Science Education

TBD, Undergraduate Medical Education

Assistant Deans

A. Stang, Continuing Medical Education and Professional Development, Physician Learning Program

H.A. Armson, Continuing Medical Education and Professional Development, Personalized Learning

G.L. Hollaar, Global Health

K. Millar, Postgraduate Medical Education, Education and Assessment Initiatives

R. DeVinney, Graduate Science Education

P.M. Veale, Undergraduate Medical Education, Clerkship

K.D. Busche, Undergraduate Medical Education, Pre-Clerkship

K.J. McLaughlin, Undergraduate Medical Education, Research and Innovation

For more information, please visit the Cumming School of Medicine website at cumming.ucalgary.ca/.

Faculty of Graduate Studies

1. Degrees Offered

See table of degrees below.

Graduate Programs

The Faculty of Graduate Studies administers doctoral programs leading to a Doctor of Philosophy or Education, and master's programs leading to a Master of Architecture, Master of Arts, Master of Biomedical Technology, Master of Business Administration, Master of Community Medicine, Master of Counselling, Master of Disability and Community Studies, Master of Education, Master of Engineering, Master of Environmental Design, Master of Fine Arts, Master of Geographic Information Systems, Master of Kinesiology, Master of Landscape Architecture, Master of Laws, Master of Music, Master of Nursing, Master of Pathologists' Assistant, Master of Planning, Master of Public Policy, Master of Science, Master of Social Work, or Master of Strategic Studies.

Combined Degree Programs

The Faculty of Graduate Studies has approved guidelines for Combined Degree Programs. A Combined Degree Program is a formal arrangement between two units offering programs whereby students may be registered simultaneously in two graduate programs (or in one master's program and one professional program such as JD or MD that normally admits students with undergraduate degrees). The University of Calgary presently offers the following combined degree programs: JD/MBA, JD/MPP, MBA/MPP, MBT/MBA, MN/MBA, MPlan/MBA, MSW/MBA, MSc/MBA, PhD/MBA, MD/Master's and MD/PhD (Leaders in Medicine). Information is available from the relevant graduate programs.

2. Faculty Information

Enquiries concerning graduate programs should be directed to the unit offering the

program. The Faculty of Graduate Studies website contains direct links to units offering graduate programs: grad.ucalgary.ca.

Introduction

The mission of the Faculty of Graduate Studies at the University of Calgary is to work with graduate programs to aid them in attracting well-prepared students, supporting the students well while they are here, graduating a high percentage of them in reasonable time, and producing graduate degree holders who are well-respected contributors in their fields wherever they are employed. To achieve this, the Faculty works with programs in setting admission standards and program requirements, and in establishing supervisory and examination committees. The Faculty is also closely involved in the administration of over \$30 million annually in financial awards for graduate study.

| | | | | | | |
|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| ANTH | ARKY | ART | BISI | BMEN | CHEM | CMMS |
| PhD | PhD | MFA | PhD | PhD | PhD | PhD |
| MA | MA | | MSc | MSc | MSc | MA |
| | | | | MEng | | |
| CMD | CMSS | CPSY | CPSC | DRAM | ECON | EDER |
| PhD | PhD | PhD | PhD | MFA | PhD | PhD |
| MSc | MSS | MSc | MSc | | MA | EdD |
| | | | | | | MA |
| | | | | | | MSc |
| | | | | | | MEd |
| EDPS | ENCH | ENCI | ENEL | ENGO | ENME | ENGL |
| PhD | PhD | PhD | PhD | PhD | PhD | PhD |
| MSc | MSc | MSc | MSc | MSc | MSc | MA |
| MEd | MEng | MEng | MEng | MEng | MEng | |
| MC | | | | | | |
| EVDS | FISL | GEOG | GLGP | GRST | GSEA | HIST |
| PhD | MA | PhD | PhD | PhD | MA | PhD |
| MArch | | MA | MSc | MA | | MA |
| MEDes | | MSc | | | | |
| MLA | | MGIS | | | | |
| MPlan | | | | | | |
| MPlan/MBA | | | | | | |
| IGP | KNES | LAW | LING | LLAC | MDBC | MDBT |
| PhD | PhD | LLM | PhD | PhD | PhD | PhD |
| MA | MSc | JD/MBA | MA | MA | MSc | MBT/MBA |
| MSc | MKin | JD/MPP | | | | |

(continued on next page...)

| MDCV | MDCH | MDGI | MDIM | MDMI | MDNS | MDPA |
|------|-----------|---------|------|--------|------|---------|
| PhD | PhD | PhD | PhD | PhD | PhD | MPath |
| MSc | MSc | MSc | MSc | MSc | MSc | |
| | MDCS | | | | | |
| MDSC | MGMT | MTST | MUSI | NURS | PHIL | PHAS |
| PhD | PhD | PhD | PhD | PhD | PhD | PhD |
| MSc | DBA | MSc | MA | MN | MA | MSc |
| | MBA | | MMus | MN/NP | | |
| | MMgmt | | | PMNP | | |
| | JD/MBA | | | MN/MBA | | |
| | MBT/MBA | | | | | |
| | MSW/MBA | | | | | |
| | MBA/MPP | | | | | |
| | MN/MBA | | | | | |
| | MPlan/MBA | | | | | |
| POLI | PSYC | PPOL | RELS | SEDV | SOCI | SOWK |
| PhD | PhD | MPP | PhD | MSc | PhD | PhD |
| MA | MSc | MBA/MPP | MA | | MA | MSW/MBA |
| | | JD/MPP | | | | MSW |
| VMS | | | | | | |
| PhD | | | | | | |
| MSc | | | | | | |

3. Admissions

There is no general right of admission to Graduate Programs. Each program determines whether to recommend to the Faculty of Graduate Studies the admission of a particular applicant based not only on the applicant's credentials but also on the availability of resources for supervision and research, departmental research objectives, program balance, and other such considerations. Taking these considerations into account, graduate programs are expected to act in equitable manner in their admission procedures.

Graduate students are admitted to the Faculty in one of the following categories:

Regular

Students may be admitted to a program leading to the master's or doctoral degree, provided admission qualifications are met.

Interdisciplinary Degree: A student wishing to pursue a thesis-based master's or doctoral degree in an area not sufficiently represented by one graduate program can request to do an interdisciplinary degree. In an interdisciplinary degree program, the student is admitted to both a home program and a conjoint program. The student submits an application form and fee along with official transcripts and letters for reference to the proposed home program, which will liaise with the proposed conjoint program.

Qualifying

A student who meets the qualifications for admission but lacks the necessary background for a graduate program in a chosen area of specialization may be admitted as a

qualifying graduate student. Upon satisfactory completion of a qualifying year, the student may be transferred to regular student status. Qualifying graduate students must be full-time registrants in either a master's or a doctoral degree program. Qualifying status will not be granted for a period exceeding one year.

Because a qualifying student is required to take more courses in a degree program than a regular graduate student, a qualifying student in a thesis-based degree program will be assessed an extra year of full program fees. A qualifying student in a course-based program will pay tuition fees for the extra required courses on a per-course basis. Tuition fees for courses taken during the qualifying year will not count toward the tuition fee for the degree program.

Visiting

A student who is registered in a graduate degree program at another university that does not have an exchange agreement with the University of Calgary, and who wishes to engage in course work and/or research at the graduate level at the University of Calgary for credit at their home university may be admitted as a visiting graduate student. A visiting student must submit a completed *Visiting Student Application* form and the application fee. Visiting students apply to specific graduate programs, and the applications are forwarded to the Faculty of Graduate Studies for registration. Visiting students pay all applicable general and tuition fees. Visiting students are normally permitted to spend a maximum of one year at the University of Calgary. It should be noted

that admission as a visiting student does not guarantee later admission to a graduate program at the University of Calgary.

Exchange

The Faculty of Graduate Studies at the University of Calgary has reciprocal exchange agreements with other institutions. Graduate students from these institutions may engage in course or research work at the University of Calgary for credit at the home institution. Exchange students must submit the appropriate application/approval form (<http://www.ucalgary.ca/future-students/graduate/apply>). Exchange students pay tuition fees at the home universities when this is written into the specific exchange agreement; they pay only the applicable general fees at the University of Calgary. If there is no reciprocal agreement, the exchange student pays both applicable general and tuition fees at the University of Calgary. It should be noted that exchange student status does not guarantee later admission to a graduate program at the University of Calgary.

The Western Deans' Agreement covers graduate students from member universities in British Columbia (British Columbia Institute of Technology, Royal Roads University, Simon Fraser University, University of British Columbia, University of Northern British Columbia, Thompson Rivers University and University of Victoria), Alberta (Athabasca University, Concordia University College of Alberta, University of Alberta, University of Calgary, University of Lethbridge), Saskatchewan (University of Regina, University of Saskatchewan), and Manitoba (Brandon University, University of Manitoba).

The Canadian Graduate Student Mobility Agreement, initiated by the Canadian Association for Graduate Studies (CAGS), encourages graduate student mobility within Canada in order to foster the exchange of ideas, specialized training, research collaboration, and interdisciplinarity. Graduate students, who must be registered full-time and paying fees at a participating home university, may register as "visiting graduate research students" at another participating university. No tuition fees will be charged to visiting graduate research students, provided they are not taking courses at the host institution. Incidental fees may be charged.

4. Qualifications

Applicants must hold or obtain the following minimum qualifications before the Faculty will give consideration to admission:

(a) A four-year baccalaureate degree or its equivalent from a recognized institution. Degrees and grades from other institutions are evaluated for their equivalency to those of the University of Calgary. A grade point average equivalent to 3.00 or better (on the University of Calgary four-point system) is required. This is based on the last two years of the undergraduate degree consisting of a minimum of 60 units. Senior Level courses of appropriate content for the graduate program applied for and any graduate work may also be considered. Individual graduate programs may require a higher admission grade point average.

In most cases, a master's degree or equivalent is required for admission to a doctoral program. See program listings in the Graduate Calendar (<http://www.ucalgary.ca/pubs/calendar/grad/current/gs-programs-descriptions.html>) for exceptions and details.

(b) Proficiency in the English language is essential for the pursuit and successful completion of graduate programs at the University of Calgary. It is the student's responsibility to demonstrate proficiency in English. For ways to meet the English language proficiency requirement, see Admissions in the Graduate Calendar.

5. Administration

Faculty Administrative Officers

Dean

L. Young

Associate Deans

J. Azaiez

S. Curtin

C. Dueck

R. Yates

Assistant Dean

D. Hansen

For more information please consult the 2018/2019 Faculty of Graduate Studies Calendar at: <http://www.ucalgary.ca/pubs/calendar/grad/current/>, or visit the Faculty of Graduate Studies website at: grad.ucalgary.ca.

Haskayne School of Business

1. Summary of Degree Programs

Degrees Offered

| Undergraduate | |
|------------------------------|-----------------------|
| Commerce Degree | Commerce Enhancements |
| BComm | Honours, Co-op |
| BComm/BA or BSC ¹ | Honours, Co-op |
| BComm/BKin ² | Honours, Co-op |
| BComm/BSc ³ | Honours, Co-op |
| BSc/BComm ⁴ | |

¹Combined Degree with the Faculty of Arts

²Combined Degree with the Faculty of Kinesiology

³Combined Degree with the Faculty of Science

⁴Combined Degree with the Schulich School of Engineering

| Graduate (Master's) |
|------------------------|
| MBA |
| MMgmt |
| MD/MBA ¹ |
| JD/MBA ² |
| MBT/MBA ¹ |
| MPP/MBA ³ |
| MN/MBA ⁴ |
| MPlan/MBA ⁵ |
| MSW/MBA ⁶ |
| Graduate (Doctorate) |
| DBA |
| PhD |

¹Combined Degree with the Cumming School of Medicine

²Combined Degree with the Faculty of Law

³Combined Degree with the School of Public Policy

⁴Combined Degree with the Faculty of Nursing

⁵Combined Degree with the Faculty of School of Architecture, Planning and Landscape

⁶Combined Degree with the Faculty of Social Work (Program is currently suspended. No new admissions will be permitted.)

Undergraduate

BComm and BComm (Honours)

The Haskayne School of Business offers programs leading to the Bachelor of Commerce (BComm or BComm (Honours)) degree.

The BComm (Honours) program provides motivated students with an opportunity for additional research-intensive coursework under the close guidance of Haskayne faculty members. A high standard of academic resiliency and performance combined with a demonstrated interest and commitment to research are required for admission and continuation in the program. The program is especially suited to those

considering graduate studies in business upon completion of the degree.

Combined Programs

Additionally, the Haskayne School of Business offers combined degree programs (details in 4.2 Combined Degrees).

The Combined Bachelor of Commerce/Bachelor of Arts or Bachelor of Science (depending on the major), with the Faculty of Arts is available in: Ancient and Medieval History, Anthropology, Archaeology, Communication and Media Studies, Development Studies, East Asian Studies, East Asian Language Studies, Economics, English, Film Studies, French, Geography, German, Greek and Roman Studies, History, International Indigenous Studies, International Relations, Italian Studies, Latin American Studies, Law and Society, Linguistics, Linguistics and Language, Music, Philosophy, Political Science, Psychology, Religious Studies, Religious Studies and Applied Ethics, Russian, Sociology, Spanish, Urban Studies and Women's Studies.

A Combined Bachelor of Commerce/Bachelor of Kinesiology (Kinesiology major) is available with the Faculty of Kinesiology.

A Combined Bachelor of Commerce/Bachelor of Science (Actuarial Science, Computer Science, or Mathematics major), is available with the Faculty of Science.

The Combined Bachelor of Science (Engineering)/Bachelor of Commerce with the Schulich School of Engineering is available in: Chemical Engineering, Civil Engineering, Electrical Engineering, Geomatics Engineering, Mechanical Engineering and Software Engineering.

Co-operative Education

Co-operative Education is an academic program designed to achieve the educational and career goals of many BComm students. Participants take their classroom learning to the job and bring their working knowledge back to the classroom. The experience gives students first-hand knowledge of what business is all about prior to graduation.

Minor

The Haskayne School of Business offers a minor program in Management and Society for students registered in other faculties.

Graduate

The Haskayne School of Business offers programs leading to Master of Business Administration (MBA), Master of Management (MMgmt), Doctor of Business Administration (DBA), and PhD degrees. Details regarding the MBA, MMgmt, DBA and PhD degrees may be found in the Faculty of Graduate Studies Calendar.

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Diplomas or Certificates

In conjunction with the Schulich School of Engineering, the business school also offers a diploma program in Project Management (details of this program are given in the Schulich School of Engineering section of this Calendar).

2. Business School Information

Contact Information

Location: Scurfield Hall 343

Undergraduate Student Information:
403.220.6593

Email address: undergraduate@haskayne.ucalgary.ca

Website: haskayne.ucalgary.ca/

Introduction

The challenge of competing effectively in a rapidly changing global economy can only be met through well-educated responsive business leadership.

Preparing those who will successfully meet this challenge is the Haskayne School of Business's mission, accomplished through its mandate of teaching, research and community service. Recognizing that the practices of commerce, business and management are fundamental to, and impact upon every facet of contemporary society, delivery of comprehensive business education programs that are relevant and rigorous, yet responsive to change, forms the fundamental framework for the business school's broad range of academic and executive programs.

Pattern

The business school offers the undergraduate programs in traditional fashion in which students complete eight academic study terms or through the Co-operative Education program in which students complement their academic studies by interspersing three or four four-month paid work terms with their study terms. (Details regarding the Co-operative Education program appear in the Co-operative Education section of this Calendar.)

After admission to the Bachelor of Commerce program, a student will complete an integrative core curriculum of business education in the areas of strategy and global

management, entrepreneurial thinking, accounting, finance, organizational behaviour and human resources, operations management, business technology management, and marketing. An advisory system will provide assistance in selecting an area of concentration. The curriculum allows pursuit of a degree program fulfilling the business school objective of a strong general educational background together with a broad, integrative commerce education permitting a limited amount of functional specialization. An opportunity for applied research is available through the completion of the Honours program.

Objectives

The component parts of the programs have been formulated on the principle that graduates will spend a major portion of their work life in a constantly changing environment. Therefore, the task of the business school is to provide the student with the opportunity to obtain a broad knowledge of the concepts underlying the operation and management of organizations. Upon graduation, a student should be equipped to function, not only in an initial position, but also for the whole of their subsequent career.

Opportunities

The Bachelor of Commerce program and Master of Business Administration program are accredited by The Association to Advance Collegiate Schools of Business.

Bachelor of Commerce

The generalist orientation of this degree enables graduates to succeed in a range of diverse industries and positions. Organizations seek candidates who have developed relevant educational, extracurricular (clubs, volunteer positions), summer/part-time work experiences and take responsibility for the direction of their working lives.

The key to obtaining meaningful employment after graduation is the development of a marketable portfolio of skills and experiences. The Haskayne School of Business assists business students in:

- Researching career interests
- Skill identification
- Resume/cover letter targeting
- Interview preparation
- Identifying work opportunities

For students looking for a research focus or to continue into graduate studies in business, the BComm Honours program offers a research-intensive option.

MBA

The mission of the Haskayne MBA is to challenge students to develop their abilities as managers. The program develops skills in leadership, business development, communication, and strategic analysis through the core functions of business, and through focused specializations.

MMgmt

Designed for recent graduates of non-business fields, the Haskayne Master of

Management (MMgmt) is an intensive 10-month program that provides students with comprehensive knowledge of business essentials, opportunities to make connections, grow their skills, and develop the competitive edge to successfully launch their career.

DBA

The Haskayne Doctor of Business Administration (DBA) is designed to provide students with the research, analytical, and critical thinking skills to become recognized contributors to new business knowledge and the application to practice.

PhD

In addition to the role of an academic professor, students earning the PhD degree can succeed in research and advisory roles in government as well as a broad spectrum of industries and organizations.

Haskayne Student Organizations

Student-run organizations help to build community with fellow classmates, professors, alumni and businesses. Participating students apply theory to practice and develop interpersonal, leadership, task management, and creative thinking and problem-solving skills. A network of business contacts starts here.

The Commerce Undergraduate Society supports and co-ordinates student club affairs, and organizes major social, sports, networking and academic-related events in collaboration with campus and corporate communities (<http://www.cuscalgary.ca/>).

The Haskayne Students' Association provides student governance and voice, works to resolve student issues and transparency, and develops initiatives to improve the student experience, engagement, and recognition of the school (<https://www.hsucalgary.com/>).

Resources

Computers in the Business School

All areas in business make extensive use of computers. Therefore, the business school recommends that students entering the business school purchase an appropriate computer for use in their academic program. Information on the recommended hardware and software configuration is available from the business school website haskayne.ucalgary.ca/services/its/students.

3. Business School Regulations

3.1 Admissions

Admission Requirements

The Haskayne School of Business has a quota on the number of students accepted into the Bachelor of Commerce program. Admission is competitive and meeting the minimum admission requirements does not guarantee admission.

High School applicants: see section A.5.1 Canadian High School Students. For

program requirements see 4.1.1 BComm Requirements for Direct Entry Students.

Transfer (including Change of Program) applicants: see sections A.5.3 Transferring from Another Post-Secondary Institution and 4.1.2 BComm Pre-Commerce Requirements for Transfer Students.

Students seeking admission into a combined degree program are further directed to 4.2 Combined Degrees.

Students seeking re-admission into the Haskayne School of Business following a voluntary withdrawal will be considered in competition with new transfer applicants and required to meet the transfer admission criteria prior to re-admission. Such students are encouraged to consult with the Haskayne Undergraduate Programs Office for advice and course planning.

Students seeking re-admission into the Haskayne School of Business after a requirement to withdraw are referred to "Student Probation and Dismissal" in 3.4 Student Standing.

Students who have obtained a Bachelor of Commerce, Bachelor of Administration, or equivalent degree may not enrol in the Bachelor of Commerce degree.

Students who hold an approved non-business degree (BA, BSc, BEd, etc.), that is recognized by the University of Calgary are encouraged to speak to a graduate advisor regarding the admission requirements for the Master of Management (MMgmt) or Master of Business Administration (MBA) programs. Those who wish to pursue the Bachelor of Commerce as a second or subsequent undergraduate degree are considered as transfer applicants to the program. For additional regulations regarding admission to a second undergraduate degree, refer to A.5.5 Second-Degree Students in the Admissions section of this Calendar.

International Foundations Program (IFP) Pathways Stream

Offered by the Werklund School of Education in conjunction with the Haskayne School of Business, IFP Pathways to Business is intended for direct entry students who meet the academic requirements for the Bachelor of Commerce degree program, but who do not meet the English Language Proficiency requirement for admission. Applicants to the IFP Pathways to Business stream are subject to the general requirements for direct entry admission to the business school listed under Admission Requirements above. In addition, applicants must meet the minimum English Language Proficiency (ELP) scores for the IFP Pathways stream, as shown in A.11.1 International Foundations Program.

Students admitted to the IFP Pathways to Business stream complete the IFP Pathways to Business curriculum over the first two years, concurrently with the first-year curriculum of the Bachelor of Commerce degree program. A minimum of three additional years are required to complete the remaining Bachelor of Commerce degree requirements. Additional information is available at

4.1.1.1 International Foundations Program (IFP) Pathways to Business.

Deadlines

Students must observe all deadlines. All documentation must be submitted to the Admissions Office, MacKimmie Block 117, 2500 University Drive NW, Calgary, AB, T2N 1N4.

The Haskayne School of Business only admits students to the Fall Term.

Open Studies and Visiting Students

Applicants are referred to the Admissions section of this Calendar, A.14 Admission to Open Studies, where more information is given on entering the University under these categories.

Applicants who wish to complete Haskayne School of Business courses as Open Studies or Visiting students (bona fide students of another institution), are required to submit the appropriate application by the deadline indicated in the Admissions section of this Calendar. All transcripts supporting the application form must be attached.

Enrolment in the majority of Haskayne School of Business courses is limited to students formally admitted into the school's degree programs, or accepted as Visiting Exchange students on a Haskayne-approved partner exchange agreement. Open Studies Degree-Holders and other Visiting business students on Letters of Permission, may also be considered for limited-enrolment courses.

Students who do not meet the requirements mentioned above will only be permitted to register in Management and Society (MGSO) Minor courses.

Registration is subject to space availability and the applicant meeting University of Calgary course requisites.

Students not formally admitted into the Haskayne School of Business degree programs will be limited in enrolment to a maximum of 30 units in the business school at the University of Calgary.

Students are advised to contact the Haskayne Undergraduate Programs Office for further details.

3.2 Registration

Accuracy of Registration

Students are responsible for the completeness and accuracy of their registration and for arranging their program to meet all requirements as detailed in this Calendar. Students should, however, seek advice from the business school concerning their choice of courses. In cases of doubt about the interpretation of regulations, a student should consult the Haskayne Undergraduate Programs Office and in any case is strongly advised to do this prior to registration in the final courses towards a degree to ensure that all graduation requirements will be met.

3.3 Course Work

Course Load

A student wishing to complete more than the normal load of 15 units per Fall or Winter term must receive special permission from the Haskayne Undergraduate Programs Office. Permission will not be granted for the business school admission term.

Enrolment in Commerce Courses

1. Registration in commerce courses will be limited to students registered in the Haskayne School of Business with the exception of courses described in the Minor in Management and Society program.

2. Yearly enrolment restrictions may be placed by the Business School on high demand courses.

3. In selecting courses, students must take cognizance of prerequisites for each course. Only with the written permission of the Associate Dean (Undergraduate Programs), Haskayne School of Business, upon the recommendation of the area chair and instructor of the course, will stated prerequisites be waived. Permission is only granted under exceptional circumstances. However, should a student fail to achieve satisfactory standing in any course for which the stated prerequisite(s) is (are) lacking, they may be required to successfully complete the stated prerequisite(s) prior to being permitted to repeat the course.

4. Students are not permitted to register in courses when less than a "C-" grade or equivalent was received in a prerequisite course.

Enrolment in Non-Commerce Courses

In selecting non-Haskayne options, students are cautioned that not all courses may be acceptable towards their program or available for registration. Program regulations, course enrolment restrictions and requisites may all impact a student's ability to register and/or use a particular course towards fulfillment of a business program requirement. To ensure appropriate course selection, students are strongly encouraged to discuss their course choices with advisors in the Haskayne Undergraduate Programs Office, and review academic requirements in their Student Centre. A list of recommended concentration-specific options is available for registration planning purposes.

Credit in Courses by Special Assessment

Students are referred to the Academic Regulations section of this Calendar for University regulations on obtaining course credits by special assessment (see B.10.1).

Application must be made on the form headed "Credit by Special Assessment" and signed by the Haskayne Undergraduate Programs Office. Students will be considered in light of their background and the program regulations.

A course previously failed or one in which a higher grade is sought may not be taken subsequently by special assessment, nor

may any course be attempted more than once in this way. No more than 12 units completed by special assessment may be counted towards a degree.

Withdrawals

A student is entitled to withdraw from any course up to and including the last day for withdrawals as indicated in the current Academic Schedule.

Students will not be permitted to withdraw more than once from a particular course. Students will be required to withdraw if they have accumulated a total of more than 30 units withdrawals while in attendance at the University of Calgary.

Repetition of Courses

A student may repeat a course previously attempted (excluding withdrawals) only once. This regulation applies not only to individual courses, but also to sets of courses where it is stated that credit for more than one of the sets is not allowed. To repeat a course more than once will require the permission of the Haskayne Undergraduate Programs Office and the department offering the course. Permission is only granted under exceptional circumstances.

Students who unsuccessfully repeat a course that is required for graduation will be dismissed from the business school.

3.4 Student Standing

Grades

The official grading system of the University of Calgary is given in the Academic Regulations section of this Calendar.

Dean's List

The Dean's List recognizes outstanding academic performance while registered in the Haskayne School of Business. It is compiled twice yearly at the end of each of the Fall and Winter Terms. To qualify for inclusion, a Bachelor of Commerce student must achieve a grade point average of 3.70 or better on 15 units or more taken in either the Fall or Winter Term at the University of Calgary. Eligibility for those students registered in full-year courses spanning two terms will be determined at the end of the Winter Term. Students on academic sanctions as outlined in section K (Statement on Principles of Conduct) of this Calendar are not eligible for the Dean's List.

Degree "With Distinction" or "First Class Honours" upon Graduation

The notation "With Distinction" will be entered in the permanent record and on the graduation parchment of a student who successfully completes the Bachelor of Commerce (non-Honours) program with a grade point average of at least 3.60 over the last 90 units of the 120 units applicable to the degree. In cases in which the "last 90" must include some but not all of a group of courses taken concurrently, the selection will be made in the manner most advantageous to the student. A student who has taken part of their course work at another institution

may be granted a degree "With Distinction" at the discretion of the business school.

The notation "First Class Honours" will be entered in place of "With Distinction" for a student who successfully completes the Bachelor of Commerce (Honours) program to the same standard.

Student Probation and Dismissal

Academic performance is assessed following the term in which 18 units or more are completed by the student at the University of Calgary since the previous Haskayne appraisal. All courses taken since the previous Haskayne appraisal will be included in the next subsequent review.

If fewer than 18 units have been completed since the previous Haskayne appraisal, the existing status is retained by the student until the next subsequent review.

For unconditional progress through the Bachelor of Commerce program students must earn a grade point average of no less than **2.00**.

Students who earn a grade point average of less than **1.70** on 18 units or more taken since their previous Haskayne appraisal, will be required to withdraw from the business school.

Students who earn a grade point average of at least **1.70** but less than **2.00** on 18 units or more taken since their previous Haskayne appraisal, will be placed on probation for the next term in which they register.

Students who earn a grade point average of less than **2.00** on 18 units or more taken since their previous Haskayne appraisal and while on probation, will be required to withdraw from the business school. Students will be removed from probation by achieving a **2.00** or better grade point average on 18 units or more taken since they were placed on probation.

Students required to withdraw from the Haskayne School of Business for unsatisfactory academic performance must wait a minimum of 12 months from the date of withdrawal to reapply, at which time they will be considered for admission at the next admission cycle together with new transfer applicants. Re-applicants will be required to meet the transfer admission standards prior to being readmitted. Students who are readmitted after having been required to withdraw from the Haskayne School of Business will be placed on probation for the next term in which they register.

Notes:

1. **Notwithstanding the above regulations**, students who unsuccessfully repeat a course that is required for graduation, as outlined earlier in 3.3 Course Work, "Repetition of Courses", will be required to withdraw from the business school following the term in which the unsuccessful repetition occurred.

2. Students are referred to section F, Academic Standing in the Academic Regulations section of this Calendar for additional University regulations including

the maximum number of probationary periods permitted while registered as undergraduates.

Academic Turnaround Program (ATP)

The Academic Turnaround Program (ATP) provides eligible Bachelor of Commerce students currently enrolled but facing a first requirement to withdraw for academic reasons with the opportunity to continue their studies on probation with enhanced academic support. General program details and conditions are found in the Academic Regulations section B.20 of this Calendar.

Students who have successfully completed 18 units or more with a cumulative GPA of 2.00 or higher since being placed on probation will have the probation cleared and will be considered to be in good academic standing in the business school. Those with a GPA below 2.00 and/or with unsuccessful repetition of coursework will be required to withdraw.

A minimum of 18 units must be completed within two years of being placed on probation.

International Foundations Program (IFP) Pathways Stream

IFP Pathways to Business students are subject to a joint academic review process by the Haskayne School of Business and the Werklund School of Education. The business school regulations with regards to student standing in credit courses and continuation in the program apply equally to IFP Pathways to Business students. In addition, IFP Pathways participants will have their records reviewed for progression in accordance with Werklund School of Education regulations. Failure to successfully complete the requirements of the program will result in the student being required to withdraw from the business school.

IFP Pathways to Business students must achieve a grade of "C" or better in unpaired academic language instructional courses (IFPX), and a "Pass" in paired language enrichment classes (IFPB). A minimum "C-" grade (or "C" if the course serves as the prerequisite for the chosen concentration), is required in the specified Bachelor of Commerce degree courses. Only International Foundations Program (IFPX) 332 may be calculated in the grade point average.

Unpaired and specified Bachelor of Commerce courses in which the minimum grade is not achieved must be repeated at the next available opportunity. A course previously attempted (excluding withdrawals), may be repeated only once.

Paired courses will be evaluated in conjunction with the corresponding Bachelor of Commerce courses. Where the minimum grade is achieved in the corresponding Bachelor of Commerce course but the paired course is not successfully completed, possible interventions, such as remedial tutorials, will be explored. Where a student withdraws from either the paired course or the corresponding Bachelor of Commerce

course, they must also withdraw from the other course in the set. Only the withdrawal from the Bachelor of Commerce course will appear on the student's transcript. However, both courses must be repeated at the next available opportunity.

Students are subject to the standard academic regulations found in this Calendar regarding conduct and academic appeals.

4. Program Details

4.1 Bachelor of Commerce (BComm)

4.1.1 BComm Requirements for Direct Entry Students

Admission

Applicants planning to enter the BComm program directly from high school must meet the admission requirements outlined in section A.5.1.1 Admission Requirements.

Additional and/or alternate admission requirements may exist for entrance into a Combined Degree program as outlined in 4.2 Combined Degrees.

Applicants are advised to contact the Haskayne Undergraduate Programs Office for details and assistance with program planning.

Recommended Program Sequence – Year 1

Students directly admitted from high school are advised to complete up to 30 units over the Fall and Winter Terms of their first year as outlined below. Ahead of registration, students are cautioned to consult course descriptions. The pre- or co-requisites listed within each course description (if any), will drive the selection and term sequencing, not the order in which the requirements appear in the following lists.

It is recommended that the following graduation requirements be taken in first year:

1. Economics 201
2. Economics 203
3. Junior English
4. Management Studies 217
5. Mathematics 249 or 265
6. Statistics 213
7. Strategy and Global Management 217

In addition to the 21 units listed above, up to 9 units may be selected from the list below in order to complete Year 1 registration:

1. Accounting 217
2. Statistics 217
3. Junior Commerce or Non-Commerce Option (3 units)^{1,2,3}
- 4.-6. Junior Non-Commerce Option (9 units)^{1,2,3}

Note: First-year students are restricted to junior (200-level) courses in their first year. Prior to registering in senior (300-level) courses, 18 units at the junior level must be successfully completed.

¹Students are advised to refer to 3.3 Course Work.

²Students who wish to pursue a Concentration in International Business Strategy are advised that

demonstrated proficiency equivalent to two courses in ONE modern language other than English is a requirement of this Concentration. A modern language minor is recommended. Refer to 4.1.4.1 Concentrations for further details.

²Data Science 201 and University 201 are recommended courses for students interested in applying to the research-based Honours program in a subsequent year. Refer to 4.1.3 BComm Honours Program for further details.

4.1.1.1 International Foundations Program (IFP) Pathways to Business

In place of the Recommended Sequence listed in 4.1.1 BComm Requirements for Direct Entry Students, students admitted to the IFP Pathways to Business program complete a two-year curriculum as detailed below. This program is made up of instructional and enrichment English language courses and the 200-level requirements of the Bachelor of Commerce degree program.

Upon successful completion of the IFP Pathways to Business two-year curriculum, students proceed to complete the senior-level requirements of the Bachelor of Commerce degree program as listed in 4.1.4 BComm Graduation Requirements. The entire program can be completed in five years.

| | Fall Term | Winter Term |
|--------|---|--|
| Year 1 | International Foundations Program Business 231 | International Foundations Program 236 |
| | International Foundations Program 230 | International Foundations Program 237 |
| | International Foundations Program 235 | Management Studies 217 |
| | Economics 201 | International Foundations Program Business 217 |
| | International Foundations Program Business 201 | Economics 203 |
| | Mathematics 249 or 265 | International Foundations Program Business 203 |
| | Junior Commerce or Non-Commerce Option ^{1,2,3} | Junior Non-Commerce Option ^{1,2,3} |
| Year 2 | International Foundations Program 332 ⁴ | International Foundations Program 334 |
| | Statistics 213 | Strategy and Global Management 217 |
| | International Foundations Program Business 213 | International Foundations Program Business 227 |
| | Accounting 217 | Statistics 217 |
| | Junior Non-Commerce Option ^{1,2,3} | Junior Non-Commerce Option ^{1,2,3} |

¹Students are advised to refer to 3.3 Course Work.

²Data Science 201 and University 201 are recommended courses for students interested in applying to the research-based Honours program in a subsequent year. Refer to 4.1.3 BComm Honours Program for further details.

³Students who wish to pursue a Concentration in International Business Strategy are advised that demonstrated proficiency equivalent to two courses in ONE modern language other than English is a requirement of this Concentration. A modern language minor is recommended. Refer to 4.1.4.1 Concentrations for further details.

⁴International Foundations Program (IFPX) 332 with a grade of "C" or higher may be used to fulfill the Junior English requirement in the Bachelor of Commerce degree, as long as the International Foundations Program is successfully

completed.

It is recommended that students enrol in a minimum of 12 units per term.

With the exception of International Foundations Program (IFPX) 332, International Foundations Program (IFPX) and International Foundations Program Business (IFPB) courses are not for credit toward the Bachelor of Commerce degree requirements.

IFP Pathways to Business students adhere to the academic policies of the Haskayne School of Business. In addition, students are subject to a joint academic review process by the Werklund School of Education and the business school. Regulations governing continuation in the program are found in 3.4 Student Standing.

4.1.2 BComm Pre-Commerce Requirements for Transfer Students Admission

1. Applicants planning to enter the BComm program from a post-secondary institution (including the University of Calgary) must meet the admission requirements outlined in section A.5.3.1 Transfer Admission Requirements. Change of Program students are considered for admission under these same transfer admission regulations.

Assistance with program planning is available through the Haskayne Undergraduate Programs Office.

2. The grade point average for determining admission will be calculated as outlined in A.5.3 Transferring from Another Post-Secondary Institution - Transfer Admission GPA, after the Fall Term. Admitted students completing courses during the Winter Term must remain in good academic standing to maintain their offer of admission.

3. Courses or their equivalents presented to fulfill admission requirements must not have been repeated more than once.

4. Additional and/or alternate admission requirements may exist for entrance into a Combined Degree program as outlined in section 4.2 Combined Degrees. Prospective applicants are advised to contact the Haskayne Undergraduate Programs Office for details.

Requirements

The following 18 prescribed units constitute the pre-commerce requirements for transfer (including Change of Program) applicants and must be completed as outlined in section A.5.3.1 Transfer Admission Requirements:

1. Economics 201
2. Mathematics 249 or 265 or equivalent
3. Statistics 213
4. Junior English
5. Economics 203
6. Statistics 217

In addition, the 12 units below fulfill BComm graduation requirements and it is strongly recommended that these be taken to complete a prospective student's remaining Year 1 registration:

7. Junior Commerce or Non-Commerce Option (3 units)^{1,2,3}

8.-10. Junior Non-Commerce Options (9 units)^{1,2,3}

Note: These courses need not necessarily be taken in the sequence indicated. Students should consult course descriptions in the latter section of this Calendar for prerequisites.

¹Students are advised to refer to 3.3 Course Work.

²Students who wish to pursue a Concentration in International Business Strategy are advised that demonstrated proficiency equivalent to two courses in ONE modern language other than English is a requirement of this Concentration. A modern language minor is recommended. Refer to 4.1.4.1 Concentrations for further details.

³Data Science 201 and University 201 are recommended courses for students interested in applying to the research-based Honours program in a subsequent year. Refer to 4.1.3 BComm Honours Program for further details.

4.1.3 BComm Honours Program Application

Continuing Haskayne School of Business Bachelor of Commerce students (any concentration), may apply for the Honours program. Applications are considered for the Fall Term only.

Prospective applicants must meet the admission requirements listed below and must submit a Change of Program request through their Student Centre. Deadline date information is found in this Calendar in Academic Regulations' section D. Change of Faculty or Program. A supplementary application package will be sent to Change of Program applicants by the Haskayne School of Business.

Admission Requirements

Applicants to the BComm (Honours) program must have successfully completed a minimum of 48 units by the Fall term to which they are seeking admission, including the following six prescribed courses completed no later than in the preceding Winter Term:

1. Entrepreneurship and Innovation 317
2. Management Studies 217
3. Management Studies 391
4. Strategy and Global Management 217
5. Statistics 213
6. Statistics 217

Admission to the program is based on the calculation of the grade point average over the most recent course work to a maximum of 30 units (University of Calgary courses and/or transfer courses taken at other institutions). All grades within a term are included except where the number of courses taken within a term exceeds that required to fulfill (to a maximum of) 30 units, in which case the highest grades are used. Applicants must have a minimum grade point average of 3.30 (calculated as outlined above), as well as a minimum grade point average of 3.30 over the six prescribed courses. Spring Intersession courses taken after May 1 in the year of admission are not used in the calculation of the grade point averages.

In addition to meeting the minimum grade point averages, applications are evaluated

on the basis of an interview and the documents submitted in the admission application package.

Admission is competitive and meeting the minimum requirements is not a guarantee for admission. The business school reserves the right to limit the number of students admitted into the BComm (Honours) program. Students on academic sanction are not eligible for the BComm (Honours) program.

Progression Requirements

BComm (Honours) students are subject to the same progression requirements already in place for all BComm students. In addition, academic performance is assessed each year at the end of the Winter term to determine eligibility to continue in Honours. A minimum grade point average of 3.30 over all courses completed since the last Honours assessment is required for continuation in the program.

Students may opt out of the BComm (Honours) program at any time and complete the regular BComm program.

4.1.4 BComm Graduation Requirements

All candidates for the Bachelor of Commerce degree must fulfill the following requirements:

1. An approved program with a minimum of 120 units. A minimum grade point average of 2.00 (or 3.30 for BComm (Honours) candidates), must be achieved over all 120 units.
2. A minimum "C-" grade in the Junior English, Entrepreneurship and Innovation 317, Management Studies 451, 453, 503 (Honours candidates), Strategy and Global Management 591 and in each course permitted to fulfill the concentration requirements. A maximum of 12 units with "D" or "D+" grades in non-concentration and non-prerequisite courses.
3. A maximum of 60 units taken at other institutions and acceptable for transfer credit may be counted toward the Bachelor of Commerce Degree. A maximum of 18 units taken at other institutions and acceptable for transfer credit as Haskayne School of Business courses may be counted toward the Bachelor of Commerce Degree.
4. The following courses or their equivalents presented for graduation must be completed within 10 years or less of the graduation date: the 3 units Junior English, Mathematics 249 or 265, Economics 201 and 203, Statistics 213 and 217, and all Commerce courses.

The following courses, or their equivalents, constitute the Bachelor of Commerce program:

Commerce Courses (63 units)

1. Management Studies 217
2. Strategy and Global Management 217
3. Accounting 217
4. Accounting 323
5. Business and Environment 395
6. Business Technology Management 317
7. Entrepreneurship and Innovation 317

8. Finance 317
9. Marketing 317
10. Operations Management 317
11. Organizational Behaviour and Human Resources 317
12. Management Studies 391
13. Management Studies 451
14. Management Studies 453
15. Strategy and Global Management 591
- 16.-21. Concentration: (18 units) from one Concentration (listed below)

Non-Commerce Courses (39 units)

1. Economics 201
2. Economics 203
3. Junior English (3 units)
4. Mathematics 249 or 265
5. Statistics 213
6. Statistics 217
7. -9. Junior Non-Commerce Options* (9 units)
- 10.-13. Senior Non-Commerce Options (12 units)

Commerce or Non-Commerce Courses (9 units)

1. Junior Commerce or Non-Commerce Option (3 units)
- 2.-3. Senior Commerce or Non-Commerce Options* (6 units)

Program-Specific Courses (9 units)

BComm (non-Honours):

- 1.-3. Senior Commerce or Non-Commerce Options* (9 units)

BComm (Honours):

1. Management Studies 301
2. Management Studies 501
3. Management Studies 503

*Concentration course may be required.

Notes:

- Junior = 200-level and Senior = 300-level and above
- Students are advised to refer to 3.3 Course Work.
- Course sequencing information for students is available in the Haskayne Undergraduate Programs Office.
- At the time of graduation, students who have not achieved a GPA of 3.30 over all 120 units will be awarded a BComm (i.e., without the Honours designation).

4.1.4.1 Concentrations

The concentration program must be approved by the business school. Certain courses in a concentration may be compulsory. Information on concentrations is available from the office of the Associate Dean (Undergraduate Programs).

Bachelor of Commerce Concentrations consist of 18 units and are available in the areas of:

- Accounting
- Business Analytics

- Business Process Management (*Suspended*)
- Business Technology Management
- Energy Management (*Suspended*)
- Energy and Professional Land Management
- Entrepreneurship and Innovation
- Finance
- General
- International Business Strategy
- Marketing
- Operations Management
- Organizational Behaviour and Human Resources
- Personal Financial Planning
- Real Estate Studies
- Risk Management and Insurance
- Risk Management: Insurance and Finance
- Supply Chain Management
- Tourism Management (*Suspended*)
- Tourism Management and Marketing (*Suspended*)

Bachelor of Commerce Concentration Requirements

In order to pursue any concentration in the Bachelor of Commerce program, students must achieve a minimum grade of "C" in the required core course(s) which is (are) prerequisite(s) for that concentration: Accounting 217 and 323; Business Technology Management 317; Energy Management 301 and 403; Entrepreneurship and Innovation 317; Finance 317; Management Studies 391; Marketing 317; Operations Management 317; Organizational Behaviour and Human Resources 317; Real Estate Studies 317; Risk Management and Insurance 317; Professional Land Management 475; Strategy and Global Management 371; Tourism Management 309.

Accounting (ACCT)

Accounting 341
Accounting 343
Accounting 361
Accounting 445 or 465
Accounting 400- or 500-level
Accounting 400- or 500-level

Note: Students should complete Accounting 323 before Year 3.

Business Analytics (BANA)

Business Technology Management 331
Business Technology Management 431
Operations Management 415
Operations Management 419

Two of:

Business Technology Management 333
Business Technology Management 455
Business Technology Management 459
Business Technology Management 465
Business Technology Management 467
Business Technology Management 531

Computer Science 319*
 Operations Management 401
 Operations Management 405
 Operations Management 407
 Operations Management 409
 Operations Management 411

**Prerequisites required make this a suitable option for students in the combined degree program with Computer Science.*

Note: Maximum one of Business Technology Management 455 or Operations Management 411. It is recommended that Data Science 201 be taken as a Junior Non-Commerce Option.

Business Process Management (BPMA) - Suspended Concentration

Business Technology Management 333
 Operations Management 403
 One of:
 Business Technology Management 455
 Operations Management 411

One or Two of:
 Business Technology Management 463
 Business Technology Management 465
 Operations Management 405
 Operations Management 407

Organizational Behaviour and Human Resources 493
 One or Two of:

Business Technology Management 331
 Business Technology Management 459
 Business Technology Management 461
 Business Technology Management 467
 Operations Management 409
 Operations Management 415

Note: Maximum of three Operations Management courses and maximum of three Business Technology Management courses.

Business Technology Management (BTMA)

Business Technology Management 331
 Business Technology Management 333
 Business Technology Management 400- or 500-level
 Business Technology Management 400- or 500-level
 Business Technology Management 400- or 500-level
 400- or 500-level Commerce Option (including Business Technology Management)

Energy and Professional Land Management (EPLM)

Energy and Environment Engineering 355
 Professional Land Management 475
 Professional Land Management 583

*Three of:

Energy Management 301
 Energy Management 403
 Energy Management 489
 Professional Land Management 573
 Professional Land Management 579

Professional Land Management 587

*Note: It is recommended that courses be chosen from the intended career stream:
 Energy Management: Energy Management 301, 403 and 489

Professional Land Management: Professional Land Management 573, 579 and 587

In addition, any unused courses above, as well as Business and Environment 517, Economics 327, 329, Energy Management 485 or 487 are recommended to be taken as Senior Options in the degree.

Energy Management (ENMG) - Suspended Concentration

Students are advised that admission to the Concentration is competitive and meeting the minimum Bachelor of Commerce requirements does not guarantee admission.

Energy Management 301
 Energy Management 403
 Energy Management 489
 Energy and Environment Engineering 355
 Two of:

Business and Environment 517 (formerly Management Studies 597.17)
 Business and Environment 533 (formerly Management Studies 559.24)

Energy Management 485
 Energy Management 487
 Finance 445
 Finance 467

Operations Management 407
 Organizational Behaviour and Human Resources 493

Entrepreneurship and Innovation (ENTI)

Entrepreneurship and Innovation 531 (formerly 559.04)
 Finance 473

One of:

Entrepreneurship and Innovation 401
 Entrepreneurship and Innovation 405
 Entrepreneurship and Innovation 411 (formerly 559.06)

Three of (not used above):

Entrepreneurship and Innovation 359
 Entrepreneurship and Innovation 400- or 500-level
 Marketing 465

Organizational Behaviour and Human Resources 493
 Risk Management and Insurance 439

Finance (FNCE)

Finance 443
 Finance 451
 Finance 400- or 500-level
 Finance 400- or 500-level
 Finance 400- or 500-level
 Finance 400- or 500-level

General (GENL)

Combination of 18 units Senior Commerce courses from two or more areas.

International Business Strategy (IBST)*

Strategy and Global Management 371 (formerly 575)

Strategy and Global Management 577
 One of:

Strategy and Global Management 579
 Strategy and Global Management 589
 Finance 461
 Marketing 467

Three of (not used above):

Finance 461
 Management Studies 571
 Marketing 467
 Risk Management and Insurance 559.02 (overseas component)
 Strategy and Global Management 403
 Strategy and Global Management 405
 Strategy and Global Management 407
 Strategy and Global Management 409
 Strategy and Global Management 571
 Strategy and Global Management 573
 Strategy and Global Management 579
 Strategy and Global Management 589

**Demonstrated proficiency equivalent to two courses in ONE modern language other than English is a requirement of this concentration. For this purpose, language courses taken will fulfill the Junior or Senior Non-Commerce Options for IBST concentrators in the degree program. Courses presented cannot be literature or culture studies based, and cannot be taught in English. Students with equivalent backgrounds are advised to consult the Haskayne Undergraduate Programs Office for approval.*

Note: It is strongly recommended that the Strategy and Global Management courses be taken in the sequence of 371 followed by 577 followed by 579.

Marketing (MKTG)

Marketing 465
 Marketing 493
 Marketing 400-level
 Marketing 400-level
 Marketing 400- or 500-level
 Marketing 400- or 500-level

Note: Maximum of two 500-level Marketing courses.

Operations Management (OPMA)

Operations Management 401
 Operations Management 405
 Three of:
 Operations Management 403
 Operations Management 407
 Operations Management 409
 Operations Management 411
 Operations Management 415

One of:

Business Technology Management 459
 Business Technology Management 465
 Business Technology Management 467

Engineering 481
Marketing 479
Operations Management 559

Organizational Behaviour and Human Resources (OBHR)

Organizational Behaviour and Human Resources 401
Organizational Behaviour and Human Resources 405
Organizational Behaviour and Human Resources 409
Organizational Behaviour and Human Resources 411

Two of:

Organizational Behaviour and Human Resources 400- or 500-level

Note: Organizational Behaviour and Human Resources 413 is recommended to qualify for CPHR Alberta designation.

Personal Financial Planning (PFPL)

Risk Management and Insurance 317
Finance 443
Finance 463
Finance 477 (formerly Management Studies 577)
Risk Management and Insurance 439
Risk Management and Insurance 449

Note: It is recommended that Finance 477 be taken after all other required Concentration courses and that Accounting 421 be taken as a Senior Commerce Option.

Real Estate Studies (REAL)

Real Estate Studies 317
Real Estate Studies 427
Real Estate Studies 567
Three of:
Business and Environment 533 (formerly Management Studies 559.24)
Organizational Behaviour and Human Resources 493

Real Estate Studies 437
Real Estate Studies 447
Real Estate Studies 457
Real Estate Studies 559

Risk Management and Insurance (RMIN)

Risk Management and Insurance 317
Risk Management and Insurance 439
Risk Management and Insurance 449
Risk Management and Insurance 459
Risk Management and Insurance 579

One of:

Accounting 421
Economics 341
Finance 443
Finance 445
Finance 451
Finance 461
Finance 463
Finance 475

Risk Management and Insurance 559

Risk Management: Insurance and Finance (RMIF)

Risk Management and Insurance 317
Finance 451

Four of:

(One must be Finance and two must be 400- or 500-level Risk Management and Insurance. Maximum one of Finance 479 or Risk Management and Insurance 579.)

Economics 341
Energy Management 487
Finance 443
Finance 445
Finance 447
Finance 449
Finance 461
Finance 463
Finance 467
Finance 475
Finance 479

Risk Management and Insurance 459

Risk Management and Insurance 559

Risk Management and Insurance 579 (formerly 559.01)

Supply Chain Management (SCMA)

Supply Chain Management 451
Supply Chain Management 453 (formerly Operations Management 417)
Supply Chain Management 455 (formerly Operations Management 559.05)
One of:
Economics 321
Economics 323
Economics 371
Geography 454

Two of:

Business Technology Management 465
Business Technology Management 467
Management Studies 571
Marketing 433
Marketing 467
Operations Management 401
Operations Management 403
Operations Management 411
Organizational Behaviour and Human Resources 493

Strategy and Global Management 371 (formerly 575)

Strategy and Global Management 571

Supply Chain Management 559

Note: Maximum one of Management Studies 571 or Strategy and Global Management 371.

Tourism Management (TOUR) - Suspended Concentration

Tourism Management 309
Tourism Management 419
Tourism Management 449

Three of:

Tourism Management 429
Tourism Management 439
Tourism Management 469
Tourism Management 479
Tourism Management 499

Note: Students are advised to complete Tourism Management 309 as soon as possible.

Tourism Management and Marketing (TRMK) - Suspended Concentration

Tourism Management 419
Tourism Management 449
Tourism Management 400-level*
Marketing 465
Marketing 400- or 500-level
Marketing 400- or 500-level

*Except Tourism Management 409 which is not for credit in the Bachelor of Commerce.

Note: Students are advised that Tourism Management 309 is a prerequisite to the Tourism courses and must be taken in lieu of an open Senior Commerce Option for this Concentration.

4.1.4.2 Minor Field

A student may formally declare a Minor Field within the Bachelor of Commerce degree program and have this officially recorded on the transcript of record, provided that at least 30 units in the field as specified by the Faculty offering the Minor are completed. This declaration must be made no later than the time of the last registration. Minors in Management and Society, Entrepreneurship and Enterprise Development, and Workplace Learning are not permitted. Consultation with the Haskayne Undergraduate Programs Office regarding choices for a Minor is required.

4.2 Combined Degrees

General Requirements

Students may elect to complete the Bachelor of Commerce degree in combination with another approved undergraduate degree. Five-year combined degree programs are sponsored jointly by the Haskayne School of Business and a second Faculty, and lead to two Bachelors' degrees awarded at the same convocation ceremony. The program is comprised of a minimum of 150 units, including all requirements of the two Faculties.

Early contact with the Undergraduate Programs Offices of the two Faculties ensures that admission and graduation requirements are met in a reasonable timeframe and within the minimum 150 units. Advisors are available to assist students with course planning and program details.

With the exception of the BSc (Engineering)/BComm degree which will be administered by the Schulich School of Engineering, combined degree students shall be registered under the Haskayne School of Business for administrative purposes.

Students may elect to remain in the combined degree or switch to either of the two

separate degree programs, as long as the requirements of each Faculty continue to be met.

Failure to meet requirements will result in a student being required to withdraw from the combined or separate programs, as the case may be. The academic regulations of each Faculty concerning student standing and progression apply equally for combined degree students.

Any Bachelor of Commerce Concentration may be chosen in combination with those Majors listed below. Students wishing to also focus their non-commerce options in one area of study are cautioned that Minors in Management and Society, Entrepreneurship and Enterprise Development, and Workplace Learning are not permitted within the combined degree. Consultation with student advisors in the Haskayne Undergraduate Programs Office regarding choices for a Minor is required.

Admission Requirements

Students wishing to enter any combined degree program are strongly advised to apply for admission to the combined degree directly from high school where more spaces may exist for entrance into the program, and where admitted students will gain earlier access to program-restricted courses.

For the combined BSc (Engineering)/BComm program, direct entry admission is based on the Schulich School of Engineering high school admission criteria only, while students applying to all other BComm combined degree programs must meet the admission criteria of each faculty.

Students who are not admissible to the Haskayne School of Business directly or those who wish to apply after the direct entry process has closed, may apply for combined degree admission in a subsequent year through the Change of Program process.

For the combined BSc (Engineering)/BComm program:

- Space permitting, students may apply for admission to the program after their first year in Schulich at the same time that the choice of a specific engineering major is made (section 3.1 Admission (Admission to Engineering Program) outlines the Engineering major selection process). In this case, priority will be given to applicants who have completed all courses listed in 4.1 First Year Curriculum for Engineering students and who meet the competitive grade point average as outlined. Supplemental criteria (in the form of a video presentation, letter of intent, essay, etc.) may also be required for admission consideration by the business school. Students are referred to the Schulich School of Engineering Calendar for additional admission, registration and program details.
- In order to avoid extra coursework, prospective combined degree students are advised to fulfill their Engineering Complementary Studies requirement with a 200-level English course (required

for graduation in the BComm degree program).

For all other BComm combined degree programs:

- Space permitting, students may apply upon successful completion of a prescribed set of pre-commerce requirements. Admission is subject to the competitive grade point average being met. Assistance in program planning is available through the Haskayne Undergraduate Programs Office.

Unless otherwise noted, the admission criteria that apply to the singular Bachelors' degrees apply equally to the combined degree program. The admission grade point average may be higher, but never lower, than that required for the singular Bachelor of Commerce degree.

Students already admitted into the Bachelor of Commerce and interested in transferring to a combined degree program, are required to submit a Change of Program application and meet the application deadlines and admission requirements of the intended second Faculty.

4.2.1 Combined BComm/BA or BSc (Arts) Program

A Major in the Arts consisting of at least 42 or 48 units (depending on the Major selected) is required. Majors are available in: Ancient and Medieval History, Anthropology, Archaeology, Communication and Media Studies, Development Studies, East Asian Studies, East Asian Language Studies, Economics, English, Film Studies, French, Geography, German, Greek and Roman Studies, History, International Indigenous Studies, International Relations, Italian Studies, Latin American Studies, Law and Society, Linguistics, Linguistics and Language, Music, Philosophy, Political Science, Psychology, Religious Studies, Religious Studies and Applied Ethics, Russian, Sociology, Spanish, Urban Studies and Women's Studies.

Requirements

Please consult both Faculties for specific requirements for this program.

Students in Major Programs requiring statistics-based courses should be cognizant of the exclusions listed under the Statistics subject heading in the Courses of Instruction section of the Calendar.

Normally, courses taken to satisfy the Faculty of Arts Major Program in the combined degree may be used, respective of level, to satisfy some or all of the non-commerce breadth requirements in the Bachelor of Commerce program. Details are available from advisors in the Haskayne Undergraduate Programs Office and the Arts Students' Centre.

4.2.2 Combined BComm/BSc (Actuarial Science or Mathematics) Program

Requirements

Please consult both Faculties for specific requirements for this program.

In these combined degrees, Statistics 321 and 323 replace Statistics 213 and 217, respectively, which are required in the Bachelor of Commerce program.

Normally, courses taken to satisfy the Bachelor of Science (Actuarial Science) or Bachelor of Science (Mathematics) programs in the combined degree may be used, respective of level, to satisfy some or all of the non-commerce breadth requirements in the Bachelor of Commerce program. Details are available from advisors in the Haskayne Undergraduate Programs Office and the Undergraduate Science Centre.

4.2.3 Combined BComm/BSc (Computer Science) Program

Requirements

Please consult both Faculties for specific requirements for this program.

Normally, courses taken to satisfy the Bachelor of Science (Computer Science) program in the combined degree may be used, respective of level, to satisfy some or all of the non-commerce breadth requirements in the Bachelor of Commerce program. Details are available from advisors in the Haskayne Undergraduate Programs Office and the Undergraduate Science Centre.

4.2.4 Combined BComm/BKin (Kinesiology) Program

No major other than the BKin (Kinesiology) will be considered by the Faculty of Kinesiology.

Requirements

Please consult both Faculties for specific requirements for this program.

Normally, courses taken to satisfy the Faculty of Kinesiology (Kinesiology) program in the combined degree may be used, respective of level, to satisfy some or all of the non-commerce breadth requirements in the Bachelor of Commerce program. Details are available from advisors in the Haskayne Undergraduate Programs Office and the Faculty of Kinesiology.

4.2.5 Combined BSc (Engineering)/BComm Program

A five-year combined degree program consisting of a minimum of 183 units is required. Depending on the major and/or program enhancements (e.g. specialization, minor, internship) selected, additional coursework and time-to-completion may be necessary. Majors are available in: Chemical Engineering, Civil Engineering, Electrical Engineering, Geomatics Engineering, Mechanical Engineering and Software Engineering.

Given the arrangement of coursework required in this combined degree, students interested in pursuing work experience will apply for admission into the continuous 12-16 month Engineering Internship Program (EIP), rather than separate Co-operative Education placements through the business school.

Requirements

Students wishing to pursue this combination are referred to the Schulich School of

Engineering section of this Calendar where additional admission and program requirements, and course sequencing information may be found.

In this combined degree, Engineering 319 and Mathematics 211 replace Statistics 213 and 217, and Mathematics 275 replaces Mathematics 249 or 265. Consequently, Statistics 213 and 217, and Mathematics 249 or 265 cannot be used to satisfy other requirements of the combined degree program.

Normally, courses taken to satisfy the Schulich School of Engineering Major Program in the combined degree may be used, respective of level, to satisfy some or all of the non-commerce breadth requirements in the Bachelor of Commerce program. Details are available from advisors in the Haskayne Undergraduate Programs Office and the Schulich School of Engineering.

4.3 Co-operative Education Program

Introduction

All Bachelor of Commerce students are eligible to apply for admission to the Co-operative Education program, with the exception of BSc (Engineering)/BComm combined degree students who are directed to apply to the Engineering Internship program instead. The Co-operative Education program normally includes 12 to 16 months of supervised paid work experience in various private companies and government agencies in addition to the eight required academic terms.

Students who wish to pursue the Co-operative Education option are urged to discuss their course selection with the Co-op Program Co-ordinator at the Haskayne Career Centre as early in their program as possible. Bachelor of Commerce students completing the requirements of the Co-operative Education option will graduate with "Co-operative Education" designated on their parchment.

Admission

1. Prospective Business Co-operative Education students must complete a Co-operative Education application form.
2. The Haskayne School of Business has a quota on the number of students accepted into the Co-operative Education program. Admission will be competitive, based on the student's skills, attitudes and academic record. Students may be required to attend an interview to assess their suitability for admission.
3. Students should refer to 3.1 Admissions and 4.1 Bachelor of Commerce (BComm) sections of this Calendar for specific admission regulations pertaining to the Haskayne School of Business.
4. Students are required to pay a non-refundable admission fee. Details are available in section P.1.4 Undergraduate Co-operative Education/Internship Course Fees.

Requirements

1. Applications to the Haskayne Co-operative Education program are accepted twice a year - from March 15th to May 1st, and

October 15th to December 1st. Direct entry students normally apply in the Fall of their second year in the Bachelor of Commerce program. Transfer students normally apply by May 1st following completion of 60 units applicable towards the Bachelor of Commerce program.

2. Applicants must have been admitted into the Haskayne School of Business before their Co-operative Education application will be reviewed.
3. To be considered for admission applicants must have a minimum GPA of 2.50. Admission GPA is calculated on the most recent 36-45 units.
4. Before a Co-operative Education student's first work term commences, at least 54 units and normally not more than 90 units appropriate to the degree program must have been successfully completed, including at least one business course relating to the chosen Concentration (e.g., Accounting 217, Finance 317), and Management Studies 217, Strategy and Global Management 217 and Entrepreneurship and Innovation 317.
5. Co-operative Education students should have completed no more than 90 units applicable to their Bachelor of Commerce before their first work term commences (consult the Co-op Program Co-ordinator at the Haskayne Career Centre).

Work Term Requirements

Attendance at the Career Centre workshops including the Co-op New Student Orientation, is a requirement of admission and must occur before the start of the job search process.

In addition to their regular academic requirements, students pursuing the Co-operative Education designation must complete the following work term courses:

Co-operative Education 523.01, 523.02 and 523.03. Students completing back-to-back third and fourth work terms with the same employer will be registered in both Co-operative Education 523.03 and 523.04. Otherwise, Co-operative Education 523.04 may only be completed with the consent of the business school.

Regulations

In addition to the Haskayne School of Business's regulations governing the Bachelor of Commerce program and the regulations governing the Co-operative Education program, the following regulations also apply:

1. Bachelor of Commerce students are required to complete a minimum of three four-month work terms, two of which must be completed while registered in the Haskayne School of Business Co-operative Education program.
2. Students wishing to transfer the credit of Co-operative Education work terms either from other faculties within the University of Calgary or from other institutions must submit a Haskayne School of Business Co-operative Education application.
3. December 1 applicants will normally begin their first four-month work term (Co-oper-

ative Education 523.01) in the subsequent Summer (Spring/Summer Intersession) Term. May 1 applicants will normally begin their first four-month work term in the subsequent Winter Term. Students can work a maximum of two Summer (Spring/Summer Intersession) work terms, the third work term must take place in the Fall or Winter Term.

4. Sequencing of work terms with academic terms is a flexible process which depends upon the availability of work terms, length of work terms (four or eight months) and the student's academic requirements.

5. Students must end their Co-operative Education program with an academic term.

6. The Co-operative Education courses are in addition to the normal requirements for each degree, i.e., students must complete the required courses and the required number of non-Co-operative Education courses as students completing the traditional degree programs.

7. Students must be registered full time during their academic terms. Students taking a vacation or a leave should inform the Co-op Program Co-ordinator. While on a four-month work term a student may take one evening or weekend academic course.

8. Once students have met graduation requirements, they are no longer eligible to participate in the Co-operative Education program.

9. If a student's academic performance results in the student being required to withdraw from the Haskayne School of Business, or being placed on probation, the student will be required to withdraw from the Co-operative Education program. If the student is required to withdraw from the Co-operative Education program but has already accepted a work term, the employer will be informed that the student is no longer registered in the Co-op program. Termination of the student's employment will be at the employer's discretion.

10. While on a work term students pay an academic course fee and are considered as full-time students.

11. Upon completion of each work term, the student must present a work term report to the Co-op Program Co-ordinator at the Haskayne Career Centre.

12. Students wishing to pursue the Co-operative Education designation who are enrolled in combined degree programs, other than the BSc (Engineering)/BComm program, should consult the Co-op Program Co-ordinator for regulations. BSc (Engineering)/BComm students should consult the Engineering Internship office.

13. Students who receive a Failure (F) on a work term will be required to withdraw from the Co-operative Education program.

For further information please contact the Co-op Program Co-ordinator at the Haskayne Career Centre.

4.4 Minor in Management and Society

The Management and Society program is designed to expose students to the various aspects of the role of management in our institutions and society. The program does not portend the development of managerial competence. It is intended to prepare graduates in other disciplines for practicing their skills in a business environment.

Requirements

In order to complete the requirements for a Minor in Management and Society, students must take 30 units as outlined below, with a maximum of 15 units transferred from an institution outside of the University of Calgary. A maximum of 6 units with a "D" or "D+" grade in a non-prerequisite course is permitted.

Required Courses:

Entrepreneurship and Innovation 201*

Accounting 301*

One of:

Finance 341*

Finance 343*

Operations Management 301*

Seven of (not used above):

Business and Environment 395

Business and Environment 401*

Business and Environment 533

Business Technology Management 321*

Entrepreneurship and Innovation 359

Entrepreneurship and Innovation 381*

Entrepreneurship and Innovation 401

Entrepreneurship and Innovation 403

Entrepreneurship and Innovation 405

Entrepreneurship and Innovation 407

Entrepreneurship and Innovation 411

Entrepreneurship and Innovation 413

Entrepreneurship and Innovation 531

Entrepreneurship and Innovation 559

Finance 341*

Finance 343*

Marketing 341*

Operations Management 301*

Organizational Behaviour and Human Resources 321*

Tourism Management 409*

Note: Maximum of three Entrepreneurship and Innovation courses beyond Entrepreneurship and Innovation 201.

**Not available for credit in the Bachelor of Commerce program.*

Note: Students not admitted to the Haskayne School of Business are not permitted to take more than 30 units from the Haskayne School of Business without the written consent of the business school.

5. Administration

Business School Administrative Officers

Dean

J. Dewald

Associate Deans

V. Jones, Academic

L. Falkenberg, Graduate and Professional Programs

Y. Koskinen, Research

S. Radford, Teaching & Learning

S. Weaver, Undergraduate Programs

Faculty of Kinesiology

1. Summary of Degree Programs

Degrees Offered

| Biomechanics | Exercise and Health Physiology | Kinesiology | Leadership in Pedagogy and Coaching | Mind Sciences in Kinesiology |
|--------------|--------------------------------|--------------|-------------------------------------|------------------------------|
| BSc | BSc | BKin | BKin | BKin |
| BSc Honours | BSc Honours | BKin Honours | BKin Honours | BKin Honours |
| | | BSc | BKin/BEd** | BSc |
| | | BSc Honours | | BSc Honours |
| | | BComm/BKin* | | |
| | | BKin/BA*** | | |

*Combined Degree with the Haskayne School of Business

**Concurrent Degree (Pedagogy concentration only) with the Werklund School of Education

***Combined Degree with the Faculty of Arts (Dance major only)

Graduate

Kinesiology

MKin

MSc

PhD

Undergraduate

The Faculty of Kinesiology offers four-year professional and disciplinary degree programs.

Students may declare only one Major.

Honours degrees are offered in all majors with a maximum of 20 spaces available each Fall.

Students who are preparing to teach in either the elementary or secondary school system should enrol in the Bachelor of Kinesiology (Leadership in Pedagogy and Coaching, Pedagogy concentration) degree program.

The Faculty of Kinesiology offers a five-year combined Bachelor of Kinesiology (Kinesiology)/Bachelor of Arts (Dance) with the Faculty of Arts, a five-year Bachelor of Commerce/Bachelor of Kinesiology (Kinesiology) with the Haskayne School of Business and a five-year concurrent Bachelor of Kinesiology (Leadership in Pedagogy and Coaching)/Bachelor of Education in Physical Education with the Werklund School of Education. No other combined degree programs are available with Kinesiology degrees.

The Faculty of Kinesiology collaborates with the Cumming School of Medicine to offer a Minor in Adapted and Therapeutic Physical Activity for students in Kinesiology. Detailed requirements are listed in the Cumming School of Medicine section of this Calendar.

Graduate

The Faculty of Kinesiology offers graduate degrees leading to the thesis-based MSc, the course-based MKin degree, and the Doctor of Philosophy (PhD) degree.

Graduate degree programs are administered by the Faculty of Graduate Studies, and details are given in their portion of the Academic Calendar.

2. Faculty Information

Contact Information

Location: Kinesiology B 142/143

Advising office phone numbers: 403.220.7018 or 403.220.3407

Email address: knesinfo@ucalgary.ca

Website: ucalgary.ca/knes/

Introduction

The origins of Kinesiology at the University of Calgary date back to 1961 when the School of Physical Education was founded. In 1994, the name was changed to the Faculty of Kinesiology. Today, the faculty's curriculum and majors are recognized and accredited by the Canadian Council of University Physical Education and Kinesiology Administrators (CCUPEKA). The curriculum is uniquely multi- and interdisciplinary. Undergraduate students study human movement from the perspectives of the natural sciences, social sciences, and humanities, with an integration of both theoretical and experiential learning components. Issues of health, wellness, and human performance are prominent in both the curriculum and research of the faculty. Kinesiology relates to the study of human movement and therefore active involvement in movement classes is part of the curriculum and an expectation of all students.

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Pattern

In addition to a core curriculum, all undergraduate students pursuing a combined or concurrent degree with another faculty, refer to the Summary of Degree Programs chart for a list of allowable combinations.

The Bachelor of Kinesiology and Bachelor of Science in Kinesiology offers a solid foundation with depth and breadth in the Kinesiology discipline. Students may tailor their degree to meet their needs and interests.

The Biomechanics Major (BSc) focuses on the mechanics of human movement with an emphasis on biomedical and sports applications, through course work in Kinesiology, Mathematics, and Engineering.

The Exercise and Health Physiology Major (BSc) builds upon fundamental knowledge in human movement and physiological functioning to understand the physiological response to exercise (from activities of daily living to high performance sport), and also the impact of exercise and diet on the physiological determinants of health and human performance across the life span.

The Mind Sciences in Kinesiology Major (BKin or BSc) provides a comprehensive education in the areas of behavioural neurosciences, cognition and neuro-motor control, and the application of personality and social psychological principles to the fields of exercise and health psychology, and sport psychology.

The Leadership in Pedagogy and Coaching Major (BKin) allows students to declare a concentration in Pedagogy or Coaching. The Pedagogy concentration addresses the teaching and learning of kinesiology content and activity for both children and adults. Teacher certification must be obtained after completing this program in order to work in the educational environment. The Coaching concentration will develop leaders from developmental to high performance coaching opportunities. Both Pedagogy and Coaching have a strong emphasis on experiential learning which includes practicum opportunities in the field. A concurrent Bachelor of Kinesiology (Pedagogy concentration only)/Bachelor of Education degree program is offered with the Werklund School of Education.

Objectives

The Kinesiology undergraduate curriculum addresses the eight core competencies endorsed by the University of Calgary. These are critical and creative thinking, problem analysis, effective communication, gathering and organizing information, abstract thinking, interpretative and assessment skills, and insight and intuition in generating knowledge. The curriculum provides an opportunity for students to acquire advanced levels of knowledge on contemporary issues related to health, movement, exercise, and sport. Laboratory, professional, and experiential courses are integral to our programs and designed to facilitate the transition from undergraduate education to the workplace and/or graduate education. Finally, the undergraduate program promotes a lifelong desire for learning, an appreciation for a healthy lifestyle, and willingness to assume leadership roles in the promotion of health, wellness, and human performance.

Career Opportunities

Graduates of Kinesiology may find employment in areas such as: teaching, corporate wellness, sport administration and marketing, management, fitness assessment and exercise prescription, health promotion, coaching and training of amateur and high performance athletes, therapeutic rehabilitation, workplace health and safety, comprehensive health care, and research.

Student Affairs

Academic advisors in the Advising Office are available for program consultation during regular office hours. Students are encouraged to become acquainted with the Advising Office and its resources to discuss any aspect of academic programs.

Kinesiology Student Society (KSS) is an undergraduate club responsible for academic and social activities. The main objective is to build spirit and rapport within the Faculty.

Resources

The Faculty of Kinesiology is home to many integrated units designed to provide a complete experience in education, research, and programming. Research in the Faculty is conducted in some of the finest laboratories, clinical space, and athletic/recreational training facilities found anywhere in the world. Several highly productive research units exist within the Faculty including the Roger Jackson Centre for Health and Wellness Research comprised of the Human Performance Laboratory (HPL) and the Sport Medicine Centre.

The Faculty includes several large non-academic units. These units, integral to the Faculty, contribute to an enriched environment for students, staff, and faculty, and include the University of Calgary Varsity Athletic teams (the Dinos), Active Living, Community Programs, Outdoor Programs, and the Olympic Oval.

The Kinesiology Complex at the University of Calgary is a multi-faceted facility comprised of over 70,000 square metres of indoor area and over 8 hectares of outdoor

activity space. The complex consists of five gymnasias, two dance studios, a 50 metre swimming pool, one wrestling room, two multipurpose studios, one fitness studio, a cycle centre, a gymnastics centre, two indoor climbing walls, a large fitness centre, and indoor 400 metre speed skating rink, an Olympic size hockey rink, a short track speed skating rink, high performance weight room, an indoor 200 metre six lane running track, an indoor 400 metre two lane running track, thirteen squash courts, seven racquetball courts, eight classrooms, four lecture theatres, and multiple meeting and conference rooms. The outdoor activity area is comprised of five natural grass playing fields, four outdoor tennis courts, and a synthetic field hockey pitch.

3. Faculty Regulations

Students in the Faculty of Kinesiology are governed by the academic regulations contained in this section and also in the Academic Regulations section of the Calendar. Certain courses are subject to individual prerequisites.

Students are advised to read and consider carefully all regulations and in cases of doubt as to the precise meaning of any statement or regulation, to consult the office of the Associate Dean (Academic), Faculty of Kinesiology.

3.1 Admissions

New applicants should refer to A.5 in the Admissions section of this Calendar for regulations regarding University admission requirements. Applicants must meet all deadlines and requirements. Refer to ucalgary.ca/future-students/undergraduate/ apply.

The Faculty of Kinesiology admits students to the Fall Term only.

Limited Enrolment

Enrolment in the Faculty of Kinesiology is limited by admission quotas. Applicants will be admitted on the basis of academic performance, until the enrolment quota is reached.

Second Baccalaureate Degree

Students who hold a bachelor's degree (or equivalent) from a recognized/accredited institution may be considered for a program leading to a second or subsequent bachelor's degree (commonly referred to as an After-Degree), provided they qualify for admission and meet all University and Faculty regulations. Consultation with academic advisors regarding admission and graduation requirements is strongly recommended. For more information regarding admission to a second undergraduate degree, refer to A.5.5 in Admissions.

3.2 Registration

Accuracy of Registration

All students are responsible for the completeness and accuracy of their registration and for arranging their course selections to satisfy graduation requirements.

Course Load

Faculty of Kinesiology students are permitted to enrol in 15 units in each of the Fall and Winter academic terms. It should be stressed that extra courses represent substantial burdens and may negatively impact overall performance. Opportunities for accelerated progress exist through courses offered in Spring and Summer Intersession.

A student wishing to complete more than the normal load of 15 units per Fall or Winter Term must receive special permission from the Kinesiology Advising Office. Permission will not be granted for the admission term.

Interruption of Program Leading to a Degree

Students who interrupt their degree program in the Faculty of Kinesiology are advised that after an absence of one calendar year (twelve consecutive months) from academic study at the University of Calgary, they may be required to comply with any regulation and curriculum change that may have come into effect. Students who do not attend the University of Calgary for two or more years (twenty-four consecutive months or greater) will be required to apply for admission and meet all admission requirements and deadlines for the year to which they apply.

Transfer Credit from Other Institutions

No more than 60 units completed at other institutions or in a previously completed University of Calgary degree may be used as transfer of credit in the degree.

Students must have obtained a minimum grade of "D" or its equivalent in courses proposed for transfer of credit. Grades obtained in transfer courses may be used in the computation of grade point averages for graduation purposes at the discretion of the Faculty.

A maximum of 27 units of Kinesiology Core courses (listed under 4. Program Details) may be transferred from other institutions. The Faculty reserves the right to determine any student's sequence of courses; credit for a course will not be awarded unless the prerequisite for that course (as listed in the Calendar) has been completed with a minimum grade of "C-".

Prior to registering for courses at a school outside the University of Calgary, students must submit a Letter of Permission request, via their Student Centre and receive approval. Students are strongly encouraged to meet with a Faculty advisor prior to submitting their request.

It is the responsibility of the student to provide full details of the courses proposed for transfer credit at the time of application. It is also the responsibility of the student to ensure that upon completion of the courses an official transcript is forwarded to the Admissions Office of this University in order that the appropriate credit may be officially recorded.

Duration of Degree

All course work used towards a Kinesiology degree must be completed within 10 calendar years from the time of first registration in the Faculty and includes transfer credit from external institutions.

Courses Bearing a Prerequisite

A student must obtain a minimum grade of "C-" in a prerequisite course to be eligible for the subsequent course.

Withdrawal from Courses

A student may withdraw from any course via the student registration system by the deadline as specified in the Academic Schedule. Before withdrawing from any course, it is strongly recommended a student seek advice from the instructor and the Advising Office.

Students wishing to withdraw completely from the University should refer to the Academic Regulations section of this Calendar. Students will not be permitted to withdraw more than once from a particular course. Students will be required to withdraw from the Faculty once they have accumulated 30 units of withdrawals while in attendance at the University of Calgary.

Repetition of Courses

A student may repeat a course previously attempted (excluding withdrawals) only once. To repeat a course more than once requires the permission of the faculty in which the student is registered and the department offering the course. Permission is granted only under exceptional circumstances.

Taking or repeating a course that is a prerequisite for a higher level course after having completed the higher level course with a grade of "C-" or better will be allowed only with the permission of both the faculty in which the student is registered and the department offering the course.

Grades

Grades will be assigned per the Evaluation Component(s) and the Grading Scale stated in the course outline. In the event a student request of Deferral of Final Examination or Deferral of Term Work is approved, the student will receive a grade of Grade Pending (GP) during the deferral period.

In the event that the deferred final examination or term work is not completed, the grade will be based on the course work completed to date.

Non-Kinesiology Student Registration

Students not admitted to the Faculty of Kinesiology, who have completed 30 units of Kinesiology courses (transfer or offered by the Faculty of Kinesiology), will be restricted from registration in additional Kinesiology courses.

3.3 Course Work

Credit in Courses by Special Assessment

Students are referred to B.10.1 in the Academic Regulations section of this Calendar for University regulations on special assessment. Students may not count more than 12 units towards their degree in courses taken outside the Faculty by special assessment.

3.4 Student Standing

Performance Review, Probationary Status and Dismissal

Kinesiology students must maintain a minimum GPA of 2.00 to maintain continuation in the program. The academic standing of students registered in the Faculty will be reviewed at the end of each Winter Term provided that they have completed at least 18 units at the University of Calgary since their previous review. Students who have not completed 18 units since the previous review will retain their existing status until the next academic standing review. All University of Calgary units, completed since the previous review, are used for the purpose of academic review. Students placed on academic probation or required to withdraw as a result of the academic performance review will be so advised in writing.

Notwithstanding the specific regulations pertaining to Student Standing, students' academic standing may be reviewed at any time and those with generally poor academic records may be placed or continued on academic probation or required to withdraw at the discretion of the Associate Dean, Academic or other delegate of the Dean. Refer to section F.3.2 Unsatisfactory Standing.

Probation, Dismissal, Readmission

1. Probationary status is only available in Kinesiology, subsequent to a successful appeal of a student's "required to withdraw" status.
2. Probationary status carries the stipulation that a student will:
 - a. Retain a GPA of at least 2.00 over all courses taken since the previous review.
 - b. Be reinstated in satisfactory standing if they have achieved a GPA of at least 2.00 over all courses taken since their previous review.
 - c. Will be required to withdraw from the Faculty if they achieve a GPA of less than 2.00 over all courses taken since their previous review.
3. Students who have been required to withdraw due to deficient academic performance should note that it is not normally possible to be readmitted to the Faculty of Kinesiology without first taking courses to improve their grade point averages to meet the required admission averages for their programs. Students readmitted after having been required to withdraw from the Faculty of Kinesiology due to unsatisfactory academic performance must maintain a grade point average of at least 2.00 on

all courses taken in each academic review period after readmission. Failure to do so will result in permanent dismissal from the Faculty of Kinesiology.

4. Students required to withdraw from an Honours program under conditions of unsatisfactory academic performance will be deemed ineligible for readmission to an Honours program. However, the student may be considered for admissions to a BKin or BSc program.

Dean's List

The Dean's List recognizes the outstanding academic achievement of students in the Faculty of Kinesiology. To be considered for the Dean's List, a student must achieve a GPA of at least 3.60 over a minimum of 24 graded units, graded, completed in the preceding Fall and Winter Terms at the University of Calgary. Students on academic sanctions as outlined in section K (Statement on Principles of Conduct) of this Calendar are not eligible for the Dean's List.

3.5 Graduation

Degree "With Distinction"

In a non-Honours program a GPA of 3.60 or better over the most recently completed 90 units will result in the degree being awarded with distinction.

A student who has taken part of their course work at another university or who has transferred into the Faculty may be granted a degree with distinction at the discretion of the Faculty.

Degree with First Class Honours

In an Honours program a GPA of 3.60 or better over the most recently completed 90 units will result in the degree being awarded with First Class Honours.

A student who has taken part of their course work at another university or who has transferred into the Faculty may be granted a degree with First Class Honours at the discretion of the Faculty.

Minor Field Programs

Students may formally declare a Minor Field and have this officially recorded on their transcript of record provided they satisfy the requirements for the relevant Minor Field program. This declaration must be made prior to application for graduation and no later than the time of their last registration.

Refer to Minor Programs section of the Academic Calendar.

3.6 Appeals Process

There are no Faculty-specific regulations governing appeals. Refer to I. Reappraisal of Graded Term Work and Academic Assessments (final grades) and J. Student Appeals to the University Appeals Committee and University Appeals Tribunal in the Academic Regulations section of this Calendar.

3.7 Fees and Expenses

Students will be expected to pay supplementary fees in some courses, as specified in course registration materials. Refer to

section P.1.10 Mandatory Supplementary Fees for Courses.

4. Program Details

4.1 Requirements

Bachelor of Kinesiology and Bachelor of Science Programs

1. Attainment a minimum 2.00 grade point average over the entire program, as outlined below.
2. Attainment a minimum 2.00 grade point average in all Faculty of Kinesiology courses.
3. No more than the equivalent of 12 units "D" or "D+" grades in core course requirements.
4. No more than the equivalent of 24 units "D" or "D+" grades throughout the entire program.
5. No "F" grades will be acceptable towards the BKin or BSc degree. A course normally may be repeated only once.
6. A minimum of 60 units at the 300 level or above must be applied to all Kinesiology degree.

Kinesiology Core Courses

Within the 120 units Bachelor of Kinesiology or Bachelor of Science degree, all students must complete the following core courses (54 units).

- Kinesiology 201
- Kinesiology 203
- Kinesiology 213
- Kinesiology 237
- Kinesiology 244
- Kinesiology 251
- Kinesiology 253
- Kinesiology 259*
- Kinesiology 260*
- Kinesiology 263
- Kinesiology 323
- Kinesiology 344
- One of Kinesiology 351, 397, or 399
- Kinesiology 355
- Kinesiology 363
- Kinesiology 372
- Kinesiology 373
- Statistics 205 or 213

In addition to the core, each Major requires the specific courses outlined in 4.2 Specific Program Requirements.

**It is recommended that Kinesiology 259 and 260 are taken in the first year.*

Students are also recommended to select some of the 200-level requirements for their chosen major. Since this entails more than 30 units, students are expected to complete these 200-level courses in their first two years of study.

All students in the Faculty of Kinesiology must complete a minimum of 15 units, up to a maximum 45 units, from outside the Faculty of Kinesiology.

Additional Requirements for Bachelor of Science Programs

To meet BSc degree requirements, a minimum of 63 units of science equivalents must be completed. These include:

- All courses offered by the Faculty of Science and Schulich School of Engineering.
- Courses offered collaboratively by the Faculty of Arts and the Faculty of Science in Earth Science EASC and Environmental Science ENSC.
- Anthropology 201, 311, 413, 435, 451, 505, 523, 552, 553, 571, 589.
- Archaeology 201, 306, 415, 417, 437, 453, 471, 506, 515, 523, 596.
- Geography 204, 280, 308, 310, 380, 391, 408, 410, 412, 480, 482, 484, 485, 500, 502, 503, 504, 506, 510, 512, 567, 584, 585, 587, 599.
- Psychology 200, 201, 300, 301, 407, 411, 469, 471, 473, 475, 477, 478, 479, 491, 497, 521, 531, 591.
- The following Kinesiology courses: Kinesiology 213, 237, 251, 259, 260, 263, 323, 351, 355, 363, 365, 367, 372, 373, 375, 377, 381, 393, 395, 413, 433, 437, 451, 460, 463, 465, 466, 469, 475, 479, 485, 490, 493, 495.

Honours Programs

See 4.2.6 for additional requirements for Honours programs.

4.2 Specific Program Requirements

4.2.1 Bachelor of Kinesiology or Bachelor of Science

Requirements

- A. Kinesiology Core (54 units)
- B. Senior Kinesiology Options (24 units)
- C. Senior non-Kinesiology Options (6 units)
- D. Junior or Senior non-Kinesiology Options (9 units)
- E. Open Options (27 units)

4.2.2 Bachelor of Science (Biomechanics)

Admission

Students should refer to the Standard Admission requirements listed in the Admissions section of this Calendar. Note that Mathematics 30-1 with a grade of 70 per cent or above and Mathematics 31 are required for admission. Physics 30, or equivalent, is strongly recommended and if not completed, students must complete Physics 211 in their first year to be eligible to take the required Engineering courses.

Requirements

- A. Kinesiology Core (54 units)
- B. Biomechanics Major Requirements (36 units):
 - Mathematics 211
 - Mathematics 275
 - Mathematics 277
 - Engineering 201

- Engineering 202
- Engineering 311
- Mechanical Engineering 317
- Engineering 349
- Kinesiology 393
- Kinesiology 395
- Kinesiology 463
- Kinesiology 466 or 490

C. Senior Kinesiology option (12 units)

D. Options (18 units)

4.2.3 Bachelor of Science (Exercise and Health Physiology)

Admission

Students should refer to the Standard Admission requirements listed in the Admissions section of this Calendar. Note that Mathematics 30-1 or equivalent with a grade of 70 per cent or above is required for admission.

Requirements

- A. Kinesiology Core (54 units)
- B. Exercise and Health Physiology Major Requirements (36 units):
 - Chemistry 201, 203, 351
 - Biochemistry 341
 - Mathematics 249 or 265
 - Kinesiology 375, 433
 - Three of Kinesiology 365, 377, 437, 465, 469, 475, 479, 485, 493, 495
 - One of:
 - Kinesiology 441 and 3 units of Kinesiology options at the 300 level or above, or
 - Kinesiology 490

C. Kinesiology Options at the 300 level or above (3 units)

D. Options (27 units)

4.2.4 Bachelor of Kinesiology (Leadership in Pedagogy and Coaching)

Admission

Admission to the Leadership in Pedagogy and Coaching Major is competitive and space is limited to approximately 30 students.

Requirements

- A. Kinesiology Core (54 units)
- B. Leadership in Pedagogy and Coaching Major Requirements (21 units):
 - Kinesiology 311
 - Kinesiology 321
 - Kinesiology 367
 - Kinesiology 397
 - Kinesiology 433 or 403
 - Kinesiology 491
 - Physical Education 321
- C. Concentration requirements (Students will declare either the Pedagogy concentration or the Coaching concentration when they enter the Leadership in Pedagogy and Coaching Major).

Pedagogy concentration requirements (15 units):

- Dance Education 325
- Physical Education 333
- Physical Education 349
- Kinesiology 331
- One of Kinesiology 335, 351*, 375, 381, or 397*, 399*, or 469

**May not be applied to both Core and Senior Option requirements.*

Coaching concentration requirements (18 units):

- Kinesiology 331
- Kinesiology 381
- Kinesiology 399*
- Kinesiology 431
- Two of Kinesiology 351*, 375, 397*, 437, 469

**May not be applied to both Core and Senior Option requirements.*

D. Options

Pedagogy concentration (30 units)

Coaching concentration (27 units)

4.2.5 Bachelor of Kinesiology or Bachelor of Science (Mind Sciences in Kinesiology)

Requirements

A. Kinesiology Core (54 units)

B. Mind Sciences in Kinesiology Major Requirements (24 units):

- Psychology 200
- Psychology 201
- Statistics 217
- 6 units from Kinesiology 351, 397, 399, 413
- 3 units from Kinesiology 451, 497, 499
- 6 units from Health and Society 201, 301, 311, Kinesiology 444, 490, 503, 593; Philosophy 201, 313, 361, Psychology 345, 351, 353, 365, 369, 375, 383; Sociology 201, 321, 341, 407, 409

C. Senior Kinesiology options in addition (12 units)

D. Options (30 units)

Notes:

1. Some of the courses listed above have prerequisites and are restricted to Majors in those programs. It is the student's responsibility to ensure that prerequisites are completed.
2. Kinesiology 451, 497, 499, 503, 591, and 593 must be completed with an instructor associated with the Mind Sciences in Kinesiology Major.
3. Credit in 400-level Psychology courses may be used towards the Mind Sciences in Kinesiology Major. However, access to these courses is extremely limited.

4. Courses applied to this major may not be applied to a Minor in Psychology.

4.2.6 Bachelor of Kinesiology Honours or Bachelor of Science Honours

Honours programs are offered in all majors.

Admission

Applicants to an Honours program must have completed a minimum of 90 units by the term in which they enter the Honours program. The completed units must include a junior level Statistics course, and a cumulative GPA of at least 3.30 over the completed 90 units (with a minimum GPA of 3.30 in all Kinesiology courses). These grade point averages must be maintained in order to retain Honours standing.

Students are strongly encouraged to consult with the Faculty's Advising Office prior to application.

Requirements

Enrolment in Kinesiology 490 (Interpretation of Research and Research Project) is added to the course requirements for each Major in an Honours program. Enrolment in Kinesiology 490 is limited and requires consent of the department. Registration in Kinesiology 490 is contingent on the student having made suitable arrangements with an eligible supervisor in the Faculty of Kinesiology, as well as confirmation of the availability of resources (laboratory space, equipment, etc.) required to complete the research project.

To graduate with Honours, a student will be required to present a minimum cumulative GPA of 3.30 over the last 90 units and a minimum GPA of 3.30 in all courses offered by the Faculty of Kinesiology.

1. Once admitted to the Honours program a student must maintain a GPA of at least 3.30 in each academic year. The following circumstances will normally result in a student being required to withdraw from the Honours program:

- (a) Any "F" grades obtained in the final two years of the program.
- (b) The accumulation of more than 12 units of "D" or "D+" grades.

2. Honours students must submit a written report annually to the Associate Dean (Academic) when Research Proposals are presented in the Fall term of Kinesiology 490.

4.2.7 Combined BKin (Kinesiology)/BA (Dance)

Introduction

The Faculty of Kinesiology with the Faculty of Arts offers a five-year combined Bachelor of Kinesiology (Kinesiology)/Bachelor of Arts (Dance) degree program. The program requires careful selection of courses to complete all requirements of the two Faculties. Interested students are urged to contact the Advising Offices of the two faculties for advice in choosing their first-year courses.

Admission

Applicants to the combined program must satisfy the admission requirements of both Faculties. Students are strongly advised to enter the combined program directly in first year.

Once accepted to the combined program, the requirements of each Faculty must be met. Failure to do so will result in a student being required to withdraw from the combined or separate programs. A student may elect to remain in the combined program or submit a Change of Program request through the online Student Centre via MyUofC to remain in either of the two separate degree programs.

Requirements

Students must adhere to the regulations and satisfy the graduation requirements of both Faculties. The combined degree requires at least 150 units and the successful completion of both degree requirements. A maximum of 60 units at the junior level, may be used towards the Kinesiology degree requirements.

The Faculty of Kinesiology requirements are as follows:

- 54 units from the Kinesiology Core as listed in 4.1 of the Faculty of Kinesiology section of the Calendar.
- 21 units of Kinesiology options at the 300 level or above.

Refer to section 4.13.3 Combined BKin (Kinesiology)/BA (Dance) for BA Dance program requirements.

4.2.8 Combined BComm/BKin (Kinesiology) Program

Introduction

No major other than the Bachelor of Commerce (BComm) will be considered by Haskayne School of Business.

The Faculty of Kinesiology with the Haskayne School of Business offers a five-year combined Bachelor of Commerce/Bachelor of Kinesiology (Kinesiology) degree program. The program requires careful selection of courses to complete all requirements of the two Faculties. Interested students are urged to contact the Advising Offices of the two faculties for advice in choosing their first-year courses.

Admission

Applicants to the BComm/BKin program must satisfy the admission requirements of both Faculties. Students are strongly advised to enter the combined program directly in first year. Students may apply for combined degree admission in a subsequent year, upon successful completion of a prescribed set of pre-commerce requirements (see section 4.1.2 in the Haskayne School of Business section of this Calendar).

At the point of admission to the combined degree program, students will be administered by the Haskayne School of Business, which is a quota restricted faculty. Therefore, admission and program requirements for

the BComm program also apply to students pursuing the combined degree program.

Requirements

Once accepted to the combined program, students may elect to remain in it or submit a Change of Program request to remain in either of the two separate degree programs, understanding that the requirements of each Faculty must be met. Failure to meet requirements will result in a student being required to withdraw from the combined or separate programs.

Students must satisfy the graduation requirements of both Faculties (see section 4.1.4 in the Haskayne School of Business section of this Calendar).

4.2.9 Concurrent BKin (Leadership in Pedagogy and Coaching)/BEd

Introduction

The Faculty of Kinesiology in partnership with the Werklund School of Education offers a five-year concurrent Bachelor of Kinesiology (Leadership in Pedagogy and Coaching)/Bachelor of Education in Physical Education. Students are strongly advised to enter the concurrent program directly in first year.

Refer to 4.3 Five-Year BEd (Concurrent) Program in the Werklund School of Education section of the Calendar.

Admission

Applicants to the BKin/BEd must meet admission requirements for both the Faculty of Kinesiology (Leadership in Pedagogy and Coaching - Pedagogy concentration only) and the Werklund School of Education (see A.5 Undergraduate Admission Requirements in this Calendar).

Requirements

A. Kinesiology Core (54 units)

B. Leadership in Pedagogy and Coaching Major Requirements (18 units):

- Kinesiology 311
- Kinesiology 321
- Kinesiology 367
- Kinesiology 391
- Kinesiology 433 or 403
- Physical Education 321

C. Pedagogy concentration requirements (18 units):

- Dance Education 325
- Education 201
- Kinesiology 331
- 3 units English or French literature option
- Physical Education 333
- Physical Education 349

Notes:

1. Students must complete Kinesiology 391, Education 201, and a junior-level English or French literature course before commencing their first year in Education.
2. Completion of the BKIN degree is required to be admissible to the final year in Werklund School of Education.

D. 60 units required by the Werklund School of Education

5. Administration

Faculty Administrative Officers

Dean

W. Herzog

Associate Deans

D. Paskevich, Academic

P. Wiley, Graduate

C.A. Emery, Research

Faculty of Law

1. Summary of Degree Programs

Degrees Offered

| |
|---|
| Undergraduate |
| JD |
| Graduate |
| LLM |
| Graduate Certificate |
| Joint Programs |
| JD/MBA* |
| JD/MPP** |
| International Energy Lawyers Program*** – JD (Calgary)/JD (Houston) |

*Combined Degree with the Haskayne School of Business

**Combined Degree with the School of Public Policy

***Combined Degree with the University of Houston

Undergraduate

The JD program comprises three years of full-time study or six years of part-time study, each divided into two sessions of 13 weeks. The program satisfies the National Requirement for the Approved Law Degree established by the Federation of Law Societies.

Combined Degree Programs

The Faculty of Law offers combined degree programs with the Haskayne School of Business (a combined JD/MBA program) the School of Public Policy (a combined JD/MPP program) and the University of Houston (a combined JD/JD program). Students wishing to obtain any of these combined degrees must be admitted to each Faculty/School through the regular admissions process. Students who have completed their first year of either program may still apply for a combined program by meeting the normal application and admission requirements for the other faculty. Students are generally only admitted to the International Energy Lawyers Program after completing the first year at either the University of Calgary or the University of Houston.

Each combined degree program is a four year program. Students must complete the combined degree requirements concurrently prior to graduation. Students wishing to graduate from the JD program prior to completion of the combined degree, must complete all the JD degree requirements as outlined by the Faculty of Law and are no longer eligible for the combined degree.

Graduate

The Faculty of Law offers a course-based Master of Laws (LLM), a thesis-based LLM, and a Graduate Certificate, all with a specialization in natural resources, energy, and environmental law. We also offer a thesis-based LLM without a specialization.

2. Faculty Information

Contact Information

Location: Murray Fraser Hall Room 2380

Student Information: 403.220.4155

Faculty number: 403.220.7115

Email address: law@ucalgary.ca

Web page: law.ucalgary.ca/

Introduction

The Faculty of Law's Juris Doctor (JD) program will prepare you for a variety of roles within the legal system. Designed to lay the groundwork for the development of competent, talented, creative and sensitive professionals, our program prepares you for the rapidly changing society in which the imagination and human qualities of the legally-trained person will be challenged to the fullest.

The Faculty of Law offers a course-based Master of Laws (LLM), a thesis-based LLM, and a Graduate Certificate, all with a specialization in natural resources, energy, and environmental law. We also offer a thesis-based LLM without a specialization. For more information about our graduate programs, consult the Faculty of Graduate Studies Calendar.

JD Program

The first year of the JD program is common to all students, and consists of intensive courses in Foundations of Law and Justice (in September and January) as well as courses in Legislation, Constitutional Law, Crime: Law and Procedure, Property, Torts and Contracts.

In the second and third year of the program students complete required courses in Civil Procedure, Administrative Law, Ethical Lawyering, Evidence, Negotiation and Advocacy. They will also take one course within the areas of international law and theoretical perspectives on the law, and fulfill an upper year writing requirement. Students choose the remainder of their courses from their area or areas of interest.

Students in joint degree programs will complete all of the required elements of the JD program.

Students at the Faculty have the opportunity to participate in extra-curricular activities related to the study and practice of law including the Student Legal Assistance legal clinic and Pro Bono Students Canada. In addition, many courses at the Faculty incorporate performance-based learning or have a clinical component.

Courses at the Faculty cover the breadth of the substance and process of law, but also reflect the Faculty's specialties in natural resources, energy and environmental law, and legal practice.

The Faculty of Law has identified the following minimum standard of competence for our graduates:

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1. Substantive legal knowledge

All law graduates should have developed an understanding of:

- The principles and jurisprudence comprising foundational doctrinal areas of law (e.g., torts, contracts, constitutional, property, criminal and administrative law)
- The principles underlying common law and equity
- Developed knowledge of the sources of law, including the structure of, and relationship between, the branches of government
- The role of legislation in the common law system

2. The context of law

All law graduates should have developed an appreciation of:

- Various perspectives on law, including theoretical, historical and comparative perspectives
- The implications of international, multi-disciplinary and technological innovations for law and legal practice
- The role of policy and its intersection with law
- The problem of access to justice and the role for lawyers in ameliorating it

3. Legal research

All law graduates should possess the ability to:

- Develop a coherent research strategy
- Identify and assess sources of legal and non-legal information appropriate to the particular issue(s) or matters

4. Legal analysis and reasoning

All law graduates should have developed the skills necessary for:

- Developing legal arguments and providing legal opinions, including the interpretation and application of statutes and case law
- Identifying, investigating and assessing a problem, both factually and legally placing a problem within a broader context as appropriate
- Understanding the relationship between different normative orderings, such as the relationship between international and domestic law methods
- Critiquing their own legal reasoning and that of others from substantive, normative and procedural perspectives

5. Legal communication

All law graduates should have developed the skills necessary for:

- Counseling and advising, including ascertaining the client's needs, wishes and risks, providing options to the client, and helping the client to select the appropriate option
- Effective negotiation, advocacy and collaboration
- Clear and accurate communication in a format appropriate to its purpose
- Drafting formal documents
- Evaluating communication to assess its effectiveness and impact
- Interpersonal skills, including teamwork and collaboration

6. Dispute resolution skills

All law graduates should have:

- Familiarity with drafting and transactional skills relevant to the prevention of disputes
- Knowledge of the characteristics and procedures of available forms of dispute resolution
- The understanding necessary to recommend appropriate form(s) of dispute resolution, whether consensus or adjudicative, for particular settings and specific conflicts

7. Ethics

All law graduates should have developed a critical understanding of:

- The normative foundations of the lawyer's role
- The scope and limits of the lawyer's role
- The law governing lawyers and legal practice
- The capacity to identify and resolve ethical dilemmas

Opportunities

To practice law in Canada a lawyer must be a member of a provincial law society, (in Alberta, the Law Society of Alberta). The JD program at the University of Calgary is approved as a law degree sufficient for admission to the Canadian common law law societies. The LLM programs at the University of Calgary are not approved as law degrees sufficient for admission to the Canadian common law law societies and do not allow students to satisfy the requirements for law society admission through the National Committee on Accreditation.

Graduates from the University of Calgary Faculty of Law work in a wide variety of settings. Many graduates work in legal practice assisting individuals, corporations, organizations and government with their legal needs. Faculty of Law graduates also work, however, in diverse professional, business and creative endeavours, including as legislators, judges, executives, entrepreneurs and academics.

The Faculty of Law at the University of Calgary works with all of our graduates to help them secure employment subsequent to graduation. Information on the Faculty's Career and Development Office can be found here: ucalgary.ca/lawcareers.

Student Affairs

The Society of Law Students is the official student association recognized by the Faculty of Law to represent the interests of all students in the undergraduate law program. The Society is responsible for providing law students with social, sporting, academic, volunteering, and administrative services, as well as being the official liaison between the student body and the Faculty, University and broader legal community.

3. Faculty Regulations

Students in the Faculty of Law are governed by the Faculty Regulations and also by the Academic Regulations section of this Calendar. The Faculty Regulations can be found here: <https://law.ucalgary.ca/sites/default/files/teams/2/faculty-regulations-june-2015.pdf>.

4. Admissions

Contact the Faculty Admissions Office or visit the Faculty of Law website (law.ucalgary.ca/) to obtain the most up-to-date information.

Requirements

The educational prerequisite for admission to the Faculty of Law is successful completion of 60 units in a program of studies leading to a degree at a university in Alberta, or its equivalent. Courses to be considered must be completed prior to December 31 in the year in which the application is made. Normally, successful applicants will have completed at least one university degree.

When selecting the most promising students each year, the Admissions Committee considers a number of factors including: academic record, performance on the Law School Admission Test (LSAT), evidence of maturity, extra-curricular activities, work experience, community involvement, the applicant's statement of interest addressing the questions set out in the Faculty's application, and references.

The Law School Admission Test

All students seeking admission to the Faculty of Law are required to take the Law School Admission Test (LSAT). The last acceptable LSAT score will be the January writing in the year the applicant is intending to commence law school studies. Only those applicants who have written the LSAT by that date will be given consideration. Any applicant who is not able to afford the LSAT fee may apply to the Law School Admission Council (LSAC) for a fee waiver.

For more information about the LSAT including the fee waiver form and criteria can be found on the LSAC website: lsac.org/.

Procedures

The deadline for receipt of fully completed application forms is November 1. All supporting documentation must be received by February 15.

The Admissions Committee starts reviewing files as soon as they are complete. This includes an LSAT score, certified transcripts from all post-secondary educational institu-

tions attended and any required reference. Academic references are preferred, although those applicants who have been out of university for a number of years may choose a work-related reference. References must not be from personal friends, family friends or family members.

It is to the applicant's advantage to have a completed file as soon as possible. Successful applicants will be required to confirm, within a specified time period, their acceptance of an offer by sending a non-refundable \$500.00 deposit.

Law Society Admission

While the Faculty of Law may admit students to its JD degree program, the right to practice law as a barrister and solicitor is granted only by the law society of the province concerned. Applicants contemplating practice should consider communicating as soon as possible with the law society of the province in which they intend to practice for all relevant particulars. In particular, applicants may wish to make inquiries of the law society with respect to matters that raise issues of good character and reputation. Such matters would include, amongst other things, past criminal convictions, instances of academic misconduct or unresolved bankruptcy declarations.

5. Program Details

Requirements for Graduation

Course Requirements

Students must complete a total of 98 units in Law courses, including achieving a satisfactory performance (a "C-", or higher, or "CR") in the following courses:

- Law 400
- Law 402
- Law 403
- Law 404
- Law 406
- Law 407
- Law 408
- Law 410
- Law 503
- Law 505
- Law 507
- Law 508
- Law 510
- Law 602

Additional Requirements

Students must achieve satisfactory performance ("C-", or higher) in a course that meets the following requirements. See the Faculty of Law website (law.ucalgary.ca/) for more information.

- Upper-Year Writing
- International
- Theoretical Perspectives

Note that all upper-year (i.e., second and third year) JD students must register for at least 12 units per term, to a maximum of 18, and for at least 31 units per year, to a maximum of 36.

6. Administration

Faculty Administrative Officers

Dean

I. Holloway

Associate Deans

N. Nikolaou, Academic

G. Hagen, Research and Graduate Program
Director

For information about our programs, please
see law.ucalgary.ca/.

Faculty of Nursing

1. Summary of Degree Programs

Degrees Offered

| |
|--|
| Undergraduate |
| BN |
| Graduate |
| Post-Master's Nurse Practitioner Diploma - Acute Care (NP Diploma) |
| MN (thesis and course-based) |
| PhD |

Undergraduate

Bachelor of Nursing Program

The University of Calgary offers an innovative Bachelor of Nursing degree to prepare students for the opportunities and challenges of a nursing career in a changing health-care system. Throughout the program, students are provided with a sound theoretical base and supervised practice experience in a variety of nursing settings. Three BN routes are available: a four-year route for high school students, a two and one-half year route for transfer students and a two-year route for degree holders.

Note: Students enrolled at the Calgary Campus, who wish to transfer to the UC-Qatar Campus or Medicine Hat College, must apply for admission at the desired site. Admission will be based on the student's grade point average and the availability of seats.

Bachelor of Nursing Program at Medicine Hat College Site

The Bachelor of Nursing program at Medicine Hat College is a partnership program offered entirely at the Medicine Hat College site, allowing students in the Medicine Hat area increased access to a baccalaureate program without having to relocate.

Note: Students enrolled at the Medicine Hat College Site, who wish to transfer to the Calgary Campus, must apply to the University of Calgary Bachelor of Nursing Direct Entry Route. Requests will be reviewed by the Dean (or designate) on a competitive basis considering the student's cumulative grade point average and space available at the level/year that the student wishes to transfer into. Additional supporting documentation is required as outlined in Nursing Faculty Regulations 3.1 Attendance in a Prior Nursing Program.

Bachelor of Nursing Program at University of Calgary Qatar Campus

For more information see: ucalgary.ca/faculties/nursingqatar/.

Note: Students enrolled at the Qatar Campus, who wish to transfer to the Calgary

Campus, must apply to the University of Calgary Bachelor of Nursing Degree Program. Admission will be based on case-by-case appraisal of student circumstance as well as the student's grade point average and the availability of seats. Due to the differences in courses and curriculum, transferability may be limited.

Post-Diploma Bachelor of Nursing for Registered Nurses (Qatar Campus Only)

For more information see: ucalgary.ca/faculties/nursingqatar/.

Graduate

See the Faculty of Graduate Studies Calendar.

2. Faculty Information

Contact Information

Location: Professional Faculties 1238

Student Information:

BN programs 403.220.4636

Master's and Doctoral programs 403.220.6241

Faculty number: 403.220.6262

Email addresses:

BN at Medicine Hat College - bnosinfo@ucalgary.ca

All other BN programs - nursing@ucalgary.ca

Master's and Doctoral - nursgrad@ucalgary.ca

Website: nursing.ucalgary.ca/

Introduction

The University of Calgary Faculty of Nursing was established in 1969. Undergraduates of the University of Calgary Baccalaureate Program in Nursing participate in the generation of disciplinary knowledge and are prepared to interpret, integrate and apply relevant knowledge from other fields to their practice, on a continuum of active learning. These Undergraduates have a clearly defined philosophical and conceptual basis for their practice; are prepared to provide a strong voice in inter-professional, collaborative undertakings; and use evidence-informed approaches and diverse ways of knowing to provide compassionate care, in order to sustain and promote healthful environments. They are called on to take leadership roles to promote health for individuals, families, public groups, communities and/or populations who are experiencing health transitions and, as such, work in a variety of settings across health/illness trajectories. Undergraduates of the University of Calgary Baccalaureate program in Nursing strive for excellence in meeting entry-level competencies as outlined by the College and Associa-

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tion of Registered Nurses of Alberta (2006) in five domains: professional responsibility/accountability; knowledge-based practice; ethical practice; service to the public; and self-regulation. They demonstrate professional and ethical decision-making behaviours as outlined in the Canadian Nurses Association Code of Ethics for Registered Nurses (2017).

Career Opportunities

Career opportunities in nursing are many and varied. Staff nurse positions are found in acute care (hospital) settings, extended care, home care, and community/rural settings. Nurses are also employed in occupational health nursing and in various government services such as outpost nursing, penitentiaries, international nursing or the Canadian Armed Forces. Completion of a BN degree allows graduates to write the National Council Licensure Examination (NCLEX) which is a prerequisite for licensure in any province/territory in Canada.

Student Affairs

Advising Services

Student advisors are available in the Nursing Undergraduate Programs Office on the ground floor of the Professional Faculties Building on the University of Calgary campus. Contact information, including office hours, can be found at: nursing.ucalgary.ca/undergraduate/undergraduate-programs-office. Students are encouraged to become familiar with the office and its services.

Undergraduate Nursing Society (UNS)

The UNS is a society consisting of elected representatives from the Nursing student body. UNS serves students by providing faculty-student liaisons, information on current nursing issues, graduation funding, social functions and a support network for Nursing students.

Professional Conduct

The study of nursing practice places students in a position of special trust with Registered Nurses, other health care professionals, and their patients or clients. The Faculty of Nursing recognizes that nursing education occurs both inside and outside the class-

room and has the responsibility to ensure that its graduates are competent and ethical. Students are expected to comply with all University of Calgary policies and regulations. Although nursing students in program are not regulated members of the College and Association of Registered Nurses of Alberta (CARNA), as part of their formation as professional nurses, they are also expected to meet professional and ethical standards for Registered Nurses as outlined by:

- Canadian Nurses Association Code of Ethics for Registered Nurses (2017):
- <https://cna-aiic.ca/html/en/Code-of-Ethics-2017-Edition/files/assets/basic-html/page-1.html>
- CARNA Practice Standards for Regulated Members (2013): http://www.nurses.ab.ca/content/dam/carna/pdfs/DocumentList/Standards/PracticeStandards_Jan2013.pdf
- CARNA Requisite Skills and Abilities for Becoming a Registered Nurse in Alberta (2011):
- http://www.nurses.ab.ca/content/dam/carna/pdfs/DocumentList/Guidelines/RN_RequisiteSkills_May2011.pdf

Students are expected to ensure they are both familiar with, and comply with these standards.

Resources

The Faculty of Nursing is located on the first and second floors of the Professional Faculties Building and the sixth floor of Craigie Hall, both which are on the main campus of the University of Calgary. The Faculty houses a Clinical Simulation Learning Centre which is designed as an interactive environment to advance excellence in Nursing. Within it, the acquisition of knowledge and skills is facilitated through a variety of resources which link nursing education, practice and research.

Nursing is a practice based profession. Terms 1 and 2 consist of foundational courses alongside option courses which bring breadth to the BN Program. Nursing practice courses begin in Term 3. Each nursing practice course for Terms 3 through 7 consists of a combination of both on- and off-campus practice hours. Term 8, the final practicum, is a full-time preceptored consolidation course which transitions nursing students to practice as a Graduate Nurse (GN). Nursing practice courses take place in a variety of institutional and community settings, including rural and urban centres, with a variety of client populations. Students are expected to travel, at their own expense, to any nursing practice agency within commuting distance to Calgary. Examples of facilities and agencies utilized by the Faculty of Nursing include: Alberta Children's Hospital, Alexandra Community Health Centre, Calgary Correctional Centre, Calgary Health Services, Claresholm Hospital, Foothills Hospital, Home Care, High River Hospital, Peter Lougheed Centre, Rockyview Hospital, Stoney Tribal Health Centre, Strathmore Public Health Unit, Wood's Homes. Many other community health agencies contrib-

ute in a variety of ways to the programs of the Faculty of Nursing. Out-of-region and international placements are arranged on an individual basis.

3. Faculty Regulations

3.1 Admissions

General Requirements

Students wishing to begin a Bachelor of Nursing degree program must meet minimum admission requirements as set out in 4. Program Details. Also see the Admissions section of this Calendar.

Deadlines

September Entry:

Refer to ucalgary.ca/future-students/undergraduate/apply

Transfer Students (January Entry)

September 1 for applications

September 15 for documents

Degree-Holding Students (January Entry)

September 1 for applications

September 15 for documents

Note: Qualifying degree must be completed no later than August 31 prior to the admission date.

BN Program at Medicine Hat College Site

March 1 for applications to the University of Calgary

June 1 for documents

Second Baccalaureate Degree

Students who have received one or more approved undergraduate degrees (BA, BSc, BEd, etc.) may apply for admission to the Bachelor of Nursing (Degree Holder Route). Students who hold a previous bachelor's degree (or equivalent) in nursing, which at the discretion of the University is deemed similar or equivalent, will not be considered for admission.

Students must apply to the Admissions Office and meet all deadlines and requirements. For more information regarding admission to a second undergraduate degree, refer to A.5.5 in Admissions.

Attendance in a Prior Nursing Program

Applicants who have previously been enrolled in a baccalaureate Nursing program at another institution, must submit:

1) a letter which outlines their academic plans and explains their reasons for transferring to the University of Calgary program and,

2) a reference letter from the Dean or Designate of the current/prior Nursing program that the applicant is transferring from, confirming that the applicant is/was in good academic standing and that they are eligible to continue in the program.

A follow-up interview with the Associate Dean may be required as part of the review process. Admission is not automatic; applicants will be considered on an individual basis. In instances where applicants have failed prior nursing courses or have been

required to withdraw from a prior nursing program, the letter must also explain why they are now likely to be successful. Refer to Admissions, section A.6 Required to Withdraw Students for more detailed information.

Immunization Requirements

All nursing students are required to complete a series of immunization and diagnostic tests as outlined on the Student Immunization Worksheet. Documented proof of completion must be provided to the Faculty of Nursing prior to commencement of the program.

Throughout the BN program, students are required to ensure that immunizations are current and must provide proof of updates to the Faculty of Nursing. Failure to do so will result in students being removed from practice courses until such time as adequate proof has been provided. Please note requirements may change during the program as determined by Alberta Health Services guidelines.

N-95 Fit Testing

All Nursing students must be fit tested for an N-95 mask prior to commencement of Term 1 (for High School Students) or Term 3 (for Transfer and Degree Holders). Students may be required to wear this mask in the practice setting to help protect against certain communicable diseases. Documented proof of a fit test must be provided to the Faculty of Nursing prior to commencement of the program. Fit testing is only valid for two years; therefore students must present proof of a second fit testing at the time of expiration.

English Language Proficiency

The Nursing profession requires a high level of spoken and written communication skills in order to ensure patient safety. Students who, after admission, show an inadequate command of spoken or written English must improve their proficiency to the Faculty's satisfaction in collaboration with the International Foundations Program. Students may be asked to withdraw from the program if their inadequate command of English interferes with their ability to provide patient care.

Students should also be aware of the English Language Proficiency requirements as outlined in A.11 of the Admissions section of this Calendar.

Skills and Abilities for Becoming a Registered Nurse in Alberta

Nursing students require certain basic skills and abilities to progress through a nursing education program and for initial entry to practice as a Registered Nurse in Alberta. Prospective students are encouraged to review the document "Requisite Skills and Abilities for Becoming a Registered Nurse in Alberta (May 2011)" to identify their fit with the requirements of becoming a registered nurse and/or identify their potential need for accommodation¹ in becoming a member of the nursing profession. Examples following each requisite skill and ability are included in the document in order to provide a snapshot of the nature and kind of activities involved

in typical entry-level registered nurse practice.

Accommodation is the process of making alterations (to the point of undue hardship) to the delivery of services so that those services become accessible to more people, including people with disabilities. (Alberta Human Rights Commission)

Academic Accommodation Policy

It is important for students with documented disabilities, who have met the admission criteria, to note that the Academic Accommodation Policy does not require the University to lower or substantially modify standards in order to accommodate students with disabilities. Adaptive technology and/or academic accommodations are available to facilitate learning; however, they do not relieve students of their responsibilities to develop the essential skills and abilities expected of all other students.

Police Information Check

All applicants to the Faculty of Nursing are required to provide a current Police Information Check which includes a Criminal Record Check and a Vulnerable Sector Search. In order to be considered "current", the Police Information Check must be completed during the three months prior to admission, (i.e. June 1-August 31 for Fall admission; October 1-December 31 for Winter admission). The original Police Information Check must be presented, in person, or via the online ePIC system, to a Faculty of Nursing Student Advisor. Without this documentation, admission to the Faculty will be rescinded. Detailed information, including deadlines, is available on the Faculty of Nursing website at: nursing.ucalgary.ca/undergraduate/future-students/required-documentation Students who are concerned about the presence of a criminal record should contact the Parole Board of Canada for information on receiving a Canadian Pardon/Record Suspension.

Failure to present a clear Police Information Check may result in admission being denied/rescinded. An internal University appeal process is available to applicants who are refused admission for this reason.

Subsequent to admission and at any time during the program, a student may be required to produce a current Police Information Check, the results of which could require their withdrawal from the program, in the sole discretion of the University. Students are obligated to inform the Faculty immediately of any change in status of their criminal record.

3.2 Registration

Students should refer to B. Registration of the Academic Regulations section of this Calendar for registration procedures.

Accuracy of Registration

All students are responsible for the completeness and accuracy of their registration and for arranging their course selections to meet all program requirements as detailed in this Calendar.

Interruption of Program Leading to a Degree

Students who interrupt their degree program in the Faculty of Nursing are warned that after an absence of one calendar year from academic study at university level, they may be required to comply with any regulations which may have come into effect in regard to their program and requirements. Students who choose to withdraw for one year will not be required to re-apply for admission. However, they must notify the Faculty of Nursing in advance of their intention to return.

Students who choose to withdraw for more than one year, or students who are required to withdraw for academic reasons must re-apply for admission, and meet all admission requirements including the competitive grade point average.

Students whose program is interrupted due to unforeseen circumstances (e.g. illness, injury, etc.) may not be able to complete the term and may be required to complete all coursework at the next available offering. Each situation will be reviewed on an individual basis by the Associate/Assistant Dean, Undergraduate Programs. [NOTE: Terms 5 and 6 are only offered once per academic year.]

Cardio-Pulmonary Resuscitation Certification

All BN students will be required to submit proof of current CPR Certification (valid for a 12 month period from date of course completion) which includes a Health Care Provider component prior to the commencement of clinical practice courses. Evidence of such certification is to be shown to the practice instructor.

Students will be responsible for obtaining course training and certification.

3.3 Course Work

Course Load

The BN Program is a full-time professional program. Only students admitted to the BN Program will be permitted to register in Nursing (NURS) courses. Students must complete all of the required courses in the term and sequence as they are prescribed (see 4.1 Nursing Program Routes chart).

Since the BN Program is a full-time professional program, students are not allowed to take additional courses while enrolled in Terms 3 through 8, without the express permission of the Associate Dean.

Transfer Credit

Core Nursing courses considered for advanced credit must have been completed within the last five years. There is no time limit on completion of support courses which include non-core Nursing options.

Students must have obtained a minimum grade of "C-" in each Anatomy and Physiology course being presented for transfer credit.

Students should be aware that advanced credits awarded to them are part of the basis on which they have been admitted to

the Faculty of Nursing, and therefore are not used in the calculation of grade point averages for promotion purposes.

Prospective students should consult with the Faculty of Nursing if they are planning to take courses as an Open Studies student or through another institution such as Athabasca University.

See 4. Program Details section for specific program regulations.

Course Work at Other Institutions for Transfer of Credit - Visiting Student Status

Only students in Year 1 (Terms 1 and 2) may be authorized to complete some of their program course work at another institution if their registration as a Visiting Student is acceptable to that institution, and if they are in good academic standing in the Faculty of Nursing. Permission for such authorization will be given on a Letter of Permission form and requires the approval of the Faculty of Nursing. A fee of \$25.00 will be charged for each Letter of Permission.

On completion of studies, it will be the responsibility of the student to ensure that official transcripts of grades are forwarded directly to a Student Advisor in the Faculty of Nursing so that appropriate credit may be awarded. Students are advised that taking courses at the end of their program may affect their graduation date. Contact a Faculty of Nursing Student Advisor for more information.

Credit in Courses by Special Assessment

The Faculty of Nursing does not allow credit through special assessment for Core Nursing courses. Faculties offering option courses in Year 1 of the BN Program may allow credit through special assessment. Students are referred to the Admissions section of this Calendar for University regulations on obtaining course credits by special assessment. (See B.10.1).

3.4 Student Standing

General Requirements

Academic performance of students registered in the Faculty of Nursing is assessed at the end of each Fall, Winter and Summer Term.

Students must attain a minimum of "C-" in both Kinesiology 259 and 260 in order to progress to Year 2 of the BN Program.

In order to obtain satisfactory standing in the Faculty of Nursing, students must attain a minimum grade of "C-" in all nursing theory courses and a grade of "CR" (completed requirements) in all practice nursing courses. Students will not be permitted to withdraw from practice nursing courses in order to avoid a failing grade.

Students who receive a "D", "D+" or "F" grade in a nursing theory course will be required to repeat it, along with all corequisite nursing theory and practice courses and must meet with the Associate/Assistant

Dean (Undergraduate Programs) to determine a progression plan.

Students who receive a grade of "F" in a nursing practice course will be required to repeat it and the corequisite nursing theory courses. Students will be required to withdraw from the corequisite theory courses at the time of the failure of the nursing practice course and must meet with the Associate/Assistant Dean (Undergraduate Programs) to determine a progression plan.

"F" grades in required nursing practice courses and "D", "D+" and "F" grades in required nursing theory (non-practice) courses must be cleared by repeating those courses before students may progress to any further nursing courses.

Students may repeat a course previously failed or one in which a higher grade is sought. However, students usually will be permitted to repeat a particular course only once. Exceptions to this regulation may be made only in unusual circumstances and at the discretion of the Associate Dean (Undergraduate Programs).

Students will not be permitted to withdraw more than once from a particular course. Students will be required to withdraw from the program if they have accumulated a total of more than 30 units withdrawals while in attendance at the University of Calgary.

All grades (including original grades in repeated courses) are used in the calculation of grade point averages for purposes of the official University transcript of record and for progression in the Nursing programs as outlined in the sections "Students Previously in Satisfactory Standing" and "Students on Probation."

Policies Relative to Practice Experience

Students are advised to read the general University regulations regarding attendance (see E.3) in the section of this Calendar headed Academic Regulations.

Students may be required to complete practice experience at sites other than the location of their residence. Students' practice experience may also be scheduled at various hours, including evenings, nights and weekends, **Monday through Sunday**. Nursing students are responsible for all travel, parking and accommodation costs related to practice.

Students must demonstrate satisfactory practice performance as delineated in the behavioural objectives of the course. Participation in all activities that are related to practice courses is mandatory.

Failure to fully participate in practice and tutorial sessions will be reviewed by the faculty members teaching the course. Students are advised that evaluation will be based in large measure on their day-to-day performance.

Students who miss one or more lab/practice days may be at risk of not successfully completing the course. Students may be asked to withdraw from the course and complete the course requirements at a later date or

they may be granted a deferral of term work pending availability of resources. If required to withdraw from the practice course, the student may be required to repeat corequisite nursing theory courses. Each situation will be reviewed on an individual basis by the Associate/Assistant Dean, Undergraduate Programs.

Normally, a student will not be permitted to withdraw from a practice course in order to avoid a failing grade in that course.

An instructor may prohibit a student from attending or completing a practice experience if there is evidence that the student has acted in a manner that is detrimental to patient care or that patient safety is at risk. The Associate Dean will be consulted or informed about any such situation or action. A student who wishes to appeal such a decision will follow the appeals process as outlined below under 3.6 Appeals Process.

Students Previously in Satisfactory Standing

Students previously in satisfactory standing:

1. Will retain that standing if they have achieved a grade point average of at least 2.00 at the end of Term 2 and Term 4.
2. Will retain that standing if they have achieved a grade point average of at least 2.50 at the end of Terms 6 and 8 on all courses taken since their previous review.
3. Will be placed on probation for a maximum of one academic year if they have achieved a grade point average of 1.70 to 1.99 at the end of Term 2 and Term 4. At the end of Term 4, students will be required to clear probation by repeating all nursing theory and practice courses in the previous term. The student must meet with the Associate/Assistant Dean (Undergraduate Programs) to determine a progression plan.
4. Will be placed on probation for a maximum of one academic year if they have achieved a grade point average of 2.00 to 2.49 at the end of Terms 6 and 8 since their last review. At the end of Terms 6 and 7, students will be required to clear probation by repeating all nursing theory and practice courses in the previous term. The student must meet with the Associate/Assistant Dean (Undergraduate Programs) to determine a progression plan.
5. Will be placed on probation if they are required to repeat any nursing course, regardless of their grade point average.
6. Will be required to withdraw if they have a grade point average of less than 1.70 at the end of Term 2 and Term 4; or less than 2.00 at the end of Terms 6 and 8 since their last review.
7. Will be allowed academic probationary status only once while registered in the Faculty of Nursing.

Note: Terms 1 and 2 are taken in Year 1; Terms 3 and 4 are taken in Year 2; Terms 5 and 6 in Year 3; and Terms 7 and 8 in Year 4.

Students on Probation

1. Will be reinstated in satisfactory standing if they have achieved the required

cumulative grade point average over all courses taken since and including those on their previous review.

2. Will be required to withdraw if they fail to achieve the required cumulative grade point average over all courses taken since and including those on their previous review.
3. Will be required to withdraw if they fail to obtain satisfactory standing in any subsequent nursing course, regardless of cumulative grade point average.

Students placed on probation or required to withdraw will be advised in writing.

Students required to withdraw may not apply for readmission in the twelve-month period following their withdrawal. Written application must then be made to the Dean.

Unsatisfactory Standing

The Faculty may refuse permission to a student or prospective student to enter any year of any course, if, in the opinion of the Council, the student shows a lack of general educational attainment. Further, a student whose performance in the practice area, in the classroom, in tests, or in final examinations is unsatisfactory, may at any time be required to withdraw from the Faculty.

Dean's List

The Dean's List recognizes the outstanding academic achievement of all BN students in the Faculty. The Dean's List is compiled at the end of Terms 2, 4, and 6. A statement of inclusion on the Dean's List will be recorded on the student's transcript. To be included on the Dean's List, a student must achieve a grade point average of 3.60 or higher on 15 units in each of the previous terms and must be in good academic standing. Students on academic sanctions as outlined in section K (Statement on Principles of Conduct) of this Calendar are not eligible for the Dean's List.

3.5 Graduation

Requirements

To be awarded the Bachelor of Nursing degree from the University of Calgary:

Students must maintain a minimum grade point average of 2.00 at the end of Terms 2 and 4 and 2.50 at the end of Terms 6 and 8 as set out in 3.4 Student Standing.

Degrees "With Distinction"

The notation "With Distinction" will be inscribed on the permanent record and graduation parchment of all BN students whose grade point average is 3.60 or better in their most recent 60 units taken through the University of Calgary Faculty of Nursing with no grade less than "C-". The notation "With Distinction" will not be granted if a student obtains a "D", "D+" or "F" grade in a Nursing Theory course or an "F" grade in a Nursing Practice course which has been completed during the time period in which the last 60 units have been taken.

Students who have taken part of their course work at another institution or who have transferred into the Faculty with fewer than 60 units remaining to be completed for

BN requirements may be granted a degree with distinction at the discretion of the Faculty.

3.6 Appeals Process

Reappraisal/Appeals

Appeals initiated by students in the BN and BN at Medicine Hat College Site will be governed by the University's regulations and procedures. Appeals at the Faculty level must be in writing, directed to the Dean and submitted within 15 days of the event or ruling giving rise to the appeal. Any such appeal must specify (a) exactly what is being appealed, (b) grounds for the appeal, and (c) the remedy sought. If sufficient grounds are not specified in the letter of appeal, the Chairperson of the Committee on Appeals may refuse to entertain the appeal.

Also see sections I. Reappraisal of Graded Term Work and Academic Assessments (final grades) and J. Student Appeals to the University Appeals Committee and University Appeals Tribunal in the Academic Regulations section of this Calendar.

3.7 Fees and Expenses

Tuition

Please refer to the Tuition and General Fees section of this Calendar for a breakdown of tuition fees. BN students who take courses in Spring/Summer Intersession to complete degree requirements will be assessed standard University tuition fees for these courses.

Other Expenses

In addition to textbooks and course packages, Nursing students can expect other additional charges. Examples listed below:

- Uniforms (as outlined in the Faculty of Nursing Uniform Policy)
- Stethoscope
- Police Information Check
- CPR Certification/Re-certification
- Immunizations
- N-95 Fit Test
- Travel to and from practice sites
- Parking Fees at practice sites
- Name badges
- Nurse Registration Examinations

4. Program Details

4.1 Bachelor of Nursing Program at the University of Calgary

Introduction

The University of Calgary offers an innovative Bachelor of Nursing degree to prepare students for the opportunities and challenges of a nursing career in a changing health-care system. Throughout the program, students are provided with a sound theoretical base and supervised practice experience in a variety of nursing settings.

Admission to the Program

See admission regulations in the Admissions section of this Calendar.

Nursing Program Routes Table

| | Direct Entry Students | Transfer Students - September Entry | Transfer Students - January Entry | Degree-Holders - January Entry |
|--------|-----------------------|-------------------------------------|-----------------------------------|--------------------------------|
| Fall | Term 1 | Term 3 | | |
| Winter | Term 2 | Term 4 | Term 3 | Term 3 |
| Spring | | | Term 4 | Term 4 |
| Fall | Term 3 | Term 5 | Term 5 | Term 5 |
| Winter | Term 4 | Term 6 | Term 6 | Term 6 |
| Spring | | Term 7 | | Term 7 |
| Fall | Term 5 | Term 8 | Term 7 | Term 8 |
| Winter | Term 6 | | Term 8 | |
| Spring | | | | |
| Fall | Term 7 | | | |
| Winter | Term 8 | | | |

Nursing Program of Study Table

| | Term 3 | Term 4 | Term 5 | Term 6 | Term 7 | Term 8 |
|--|----------|----------|----------|----------|-----------------|----------|
| The Discipline and Profession of Nursing | NURS 285 | NURS 385 | NURS 485 | NURS 495 | NURS 585 | |
| The Science of Health | NURS 287 | NURS 387 | NURS 487 | NURS 497 | NURS SR. OPTION | |
| Supporting Health | NURS 288 | NURS 388 | NURS 488 | NURS 498 | NURS SR. OPTION | |
| Integrating Nursing Roles and Practices | NURS 289 | NURS 389 | NURS 489 | NURS 499 | NURS 589 | NURS 599 |

Direct Entry Route (from High School):

To be eligible for the Direct Entry Route, applicants must be entering directly from high school or be presenting no more than 12 units transferable post-secondary courses (including University of Calgary courses).

(a) Standard (high school) Admission: English Language Arts 30-1, Mathematics 30-1 or Mathematics 30-2, Biology 30, Chemistry 30 and one other "30" level 5-credit subject.

(b) Adult Student Admission: English Language Arts 30-1, Mathematics 30-1 or Mathematics 30-2, Biology 30 and Chemistry 30. The fifth 5-credit subject is waived.

(c) Transfer students must present the required matriculation subjects as outlined in (a) or (b) above. A transfer average will be calculated and used as outlined in A.2 (Undergraduate Admission) of this Calendar.

Transfer Route:

Applicants must present the following high school subjects or equivalent:

- Mathematics 30-1 or 30-2
- Biology 30
- Chemistry 30

Plus the following from an accredited post-secondary institution recognized by the University of Calgary:

- A minimum of 30 transferable units which must include the following courses, or equivalent, at a junior level or higher:
 - English or a comparable English literature (3 units)
 - Arts* course (3 units)

- Statistics course (3 units)

- Human Anatomy and Human Physiology course(s)** (6 units with a minimum of grade of "C-").

- A transfer grade point average (GPA) which meets the minimum admission average (set annually). Effective Fall Term 2017, the Transfer Admission GPA will be calculated based on the five prerequisites outlined above (English, Arts, Statistics and Anatomy/Physiology), regardless of when they were completed, plus an additional 15 units taken from the most recent transferable coursework for a total of 30 units and as per section A.2 (Undergraduate Admission).

*Arts includes any course offered by the Faculty of Arts at the University of Calgary.

**Approved by the Faculty of Nursing.

Degree-Holder Route:

Applicants must present the following from an accredited post-secondary institution recognized by the University of Calgary:

- An approved baccalaureate degree.
- A minimum of 90 transferable units which must include the following courses, or equivalent, at a junior level or higher:
 - English or a comparable English literature course (3 units)
 - Arts* course (3 units)
 - Statistics course (3 units)
 - Human Anatomy and Human Physiology course(s)** (6 units with a minimum grade of "C-").

- A grade point average (GPA) which meets the minimum admission average (set annually). Effective Fall Term 2017, the Transfer Admission GPA will be calculated based on the prerequisite courses outlined above (English, Arts, Statistics and Anatomy/Physiology), regardless of when they were completed, plus an additional 15 units taken from the most recent transferable coursework for a total of 30 units and as per section A.2 (Undergraduate Admission).

**Arts includes any course offered by the Faculty of Arts at the University of Calgary.*

***Approved by the Faculty of Nursing.*

Limitation of Enrolment

Enrolment in the BN program is limited. Applicants will be accepted on the basis of academic standing in high school and/or previous post-secondary education completed.

Deferral of Admission

Due to the high demand of this quota-based program, requests for deferral of admission will not normally be granted.

Course Requirements

Students are required to register according to the following schedule. Terms 1 and 2 (see "Nursing Program of Study" Table) are for students admitted to the Direct Entry Route (from High School). Students admitted to the Transfer and Degree-Holder Routes are exempt from completing these Terms; therefore, they commence the program in Term 3.

It is important to note that students will not be permitted to switch routes mid-program.

Nursing Program Routes

See "Nursing Program Routes Table".

Students in all three routes of the BN Program are required to complete the following program of study.

Nursing Program of Study

See "Nursing Program of Study Table".

Students admitted to the four-year program route must successfully complete all ten Term 1 and Term 2 courses as outlined under "Course Requirements" prior to commencement of Year 2 (Term 3), unless approved by the Associate Dean, Undergraduate Programs.

Terms 1 and 2 consist of the following required courses:

Kinesiology 259

Academic Writing 303

Junior Arts Option (Suggestions: Psychology 200, 203 or Sociology 201)

Kinesiology 260

Junior Statistics Option (Statistics 205 recommended)

Philosophy Option (Philosophy 249, 259, 313 or 347 recommended)

Junior Open Option (Science option recommended)

Junior Open Option

Junior Open Option

Open Option

Other Requirements

Promotion from year to year is by recommendation of the Faculty of Nursing. For the purposes of promotion, Terms 1 and 2 are taken in Year 1; Terms 3 and 4 in Year 2; Terms 5 and 6 in Year 3, and Terms 7 and 8 in Year 4.

The minimum requirement is a grade point average of 2.00 in each of the first two years and 2.50 in each of the last two years. Refer to 3.4 Student Standing: Students Previously in Satisfactory Standing.

Program Regulations

Duration of Degree Program

Except with special permission of the Dean, the BN degree must be completed within seven calendar years from the date of initial registration in the program.

Transfer Credit

Students transferring from other institutions or faculties within the University are considered on an individual basis. However, students will be required to complete the equivalent of not fewer than ten courses, at least six of which must be Nursing courses taken as a BN student.

Nurse Registration Examinations

In order to be considered eligible to write the National Council Licensure Examination (NCLEX), BN students are required to complete the fourth year program requirements with a minimum 2.50 grade point average.

4.2 Bachelor of Nursing Program at Medicine Hat College Site

Introduction

The Bachelor of Nursing program at Medicine Hat College is a four year partnership program offered entirely at the Medicine Hat College site, allowing students in the Medicine Hat area increased access to a baccalaureate program without having to relocate. This innovative Bachelor of Nursing degree program prepares students for the opportunities and challenges of a nursing career in a changing health-care system. Throughout the program, students are provided with a sound theoretical base and supervised practice experience in a variety of nursing settings.

Admissions

Students will apply to enter the program in year one at Medicine Hat College. Upon successful completion of their first two years of the program and upon meeting the University of Calgary Faculty of Nursing admission criteria (minimum 2.00 GPA on the last 30 units), students apply to enter the University of Calgary as third year students. The remaining courses will be completed as University of Calgary students at Medicine Hat College.

Course Requirements

1st Year

First and Second Years of the program are Medicine Hat College courses.¹

Terms 1 and 2

Biology 275

English 252

Statistics (Statistics 333 recommended)

Biology 277

Junior Arts Option (Suggestions: Psychology 205 or Sociology 201)

Philosophy Option (Philosophy 313 recommended)

Junior Open Option (Cellular, Molecular and Microbial Biology 250 recommended)

Junior Open Option (Interdisciplinary Studies 100 recommended)

Junior Open Option

Junior Open Option

2nd Year

Term 3

Nursing 285

Nursing 287

Nursing 288

Nursing 289

Term 4

Nursing 385

Nursing 387

Nursing 388

Nursing 389

3rd Year

Term 5

Nursing 485

Nursing 487

Nursing 488

Nursing 489

Term 6

Nursing 495

Nursing 497

Nursing 498

Nursing 499

4th Year

Term 7

Nursing 585

Nursing Senior Option

Nursing Senior Option

Nursing 589

Term 8

Nursing 599

¹First and Second Year course descriptions will not be listed in the University of Calgary Calendar since students must complete them prior to their admission to this institution.

Other Requirements

Promotion from third year to fourth year is by recommendation of the University of Calgary Faculty of Nursing. For purposes of promotion, the academic year is considered to be from September 1 of one year to August 31 of the next. Hence, Spring/Summer grades are calculated with the previous Fall/Winter Term grades. The minimum requirement is a grade point average of 2.50 in each of the third and fourth years.

Program Regulations

Duration of Degree Program

Except with special permission of the Associate Dean (Undergraduate Programs), the BN degree must be completed within seven calendar years from the date of initial registration in the program.

Nurse Registration Examinations

In order to be considered eligible to write the nurse registration examinations, BN students at the Medicine Hat College Site are required to complete the fourth year program requirements with a minimum 2.50 grade point average.

4.3 Bachelor of Nursing (Qatar Campus)

Introduction

The University offers four-year Bachelor of Nursing and two-year post-diploma Bachelor of Nursing degree programs through the Qatar Faculty located in Doha, Qatar. For more information see ucalgary.ca/pubs/calendar/current/ucq-1.html or qatar.ucalgary.ca/.

5. Administration

Faculty Administrative Officers

Dean

S.J. Davidson

Associate Deans

D.S. Raffin Bouchal, Graduate Programs

K.M. Benzies, Research

Z.N. Shajani, Undergraduate Practice Education

C.M. Laing, Undergraduate Programs

S.J. Goldsworthy, Teaching Learning and Technology

Schulich School of Engineering

1. Summary of Degree Programs

Degrees Offered

| Undergraduate | | | | | | | |
|---------------|---------------|---------------|----------|---------------|---------------|---------------|---------------|
| Chemical | Civil | Electrical | Energy | Geomatics | Mechanical | Oil & Gas | Software |
| BSc | BSc | BSc | BSc | BSc | BSc | BSc | BSc |
| BSc BMEN | BSc BMEN | BSc BMEN | | BSc BMEN | BSc BMEN | | BSc BMEN |
| BSc ENEE | BSc ENEE | BSc ENEE | | BSc ENEE | BSc ENEE | | |
| BSc(Eng)/BSc* | BSc(Eng)/BSc* | BSc(Eng)/BSc* | | BSc(Eng)/BSc* | BSc(Eng)/BSc* | BSc(Eng)/BSc* | BSc(Eng)/BSc* |
| BSc(Eng)/BA* | BSc(Eng)/BA* | BSc(Eng)/BA* | | BSc(Eng)/BA* | BSc(Eng)/BA* | BSc(Eng)/BA* | BSc(Eng)/BA* |
| BSc INTE | BSc INTE | BSc INTE | BSc INTE | BSc INTE | BSc INTE | BSc INTE | BSc INTE |
| Graduate | | | | | | | |
| MEng | MEng | MEng | | MEng | MEng | | |
| MSc | MSc | MSc | | MSc | MSc | | |
| PhD | PhD | PhD | | PhD | PhD | | |

*Combined Degree

Undergraduate

BSc Programs

The Schulich School of Engineering administers regular four year programs leading to the BSc degree in Chemical, Civil, Electrical, Geomatics, Mechanical, Oil & Gas, and Software Engineering and a polytechnic transfer program leading to the BSc in Energy Engineering.

Specialization

The Departments of Chemical and Petroleum Engineering, Civil Engineering, Electrical and Computer Engineering, Geomatics Engineering and Mechanical and Manufacturing Engineering offer a specialization in Biomedical Engineering which can be combined with the regular four year programs leading to the BSc degree in Chemical, Civil, Electrical, Geomatics, Mechanical and Software Engineering.

The Departments of Chemical and Petroleum Engineering, Civil Engineering, Electrical and Computer Engineering, Geomatics Engineering and Mechanical and Manufacturing Engineering offer a specialization in Energy and Environment, which can be combined with the regular four year programs leading to the BSc degree in Chemical, Civil, Electrical, Geomatics, and Mechanical Engineering.

Minors and Concentrations

In addition, the Department of Electrical and Computer Engineering offers an Electrical Engineering degree with a Minor in Computer Engineering, the Department of Chemical and Petroleum Engineering offers a Chemical Engineering degree with a Minor in Petroleum Engineering, the Department of Civil Engineering offers minors in Struc-

tural, and in Transportation Engineering, the Department of Geomatics Engineering offers a Geomatics Engineering degree with a Concentration in Cadastral Surveying, the Department of Mechanical and Manufacturing Engineering offers a Mechanical Engineering degree with minors in Mechatronics, Manufacturing Engineering or in Petroleum Engineering (offered in conjunction with the Department of Chemical and Petroleum Engineering). The Schulich School of Engineering in conjunction with the Haskayne School of Business offers a Minor in Entrepreneurship and Enterprise Development.

Engineering Internship Program

The Schulich School of Engineering also provides the option of an Internship Program. The Engineering Internship Program is a five-year program which includes, in addition to the regular four-year academic program, an internship year (a minimum of twelve and a maximum of sixteen consecutive months) of supervised work experience in industry.

Combined Programs

Undergraduate engineering students may combine their engineering degree with other undergraduate degrees and/or minors offered at the University of Calgary. Program details are given in the section 4.12 Combined Programs.

Graduate

Graduate work leading to the MSc, MEng and PhD degrees is offered by all engineering departments under the administration of the Faculty of Graduate Studies. Details of these programs appear in the Faculty of Graduate Studies Calendar.

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Diplomas

Diplomas of the Schulich School of Engineering, which provide special qualifications in designated areas, are also offered.

For additional details see the section 4.13 Diplomas.

Diploma of the Schulich School of Engineering

The Schulich School of Engineering sponsors a diploma program providing additional special qualifications in designated departments which lead to the Diploma of the Schulich School of Engineering. This program is intended primarily for professional engineers engaged in practice who are not interested in submitting to the discipline of a true graduate degree including a thesis.

The Schulich School of Engineering also sponsors a diploma program providing additional specialization in Environmental Engineering. This diploma is intended for professional engineers or holders of equivalent approved degrees and leads to the Diploma of the Schulich School of Engineering in Environmental Engineering.

Diploma of the Schulich School of Engineering and the Haskayne School of Business in Project Management Specialization

The Schulich School of Engineering and the Haskayne School of Business jointly sponsor a diploma program providing additional special qualifications in the area of Project Management which leads to the Diploma of the Schulich School of Engineering and of the Haskayne School of Business in Project Management. This program is intended primarily for professionals engaged in practice who are not interested in the MSc or MEng degrees.

2. Faculty Information

Contact Information

Engineering Student Centre

Location: Engineering C 205

Student Information: 403.220.5732

Website: schulich.ucalgary.ca/

Introduction

The Schulich School of Engineering at the University of Calgary was established in 1965. The degrees awarded by the Schulich School since its inception have been recognized by the Canadian Engineering Accreditation Board (CEAB). The engineering curriculum consists of a well-balanced mixture of traditional topics in engineering sciences and specialization in subjects relevant to current industrial practice. The academic staff and students of the Schulich School of Engineering come from all parts of the world, giving the Schulich School its uniquely friendly and international atmosphere.

Enquiries

Enquiries regarding admission, registration, interpretation of regulations, or any matter regarding undergraduate studies in Engineering should be directed to the Engineering Student Centre, Engineering C 205, telephone 403.220.5732. Students and prospective students are invited to view pertinent information available through the engineering website, schulich.ucalgary.ca/.

Pattern

Admission to the four-year programs offered by the Schulich School of Engineering normally takes one of two forms: (1) Students are admitted to the first year of the program directly from high school; (2) Students are admitted to the first year or second year of the program after having received advanced credits from another University of Calgary faculty or from another post-secondary institution.

The first year of the four-year Engineering programs is common to all students. In April of the first year of study, students apply for admission to a discipline: Chemical, Civil, Electrical, Geomatics, Mechanical, Oil & Gas, or Software Engineering. Admission to the discipline is based on the grade point average (GPA) and the courses taken during the first Review Period. During second year, students not only complete courses common for all disciplines, but also courses specific to their chosen discipline. In the third year students take specialized courses in their chosen discipline.

Admission to the BSc in Energy Engineering requires prior completion of a Diploma in Engineering Technology from an accredited engineering technology program from a technology discipline relevant to Energy Engineering. See 3.1 Admission to the BSc in Energy Engineering Program for more detailed information.

At the end of third year students at their option may enrol in the Engineering Internship Program (EIP); this program consists of 12 to 16 months of work in an industry setting where students gain valuable practical engineering experience (see 4.14 Engineering Internship Program). This academic program is available to all students who have completed third year and are in good standing.

In some disciplines during the fourth year of study (fifth year for Internship enrollees) students have the option to take a minor in one of several areas. In addition to the technical requirements, students take complementary studies courses in non-Engineering and non-Science subjects as an integral component of an Engineering education. This pattern is somewhat different for students who enrol in a combined degree program with one of the other faculties of the University of Calgary (see 4.12 Combined Programs).

Opportunities

To practice in Canada as a professional engineer (P.Eng.) one must be registered (licensed) with the professional engineering association of the province or territory in which one practices. All BSc degrees offered by the Schulich School of Engineering are accredited by the Canadian Engineering Accreditation Board (CEAB) of Engineers Canada, a federation of the 12 professional engineering associations in Canada which registers and licenses engineers. Students graduating from these programs fulfill the academic requirements for registration as Professional Engineers with the province or territory where they choose to practice.

Student Affairs

Engineering Students' Society (ESS)

The Engineering Students' Society (ESS) is an organization affiliated with the Association of Professional Engineers and Geoscientists of Alberta. The ESS provides a social atmosphere for engineering students and, in addition, acquaints them with the professional and technical responsibilities of the profession. It is expected that all Engineering students will join the Society, participate in its activities and promote its interests.

By majority vote of the engineering-student population, in 1995 the Engineering Students' Society established the Calgary Engineering Endowment. A \$25.00 per term optional levy is included in the tuition of every engineering undergraduate student. Interest from the endowment is used to purchase equipment for the undergraduate laboratories. The funds are distributed by the Endowment Board of Directors whose membership consists of a majority of undergraduate students. Proposals are requested in March of each year.

3. School Regulations

Students in the Schulich School of Engineering are governed by the academic regulations contained in this section and also in the Academic Regulations section of this Calendar. Students are advised to read and consider all regulations and, in cases of doubt as to precise meaning of any statement or regulation, to consult the Engineering Student Centre, Schulich School of Engineering, Engineering C 205.

3.1 Admissions

Admission Requirements

New applicants should refer to A.2 in the Admissions section of this Calendar for regulations regarding University admission. Students wishing to enrol in the Schulich School of Engineering must meet minimum admission requirements for Standard Admission as set out in the Admissions section (A.5.1.1) of this Calendar.

Students required to withdraw from another faculty or another post-secondary educational institution because of an unsatisfactory academic record will not normally be considered for admission to the Schulich School of Engineering within 12 months of the withdrawal. Students seeking admission or readmission to the Schulich School of Engineering who have been determined (through due process) to be guilty of academic or non-academic misconduct at this or any other academic institution must accompany their application with a letter of explanation and will be considered for admission on an individual basis. Students who have been expelled from the Schulich School of Engineering may not apply for readmission.

Applicants coming directly from high school must present English Language Arts 30-1, Mathematics 30-1, Mathematics 31, Physics 30 and Chemistry 30 to be considered for admission. Applicants may also be considered for admission via the Biology-based

admissions route (see A.5.1.1) if they present English Language Arts 30-1, Mathematics 30-1, Mathematics 31, Biology 30 and Chemistry 30. Offers of admission via this route are conditional on successful completion of the Schulich School of Engineering Summer Bioengineering Institute prior to the start of the engineering program. Applicants must apply for admission and submit final transcripts by the deadlines indicated in Section A.3 of the University Calendar.

Students who have never taken Mathematics 31 and present another matriculation subject (e.g., Biology 30, Social Studies 30) instead of Mathematics 31 and who achieve a high standing (at least five per cent above the admission standard) over the five subjects used for admission purposes may be admitted to the School under special conditions. These conditions involve enrolment in an alternative calculus stream.

Students who have attended a post-secondary institution must apply for admission and submit transcripts by the deadlines indicated in Section A.3 of the University Calendar. All applicants must present senior matriculation standing, or equivalent, in the five specified high school subjects, even though they may have attended a post-secondary institution.

Applicants who have a CEAB-accredited engineering degree may be considered for admission to a subsequent engineering degree at the University of Calgary if the degree program requested is determined by the Associate Dean (Student Affairs) to be sufficiently different from the prior degree program. A minimum of 30 units is required for completion of a University degree. Students admitted under this regulation may, depending on how much transfer credit they are granted, have the Minimum Residence Time regulation waived.

Aboriginal Applicants

The Schulich School of Engineering is committed to enhanced access for aboriginal applicants. In accordance with the University Aboriginal Admission Policy, spaces have been set aside for aboriginal applicants seeking to enter first year from high school or seeking to enter first or second year as a transfer or change-of-faculty student. Students should contact the Associate Dean (Student Affairs) for more information.

Student Athletes

The Schulich School of Engineering encourages applications from student athletes. The school maintains a program that allows Varsity and National team students in first year to balance their academic workload with athletic responsibilities.

Admission to Engineering Program

Choice of an engineering program (Chemical, Civil, Electrical, Geomatics, Mechanical, Oil & Gas, or Software) is normally made during the Winter Term of the first year of studies. Students in the BSc in Energy Engineering, as well as students entering the BSc in Geomatics Engineering via the Polytechnic Transfer Pathway are admitted

directly into their program. While a place in at least one of the programs is assured for every student advancing to second year with satisfactory performance, it is not always possible to accommodate every student's first choice of program. Students will not normally be admitted to a program if they are deficient in more than two courses from the first year program or if they are deficient in any courses which are prerequisites for second year courses in the program of choice.

First year Engineering students wishing to enter the Biomedical Engineering Specialization or the Energy & Environment Specialization must apply for admission to the Biomedical Engineering Specialization program or the Energy & Environment Specialization at the same time the choice of an engineering program is made.

In the event that the number choosing a program exceeds the program capacity, students will be admitted to the program in order of academic performance until the enrolment limit is reached. Academic performance is judged on the student's GPA for those courses required for the engineering program and taken during the last review period. Priority is generally given to students who have taken a full course load in their last review period and who have all courses in the first year program complete. The exact policy for prioritization of students is determined by the Associate Dean (Student Affairs) and may be revised from year to year. Students may obtain information on current policy from the Engineering Student Centre.

Students admitted to a program at the second year level include the continuing students who have completed their first year successfully in the School and transfer students. Many transfer-student files are not complete and thus no admission decision has been taken at the time registration starts in the summer. To give transfer students a fair opportunity for admission to their program of first choice, a certain number of places will be allotted to the continuing students and the remaining places will be retained for transfer students. The number of places in the two categories will be decided each year based on an assessment of the demand, with the objective of admitting transfer and continuing students to each program with equivalent qualifications. Transfer students are assessed for program admission on an equivalent basis to continuing students in terms of (a) the courses for which they have obtained transfer credit towards the engineering technical program, and (b) their GPA on those courses. Continuing students who have not registered in both Fall and Winter Term classes in their programs by July 15 will not be guaranteed their place in their program. Students who have not been admitted to a program will not normally be permitted to register in courses specific to that program, even if there is room in one or more courses specific to a program.

Admission to Minors

Application to a Minor within an engineering program is made during the Winter Term.

To be considered for admission into any of: Computer Minor in Electrical Engineering; Structural or Transportation Minors in Civil Engineering; or Petroleum, Manufacturing, or Mechatronics Minors in Mechanical Engineering, students will be evaluated based on the most recent 10 courses (pertaining to degree requirements) completed at U of C at the time of selection. For the Computer Minor, students must have completed (or be on-track for completion of) second year curriculum in Electrical engineering; and for all other minors listed above, students must have completed (or be on-track for completion of) third year curriculum in the appropriate program.

To be considered for admission into any of: Petroleum minor in Chemical Engineering, or the Minor in Entrepreneurship and Enterprise Development (MEED), students must apply in their first year of studies. Requests from upper year students for MEED will be considered if space permits; see the Engineering Student Centre for details. For the Petroleum minor, a student must be first placed into Chemical Engineering; and for the MEED minor, a student must first be placed into a program. Students will be evaluated for these two Minors as outlined in Admission to Engineering Program (above).

To be admitted to any Minor, a student must be in good standing on their most recent academic review. In the event that the number choosing a Minor exceeds the number that can be accommodated, students will be admitted to the Minor in order of academic performance as described above, until the enrolment limit is reached.

Admission to the BSc in Energy Engineering Program

Applicants must have a Diploma in Engineering Technology from an accredited engineering technology program in a technology discipline relevant to Energy Engineering or equivalent. Admission is competitive based on the admission average calculated as described in Section A.5.1.1 of the University Calendar. Applicants must have a grade point average¹ of at least 3.30 calculated over all courses comprising the engineering technology program² and meet the Schulich School of Engineering high school course requirements³ or equivalent to be eligible for admission consideration.

Students who completed all or parts of their engineering technology diploma more than eight years prior to the start of their first term at the University of Calgary will be required to demonstrate that their technical knowledge remains current. Evidence may include employer references and other documentation of recent employment or coursework (including continuing education and professional development) requiring up-to-date technical knowledge.

¹This average is based on the marks/grades received by the applicants in the required courses for their engineering technology program.

²For students who are in the process of completing their engineering technology diploma, admission will be based on the average calculated for the first three terms of study (Fall/Winter of Year 1 and Fall of Year 2) and will be conditional on successful completion of the student's engineering technology program prior to admission to the BSc in Energy Engineering program.

³The minimum high school course requirements for Schulich School of Engineering applicants are noted in Section A.5.1.1 of the University Calendar. Individual course requirements may be substituted by equivalent courses taken as part of the applicant's engineering technology diploma.

Admission to the BSc in Geomatics Engineering via the Polytechnic Transfer Pathway

Applicants must have a Diploma in Geomatics Engineering Technology from an accredited engineering technology program. Admission is competitive based on the admission average calculated as described in Section A.5.1.1 of the University Calendar. Applicants must have a grade point average¹ of at least 3.30 calculated over all courses comprising the engineering technology program² and meet the Schulich School of Engineering high school course requirements³ or equivalent to be eligible for admission consideration.

Students who completed all or parts of their engineering technology diploma more than eight years prior to the start of their first term at the University of Calgary will be required to demonstrate that their technical knowledge remains current. Evidence may include employer references and other documentation of recent employment or coursework (including continuing education and professional development) requiring up-to-date technical knowledge.

¹This average is based on the marks/grades received by the applicants in the required courses for their engineering technology program.

²For students who are in the process of completing their engineering technology diploma, admission will be based on the average calculated for the first three terms of study (Fall/Winter of Year 1 and Fall of Year 2) and will be conditional on successful completion of the student's engineering technology program prior to admission to the BSc in Geomatics Engineering program.

³The minimum high school course requirements for Schulich School of Engineering applicants are noted in Section A.5.1.1 of the University Calendar. Individual course requirements may be substituted by equivalent courses taken as part of the applicant's engineering technology diploma.

Admission to the International Foundations Program (IFP) Pathways Stream

Applicants to the IFP Pathways stream are subject to the general requirements for admission to the Schulich School of Engineering listed under Admissions Requirements above. In addition, applicants must meet the minimum English Language Proficiency (ELP) scores for the IFP Pathways stream, as shown in A.11 Admissions.

Students admitted to IFP Pathways must complete the IFP Pathways curriculum and cannot submit ELP scores for early exit. The IFP Pathways curriculum is completed over two years, concurrently with the regular Schulich School of Engineering first-year curriculum (see 4.16 International Foundations Program (IFP) Pathways).

Limited Enrolment

Enrolment in the Schulich School of Engineering is limited. Applicants will be accepted on the basis of academic standing in high school and/or previous course work completed. As a consequence of the limitations in enrolment, the following procedures apply. In addition, refer to information given under the heading Admission to Engineering Program.

Readmission after Voluntary Withdrawal

Students who withdrew voluntarily from the Schulich School of Engineering for two consecutive terms (Fall and Winter Terms of one academic year, or Winter Term and the following Fall Term) and who wish to return, must re-apply for admission by the prescribed deadlines and will be considered in competition with all other applicants. Students are encouraged to consult with the Associate Dean (Student Affairs) prior to making a decision concerning voluntary withdrawal.

Transfer of Course Credits

The Schulich School of Engineering may grant transfer credit to students for courses taken in another post-secondary educational program. Students must normally have obtained an acceptable overall academic standing to be eligible for transfer credit. Transfer credit will be considered for courses which are approximately equivalent to courses in the Engineering program and in which grades of "C-" or higher have been obtained. Transfer credit for a course will not be granted unless the student has obtained credit for the prerequisites for that course (as listed in this Calendar). The maximum number of transfer credits for technical courses that will be awarded is 45 units, except that more may be awarded to a student admitted after completing a CEAB-accredited Engineering degree. Transfer credits for third and fourth year technical courses will only be granted if the instructor(s) of the transferring courses hold a P.Eng. or the equivalent in jurisdictions recognized by the CEAB. Credit for Engineering 513 will only be granted when the transferring course is from another CEAB or Accreditation Board for Engineering and Technology accredited program (or the equivalent in jurisdictions recognized by the CEAB).

Credit will not normally be granted for courses taken eight or more years prior to the date of admission to the Schulich School of Engineering.

Minimum Residence Time

To qualify for a degree, a transfer student must successfully complete at least four regular terms of full-time study and a minimum of 60 units while registered in the Schulich School of Engineering.

Second Baccalaureate Degree

Students who have received one or more approved undergraduate degrees (BA, BSc, BEd, etc.) may apply for admission to programs leading to a Second Baccalaureate

Degree with a Major Field or a Second Baccalaureate Degree program with Honours in a Major Field.

Students must apply to the Admissions Office and meet all deadlines and requirements. For more information regarding admission to a second undergraduate degree, refer to A.5.5 in Admissions.

3.2 Registration

Accuracy of Registration

All students are responsible for the completeness and accuracy of their registration and for arranging course selections to satisfy graduation requirements.

Management of Course Registration

The Schulich School of Engineering may prioritize registration in certain courses to ensure that students are able to register in course sections appropriate to their program and that the available capacity is used to best support students' progression through their programs. Students may contact the Engineering Student Centre for clarification of registration management practices and for assistance with registration, as required.

3.3 Course Work

Prerequisites

To register in an undergraduate course delivered by the Schulich School of Engineering, a student must have obtained a grade of at least "C-" or better in each prerequisite course.

This regulation takes effect at the beginning of the Fall 2013 session. Prior to Fall 2013 "D" and "D+" grades were acceptable as prerequisites (except when such grades meant that credit would not be given for the course under Student Standing regulations). If a student obtained a "D" or "D+" in a course in Summer 2013 or earlier (and is not required by Student Standing regulations to repeat the course), the grade in that course will be considered acceptable in courses for which it is a prerequisite.

Equivalent Courses

Approval may be given by the Associate Dean (Student Affairs) or by the relevant Department Head for a student to replace one or more courses in the Engineering program by registering in equivalent courses in other faculties. To receive credit, the student must normally obtain a grade of "C-" or higher.

Final Year Technical Options

A student in the final year of the Engineering undergraduate program, who has a high academic standing, may be permitted to substitute a graduate course(s) for a fourth year departmental course(s) with the approval of the department. The undergraduate grading scheme will apply to this student.

Part-Time Studies

Because space in the School is limited, students are encouraged to complete all required courses for their year of program within each academic year. Students who have not yet been placed in a specific

degree program are advised that taking a reduced course load may disadvantage them when they are ranked for placement in programs.

As long as students take at least 9 units (not including Block Week courses) in each of the Fall and Winter Terms, they will be allowed to continue in Engineering as long as all other requirements for satisfactory standing are met. Students who take two or fewer courses in Fall or Winter without valid reason for doing so may be required to withdraw or may lose their space in their degree program. This applies as well to students who start a term in three or more courses but complete two or fewer due to withdrawals from courses.

Students who wish to take two or fewer courses in a Fall or Winter Term for valid reasons must request permission from the Associate Dean (Student Affairs). Valid reasons include (but are not limited to): inability to take courses due to missing prerequisites; inability to take courses due to not having been placed in a degree program; extraordinary extracurricular activities such as national team athletic training and competition; extenuating circumstances such as serious disability, illness, or family issues.

As many required courses are not offered during the evenings or during the Spring or Summer Intercession, students should anticipate that it will not be possible to complete their degree without a significant time commitment on weekdays during several Fall and Winter Terms.

Note also that there is a regulation under 3.4 Student Standing that students must normally complete all degree requirements within eight calendar years.

Permission to Take Courses for Credit at Another Institution

Normally students are expected to complete their programs through courses taken at the University of Calgary. Students who wish to take a course elsewhere should obtain written permission from the Schulich School of Engineering before registering in the course, to ensure that it is acceptable for credit.

It is the responsibility of the student to ensure that an official transcript of grades is forwarded directly to the Registrar of the University of Calgary in order that the appropriate credit may be officially recorded. To receive transfer credit, a minimum grade of "C-" or equivalent must be obtained in each transfer course. (Under some circumstances students may also receive credit for courses with grades of "D" or "D+"). The grades obtained in such courses are not used in the computation of grade point averages for graduation purposes.

Complementary Studies

The following six complementary studies courses are required for all students^{1,2} in the School:

- (a) Engineering 209 (Economics 209)³ - not open to first-year students
- (b) Engineering 481

(c) Engineering 213 or Communications Studies 363⁴

(d) Engineering 513

(e) Two general complementary studies courses are required for all programs except in the following cases:

- For Chemical Engineering and Oil and Gas Engineering Programs, students are required to take three general complementary studies courses³

General complementary studies courses must be selected from the list of acceptable courses which may be obtained from the Engineering Student Centre and via the following link: schulich.ucalgary.ca/education/current-students/undergraduate/degree-programs-minors-and-specializations/complementary. Students are responsible for ensuring that any prerequisite conditions are satisfied.

Note inclusions to the list of acceptable general complementary courses for specific programs:

- Energy Management 301, which is required in the Energy and Environment Specialization, counts as a general complementary studies course.
- For Geomatics Engineering Programs (except for Geomatics with Energy and Environment Specialization), Business and Environment 395 may be used as a general complementary studies course.

¹The sequence of complementary studies courses for BSc in Energy Engineering students is listed in 4.5. Energy Engineering students may not use Economics/Engineering 209 or Engineering 213 or Communications Studies 363; these students must take two general complementary studies courses.

²The required sequence of complementary studies courses for students in the combined degree program, BSc (Engineering)/BComm is listed in section 4. Program Details. Students in this program may not use Economics/Engineering 209, and are required to take Strategy and Global Management 217 in place of Engineering 213 or Communications Studies 363.

³Students in Chemical Engineering and Oil and Gas Engineering may not use Economics 209 or Engineering 209 as a Complementary Studies course; these students must take three general complementary studies courses.

⁴For students in the IFP Pathways program, International Foundations Program 350 is required in place of Engineering 213 or Communications Studies 363.

3.4 Academic Performance, Review, and Student Standing

For normal advancement towards the degree, students must register in courses directly applicable to the degree program in which they are registered and must maintain satisfactory performance in their programs. Students are referred to the general University regulations regarding Unsatisfactory Standing under F. Academic Standing in the Academic Regulations section of this Calendar. Students are advised to read and consider all regulations and, in cases of doubt as to precise meaning of any statement or regulation, to consult the Engineering Student Centre.

The Schulich School of Engineering Undergraduate Studies Committee meets at the end of the Winter Term to review the academic performance of Engineering students. Categories of Student Standing as a result

of the review include "Dean's List", "Good Standing", "Academic Probation", and "Required to Withdraw", which will be described in what follows. All students are subject to review, except:

- Students who have been given permission to take a reduced course load (see Part-Time Studies in section 3.3) and who have completed fewer than 18 units since their last review;
- Students who have spent the majority of the time since their previous review in the Engineering Internship Program.

Students on Academic Probation due to the Academic Turnaround Program (see B.3c) will be reviewed regardless of the number of courses completed since the previous review.

Normally, all courses taken by the student since the previous review (or since admission in the case of the first review) will be included in the evaluation of academic performance; for students on academic probation at the time of review, only those courses taken during the review period that satisfy a degree requirement in an engineering program will be included in the count of courses and in the evaluation of academic performance.

Notwithstanding these regulations, a student's performance may be reviewed at any time by the School and a student may be permitted to continue in program under specific conditions or required to withdraw. Specific regulations for the Schulich School of Engineering are listed below.

A. Academic Performance and Progress

A.1. Clearing Courses - Students with one or more grades insufficient to clear a course (based on the minimum grades specified below), or course withdrawals "W", in the courses taken during the period under review shall clear such courses in the following review period. The following minimum grades are required to clear a course.

Students who have been placed in an Engineering program:

- "C-" or higher for a course that is a prerequisite for one or more courses that are required for graduation in their program
- "D" or higher for a course that is not a prerequisite for any course that is required for graduation in their program

Students who have not yet been placed in an Engineering program:

- "C-" or higher for a course that is a prerequisite for one or more courses that are required for graduation in all Engineering programs
- "D" or higher for a course that is not a prerequisite for any course that is required for graduation in at least one Engineering program

Consistent with University regulations, the same course may normally be attempted no more than twice. A student who fails to clear a required course after two attempts may be

required to withdraw or placed on academic probation.

A.2. Degree Progression - Students must prioritize lower-level courses before proceeding to higher-level courses even if they have the prerequisites for the higher-level courses. Students who have failed to clear a course that is a prerequisite for one or more required higher-level courses in their current program (with a "C-" or higher grade as required by A.1 above) may be denied registration in higher-level courses until they have cleared the pre-requisite course.

A.3. Timely Completion - A student who, after eight calendar years from initial registration in the Engineering program, has not completed degree requirements, will be denied further registration in Engineering. (The eight years does not include time spent in the Internship Program, if any, or the extra time spent by those students in the combined degree programs.) For a transfer student, the permissible number of years will be prorated according to the number of credits in the program. Students with approved accommodations based on an assessment by Student Accessibility Services may be allowed additional time to complete their program, subject to approval by the Associate Dean (Student Affairs). Clarification may be obtained from the Engineering Student Centre.

B. Review and Student Standing

B.1 Dean's List

To be included in the Dean's List, a student must achieve a grade point average of 3.60 or higher during the review period, with at least 30 units taken over the immediately preceding 12 month period of May 1 to April 30. Students who have completed fewer than 30 units during the 12 month period are eligible for the Dean's list only if their program of study has been assessed by Student Accessibility Services to be equivalent to full-time studies for a particular student. Students on academic sanctions as outlined in section K (Statement on Principles of Conduct) of this Calendar are not eligible for the Dean's List.

B.2 Good Standing

B.2a. A student who has a grade point average (GPA) of 2.00 or higher on 18 units or more of courses taken during the period under review will be considered to have satisfactory performance and will be placed in Good Standing.

B.2b. A student who has a grade point average (GPA) of 2.00 or higher on fewer than 18 units of courses taken during the period under review may be considered to have satisfactory performance, subject to recommendation by the Associate Dean (Student Affairs) and/or review of the student's record by the Engineering Undergraduate Studies Committee.

B.3 Academic Probation

B.3a Placement on Academic Probation - A student in Good Standing, who has not been on Academic Probation for the past five years, and who has a grade point aver-

age of 1.70 or higher, but less than 2.00 in the current review period will be placed on Academic Probation.

B.3b Clearing Academic Probation - In order to clear Academic Probation, students must

- i. clear (see A.1 Clearing Courses above) all courses in which they earned an insufficient grade or from which they withdrew ("W") in a previous review period; and
- ii. attain a GPA of 2.00 or greater in the review period.

Students on Academic Probation may have further restrictions placed on their registration such as denial of registration in upper-level courses.

B.3c Academic Turnaround Program and Academic Probation - A student who is facing their first Required to Withdraw ruling for academic reasons will be offered to participate in the Academic Turnaround Program. Students who accept this invitation by the deadline specified in the invitation letter and who complete the requirements to initiate participation in ATP will be placed on Academic Probation.

Details about the Academic Turnaround Program are found in section B.20 in the Academic Regulations section of this Calendar.

B.3d Clearing Academic Probation for participants in the Academic Turnaround Program - In order to clear Academic Probation, students must

- i. attain a GPA of 2.00 or greater in the review period; and
- ii. meet all other requirements of the Academic Turnaround Program, including participation in required workshops and seminars; and
- iii. complete a minimum of 18 units since joining the Academic Turnaround Program; and
- iv. clear all courses in which they earned an insufficient grade to clear the course (see A.1 Clearing Courses above) or from which they withdrew ("W") in a previous review period.

Students who have met conditions i. and ii. above at the end of the first review period after joining the Academic Turnaround Program may be allowed to continue on Academic Probation in the Academic Turnaround Program for a second year, subject to the approval by the dean or designate of a plan for successful completion of requirements i. to iv. by the following review.

B.4 Required to Withdraw (RTW)

Students under review may be Required to Withdraw from the Schulich School of Engineering for the following reasons:

- B.4a - failing to clear all first year courses by the end of their second review period; or
- B.4b - failing to achieve a grade point average of 2.00 or greater for the period under review after having previously been placed on Academic Probation and/or failing to clear other terms of an Academic Probation. Students are permitted a maximum of one probationary period while registered as

undergraduate students at the University of Calgary, unless probationary periods are more than five years apart; or

B.4c - failing to achieve a grade point average of 1.70 in the period under review.

B.4d - failing to meet all requirements of the Academic Turnaround Program.

Students that are required to withdraw will not be permitted to register in any course specified as part of the degree requirements in Engineering for a period of 12 months from the date of withdrawal. A student who has been required to withdraw may apply for readmission, to resume study in a Fall Term beginning 12 months or more after the student has been required to withdraw. Students applying for readmission must respect application and transcript deadlines posted by the University of Calgary Admissions Office; these deadlines are typically several months in advance of the beginning of the Fall Term. Readmission is not automatic and will be considered on an individual basis in competition with all other admission applications received. On readmission, students' records will be reviewed to determine credits to be awarded.

Notes:

1. The above regulations are stated in terms of grades in three-unit courses. A grade in a six-unit course will be considered to be equivalent to two such grades.
2. The method used to determine the grade point average is described under F. Academic Standing in the Academic Regulations section of this Calendar.
3. Grades obtained in courses in the Spring/Summer Intersessions are not used to alter retroactively the ruling made on a student's performance at the end of the previous review period.

Mitigating Circumstances

Students who would normally be required to withdraw may be placed on academic probation instead if they have experienced serious mitigating circumstances and can demonstrate that they have good prospects for future success. Students who believe that they fall into this category should discuss their situation with an Engineering Student Centre advisor at the earliest possible opportunity and no later than the end of Winter Term.

C. IFP Pathways Stream

IFP Pathways students are subject to a joint academic review process by the Schulich School of Engineering and the Werklund School of Education. The regulations set out in sections A. and B. above apply to IFP Pathways students. In addition, IFP Pathways participants must achieve a grade of "C" or better in general academic language instruction courses (IFPX), and a "Pass" in adjunct language support classes (IFPE) to continue in their program of studies.

- If an IFP Pathways student fails a course from the regular Schulich School of Engineering first-year curriculum (4.1 First Year Curriculum), the student will be required to retake the course at the next

available opportunity. If, at the end of the second IFP Pathways year, a student is deficient in three or more technical courses, the student may be required to complete an additional year in the common first-year program in order to be placed into a second year Engineering program. Students who fail to clear the common first-year curriculum courses within twelve months of completing the two-year IFP Pathways curriculum (three years total) will be required to withdraw. As part of the academic review, the student may be offered or required to repeat the corresponding IFPE adjunct course.

- If an IFP Pathways student fails the final exam in an International Foundations Program (IFPX) discrete course, but has earned a passing grade (cumulative) on all term work, the student may be offered a remedial summative assessment. Otherwise, if a student fails an International Foundations Program (IFPX) discrete course, the IFPX course must be repeated in order to clear the English Language Proficiency requirement. Students failing to clear the IFP Pathways requirements will be required to withdraw.
- If an IFP Pathways student fails the final exam in an International Foundations Program Engineering (IFPE) adjunct course, but has earned a passing grade (cumulative) on all term work, the student may be offered a remedial summative assessment.

D. Academic Turnaround Program

The Academic Turnaround Program (ATP) provides students facing their first Required to Withdraw (RTW) ruling for academic reasons the opportunity to continue in their current SSE program. Eligible students in the SSE will receive a written invitation to participate in the Academic Turnaround Program from the dean or designate after the performance review at the end of the Winter Term. This letter will specify a deadline by which the student must accept and initiate participation in the ATP, or the student will be Required to Withdraw. Students who accept the invitation to participate in the ATP and complete all requirements to initiate participation in ATP (including attendance at required workshops, submission of an approved plan for success, and any other requirements stated in the letter inviting them to participate in ATP) will be allowed to continue their studies under Academic Probation provided that they continue to fulfill all requirements and are compliant with the conditions of the program. All ATP requirements will be provided to students in writing by the faculty dean or designate. Participation in ATP continues until the student either achieves Good Standing by meeting the requirements in B.3d or is Required to Withdraw under the regulations in B.4.

At the end of the following Winter Term, students' progress will be reviewed by the SSE regardless of the number of courses completed. Students in the ATP will normally be expected to complete a minimum of 18 units over the academic year (Spring, Sum-

mer, Fall, Winter), subject to the following restrictions:

- Fall and Winter Terms: normally required to take exactly 9 units per term
- Spring and Summer Terms: allowed to take up to 3 units per six-week term (beginning with the Summer Term following the Required to Withdraw ruling)

Additional courses may be authorized at the discretion of the dean or designate.

Students who are non-compliant with any of the ATP conditions will be Required to Withdraw. Students may participate in the Academic Turnaround Program only once while registered as undergraduate students in any faculty at the University of Calgary.

3.5 Examinations

Supplemental Examinations

Supplemental examinations provide students with an opportunity to demonstrate competence in a course. The primary goal is to allow students a chance to earn a "C-" grade in the course so they can use the course as a prerequisite. As such, if a student passes a supplemental examination a "C-" grade will be recorded on the student's transcript. If a student fails the supplemental examination, the original grade will stand.

Supplemental examinations are not available for all courses. Availability of supplemental exams is guaranteed only for courses that explicitly indicate on their official course outline that a supplemental examination is possible. Supplemental examinations may be offered in other courses at the discretion of the department offering the course.

Additionally:

- No more than two supplemental examination privileges, in any University of Calgary course, may be granted to a student in one academic year,
- No more than four supplemental examination privileges will be granted to a student over their whole degree program.
- Only one supplemental exam will be allowed per course.

Supplemental examinations will normally be offered at the same time as deferred final examination for that course, during Spring/Summer intersession, or block weeks.

Supplemental examinations may be in a different format than the regular final examination but will cover the same course material as the regular final examination. Supplemental examinations are not allowed for deferred examinations.

Supplemental exams do not replace the deferred examination process as outlined in Section G.6 and are a privilege earned by meeting the criteria set out below.

A student is eligible for a supplemental examination if one is offered in a course and the student meets the following requirements:

1. The student is in good academic standing with the last review GPA being greater than 2.00,

2. The student has earned a cumulative grade of "C-" or better on coursework (e.g. laboratories, assignments, mid-term examinations, quizzes), and
3. The student achieved the minimum grade for any required term-work components as indicated on the course outline (e.g. requirement to pass the lab component).

A student is not eligible for a supplemental examination if the student:

- Has been previously allowed to write a supplemental examination for the course.
- Earned a grade greater than a "D+" in the course.
- Did not write the final examination in the course.
- Is on academic probation.
- Was assigned a failing grade in the course due to academic misconduct.
- Is a graduate student

Application Process:

1. Students who wish to apply for a supplemental examination should contact the Engineering Student Centre to confirm eligibility. Students who indicate that they want to write the supplemental examination will be charged a \$150.00 fee by Student Enrolment Services.
2. Students who decide not to write the supplemental examination after fees have been assessed will forfeit the supplemental examination fee.

Supplemental Examinations for Graduating Students

At the discretion of the Engineering Undergraduate Studies Committee, supplemental privileges may be granted to fourth-year students. If these privileges are granted, the student will be informed in writing and must then make application to write the examinations prescribed. Supplemental examinations may be granted in Engineering courses required in the final year program to those students who, at the time of the convocation meeting of the Engineering Undergraduate Studies Committee, will be eligible to graduate if one or two "D", "D+" or "F" grades are raised to the required grade.

Where courses other than Engineering courses are involved, the successful completion of another approved course may be accepted as clearing the deficiency.

A student may be granted supplemental privileges for graduating students only once and to a maximum of two supplemental examinations in the courses taken since the last review. Supplemental examinations granted during an academic year will normally be written in the following August.

3.6 Graduation

Graduation Requirements

Students are required to obtain credit for the full set of courses listed in the Calendar for any particular program.

For graduation in all branches of Engineering, a student must have an overall grade point average of at least 2.00 with no uncles "F" grades. The average will be calculated by using the numerical equivalent of the best grade in each course taken. A six-unit course will be counted as two three-unit courses for this purpose.

Note: An "F" grade in any technical elective course or complementary studies elective course may be cleared by a passing grade in another acceptable technical elective or complementary studies elective, respectively.

Degrees "With Distinction"

The notation "With Distinction" will be inscribed on the permanent record and graduation parchment of students who obtain a grade point average of at least 3.60 over the last 60 units taken at the University of Calgary, with no more than one "D" or "D+" grade and no failures. The notation "With Distinction" will not be granted if a student obtains an "F" grade in a CR/F course (including Internship) which has been completed during the time period in which the last 60 units have been taken. For cases in which the last 60 units must include some, but not all, of a group of courses taken concurrently, the selection will be made in the manner most advantageous to the student. Students who have taken part of their work at another university or who have transferred into this School may be granted a degree "With Distinction" at the discretion of the School.

4. Program Details

4.1 First Year Curriculum

The first year curriculum is common to all programs except Energy Engineering. Courses shown in both terms may be taken in either term.

First Year

| Fall | Winter |
|--|--|
| Mathematics 275 or Applied Mathematics 217 | Mathematics 277 or Applied Mathematics 219 |
| Engineering 200 | Engineering 202 |
| Engineering 233 | Engineering 225 |
| Mathematics 211 | Physics 259 |
| Chemistry 209 | |
| Engineering 201 | |
| Complementary Studies Course (3 units) | |

Students Enrolled in the BSc (Engineering)/BComm Combined Degree Program

First Year

| Fall | Winter |
|---|--|
| Mathematics 275 or Applied Mathematics 217 | Mathematics 277 or Applied Mathematics 219 |
| Engineering 200 | Engineering 202 |
| Engineering 233 | Engineering 225 |
| Mathematics 211 | Physics 259 |
| Chemistry 209 | |
| Engineering 201 | |
| Complementary Studies Course (3 units) – 200-level English ¹ | |
| Strategy and Global Management 217 ² | |

¹It is recommended that students complete the 200-level English course prior to the start of their second year.

²Strategy and Global Management 217 can be completed at any time prior to the Fall Term of the student's third year.

4.2 Chemical Engineering

Admission

Refer to 3.1 Admissions.

Chemical Engineering, Regular Program

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|---|--------------------------|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Chemical Engineering 317 |
| Engineering 311 | Chemical Engineering 315 |
| Engineering 319 | Chemical Engineering 331 |
| Engineering 349 | Chemistry 357 |
| Science Option (3 units) ¹ | |
| Two Complementary Studies Courses (6 units) | |
| Third Year | |
| Fall | Winter |
| Chemistry 409 | |
| Chemical Engineering 407 | Chemical Engineering 405 |
| Chemical Engineering 401 | Chemical Engineering 421 |
| Chemical Engineering 403 | Chemical Engineering 423 |
| Chemical Engineering 427 | Chemical Engineering 429 |
| Technical Elective Course (3 units) | |
| Complementary Studies Course (3 units) | |
| Fourth Year | |
| Chemical Engineering 501 | Chemistry 579 |
| Chemical Engineering 505 | Chemical Engineering 531 |
| Chemical Engineering 511 | |

| | |
|--|--|
| Chemical Engineering 551 | |
| Engineering 513 | |
| Two Technical Elective Courses (6 units) | |
| Complementary Studies Course (3 units) | |

¹The courses that are acceptable for the Science option include Physics 365 or 369, Geology 377, Biology 241 or 243, Chemistry 321 and Mathematics 377. Other courses from the Faculty of Science may be substituted with approval of the student's department and the relevant department in the Faculty of Science.

Chemical Engineering, Minor in Petroleum Engineering

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|--|--|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Chemical Engineering 317 |
| Engineering 311 | Chemical Engineering 315 |
| Engineering 319 | Chemical Engineering 331 |
| Engineering 349 | Chemistry 357 |
| Geology 377 | Petroleum Engineering 313 |
| Complementary Studies Course (3 units) | Complementary Studies Course (3 units) |
| Third Year | |
| Fall | Winter |
| Chemistry 409 | Chemical Engineering 405 |
| Chemical Engineering 407 | Chemical Engineering 421 |
| Chemical Engineering 401 | Chemical Engineering 423 |
| Chemical Engineering 403 | Chemical Engineering 429 |
| Chemical Engineering 427 | Technical Elective Course (3 units) |
| Petroleum Engineering 429 | Complementary Studies Course (3 units) |
| Fourth Year | |
| Fall | Winter |
| Chemical Engineering 501 | Chemistry 579 |
| Chemical Engineering 505 | Petroleum Engineering 531 |
| Petroleum Engineering 511 | |
| Petroleum Engineering 551 | |
| Engineering 513 | |
| Two Technical Elective Courses (6 units) | |
| Complementary Studies Course (3 units) | |

Chemical Engineering, Biomedical Engineering Specialization

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|--|--|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Chemical Engineering 317 |
| Engineering 311 | Chemical Engineering 315 |
| Engineering 319 | Chemical Engineering 331 |
| Engineering 349 | Chemistry 357 |
| Biomedical Engineering 301 | Biomedical Engineering 309 |
| Complementary Studies Course (3 units) | Complementary Studies Course (3 units) |
| Third Year | |
| Fall | Winter |
| Chemistry 409 | Chemical Engineering 405 |
| Chemical Engineering 407 | Chemical Engineering 421 |
| Chemical Engineering 401 | Chemical Engineering 423 |
| Chemical Engineering 403 | Chemical Engineering 429 |
| Chemical Engineering 427 | Biomedical Engineering 401 |
| Complementary Studies Course (3 units) | Complementary Studies Course (3 units) |
| Fourth Year - Thesis Option | |
| Fall | Winter |
| Chemical Engineering 501 | Chemical Engineering 531 |
| Chemical Engineering 505 | |
| Chemical Engineering 511 | |
| Engineering 513 | |
| Biomedical Engineering 500 ¹ | Two Biomedical Engineering Technical Electives (6 units) |
| Fourth Year - Project Option | |
| Fall | Winter |
| Chemical Engineering 501 | Chemical Engineering 531 |
| Chemical Engineering 505 | |
| Chemical Engineering 511 | |
| Engineering 513 | |
| Biomedical Engineering 501 | |
| Any two courses from the following: Biomedical Engineering Technical Electives, Chemical and Petroleum Engineering Technical Electives, Chemical Engineering 551 and Chemistry 579 (6 units) | |
| Two Biomedical Engineering Technical Electives (6 units) | |

¹Nine units.

Chemical Engineering, Energy and Environment Specialization

| Second Year | |
|---|--|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | |
| Engineering 311 | Chemical Engineering 317 |
| Engineering 319 | Chemical Engineering 315 |
| Engineering 349 | Chemical Engineering 331 |
| Energy and Environment, Engineering 355 | Chemistry 357 |
| Chemistry 321 | Complementary Studies Course (3 units) |
| Third Year | |
| Fall | Winter |
| Chemistry 409 | Chemical Engineering 405 |
| Chemical Engineering 407 | Chemical Engineering 421 |
| Chemical Engineering 401 | Chemical Engineering 423 |
| Chemical Engineering 403 | Chemical Engineering 429 |
| Chemical Engineering 427 | Energy and Environment Technical Elective course (3 units) |
| Energy Management 301 | Complementary Studies Course (3 units) |
| Fourth Year | |
| Fall | Winter |
| Chemical Engineering 501 | Chemistry 579 |
| Chemical Engineering 505 | |
| Chemical Engineering 511 | Chemical Engineering 531 |
| Chemical Engineering 551 | |
| Science 529 | |
| Engineering 513 | |
| Two Energy and Environment Technical Elective Courses (6 units) | |
| Complementary Studies Course (3 units) | |

BSc Chemical Engineering/BComm Combined Degree Program

Suggested Sequence of Courses

Courses that span over two terms can be taken in either term.

| Second Year | |
|-----------------|--------------------------|
| Fall | Winter |
| Mathematics 375 | Chemical Engineering 317 |
| Engineering 311 | Chemical Engineering 315 |
| Engineering 319 | Chemical Engineering 331 |
| Engineering 349 | Chemistry 357 |

| Management Studies 217 | Accounting 217 |
|--|---------------------------------------|
| Economics 201 | Economics 203 |
| Third Year | |
| Fall | Winter |
| Chemistry 409 | Finance 317 |
| Chemical Engineering 407 | Business Technology Management 317 |
| Chemical Engineering 401 | Entrepreneurship and Innovation 317 |
| Chemical Engineering 403 | Accounting 323 |
| Management Studies 391 | Business and Environment 395 |
| Organizational Behaviour and Human Resources 317 | Chemical Engineering 423 |
| Fourth Year | |
| Fall | Winter |
| Marketing 317 | Chemical Engineering 405 |
| Operations Management 317 | Chemical Engineering 421 |
| Management Studies 451 | Chemical Engineering 429 |
| Management Studies 453 | Chemistry 579 |
| Engineering 481 | BComm Concentration course (3 units) |
| Chemical Engineering 427 | BComm Concentration course (3 units) |
| Fifth Year | |
| Spring | |
| Engineering 513 | |
| Fall | Winter |
| Chemical Engineering 511 | Chemical Engineering 531 |
| Chemical Engineering 501 | Technical Elective Course (3 units) |
| Chemical Engineering 505 | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | Science Option (3 units) ¹ |
| Chemical Engineering 551 | Strategy and Global Management 591 |

¹The courses that are acceptable for the Science option include Physics 365 or 369, Geology 377, Biology 241 or 243, Chemistry 321 and Mathematics 377. Other courses from the Faculty of Science may be substituted with approval of the student's department and the relevant department in the Faculty of Science.

Chemical and Petroleum Engineering Approved Technical Electives

Regular Program and Petroleum Engineering Minor

Select 9 units.

| | |
|----------------------------|---------------------------|
| Biomedical Engineering 511 | Petroleum Engineering 507 |
| Biomedical Engineering 515 | Petroleum Engineering 509 |
| Biomedical Engineering 585 | Petroleum Engineering 513 |

| | |
|---|---------------------------|
| Chemical Engineering 503 | Petroleum Engineering 521 |
| Chemical Engineering 519 | Petroleum Engineering 523 |
| Chemical Engineering 530 | Petroleum Engineering 525 |
| Chemical Engineering 535 | Petroleum Engineering 533 |
| Chemical Engineering 537 | Petroleum Engineering 543 |
| Chemical Engineering 539 | Petroleum Engineering 561 |
| Energy and Environment, Engineering 501 | Petroleum Engineering 563 |
| Energy and Environment, Engineering 503 | Petroleum Engineering 571 |
| Energy and Environment, Engineering 505 | Petroleum Engineering 573 |
| Engineering 515 | |

Note: All technical electives may not be offered each year.

4.3 Civil Engineering

Admission

Refer to 3.1 Admissions.

Accelerated Master's Program

Students entering their third year are encouraged to consider the possibility of continuing their education, by enrolling in a master's degree program after completion of their BSc. By taking two or three courses (graduate or undergraduate) during their undergraduate program, which would be additional to their undergraduate degree program requirements, students will position themselves to be able to complete their master's degree in 12 to 16 months after completion of their BSc. Students considering this possibility must consult with the Associate Head, Undergraduate Studies or the Department Head and should review the Faculty of Graduate Studies admission requirements.

Civil Engineering, Regular Program

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|---|----------------------------|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Civil Engineering 317 | Civil Engineering 337 |
| Engineering 319 | Engineering 407 |
| Engineering 349 | Mechanical Engineering 341 |
| Physics 365 or 369 | |
| Two Complementary Studies Courses (6 units) | |
| Third Year | |
| Fall | Winter |
| Civil Engineering 402 | Civil Engineering 413 |
| Civil Engineering 461 | Civil Engineering 423 |

| Civil Engineering 471 | Civil Engineering 451 |
|---|-----------------------|
| Civil Engineering 481 | Civil Engineering 473 |
| Geology 471 | |
| Engineering 513 | |
| Complementary Studies Course (3 units) | |
| Fourth Year | |
| Fall | Winter |
| Civil Engineering 570 (6 units) ¹ | |
| Five Civil Engineering Group A Technical Electives (15 units) | |
| Civil Engineering Group A or Group B Technical Elective (3 units) | |
| Two Civil Engineering Group B Technical Electives (6 units) | |
| Complementary Studies Course (3 units) | |

¹Fall and Winter.

Civil Engineering, Minor in Structural Engineering

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|--|----------------------------|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Civil Engineering 317 | Civil Engineering 337 |
| Engineering 319 | Engineering 407 |
| Engineering 349 | Mechanical Engineering 341 |
| Physics 365 or 369 | |
| Two Complementary Studies Courses (6 units) | |
| Third Year | |
| Fall | Winter |
| Civil Engineering 402 | Civil Engineering 413 |
| Civil Engineering 461 | Civil Engineering 423 |
| Civil Engineering 471 | Civil Engineering 451 |
| Civil Engineering 481 | Civil Engineering 473 |
| Geology 471 | |
| Engineering 513 | |
| Complementary Studies Course (3 units) | |
| Fourth Year | |
| Fall | Winter |
| Civil Engineering 570 (6 units) ¹ | |
| Civil Engineering 523 | Civil Engineering 557 |
| Civil Engineering 551 | |
| Civil Engineering 513 | |
| Structural Engineering Option (3 units) ² | |
| Three Civil Engineering Group A or Group B Technical Electives (9 units) | |
| Complementary Studies course (3 units) | |

¹Fall and Winter.

²One Structural Engineering graduate course or Civil Engineering 595 (Special Topics in Structures). Department approval required.

Civil Engineering, Minor in Transportation Engineering

Courses shown in both terms may be taken in either term.

| Second Year | |
|---|------------------------------------|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Civil Engineering 317 | Civil Engineering 337 |
| Engineering 319 | Engineering 407 |
| Engineering 349 | Mechanical Engineering 341 |
| Physics 365 or 369 | |
| Two Complementary Studies Courses (6 units) | |
| Third Year | |
| Fall | Winter |
| Civil Engineering 402 | Civil Engineering 413 |
| Civil Engineering 461 | Civil Engineering 423 |
| Civil Engineering 471 | Civil Engineering 451 |
| Civil Engineering 481 | Civil Engineering 473 |
| Geology 471 | |
| Engineering 513 | |
| Complementary Studies Course (3 units) | |
| Fourth Year | |
| Fall | Winter |
| Civil Engineering 570 (6 units) ¹ | |
| Civil Engineering 575 | Civil Engineering 502 ² |
| Four Civil Engineering Group A Technical Electives (12 units) | |
| Two Civil Engineering Group A or Group B Technical Elective (6 units) | |
| Complementary Studies Course (3 units) | |

¹Fall and Winter.

²One Transportation Engineering graduate course may be substituted for Civil Engineering 502. Department approval required.

Civil Engineering, Biomedical Engineering Specialization

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|--|--|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Civil Engineering 317 | Civil Engineering 337 |
| Engineering 319 | Engineering 407 |
| Engineering 349 | Mechanical Engineering 341 |
| Physics 365 or 369 | Biomedical Engineering 309 |
| Biomedical Engineering 301 | Complementary Studies Course (3 units) |
| Third Year | |
| Fall | Winter |
| Civil Engineering 402 | Civil Engineering 413 |
| Civil Engineering 461 | Civil Engineering 423 |

| | |
|---|----------------------------|
| Civil Engineering 471 | Civil Engineering 451 |
| Civil Engineering 481 | Civil Engineering 473 |
| Geology 471 | Biomedical Engineering 401 |
| Engineering 513 | |
| Complementary Studies Course (3 units) | |
| Fourth Year - Thesis Option | |
| Fall | Winter |
| Civil Engineering 570 (6 units) ¹ | |
| Three Civil Engineering Group A Technical Electives (9 units) | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| Biomedical Engineering 500 ² | |
| Two Complementary Studies Courses (6 units) | |
| Fourth Year - Project Option | |
| Fall | Winter |
| Civil Engineering 570 (6 units) ¹ | |
| Three Civil Engineering Group A Technical Electives (9 units) | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| Biomedical Engineering 501 | |
| Two Biomedical Engineering, Civil Engineering Group A, or Civil Engineering Group B Technical Electives (6 units) | |
| Two Complementary Studies Courses (6 units) | |

¹Fall and Winter.

²Nine units.

Civil Engineering, Energy and Environment Specialization

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|--|---|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Civil Engineering 317 | Civil Engineering 337 |
| Engineering 319 | Engineering 407 |
| Engineering 349 | Mechanical Engineering 341 |
| Physics 365 or 369 | Two Complementary Studies Courses (6 units) |
| Energy and Environment, Engineering 355 | |
| Third Year | |
| Fall | Winter |
| Civil Engineering 402 | Civil Engineering 413 |
| Civil Engineering 461 | Civil Engineering 423 |
| Civil Engineering 471 | Civil Engineering 451 |
| Civil Engineering 481 | Civil Engineering 473 |
| Geology 471 | Engineering 513 |
| Energy Management 301 | Complementary Studies Course (3 units) |
| Fourth Year | |

| | |
|---|---------------|
| Fall | Winter |
| Civil Engineering 570 (6 units) ¹ | |
| Science 529 | |
| Civil Engineering 581 | |
| Three Energy and Environment Technical Electives (9 units) | |
| Four Civil Engineering Group A Technical Electives (12 units) | |

¹Fall and Winter.

BSc Civil Engineering/BComm Combined Degree Program

Suggested Sequence of Courses

Courses that span over two terms can be taken in either term.

| Second Year | |
|--|---|
| Fall | Winter |
| Mathematics 375 | Engineering 311 |
| Civil Engineering 317 | Civil Engineering 337 |
| Engineering 319 | Engineering 407 |
| Engineering 349 | Mechanical Engineering 341 |
| Management Studies 217 | Accounting 217 |
| Economics 201 | Economics 203 |
| Third Year | |
| Fall | Winter |
| Physics 365 or 369 | Finance 317 |
| Civil Engineering 402 | Business Technology Management 317 |
| Civil Engineering 461 | Entrepreneurship and Innovation 317 |
| Civil Engineering 471 | Accounting 323 |
| Management Studies 391 | Business and Environment 395 |
| Organizational Behaviour and Human Resources 317 | Engineering 481 |
| Fourth Year | |
| Fall | Winter |
| Marketing 317 | Civil Engineering 413 |
| Operations Management 317 | Civil Engineering 423 |
| Management Studies 451 | Civil Engineering 451 |
| Management Studies 453 | Civil Engineering 473 |
| Civil Engineering 481 | BComm Concentration course (3 units) |
| Geology 471 | BComm Concentration course (3 units) |
| Fifth Year | |
| Spring | |
| Engineering 513 | |
| Fall | Winter |
| Civil Engineering 570 (6 units) | |
| Civil Engineering Group A Technical Elective (3 units) | Civil Engineering Group A or B Technical Elective (3 units) |

| | |
|--|---|
| Civil Engineering Group A Technical Elective (3 units) | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | Civil Engineering Group A or B Technical Elective (3 units) |
| Strategy and Global Management 591 | Civil Engineering Group A Technical Elective (3 units) |

Civil Engineering Approved Technical Electives

Group A

| | |
|-----------------------|-----------------------|
| Civil Engineering 513 | Civil Engineering 565 |
| Civil Engineering 523 | Civil Engineering 575 |
| Civil Engineering 551 | Civil Engineering 581 |

Group B

| | |
|-----------------------|-----------------------|
| Civil Engineering 502 | Civil Engineering 571 |
| Civil Engineering 504 | Civil Engineering 595 |
| Civil Engineering 508 | Civil Engineering 597 |
| Civil Engineering 557 | |

Notes:

- One of the Group B Technical Elective course requirements may be satisfied by a 500-level or higher-level course from either the Faculty of Science or the Schulich School of Engineering with the approval of the Department Head. The higher-level course can be a 600-level or higher-level course from the Department of Civil Engineering if the student has a GPA higher than 3.00 at the end of third year and with the approval of the Department Head.
- All technical elective courses have similar workloads even though the hours in the timetable are variable.
- Optional undergraduate courses and all graduate courses are offered, in any calendar year, at the discretion of the Department of Civil Engineering.

4.4 Electrical Engineering

Admission

Refer to 3.1 Admissions.

Electrical Engineering, Regular Program

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|--|----------------------------|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Computer Engineering 369 |
| Electrical Engineering 101 ¹ | Electrical Engineering 300 |
| Computer Engineering 335 or Software Engineering for Engineers 337 | Electrical Engineering 327 |
| Electrical Engineering 353 | Electrical Engineering 343 |

| | |
|---|----------------------------|
| Physics 365 | Electrical Engineering 361 |
| Complementary Studies Course (3 units) | |
| Third Year | |
| Fall | Winter |
| Electrical Engineering 102 ¹ | Electrical Engineering 400 |
| Electrical Engineering 419 | Electrical Engineering 471 |
| Electrical Engineering 441 | Electrical Engineering 476 |
| Electrical Engineering 475 | Electrical Engineering 487 |
| Electrical Engineering 453 | |
| Computer Engineering 467 | |
| Electrical Engineering 469 | |
| Complementary Studies Course (3 units) | |
| Fourth Year | |
| Fall | Winter |
| Engineering 513 | |
| Electrical Engineering 500 (6 units) ² | |
| Six Technical Elective Courses (18 units) | |
| Two Complementary Studies Courses (6 units) | |

¹One and one-half units.²Fall and Winter.

Electrical Engineering, Minor in Computer Engineering

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| | |
|--|--|
| Second Year | |
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Computer Engineering 369 |
| Electrical Engineering 101 ¹ | Electrical Engineering 300 |
| Computer Engineering 335 or Software Engineering for Engineers 337 | Electrical Engineering 327 |
| Electrical Engineering 353 | Electrical Engineering 343 |
| Physics 365 | Electrical Engineering 361 |
| Complementary Studies Course (3 units) | |
| Third Year | |
| Fall | Winter |
| Computer Engineering 467 | Electrical Engineering 400 |
| Electrical Engineering 419 | Electrical Engineering 471 |
| Electrical Engineering 441 | Computer Science 319 |
| Electrical Engineering 102 ¹ | Software Engineering for Engineers 409 |
| Computer Engineering 511 | |
| Electrical Engineering 453 | |
| One of Electrical Engineering 469, 475 or 487 | |

| | |
|---|--------------------------|
| Complementary Studies Course (3 units) | |
| Fourth Year | |
| Fall | Winter |
| | Computer Engineering 501 |
| Engineering 513 | |
| Electrical Engineering 500 (6 units) ² | |
| Electrical Engineering 573 | |
| Computer Science 457 | |
| Three Technical Elective Courses (9 units) | |
| Two Complementary Studies Courses (6 units) | |

¹One and one-half units.²Fall and Winter.

Electrical Engineering, Biomedical Engineering Specialization

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| | |
|--|----------------------------|
| Second Year | |
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Computer Engineering 369 |
| Electrical Engineering 101 ¹ | Electrical Engineering 300 |
| Computer Engineering 335 or Software Engineering for Engineers 337 | Electrical Engineering 327 |
| Electrical Engineering 353 | Electrical Engineering 343 |
| Physics 365 | Electrical Engineering 361 |
| Biomedical Engineering 301 | Biomedical Engineering 309 |
| Complementary Studies Course (3 units) | |
| Third Year | |
| Fall | Winter |
| Electrical Engineering 102 ¹ | Electrical Engineering 400 |
| Electrical Engineering 419 | Electrical Engineering 471 |
| Electrical Engineering 441 | Electrical Engineering 476 |
| Electrical Engineering 475 | Electrical Engineering 487 |
| Electrical Engineering 453 | Biomedical Engineering 401 |
| Computer Engineering 467 | |
| Electrical Engineering 469 | |
| Complementary Studies Course (3 units) | |
| Fourth Year - Thesis Option | |
| Fall | Winter |
| Electrical Engineering 500 (6 units) ² | |
| Engineering 513 | |
| Electrical Engineering Technical Elective Course (3 units) | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| Biomedical Engineering 500 (9 units) | |

| | |
|--|---------------|
| Two Complementary Studies Courses (6 units) | |
| Fourth Year - Project Option | |
| Fall | Winter |
| Electrical Engineering 500 (6 units) ² | |
| Engineering 513 | |
| Electrical Engineering Technical Elective Course (3 units) | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| Biomedical Engineering 501 | |
| Two Biomedical Engineering or Electrical Engineering Technical Electives (6 units) | |
| Two Complementary Studies Courses (6 units) | |

¹One and one-half units.²Fall and Winter.

Electrical Engineering, Energy and Environment Specialization

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| | |
|--|----------------------------|
| Second Year | |
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Computer Engineering 369 |
| Electrical Engineering 101 ¹ | Electrical Engineering 300 |
| Computer Engineering 335 or Software Engineering for Engineers 337 | Electrical Engineering 327 |
| Electrical Engineering 353 | Electrical Engineering 343 |
| Physics 365 | Electrical Engineering 361 |
| Energy and Environment, Engineering 355 | Engineering 311 |
| Complementary Studies Course (3 units) | |
| Third Year | |
| Fall | Winter |
| Electrical Engineering 102 ¹ | Electrical Engineering 400 |
| Electrical Engineering 419 | Electrical Engineering 471 |
| Electrical Engineering 441 | Electrical Engineering 476 |
| Electrical Engineering 475 | Electrical Engineering 487 |
| Energy Management 301 | |
| Electrical Engineering 453 | |
| Computer Engineering 467 | |
| Electrical Engineering 469 | |
| Fourth Year | |
| Fall | Winter |
| Science 529 | |
| Electrical Engineering 500 (6 units) ² | |
| Engineering 513 | |
| Electrical Engineering Technical Elective Course (3 units) | |

| |
|--|
| Four Energy and Environment Technical Electives (12 units) |
| Two Complementary Studies Courses (6 units) |

¹One and one-half units.

²Fall and Winter.

BSc Electrical Engineering/BComm Combined Degree Program

Suggested Sequence of Courses

Courses that span over two terms can be taken in either term.

| Second Year | |
|--|--------------------------------------|
| Fall | Winter |
| Electrical Engineering 101 ¹ | |
| Mathematics 375 | Computer Engineering 369 |
| Computer Engineering 335 or Software Engineering for Engineers 337 | Electrical Engineering 300 |
| Electrical Engineering 353 | Electrical Engineering 327 |
| Physics 365 | Electrical Engineering 361 |
| Management Studies 217 | Accounting 217 |
| Economics 201 | Economics 203 |
| Third Year | |
| Fall | Winter |
| Electrical Engineering 102 ¹ | |
| Electrical Engineering 453 | Finance 317 |
| Electrical Engineering 419 | Business Technology Management 317 |
| Electrical Engineering 441 | Entrepreneurship and Innovation 317 |
| Electrical Engineering 475 | Accounting 323 |
| Business and Environment 395 | Management Studies 391 |
| Organizational Behaviour and Human Resources 317 | Electrical Engineering 343 |
| Fourth Year | |
| Fall | Winter |
| Marketing 317 | Electrical Engineering 400 |
| Operations Management 317 | Electrical Engineering 471 |
| Management Studies 451 | Electrical Engineering 476 |
| Management Studies 453 | Electrical Engineering 487 |
| Computer Engineering 467 | BComm Concentration course (3 units) |
| Electrical Engineering 469 | BComm Concentration course (3 units) |
| Fifth Year | |
| Spring | |
| Engineering 513 | |
| Fall | Winter |
| Electrical Engineering 500 (6 units) | |

| | |
|--|--|
| Electrical Engineering Technical Elective Course (3 units) | Engineering 481 |
| Electrical Engineering Technical Elective Course (3 units) | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | Electrical Engineering Technical Elective Course (3 units) |
| Strategy and Global Management 591 | |

¹One and one-half units.

Electrical Engineering Approved Technical Electives

Regular Program

Select 18 units.

Computer minor students - can choose from this list, but should also see separate section of technical electives for the Computer minor.

| | |
|--|--|
| Biomedical Engineering 509 | Electrical Engineering 569 |
| Biomedical Engineering 515 | Electrical Engineering 571 |
| Biomedical Engineering 585 | Electrical Engineering 573 |
| Computer Engineering 501 | Electrical Engineering 574 |
| Computer Engineering 507 | Electrical Engineering 575 |
| Computer Engineering 509 | Electrical Engineering 582 |
| Computer Engineering 511 | Electrical Engineering 584 |
| Computer Engineering 515 | Electrical Engineering 585 |
| Computer Engineering 517 | Electrical Engineering 586 |
| Electrical Engineering 503 | Electrical Engineering 587 |
| Electrical Engineering 514 | Electrical Engineering 591 |
| Electrical Engineering 519* (Special Topics) | Electrical Engineering 592 |
| Electrical Engineering 525 | Electrical Engineering 593 |
| Electrical Engineering 529 | Electrical Engineering 594 |
| Electrical Engineering 541 | Electrical Engineering 597 |
| Electrical Engineering 559 | Electrical Engineering 599 |
| Electrical Engineering 562 | Energy and Environment Engineering 577 |
| Electrical Engineering 563 | Software Engineering 409 |
| Electrical Engineering 565 | Software Engineering 545 |
| Electrical Engineering 567 | |

*A maximum of three Electrical Engineering 519 courses can be selected as technical electives.

Note: Selection of a course not on this list requires department approval.

Minor in Computer Engineering

All technical electives listed in the Regular Program are permitted, as well as the following:

| | |
|----------------------|--------------------------|
| Computer Science 411 | Computer Science 471 |
| Computer Science 453 | Computer Engineering 505 |

In addition, the following courses may be taken as technical electives in the Minor in Computer Engineering if not used to meet other degree requirements:

| |
|----------------------------|
| Electrical Engineering 469 |
| Electrical Engineering 475 |
| Electrical Engineering 476 |
| Electrical Engineering 487 |

Note: All technical elective courses have similar workloads even though the hours in the timetable are variable. One 500-level or higher course from either the Faculty of Science or the Schulich School of Engineering may be approved by the Associate Head or by the Program Director as a technical elective. Optional undergraduate courses and all graduate courses are offered, in any calendar year, at the discretion of the department.

4.5 Energy Engineering

Admission

Refer to 3.1 Admissions.

Energy Engineering, Regular Program

The program requirements listed below assume that students admitted to Energy Engineering have been granted transfer credit for Communications Studies 363, Mathematics 275, and 21 units of Engineering Science coursework based on their prior studies. Students admitted without one or more of these transfer credits will be required to complete the corresponding course(s) in addition to the requirements shown below.

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|------------------------------|--|
| Spring | Summer |
| Energy Engineering 240 | Energy Engineering 340 |
| Mathematics 209 ¹ | Engineering 201 |
| Energy Engineering 200 | Energy Engineering 260 |
| Third Year | |
| Fall | Winter |
| Engineering 311 | Petroleum Engineering 523 |
| Energy Engineering 480 | Complementary Studies Course (3 units) |
| Energy Engineering 300 | Energy Engineering 400 |
| Energy Engineering 425 | Energy Engineering 460 |

| | |
|--|---|
| Energy Engineering 360 | Mechanical Engineering 471 |
| Science Option (3 units) ² | Chemistry 209 |
| Third Year | |
| Spring | Summer |
| Engineering 513 ³ | Complementary Studies Course (3 units) |
| Fourth Year | |
| Fall | Winter |
| Engineering 519.03 ⁴ | |
| Engineering 501 | Energy Engineering 502 |
| Energy and Environment, Engineering 355 | Energy and Environment, Engineering 503 |
| Energy Engineering 560 | Energy Engineering 570 |
| Engineering 319 | Petroleum Engineering 533 |
| Technical Elective Course (3 units) ⁵ | Engineering 481 |
| Energy Science Option (3 units) ² | Energy and Environment, Engineering 575 |

¹Required for students entering the Energy Engineering program in Spring 2017 or later.

²The courses that are acceptable for the Science Option include Biology 241 or 243, Chemistry 321, Chemistry 357, Geology 377, and Physics 371. The courses that are acceptable for the Energy Science Option are either Physics 371 or Geology 377. Other courses from the Faculty of Science may be substituted with approval of the Energy Engineering program director and the relevant department in the Faculty of Science.

³Online Course.

⁴Required for students who entered the Energy Engineering program in Spring 2015 or Spring 2016.

⁵Students who entered the Energy Engineering program in 2015 or 2016 and have completed Energy Engineering 350 with a passing grade may count this course as their technical elective.

Energy Engineering Approved Technical Electives

Select 3 units.

| | |
|----------------------------|---------------------------|
| Mechanical Engineering 421 | Petroleum Engineering 525 |
| Mechanical Engineering 505 | Petroleum Engineering 561 |
| Mechanical Engineering 583 | Petroleum Engineering 563 |
| Mechanical Engineering 599 | Petroleum Engineering 571 |
| Petroleum Engineering 507 | Petroleum Engineering 573 |
| Petroleum Engineering 521 | |

Notes:

- Students wishing to focus their elective in mechanical engineering should choose their technical elective from Mechanical Engineering 421, 583, and 599; students wishing to focus their elective in petroleum engineering should choose their technical elective from Petroleum Engineering 507, 521, 525, 561, 563, 571, and 573.
- Technical electives in the undergraduate program and all graduate courses are offered, in any academic year, at the discretion of the department.

4.6 Geomatics Engineering

Admission

Refer to 3.1 Admissions.

Geomatics Engineering, Regular Program

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| | |
|---|---------------------------|
| Second Year | |
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | |
| Geomatics Engineering 319 | Geomatics Engineering 327 |
| Engineering 349 | Geomatics Engineering 343 |
| Geomatics Engineering 333 | Geomatics Engineering 351 |
| Physics 369 | Geomatics Engineering 363 |
| Two Complementary Studies Courses (6 units) ¹ | |
| Third Year | |
| Fall | Winter |
| Geomatics Engineering 401 | Engineering 407 |
| Geomatics Engineering 419 | Geomatics Engineering 423 |
| Geomatics Engineering 421 | Geomatics Engineering 431 |
| Geomatics Engineering 435 | Geomatics Engineering 455 |
| Geomatics Engineering 443 or Geomatics Engineering 451 | Geomatics Engineering 465 |
| Complementary Studies Course (3 units) | |
| Fourth Year | |
| Summer | |
| Geomatics Engineering 501 ² | |
| Fall | Winter |
| Geomatics Engineering 500 or Engineering 501/502 (6 units) ³ | |
| Engineering 513 | |
| Six Technical Elective Courses (18 units) | |
| Complementary Studies Course (3 units) | |

¹The complementary studies course Engineering 213 or Communications Studies 363 is a corequisite for third year course Geomatics Engineering 451 and a prerequisite for third year course Geomatics Engineering 455. Students must complete the course during or before the Fall Term of their third year.

²Two week field camp normally held prior to the start of the Fall Term.

³Fall and Winter.

Geomatics Engineering, Regular Program - Polytechnic Transfer Pathway

The program requirements listed below assume that students admitted to Geomatics Engineering via the Polytechnic Transfer Pathway have been granted transfer credit for Communications Studies 363, Geomatics Engineering 343, 351, 363, 421, 431 and 435, Mathematics 211 and 275. Students admitted without one or more of these transfer credits will be required to complete the corresponding course(s) in addition to the requirements shown below.

All students admitted to Geomatics Engineering via the Polytechnic Transfer Pathway must also complete Engineering 319 (or an equivalent course) prior to graduation or through transfer credit for prior studies.

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| | |
|---|--|
| Second Year | |
| Fall | Winter |
| Engineering 200 | Engineering 202 |
| Engineering 233 | Engineering 225 |
| Geomatics Engineering 419 | Mathematics 277 |
| Physics 259 | |
| Chemistry 209 | |
| Engineering 201 | |
| Two Complementary Studies Courses (6 units) | |
| Third Year | |
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Engineering 407 |
| Engineering 349 | Geomatics Engineering 327 |
| Physics 369 | Geomatics Engineering 423 |
| Geomatics Engineering 333 | Geomatics Engineering 455 |
| Geomatics Engineering 401 | Geomatics Engineering 465 |
| Geomatics Engineering 443 or Geomatics Engineering 451 | Complementary Studies Course (3 units) |
| Fourth Year | |
| Summer | |
| Geomatics Engineering 501 ¹ | |
| Fall | Winter |
| Geomatics Engineering 500 or Engineering 501/502 (6 units) ² | |
| Engineering 513 | |
| Six Technical Elective Courses (18 units) | |
| Complementary Studies Course (3 units) | |

¹Two week field camp normally held prior to the start of the Fall Term.

²Fall and Winter.

Geomatics Engineering, Biomedical Engineering Specialization

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|---|--|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | |
| Geomatics Engineering 319 | Geomatics Engineering 327 |
| Engineering 349 | Geomatics Engineering 343 |
| Geomatics Engineering 333 | Geomatics Engineering 351 |
| Physics 369 | Geomatics Engineering 363 |
| Biomedical Engineering 301 | Biomedical Engineering 309 |
| | Complementary Studies Course (3 units) |
| Third Year | |
| Fall | Winter |
| Geomatics Engineering 401 | Engineering 407 |
| Geomatics Engineering 419 | Geomatics Engineering 423 |
| Geomatics Engineering 421 | Geomatics Engineering 431 |
| Geomatics Engineering 435 | Geomatics Engineering 455 |
| Geomatics Engineering 451 | Geomatics Engineering 465 |
| Complementary Studies Course (3 units) | Biomedical Engineering 401 |
| Fourth Year - Thesis Option | |
| Summer | |
| Geomatics Engineering 501 ² | |
| Fall | Winter |
| Geomatics Engineering 500 or Engineering 501/502 (6 units) ³ | |
| Engineering 513 | |
| Geomatics Engineering Technical Elective Course (3 units) | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| Biomedical Engineering 500 ⁴ | |
| Two Complementary Studies Courses (6 units) | |
| Fourth Year - Project Option | |
| Summer | |
| Geomatics Engineering 501 ² | |
| Fall | Winter |
| Geomatics Engineering 500 or Engineering 501/502 (6 units) ³ | |
| Engineering 513 | |
| Geomatics Engineering Technical Elective Course (3 units) | |
| Four Energy and Environment Technical Electives (12 units) | |
| Two Complementary Studies Courses (6 units) | |
| Biomedical Engineering 501 | |

| |
|---|
| Two Biomedical Engineering or Geomatics Engineering Technical Electives (6 units) |
| Two Complementary Studies Courses (6 units) |

¹The complementary studies course Engineering 213 or Communications Studies 363 is a corequisite for third year course Geomatics Engineering 451 and a prerequisite for third year course Geomatics Engineering 455. Students must complete the course during or before the Fall Term of their third year.

²Two week field camp normally held prior to the start of the Fall Term.

³Fall and Winter.

⁴Nine units.

Geomatics Engineering, Energy and Environment Specialization

Suggested Sequence of Courses

Courses shown in both terms may be taken in either term.

| Second Year | |
|---|--|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | |
| Geomatics Engineering 319 | Geomatics Engineering 327 |
| Engineering 349 | Geomatics Engineering 343 |
| Geomatics Engineering 333 | Geomatics Engineering 351 |
| Physics 369 | Geomatics Engineering 363 |
| Energy and Environment, Engineering 355 | Engineering 311 |
| | Complementary Studies Course (3 units) |
| Third Year | |
| Fall | Winter |
| Geomatics Engineering 401 | Engineering 407 |
| Geomatics Engineering 419 | Geomatics Engineering 423 |
| Geomatics Engineering 421 | Geomatics Engineering 431 |
| Geomatics Engineering 435 | Geomatics Engineering 455 |
| Geomatics Engineering 451 | Geomatics Engineering 465 |
| Energy Management 301 | |
| Fourth Year | |
| Summer | |
| Geomatics Engineering 501 ² | |
| Fall | Winter |
| Geomatics Engineering 500 or Engineering 501/502 (6 units) ³ | |
| Science 529 | |
| Engineering 513 | |
| Geomatics Engineering Technical Elective Course (3 units) | |
| Four Energy and Environment Technical Electives (12 units) | |
| Two Complementary Studies Courses (6 units) | |

¹The complementary studies course Engineering 213 or Communications Studies 363 is a corequisite for third year

course Geomatics Engineering 451 and a prerequisite for third year course Geomatics Engineering 455. Students must complete the course during or before the Fall Term of their third year.

²Two week field camp normally held prior to the start of the Fall Term.

³Fall and Winter.

BSc Geomatics Engineering/ BComm Combined Degree Program

Suggested Sequence of Courses

Courses that span over two terms can be taken in either term.

| Second Year | |
|--|--|
| Fall | Winter |
| Mathematics 375 | Geomatics Engineering 327 |
| Geomatics Engineering 319 | Geomatics Engineering 343 |
| Physics 369 | Geomatics Engineering 351 |
| Geomatics Engineering 333 | Geomatics Engineering 363 |
| Management Studies 217 | Accounting 217 |
| Economics 201 | Economics 203 |
| Third Year | |
| Fall | Winter |
| Engineering 349 | Finance 317 |
| Geomatics Engineering 435 | Business Technology Management 317 |
| Geomatics Engineering 419 | Entrepreneurship and Innovation 317 |
| Geomatics Engineering 421 | Accounting 323 |
| Management Studies 391 | Business and Environment 395 |
| Organizational Behaviour and Human Resources 317 | One course (3 units) selected from Engineering 407, Geomatics Engineering 423, Geomatics Engineering 431, and Geomatics Engineering 455 |
| Fourth Year | |
| Fall | Winter |
| Marketing 317 | Three courses (9 units) selected from Engineering 407, Geomatics Engineering 423, Geomatics Engineering 431, and Geomatics Engineering 455 |
| Operations Management 317 | Geomatics Engineering 465 |
| Management Studies 451 | BComm Concentration course (3 units) |
| Management Studies 453 | BComm Concentration course (3 units) |
| Geomatics Engineering 401 | |
| Geomatics Engineering 451 or 443 | |

| Fifth Year | |
|---|---|
| Spring | |
| Engineering 513 | |
| Summer | |
| Geomatics Engineering 501 ¹ (3 units) | |
| Fall | Winter |
| Geomatics Engineering 500 or Engineering 501/502 (6 units) ² | |
| Geomatics Engineering Technical Elective Course (3 units) | Geomatics Engineering Technical Elective Course (3 units) |
| Geomatics Engineering Technical Elective Course (3 units) | Geomatics Engineering Technical Elective Course (3 units) |
| BComm Concentration course (3 units) | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | BComm Concentration course (3 units) |
| Strategy and Global Management 591 | Engineering 481 |

¹Two week field camp normally held prior to the start of the Fall Term.

²Fall and Winter.

Geomatics Engineering Approved Technical Electives

Select 18 units.

| | |
|----------------------------|---------------------------|
| Biomedical Engineering 509 | Geomatics Engineering 563 |
| Engineering 515 | Geomatics Engineering 567 |
| Geomatics Engineering 531 | Geomatics Engineering 573 |
| Geomatics Engineering 545 | Geomatics Engineering 579 |
| Geomatics Engineering 551 | Geomatics Engineering 581 |
| Geomatics Engineering 559 | Geomatics Engineering 583 |
| | Geomatics Engineering 585 |

Notes:

1. A 400-level or higher technical course from the Faculty of Science or another engineering department may be substituted for a technical elective with permission of the Head of the Department of Geomatics Engineering.
2. Technical electives in the undergraduate program and all graduate courses are offered, in any academic year, at the discretion of the department.
3. Students who complete Geomatics Engineering 443 may request that Geomatics Engineering 451 be taken as a technical elective with permission of the Head of the Department.

Geomatics Engineering, Concentration in Cadastral Surveying

The Concentration in Cadastral Surveying is for students who have an interest in pursuing a career as a professional land surveyor. Students can acquire a Concentration in Cadastral Surveying by successfully completing the following courses:

1. Geomatics Engineering 443: Geodetic and Engineering Surveys
2. Geomatics Engineering 545: Hydrographic Surveying
3. Geomatics Engineering 579: Survey Law and Practice
4. Geomatics Engineering 581: Land Use Planning
5. Business and Environment 395: Business Law for Strategic Decision-Makers
6. One of:
 - Geomatics Engineering 451: Design and Implementation of Geospatial Information Systems
 - Geomatics Engineering 531: Advanced Photogrammetric and Ranging Techniques
 - Geomatics Engineering 559: Digital Imaging and Applications

Students who complete a BSc in Geomatics Engineering with a Concentration in Cadastral Surveying are eligible to obtain a Certificate of Completion of Academic Requirements for Professional Surveyors from the Canadian Board of Examiners for Professional Surveyors (CBEPS). For more information about CBEPS and professional registration of land surveyors refer to their website: cbeeps-cceag.ca.

4.7 Mechanical Engineering

Admission

Refer to 3.1 Admissions.

Mechanical Engineering, Regular Program

Suggested Sequence of Courses

Courses shown in both terms are offered in both terms, however registration is determined by the department.

| Second Year | |
|--|----------------------------|
| Fall | Winter |
| Mechanical Engineering 101 ¹ | Chemistry 379 |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Engineering 319 | Mechanical Engineering 317 |
| Engineering 349 | Engineering 407 |
| Mechanical Engineering 337 | Mechanical Engineering 339 |
| Physics 365 or 369 | Mechanical Engineering 341 |
| Third Year | |
| Fall | Winter |
| Mechanical Engineering 421 | |
| Mechanical Engineering 461 | |
| Mechanical Engineering 471 | |
| Mechanical Engineering 473 | |
| Mechanical Engineering 479 | |
| Mechanical Engineering 485 | |
| Mechanical Engineering 493 | |
| Mechanical Engineering 495 | |

| Manufacturing Engineering 417 | |
|---|---|
| Two Complementary Studies Courses (6 units) | |
| Fourth Year | |
| Fall | Winter |
| Mechanical Engineering 501 ² | Mechanical Engineering 502 ² |
| Mechanical Engineering 585 | |
| Mechanical Engineering 599 | |
| Engineering 513 | |
| Four Mechanical Engineering Technical Elective Courses (12 units) | |
| Two Complementary Studies Courses (6 units) | |

¹Block Week Course.

²Students may request Department Consent to substitute either Engineering 501 and 502, or Engineering 503 and 504 for Mechanical Engineering 501 and 502 if they meet the prerequisites and notes for Mechanical Engineering 501 and 502.

Mechanical Engineering, Minor in Manufacturing Engineering

Suggested Sequence of Courses

Courses shown in both terms are offered in both terms, however registration is determined by the department.

| Second Year | |
|---|---|
| Fall | Winter |
| Mechanical Engineering 101 ¹ | Chemistry 379 |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Engineering 319 | Mechanical Engineering 317 |
| Engineering 349 | Engineering 407 |
| Mechanical Engineering 337 | Mechanical Engineering 339 |
| Physics 365 or 369 | Mechanical Engineering 341 |
| Third Year | |
| Fall | Winter |
| Mechanical Engineering 421 | |
| Mechanical Engineering 461 | |
| Mechanical Engineering 471 | |
| Mechanical Engineering 473 | |
| Mechanical Engineering 479 | |
| Mechanical Engineering 485 | |
| Mechanical Engineering 493 | |
| Mechanical Engineering 495 | |
| Manufacturing Engineering 417 | |
| Two Complementary Studies Courses (6 units) | |
| Fourth Year | |
| Fall | Winter |
| | Manufacturing Engineering 514 |
| Mechanical Engineering 501 ² | Mechanical Engineering 502 ² |
| Mechanical Engineering 585 | |
| Mechanical Engineering 599 | |
| Engineering 513 | |

Three Manufacturing Minor Technical Elective Courses (9 units)

Two Complementary Studies Courses (6 units)

¹Block Week Course.

²Students may request Department Consent to substitute either Engineering 501 and 502, or Engineering 503 and 504 for Mechanical Engineering 501 and 502 if they meet the prerequisites and notes for Mechanical Engineering 501 and 502.

Mechanical Engineering, Minor in Mechatronics

Suggested Sequence of Courses

Courses shown in both terms are offered in both terms, however registration is determined by the department.

| Second Year | |
|---|---|
| Fall | Winter |
| Mechanical Engineering 101 ¹ | Chemistry 379 |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Engineering 319 | Mechanical Engineering 317 |
| Engineering 349 | Engineering 407 |
| Mechanical Engineering 337 | Mechanical Engineering 339 |
| Physics 365 or 369 | Mechanical Engineering 341 |
| Third Year | |
| Fall | Winter |
| Mechanical Engineering 421 | |
| Mechanical Engineering 461 | |
| Mechanical Engineering 471 | |
| Mechanical Engineering 473 | |
| Mechanical Engineering 479 | |
| Mechanical Engineering 485 | |
| Mechanical Engineering 493 | |
| Mechanical Engineering 495 | |
| Manufacturing Engineering 417 | |
| Two Complementary Studies Courses (6 units) | |
| Fourth Year | |
| Fall | Winter |
| | Manufacturing Engineering 533 |
| Mechanical Engineering 560 ³ | |
| Mechanical Engineering 501 ² | Mechanical Engineering 502 ² |
| Mechanical Engineering 585 | Mechanical Engineering 599 |
| Engineering 513 | |
| Two Mechatronics Minor Technical Elective Courses (6 units) | |
| Two Complementary Studies Courses (6 units) | |

¹Block Week Course.

²Students may request Department Consent to substitute either Engineering 501 and 502, or Engineering 503 and 504 for Mechanical Engineering 501 and 502 if they meet the prerequisites and notes for Mechanical Engineering 501 and 502.

³Fall and Winter.

Mechanical Engineering, Minor in Petroleum Engineering

Suggested Sequence of Courses

Courses shown in both terms are offered in both terms, however registration is determined by the department.

| Second Year | |
|--|---|
| Fall | Winter |
| Mechanical Engineering 101 ¹ | Chemistry 379 |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Engineering 319 | Mechanical Engineering 317 |
| Engineering 349 | Engineering 407 |
| Mechanical Engineering 337 | Mechanical Engineering 339 |
| Physics 365 or 369 | Mechanical Engineering 341 |
| Third Year | |
| Fall | Winter |
| Mechanical Engineering 421 | |
| Mechanical Engineering 461 | |
| Mechanical Engineering 471 | |
| Mechanical Engineering 473 | |
| Mechanical Engineering 479 | |
| Mechanical Engineering 485 | |
| Mechanical Engineering 493 | |
| Mechanical Engineering 495 | |
| Manufacturing Engineering 417 | |
| Two Complementary Studies Courses (6 units) | |
| Fourth Year | |
| Fall | Winter |
| Petroleum Engineering 523 | |
| Mechanical Engineering 501 ² | Mechanical Engineering 502 ² |
| Mechanical Engineering 585 | |
| Mechanical Engineering 599 | |
| Engineering 513 | |
| Three Petroleum Minor Technical Elective Courses (9 units) | |
| Two Complementary Studies Courses (6 units) | |

¹Block Week Course.

²Students may request Department Consent to substitute either Engineering 501 and 502, or Engineering 503 and 504 for Mechanical Engineering 501 and 502 if they meet the prerequisites and notes for Mechanical Engineering 501 and 502.

Mechanical Engineering, Biomedical Engineering Specialization

Suggested Sequence of Courses

Courses shown in both terms are offered in both terms, however registration is determined by the department.

| Second Year | |
|--|---|
| Fall | Winter |
| Mechanical Engineering 101 ¹ | |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Engineering 319 | Mechanical Engineering 317 |
| Engineering 349 | Engineering 407 |
| Mechanical Engineering 337 | Mechanical Engineering 339 |
| Physics 365 or 369 | Mechanical Engineering 341 |
| Biomedical Engineering 301 | Biomedical Engineering 309 |
| Third Year | |
| Fall | Winter |
| | Biomedical Engineering 401 |
| Mechanical Engineering 421 | |
| Mechanical Engineering 461 | |
| Mechanical Engineering 471 | |
| Mechanical Engineering 473 | |
| Mechanical Engineering 479 | |
| Mechanical Engineering 485 | |
| Mechanical Engineering 493 | |
| Mechanical Engineering 495 | |
| Manufacturing Engineering 417 | |
| Two Complementary Studies Courses (6 units) | |
| Fourth Year - Thesis Option | |
| Fall | Winter |
| Mechanical Engineering 501 ² | Mechanical Engineering 502 ² |
| Mechanical Engineering 585 | |
| Mechanical Engineering 599 | |
| Engineering 513 | |
| Biomedical Engineering 500 ⁴ | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| Two Complementary Studies Courses (6 units) | |
| Fourth Year - Project Option | |
| Fall | Winter |
| Mechanical Engineering 501 ² | Mechanical Engineering 502 ² |
| Mechanical Engineering 585 | |
| Mechanical Engineering 599 | |
| Engineering 513 | |
| Biomedical Engineering 501 | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| Two Biomedical Engineering or Mechanical Engineering Technical Electives (6 units) | |

Two Complementary Studies Courses (6 units)

¹Block Week Course.²Students may request Department Consent to substitute either Engineering 501 and 502, or Engineering 503 and 504 for Mechanical Engineering 501 and 502 if they meet the prerequisites and notes for Mechanical Engineering 501 and 502.³Fall and Winter.⁴Nine units.**Mechanical Engineering, Energy and Environment Specialization****Suggested Program Courses**

Courses shown in both terms are offered in both terms, however registration is determined by the department.

| Second Year | |
|--|---|
| Fall | Winter |
| Mechanical Engineering 101 ¹ | Chemistry 379 |
| Mathematics 375 or Applied Mathematics 307 | Engineering 311 |
| Engineering 319 | Mechanical Engineering 317 |
| Engineering 349 | Engineering 407 |
| Mechanical Engineering 337 | Mechanical Engineering 339 |
| Physics 365 or 369 | Mechanical Engineering 341 |
| Energy and Environment, Engineering 355 | |
| Third Year | |
| Fall | Winter |
| Mechanical Engineering 421 | |
| Mechanical Engineering 461 | |
| Mechanical Engineering 471 | |
| Mechanical Engineering 473 | |
| Mechanical Engineering 479 | |
| Mechanical Engineering 485 | |
| Mechanical Engineering 493 | |
| Mechanical Engineering 495 | |
| Manufacturing Engineering 417 | |
| Energy and Environment Technical Elective (3 units) | |
| Complementary Studies Course (3 units) | |
| Energy Management 301 | |
| Fourth Year | |
| Fall | Winter |
| Science 529 | |
| Mechanical Engineering 501 ² | Mechanical Engineering 502 ² |
| Mechanical Engineering 585 | |
| Mechanical Engineering 599 | |
| Engineering 513 | |
| Three Energy and Environment Technical Electives (9 units) | |
| Two Complementary Studies Courses (6 units) | |

¹Block Week Course.²Students may request Department Consent to substitute either Engineering 501 and 502, or Engineering 503 and 504 for Mechanical Engineering 501 and 502 if they meet

the prerequisites and notes for Mechanical Engineering 501 and 502.

BSc Mechanical Engineering/ BComm Combined Degree Program**Suggested Sequence of Courses**

| Second Year | |
|--|--|
| Fall | Winter |
| Mechanical Engineering 101 ¹ | |
| Mathematics 375 | Engineering 311 |
| Engineering 319 | Mechanical Engineering 317 |
| Engineering 349 | Engineering 407 |
| Mechanical Engineering 337 | Mechanical Engineering 339 |
| Management Studies 217 | Accounting 217 |
| Economics 201 | Economics 203 |
| Third Year | |
| Fall | Winter |
| Physics 365 or 369 | Finance 317 |
| Mechanical Engineering 421 | Business Technology Management 317 |
| Mechanical Engineering 473 | Entrepreneurship and Innovation 317 |
| Mechanical Engineering 479 | Accounting 323 |
| Management Studies 391 | Business and Environment 395 |
| Organizational Behaviour and Human Resources 317 | Mechanical Engineering 341 |
| Fourth Year | |
| Fall | Winter |
| Marketing 317 | Mechanical Engineering 461 |
| Operations Management 317 | Mechanical Engineering 485 |
| Management Studies 451 | Mechanical Engineering 493 |
| Management Studies 453 | Mechanical Engineering 495 |
| Mechanical Engineering 471 | BComm Concentration course (3 units) |
| Manufacturing Engineering 417 | BComm Concentration course (3 units) |
| Fifth Year | |
| Spring | |
| Engineering 513 | |
| Fall | Winter |
| Mechanical Engineering 501 ² | Mechanical Engineering 502 ² |
| Mechanical Engineering 585 | Mechanical Engineering Technical Elective Course (3 units) |
| Mechanical Engineering 599 | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | Mechanical Engineering Technical Elective Course (3 units) |

Strategy and Global Management 591

Engineering 481

¹Block Week Course.²Students may request Department Consent to substitute either Engineering 501 and 502, or Engineering 503 and 504 for Mechanical Engineering 501 and 502 if they meet the prerequisites and notes for Mechanical Engineering 501 and 502.**Mechanical Engineering Approved Technical Electives****Regular Program****Select 12 units.**

Students completing the Regular Program may request a maximum of one (1) technical elective substitution from the Undergraduate Program Director.

| | |
|---|-------------------------------|
| Biomedical Engineering 509 | Mechanical Engineering 597 |
| Biomedical Engineering 515 | Manufacturing Engineering 501 |
| Biomedical Engineering 523 | Manufacturing Engineering 503 |
| Biomedical Engineering 525 | Manufacturing Engineering 509 |
| Energy and Environment, Engineering 575 | Manufacturing Engineering 514 |
| Engineering 515 | Manufacturing Engineering 517 |
| Engineering 525 | Manufacturing Engineering 527 |
| Mechanical Engineering 505 | Manufacturing Engineering 533 |
| Mechanical Engineering 519 | Petroleum Engineering 521 |
| Mechanical Engineering 521 | Petroleum Engineering 555 |
| Mechanical Engineering 547 | Petroleum Engineering 561 |
| Mechanical Engineering 583 | Petroleum Engineering 563 |
| Mechanical Engineering 587 | Petroleum Engineering 565 |
| Mechanical Engineering 595 | |

Minor in Manufacturing Engineering**Select 9 units.**

| | |
|-------------------------------|-------------------------------|
| Engineering 515 | Manufacturing Engineering 517 |
| Manufacturing Engineering 501 | Manufacturing Engineering 527 |
| Manufacturing Engineering 503 | Manufacturing Engineering 533 |
| Manufacturing Engineering 509 | Mechanical Engineering 505 |

Minor in Mechatronics**Select 6 units.**

| |
|-------------------------------|
| Manufacturing Engineering 529 |
| Mechanical Engineering 505 |
| Mechanical Engineering 547 |

Minor in Petroleum Engineering

Select 9 units.

| | |
|----------------------------|---------------------------|
| Geology 377 | Petroleum Engineering 555 |
| Mechanical Engineering 595 | Petroleum Engineering 561 |
| Mechanical Engineering 597 | Petroleum Engineering 563 |
| Petroleum Engineering 525 | Petroleum Engineering 565 |
| Petroleum Engineering 533 | |

4.8 Oil & Gas Engineering

Admission

Refer to 3.1 Admissions.

Oil and Gas Engineering

Suggested Sequence of Courses

Courses that span two terms can be taken in either term.

| Second Year | |
|---|------------------------------|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Chemistry 357 |
| Engineering 311 | Petroleum Engineering 313 |
| Engineering 319 | Chemical Engineering 315 |
| Engineering 349 | Chemical Engineering 331 |
| Geology 377 | Chemical Engineering 317 |
| Two Complementary Studies Courses (6 units) | |
| Third Year | |
| Fall | Winter |
| Chemical Engineering 401 | Petroleum Engineering 423 |
| Chemical Engineering 403 | Petroleum Engineering 507 |
| Chemical Engineering 427 | Petroleum Engineering 525 |
| Chemical Engineering 407 | Petroleum Engineering 533 |
| Petroleum Engineering 429 | Complementary Studies Course |
| Technical Elective Course (3 units) | |
| Petroleum Engineering 515 | |
| Fourth Year | |
| Fall | Winter |
| Chemical Engineering 501 | Petroleum Engineering 509 |
| Petroleum Engineering 505 | Petroleum Engineering 531 |
| Petroleum Engineering 511 | Petroleum Engineering 551 |
| Petroleum Engineering 543 | |
| Engineering 513 | |
| Technical Elective Course (3 units) | |
| Complementary Studies Course (3 units) | |

Oil and Gas Engineering Approved Technical Electives

Select six units.

| | |
|---|---------------------------|
| Chemistry 579 | Engineering 515 |
| Chemical Engineering 405 | Petroleum Engineering 519 |
| Chemical Engineering 503 | Petroleum Engineering 555 |
| Chemical Engineering 530 | Petroleum Engineering 561 |
| Chemical Engineering 537 | Petroleum Engineering 563 |
| Energy and Environment, Engineering 501 | Petroleum Engineering 571 |
| Energy and Environment, Engineering 503 | Petroleum Engineering 573 |
| Energy and Environment, Engineering 505 | |

4.9 Software Engineering

Admission

Refer to 3.1 Admissions.

Software Engineering, Regular Program

Suggested Sequence of Courses

Courses that span two terms can be taken in either term.

| Second Year | |
|--|--|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Computer Science 319 |
| Software Engineering for Engineers 337 | Computer Engineering 369 |
| Electrical Engineering 353 | Electrical Engineering 327 |
| Engineering 319 | Software Engineering for Engineers 409 |
| Physics 365 or 369 | Mathematics 271 |
| Complementary Studies Course (3 units) | |
| Third Year | |
| Fall | Winter |
| Computer Engineering 511 | Software Engineering 401 |
| Software Engineering for Engineers 480 | Software Engineering 438 |
| | Software Engineering 471 |
| Computer Science 441 | |
| Computer Science 457 | |
| Computer Science 471 | |
| Two Complementary Studies Courses (6 units) | |
| Fourth Year | |
| Fall | Winter |
| Software Engineering 511 | Software Engineering 533 |
| Electrical Engineering 500 (6 units) ² | |
| Biomedical Engineering 501 | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| One Software Engineering Technical Elective (3 units) | |
| Engineering 513 | |
| Complementary Studies Course (3 units) | |
| Fourth Year - Project Option | |
| Fall | Winter |
| Software Engineering 511 | Software Engineering 533 |
| Electrical Engineering 500 (6 units) ² | |
| Biomedical Engineering 501 | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| Two Biomedical Engineering or Software Engineering Technical Electives (6 units) | |

| |
|--|
| Engineering 513 |
| Complementary Studies Course (3 units) |

¹Fall and Winter.

Software Engineering, Biomedical Engineering Specialization

Suggested Sequence of Courses

Courses that span two terms can be taken in either term.

| Second Year | |
|--|--|
| Fall | Winter |
| Mathematics 375 or Applied Mathematics 307 | Computer Science 319 |
| Software Engineering for Engineers 337 | Computer Engineering 369 |
| Electrical Engineering 353 | Electrical Engineering 327 |
| Engineering 319 | Software Engineering for Engineers 409 |
| Biomedical Engineering 301 | Mathematics 271 |
| Complementary Studies Course (3 units) | Biomedical Engineering 309 |
| Third Year | |
| Fall | Winter |
| Computer Engineering 511 | Software Engineering 401 |
| Software Engineering for Engineers 480 | Software Engineering 438 |
| Physics 365 or 369 | Computer Science 457 |
| | Software Engineering 471 |
| | Biomedical Engineering 401 |
| Computer Science 441 | |
| Computer Science 471 | |
| Two Complementary Studies Courses (6 units) | |
| Fourth Year - Thesis Option | |
| Fall | Winter |
| Software Engineering 511 | Software Engineering 533 |
| Electrical Engineering 500 (6 units) ² | |
| Biomedical Engineering 500 ¹ (9 units) | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| One Software Engineering Technical Elective (3 units) | |
| Engineering 513 | |
| Complementary Studies Course (3 units) | |
| Fourth Year - Project Option | |
| Fall | Winter |
| Software Engineering 511 | Software Engineering 533 |
| Electrical Engineering 500 (6 units) ² | |
| Biomedical Engineering 501 | |
| Two Biomedical Engineering Technical Electives (6 units) | |
| Two Biomedical Engineering or Software Engineering Technical Electives (6 units) | |

| |
|---|
| One Software Engineering Technical Elective (3 units) |
| Engineering 513 |
| Complementary Studies Course (3 units) |

¹9 units.

²Fall and Winter.

BSc Software Engineering/BComm Combined Degree Program

Suggested Sequence of Courses

Courses that span over two terms can be taken in either term.

| Second Year | |
|---|---|
| Fall | Winter |
| Mathematics 375 | Computer Science 319 |
| Software Engineering for Engineers 337 | Computer Engineering 369 |
| Electrical Engineering 353 | Mathematics 271 |
| Engineering 319 | Software Engineering for Engineers 409 |
| Management Studies 217 | Accounting 217 |
| Economics 201 | Economics 203 |
| Third Year | |
| Fall | Winter |
| Computer Engineering 511 | Finance 317 |
| Physics 365 or 369 | Business Technology Management 317 |
| Computer Science 441 | Entrepreneurship and Innovation 317 |
| Computer Science 471 | Accounting 323 |
| Management Studies 391 | Business and Environment 395 |
| Organizational Behaviour and Human Resources 317 | Software Engineering 471 |
| Fourth Year | |
| Fall | Winter |
| Marketing 317 | Software Engineering 401 |
| Operations Management 317 | Electrical Engineering 327 |
| Management Studies 451 | Software Engineering 438 |
| Management Studies 453 | Software Engineering Technical Elective (3 units) |
| Software Engineering for Engineers 480 | BComm Concentration course (3 units) |
| Computer Science 457 | BComm Concentration course (3 units) |
| Fifth Year | |
| Spring | |
| Engineering 513 | |
| Fall | Winter |
| Electrical Engineering 500 (6 units) ¹ | |
| Software Engineering 511 | Software Engineering 533 |
| Engineering 481 | BComm Concentration course (3 units) |

| | |
|--------------------------------------|---|
| BComm Concentration course (3 units) | BComm Concentration course (3 units) |
| BComm Concentration course (3 units) | Software Engineering Technical Elective (3 units) |
| Strategy and Global Management 591 | Software Engineering Technical Elective (3 units) |

¹Fall and Winter.

Software Engineering Approved Technical Electives

Select 12 units.

| | |
|------------------------------|---|
| Biomedical Engineering 509** | Electrical Engineering 503 |
| Biomedical Engineering 515** | Electrical Engineering 525 |
| Biomedical Engineering 585 | Electrical Engineering 563 |
| Computer Engineering 501 | Electrical Engineering 591 |
| Computer Engineering 509 | Electrical Engineering 592 |
| Computer Engineering 515 | Electrical Engineering 594 |
| Computer Engineering 517 | Electrical Engineering 599 |
| Computer Science 411 | Software Engineering 499 |
| Computer Science 453 | Software Engineering 501 |
| Computer Science 457 | Software Engineering 513 |
| Computer Science 481 | Software Engineering 515 |
| Computer Science 525 | Software Engineering 523 |
| Computer Science 526 | Software Engineering 541 |
| Computer Science 550 | Software Engineering 550 |
| Computer Science 559 | Software Engineering for Engineers 519* |
| Computer Science 583 | Software Engineering for Engineers 545 |

*A maximum of three Software Engineering for Engineers 519 courses can be selected as technical electives.

**A maximum of one of Biomedical Engineering 509 or Biomedical Engineering 515 can be selected as technical electives.

Notes:

- Selection of a course not on this list requires department approval. Elective courses are offered, in any calendar year, at the discretion of the department.
- Computer Science 471, Data Base Management Systems, may be used as a technical elective only by students whose program did not include Computer Science 471 as a required course. Students may not take Computer Science 471 as a technical elective if they have already completed Software Engineering for Engineers 519.31.
- All technical elective courses have similar workloads even though the hours in the timetable are variable. One 500-level or high course from either the Faculty of Science or the Schulich School of Engineering may be approved by the Associate Head or by

the Program Director as a technical elective. Optional undergraduate courses and all graduate courses are offered, in any calendar year, at the discretion of the department.

4.10 Biomedical Engineering Specialization

Introduction

The Biomedical Engineering Specialization (BMEN) allows a student to fulfill the requirements for a BSc degree in Chemical, Civil, Electrical, Geomatics, Mechanical or Software Engineering and at the same time complete a program in Biomedical Engineering.

Admission

First year Engineering students wishing to enter the Biomedical Engineering Specialization must apply for admission to the Biomedical Engineering Specialization program at the same time the choice of an engineering program is made.

Requirements

Curriculum requirements for the Biomedical Engineering Specialization are listed with the requirements for each program.

Biomedical Engineering Approved Technical Electives

| | |
|----------------------------|-------------------------------|
| Biomedical Engineering 509 | Biomedical Engineering 585 |
| Biomedical Engineering 511 | Chemical Engineering 535 |
| Biomedical Engineering 515 | Computer Engineering 509 |
| Biomedical Engineering 519 | Electrical Engineering 563 |
| Biomedical Engineering 523 | Manufacturing Engineering 529 |
| Biomedical Engineering 525 | |

Note: Not all technical electives may be offered each year. An updated list of available technical electives may be found at ucalgary.ca/bme/undergrad.

Practicum

All Biomedical Engineering Specialization students are required to complete a biomedical engineering practicum via at least one of the following options:

- A minimum of four (4) months of industrial work experience in a biomedical engineering-related company (typically co-ordinated through the Engineering Internship Office).
- A minimum of four (4) months research placement in biomedical engineering (typically a summer in a BME laboratory).
- Successful completion of a fourth year BME thesis (Biomedical Engineering 500).

All internship or research placements must be approved by the Centre for Bioengineering Research and Education.

4.11 Energy and Environment Specialization

Introduction

The Energy and Environment Specialization (ENEE) allows a student to fulfill the requirements for a BSc degree in Chemical, Civil, Electrical, Geomatics, or Mechanical Engineering and at the same time complete a program in Energy and Environment.

Admission

First year Engineering students wishing to enter the Energy and Environment Specialization must apply for admission to the Energy and Environment Specialization program at the same time the choice of an engineering program is made.

Requirements

Curriculum requirements for the Energy and Environment Specialization are listed with the requirements for each program.

Energy and Environment Approved Technical Electives

| | |
|---|---|
| Chemical Engineering 530 | Energy and Environment, Engineering 575 |
| Civil Engineering 502 | Energy and Environment, Engineering 577 |
| Civil Engineering 506 | Engineering 523 |
| Civil Engineering 508 | Geomatics Engineering 551 |
| Civil Engineering 581 | Geomatics Engineering 581 |
| Electrical Engineering 562 | Geomatics Engineering 583 |
| Electrical Engineering 584 | Mechanical Engineering 583 |
| Electrical Engineering 585 | Mechanical Engineering 593 |
| Electrical Engineering 587 | Mechanical Engineering 595 |
| Electrical Engineering 597 | Mechanical Engineering 597 |
| Energy and Environment, Engineering 501 | Petroleum Engineering 523 |
| Energy and Environment, Engineering 503 | Petroleum Engineering 533 |
| Energy and Environment, Engineering 505 | Petroleum Engineering 555 |
| Energy and Environment, Engineering 507 | Petroleum Engineering 561 |
| Energy and Environment, Engineering 519 | Petroleum Engineering 571 |

Note: All technical electives may not be offered each year.

4.12 Combined Programs

An engineering undergraduate degree program may be combined with any other undergraduate degree program on campus. Students may either be admitted to two degree programs when they first apply to the University or may seek admission to a

second degree program after being admitted to engineering. Students are reminded that all degree programs at the University of Calgary are subject to quotas and it is the student's responsibility to meet the admission requirements for the second degree program. Students should consult the engineering website or inquire at the Engineering Student Centre for more information.

Students who are admitted to two degree programs when they initially apply to the University of Calgary may opt to spread their first year engineering courses over two years and be admitted to an engineering discipline after their second review period. Interested students must see the Associate Dean (Student Affairs) before the add/drop deadline of their first year to initiate this arrangement.

It is possible for students to opt out of a combined degree program after one year and complete either the BSc (Engineering) or the other degree.

Students may also combine their engineering degree with any minor offered by any faculty at the University of Calgary.

Combined Degree Program, BSc (Engineering)/BComm

The Schulich School of Engineering and the Haskayne School of Business offer a combined degree program leading to a BSc degree in Chemical, Civil, Electrical, Geomatics, Mechanical, or Software Engineering and a BComm degree. The BSc (Engineering)/BComm combined degree program can be completed in five years. Applicants who are interested in pursuing the BSc (Engineering)/BComm combined degree program may apply for direct entry to the combined degree program from high school. Admission to the combined degree program is competitive and based on the admission average calculated for the purpose of admission to Engineering.

Space permitting, students may apply for admission to the combined program after their first year in Schulich at the same time that the choice of a specific engineering major is made (section 3.1 Admission). Students who wish to pursue the BSc (Engineering)/BComm combined degree program must complete the specific course requirements listed in sections 4.1 First Year Curriculum, 4.2 Chemical Engineering, 4.3 Civil Engineering, 4.4 Electrical Engineering, 4.6 Geomatics Engineering, 4.7 Mechanical Engineering, and 4.9 Software Engineering.

4.13 Diplomas

4.13.1 Diploma of the Schulich School of Engineering

Introduction

The Schulich School of Engineering sponsors a diploma program providing additional special qualifications in designated departments which lead to the Diploma of the Schulich School of Engineering. The designated departments offering the diploma program are: Chemical and Petroleum; Civil; Electrical and Computer; and Mechanical and Manufacturing Engineering. This

program is intended primarily for professional engineers engaged in practice who are not interested in enrolling in a graduate degree including a thesis, or who are unable to meet the residence requirements of the MSc degree.

Admission

Admission to the diploma program may be granted to holders of an approved degree or its equivalent. Engineers, without a degree, who are registered as Professional Engineers with the Association of Professional Engineers, Geologists and Geophysicists of Alberta, or an equivalent association, may also be eligible for admission to the diploma program.

Requirements

The diploma program consists of 24 units of which at least 12 units must be graduate courses in engineering. Courses which normally fall within an undergraduate program in the same area in which the diploma is sought will not be credited toward the diploma.

Regulations

A student must obtain a grade point average of at least 2.50 in the courses taken for credit toward the diploma. The minimum passing grade in courses taken for credit in the diploma program is "C".

Enquiries about the diploma program should be directed to the department in which the diploma is sought.

Environmental Engineering

The Schulich School of Engineering also sponsors a diploma program providing additional specialization in Environmental Engineering, intended for professional engineers or holders of equivalent approved degrees and leading to the Diploma of the Schulich School of Engineering in Environmental Engineering. The admission criteria, requirements and regulations for the diploma are the same as for the Diploma of the Schulich School of Engineering. Enquiries about the specialization in Environmental Engineering should be directed to the Department of Civil Engineering.

4.13.2 Diploma of the Schulich School of Engineering and the Haskayne School of Business in Project Management Specialization Introduction

The Schulich School of Engineering and the Haskayne School of Business jointly sponsor a diploma program providing additional special qualifications in the area of Project Management which leads to the Diploma of the Schulich School of Engineering and of the Haskayne School of Business in Project Management. This program is intended primarily for professionals engaged in practice who are not interested in the MSc or MEng degrees.

Admission

Admission to the diploma program may be granted to holders of an approved Engineering degree, Engineers without a degree who

are registered with APEGA or an equivalent association, and those having equivalent qualifications or experience as determined by the Director of the Project Management specialization.

Criteria for admission to the Diploma with a Specialization in Project Management of the Schulich School of Engineering and the Haskayne School of Business are as follows:

1. An approved Engineering degree or registration with APEGA or an equivalent association or equivalent qualifications or experience as determined by the Director of the Project Management Specialization;
2. Up to five years of relevant experience in industry as determined by the Director of the Project Management Specialization;
3. Successful completion of up to 12 units in the Project Management Specialization with a grade point average of at least 2.50, and a minimum passing grade of "C" for all courses.

Requirements

The diploma program consists of 24 units of which at least 18 units must be graduate courses in project management. Courses which fall within an undergraduate program in the area of Project Management will not normally be credited toward the diploma.

Regulations

A student must obtain a grade point average of at least 2.50 in the courses taken for credit toward the diploma. The minimum passing grade in courses taken for credit in the diploma program is "C".

Enquiries about the diploma program should be directed to the Director of the Project Management specialization.

4.14 Engineering Internship Program

Introduction

The Engineering Internship Program is a five-year program which includes, in addition to the regular four-year academic program, an internship year (a minimum of twelve and a maximum of sixteen consecutive months) of supervised work experience in industry. The internship year may commence in May or September after the student has completed the first three years of the Engineering program. (For students enrolled in the BSc (Engineering)/BComm combined degree program, the internship year will commence after the student has completed the first four years of the five-year program, and will extend the total length of the combined degree from five years to six years.) The student is expected to return to complete the final academic year of the program in September of the following year. In certain circumstances, it may be possible to commence the internship year in January, and return to the academic program the following January. Interested students are encouraged to contact the Engineering Internship office.

Admission

Students are required to apply online to the Engineering Internship Program prior to October 15 in the Fall Term of their third year. Students who do not meet the application deadline should contact the Engineering Internship Office regarding admission.

To be admitted to the Engineering Internship Program, students must be full-time students in good academic standing after second year. Only students who are in good standing and eligible for full-time registration in the Schulich School of Engineering at the time they apply for the internship program and at the time they expect to start their internship are eligible for access to the placement processes of the Engineering Internship Program. Students must normally have completed all courses listed in 4.1 First Year Curriculum and all courses listed in Second and Third Year in their engineering program (see the applicable section 4.2-4.9) to be eligible to start their internship. Students who will not meet these requirements at the end of their third year are encouraged to contact the Engineering Career Centre to discuss options for internship participation. Students should refer to the Co-operative Education/Internship section of this Calendar for general admission requirements.

Requirements

Students must complete a minimum of twelve months work experience while registered in the Internship courses, Internship 513.01-04 (Internship in Engineering I-IV), in addition to the regular requirements for the BSc in Engineering. Students who have completed any portion of the twelve month requirement will not be permitted to apply for positions that extend beyond either the sixteen month maximum permitted to complete the requirements, or the date on which they are expected to resume their academic program.

Regulations

If a student's academic performance in the third year results in the student not being in good standing after the third year, the student will normally be required to withdraw from the Engineering Internship Program. Students who have been required to withdraw from the Engineering Internship Program will no longer have access to the program's job search systems or support. If the student is required to withdraw from the Engineering Internship Program but has already accepted a placement, the employer will be informed that the student is no longer registered in the Internship Program.

Students who have completed the twelve month minimum requirement will not be permitted to apply for further internship positions.

Students who have accepted a placement obtained through the Internship Placement process will be registered in the required Internship courses corresponding to the length of the placement and appropriate fees will be payable.

In order to have the Internship designation appear on the BSc parchment, a student must complete the twelve-month minimum requirement and pass the requisite internship courses.

Each work experience is supervised by a Professional Engineer in the host company. Normally the entire internship year is spent with the same employer.

4.15 Minor in Entrepreneurship and Enterprise Development in the Schulich School of Engineering

Introduction

The Schulich School of Engineering in partnership with the Haskayne School of Business offers a Minor in Entrepreneurship and Enterprise Development (MEED) open to all engineering students. MEED typically commences in Year Two of the engineering program and consists of five Entrepreneurship and Innovation (ENTI) courses, all of which are currently offered by the Haskayne School of Business plus any five fourth-year engineering courses that are taken as part of the normal requirements for the engineering degree. Thus, to satisfy MEED requirements, students must receive credit for 15 units over and above the engineering degree requirements.

Admission

Students apply for admission to MEED at the same time as they apply for their choice of engineering program specialization, in April of their first year. Admission to the MEED program is limited to 50 students. In the event that the number of applicants exceeds the number of spaces available, admission will be decided on the basis of academic performance, using the same process as is used for admission to the engineering program specialization. If students apply later in their program than second year, they will be admitted in order of academic performance according to the number of spaces available. Students are encouraged to apply as soon as possible in order that the Haskayne School of Business may plan for the required number of places in the ENTI courses. Application forms are available from and should be submitted to the Engineering Student Centre. Admission to the program depends upon the availability of space in the required ENTI courses.

Requirements

Students must receive credit for 15 units in addition to 15 units fourth-year engineering courses that are part of the undergraduate engineering degree requirements. The five courses that are to be completed in addition to the engineering degree requirements are:

1. Entrepreneurship and Innovation 201 Introduction to Business Venturing
2. Entrepreneurship and Innovation 381 Principles of Entrepreneurship
3. Entrepreneurship and Innovation 401 Opportunity Identification

4. Entrepreneurship and Innovation 405 New Venture Start-Up

5. One of the following options:

Business and Environment 395 Business Law for Strategic Decision-Makers

Business Technology Management 321 Information Technology in Business

Entrepreneurship and Innovation 403 New Venture Planning

Entrepreneurship and Innovation 531 Entrepreneurship Law

Finance 341 Canadian Business Finance

Finance 343 Personal Financial Management

Marketing 341 Introduction to Marketing

Operations Management 301 Introduction to Operations and Supply Chain Management

Organizational Behaviour and Human Resources 321 Foundations in the Organizational Behaviour and Human Resources

Regulations

Regulations of the Schulich School of Engineering apply to students taking MEED courses. In order to have the Minor in Entrepreneurship and Enterprise Development appear on the student's transcript, the five-course MEED program must be completed before the student graduates.

4.16 International Foundations Program (IFP) Pathways

For students admitted to IFP Pathways, the regular Schulich School of Engineering first-year curriculum (4.1 First Year Curriculum) is replaced by the following two-year curriculum. Upon successful completion of the IFP Pathways two-year curriculum, students will be placed into an Engineering program according to the process described under 3.1 Admissions.

| Year | Fall Term | Winter Term |
|------|---|---|
| 1 | Mathematics 275 | Engineering 225 |
| | International Foundations Program Engineering 275 | International Foundations Program Engineering 225 |
| | Engineering 233 | Engineering 201 |
| | International Foundations Program Engineering 233 | International Foundations Program Engineering 201 |
| | International Foundations Program 257 | International Foundations Program 250 |
| 2 | Engineering 200 | Physics 259 |
| | International Foundations Program Engineering 200 | International Foundations Program Engineering 259 |
| | Mathematics 211 | Engineering 202 |
| | International Foundations Program Engineering 211 | International Foundations Program Engineering 202 |
| | Chemistry 209 | Mathematics 277 |
| | International Foundations Program Engineering 209 | International Foundations Program Engineering 277 |
| | International Foundations Program 357 | International Foundations Program 350 |

IFP Pathways to Engineering students adhere to the academic policies of the Schulich School of Engineering. In addition, students are subject to a joint academic review process by the Werklund School of Education and the Engineering school. Regulations governing continuation in the program are found in 3.4 Academic Performance, Review, and Student Standing.

5. Administration

School Administrative Officers

Dean

W. Rosehart

Vice Dean

A. Nygren

Senior Associate Dean

Q. Sun, Equity & Diversity

Associate Deans

K. Johnston, Academic & Planning and Teaching & Learning

G. Achari, Research and Graduate Studies

A. Sen, Student Affairs and Student Professional Development

Faculty of Science

1. Summary of Programs

Degrees Offered*

| Department and Program | | Undergraduate | |
|---|-----------------------|---|---------------------------------|
| | Core | Enhancements | Combined Degrees ^{1,7} |
| Department of Biological Sciences | | | |
| Biochemistry | BSc | BSc Honours | |
| Biological Sciences | BSc | BSc Honours | |
| Cellular, Molecular and Microbial Biology | BSc | BSc Honours | |
| Ecology | BSc | BSc Honours, BSc Co-op, BSc Co-op Honours | |
| Plant Biology | BSc | BSc Honours | |
| Zoology | BSc | BSc Honours | |
| Department of Chemistry | | | |
| Chemistry | BSc | BSc Honours | |
| Department of Computer Science | | | |
| Computer Science | BA ² , BSc | BSc Honours, BSc Internship, BSc Internship Honours | BComm/BSc ³ |
| Department of Geoscience | | | |
| Geology | BSc | BSc Honours | |
| Geophysics | BSc | BSc Honours | |
| Department of Mathematics and Statistics | | | |
| Actuarial Science | BSc | BSc Honours, BSc Co-op, BSc Co-op Honours | BComm/BSc ³ |
| General Mathematics | BSc | | BSc/BEd ⁴ |
| Mathematics | BSc | BSc Honours | BComm/BSc ³ |
| Department of Physics and Astronomy | | | |
| Astrophysics | BSc | BSc Honours | |
| Physics | BSc | BSc Honours | |
| Non-Departmental Programs | | | |
| Data Science | Minor only | | |
| Environmental Science | BSc | BSc Honours | |
| Neuroscience | BSc Honours Only | | |
| Nanoscience | Minor only | | |
| Natural Sciences | BSc | BSc Honours | BSc/BEd ⁴ |

(See suspended programs on next page)

*Graduate degrees are offered in all Departments within the Faculty of Science. Details of graduate specializations can be found in the graduate section of this calendar.

¹All degrees in the Faculty of Science, except Environmental Science, can be combined with eligible BA and BSc programs in the Faculty of Arts.

²Combined Degree with the Faculty of Arts (Note this program is undergoing review.)

³Combined Degree with the Haskayne School of Business.

⁴Concurrent Degree with the Werklund School of Education.

⁵BSc and BSc Honours degrees can be combined with BSc degrees from the Schulich School of Engineering as described in section 3.4.H.

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Through its six Departments of Biological Sciences, Chemistry, Computer Science, Geoscience, Mathematics and Statistics, and Physics and Astronomy, and the USC Specialized Programs Office, the Faculty of Science offers the programs listed below.

The Faculty of Science is committed to providing students with rich undergraduate educational experiences that can be completed in four years. All BSc and BA programs within the Faculty normally require four years to complete, with the exception of the Combined Degree programs and the Co-operative Education/Internship programs that require at least five years. Students are encouraged to visit the Undergraduate Science Centre regularly throughout their degree for program advising and support in achieving the goal of completing their degree in the normal amount of time.

Students starting their first year of university may enter any Science Major programs designated for first-year students. Students who are undecided about which program to choose should register in the Natural Sciences program in first year. While registered in this program, they should register in the first-year courses that are appropriate to the future program of their choice.

Admission to some programs is based on selection criteria as described in Section 4 (Program Details).

Undergraduate Programs

Details on undergraduate programs are given in Section 4 (Program Details).

Degree Programs Within the Faculty of Science

- BSc Major Programs
- BSc Honours Programs
- Co-operative/Internship BSc Major Programs

Suspended Programs

| Department and Program | | Undergraduate | | |
|---|-----------|-------------------|---------------------------------|----------------|
| | Core | Enhancements | Combined Degrees ^{1,7} | Effective Date |
| Department of Chemistry | | | | |
| Applied Chemistry | BSc Co-op | BSc Honours Co-op | | Fall 2018 |
| Chemical Physics | | BSc Honours | | Fall 2016 |
| Department of Geoscience | | | | |
| Applied and Environmental Geology | BSc | BSc Honours | | Fall 2015 |
| Department of Mathematics and Statistics | | | | |
| Applied Mathematics | BSc | BSc Honours | | Fall 2018 |
| Pure Mathematics | BSc | BSc Honours | | Fall 2018 |
| Statistics | BSc | BSc Honours | | Fall 2018 |
| Statistics | BSc | BSc Honours | | Fall 2018 |

¹All degrees in the Faculty of Science, except Environmental Science, can be combined with eligible BA and BSc programs in the Faculty of Arts.

⁷BSc and BSc Honours degrees can be combined with BSc degrees from the Schulich School of Engineering as described in section 3.4.H.

- Co-operative/Internship BSc Honours Programs
- BSc Double Major Programs
- BSc Double Honours Programs
- BSc/BSc Combined Degree Programs within the Faculty of Science
- Second Degree Programs following an appropriate first degree: BSc Major or BSc Honours Programs

BA degrees may be conferred in programs in the Department of Computer Science if the program is part of a Double Major program with the second program in another faculty that only awards BA degrees.

Combined or Concurrent Degree Programs with Other Faculties

- BSc or BA (Science) and BSc or BA (Arts), administered jointly with the Faculty of Arts.
- BComm and BSc, administered jointly with the Haskayne School of Business.
- BSc (General Mathematics in Education) or BSc (Natural Sciences) and BEd, administered jointly with the Werklund School of Education.
- Combined BSc degree with Schulich School of Engineering.

Minor Programs

Science Minors are available in the following subjects:

Actuarial Science, Astrophysics, Biological Sciences, Chemistry, Computer Science, Data Science, Geology, Geophysics, Mathematics, Nanoscience, Physics, Statistics. The minors in Applied Mathematics and Pure Mathematics have been suspended.

Pre-Professional Preparation for Degree Programs at this and Other Institutions

The Faculty of Science admits students only to its degree programs. However, students who wish to transfer to a professional program are advised to choose a Faculty of Science program that best fits their professional aspirations and which, at the same time, permits them to work toward completing the chosen Science program,

i.e., it is important to simultaneously satisfy both Faculty of Science program requirements as well as pre-professional requirements.

- Dentistry - the University of Alberta, Edmonton.
- Medicine - the University of Calgary, University of Alberta and various other institutions.
- Optometry - the University of Waterloo, Ontario.
- Veterinary Medicine - the University of Calgary and the Western College of Veterinary Medicine, Saskatoon, Saskatchewan

Students interested in applying to professional programs should contact the institution offering their desired program for details regarding the necessary pre-professional prerequisite requirements.

Graduate Programs

All Departments of the Faculty of Science offer graduate programs leading to Masters and Doctoral degrees. These programs are under the jurisdiction of the Faculty of Graduate Studies.

The normal preparation for graduate studies will be an Honours degree in the chosen subject.

Details on graduate programs are given in the Calendar of the Faculty of Graduate Studies.

2. Faculty Student Affairs

All programs offered by the Faculty of Science are administered by the Undergraduate Science Centre, in collaboration with the six departments within the Faculty and the Directors of the Data Science, Environmental Science, Nanoscience, Natural Sciences and Neuroscience programs. Advice on these programs is available in the Undergraduate Science Centre, as well as Department and Program Directors' offices.

General inquiries related to the Faculty Regulations described in Section 3 should be directed to the Undergraduate Science

Centre. Specific inquiries related to course requirements, as described in Section 4, can be directed to the Undergraduate Science Centre, but often the Associate Head in the Department or Program Office concerned may be in a better position to answer these. Information on student advising is given in Section 4.

Undergraduate Science Centre

Location: Energy Environment Experiential Learning (EEEL) 445

Telephone: 403.220.8600

Faculty of Science web page: ucalgary.ca/science/

Undergraduate Science Centre website: ucalgary.ca/science/usc

Email address: usc@ucalgary.ca

3. Faculty Regulations

Students in the Faculty of Science are governed by the regulations in this section of the Calendar as well as by the general University regulations in the sections titled Admissions and Academic Regulations. For the precise interpretation of any statement or regulation, students should feel free to contact the Associate Dean (Undergraduate) of Science. The Dean has delegated responsibility for undergraduate student affairs in the faculty to the Associate Dean (Undergraduate).

3.1 Terminology

Please refer to the glossary at the back of this Calendar.

3.2 Admission

All programs offered by the Faculty of Science have a fixed number of places for students. For any given program, whenever demand exceeds capacity enrolment will be limited and students will be admitted on the basis of descending ranked academic performance until that capacity is met. Specified selection criteria are described in Section 4 (Program Details) under the appropriate Department.

Direct entry is possible to most Science Major programs. Entry to most Science Honours programs is possible only after successful completion of at least 30 credits. A limited number of programs offer direct entry into a Science Honours program for highly qualified high school students. These programs are Biochemistry; Cellular, Molecular and Microbial Biology; Ecology; Neuroscience; Plant Biology; and Zoology. Students who do not enter an Honours program at the time of admission, can be considered following the completion of at least 30 credits.

Repeated courses may only be counted once in a student's degree program but all instances (that fall within the group of courses used to calculate admission) are used in the calculation of the admission grade point average.

For additional admission requirements, refer to the departmental sections.

Students may transfer from one program to any other for which they are eligible.

Continuing University of Calgary students may request a change of program online using the Student Centre. Changes in program include transfer to a program in the Faculty of Science, either from another faculty or from within the Faculty of Science, including transfer from a Major to an Honours program, and designation of a Minor. If an application is unsuccessful, a new application must be submitted in the following year. To be eligible for admission, a student must meet the following requirements:

Major Programs

High school matriculation or equivalent. All applicants should have English Language Arts 30-1, Mathematics 30-1 and three additional 30-level subjects (of which two must be science courses). Incoming students should complete the appropriate high school 30/31 courses that support their expected first-year course registrations and that are listed in A.5 in the Admissions section of this Calendar.

Students who have completed some university-level course work must consult A.5 in the Admissions section of this Calendar for details.

Honours Programs

Admission to an Honours Program requires successful completion of at least 30 units (with the exception of programs which offer direct admission from high school. These programs are described above under 3.2 Admission). At the time of admission, students must present (i) a GPA of at least 3.30 calculated over the most recent course work to a maximum of 60 units, and (ii) a GPA of at least 3.30 calculated for all science courses included in (i) above (University of Calgary courses and/or transferable courses taken at other institutions).

For continuation in an Honours program, students are subject to an annual review at the end of the winter semester. Students must maintain a GPA of 3.30 over the courses subject to assessment and on all science courses within those subject to assessment. If fewer than 60 units have been completed then all courses will be subject to assessment; if more than 60 units have been completed, then only the most recent 60 units are subject to assessment. Students whose review GPA is between 3.20 and 3.30 will be placed on notice that they may not be able to complete their Honours degree if their academic achievement does not improve to the level required by graduation requirements. Students who wish to reapply to an Honours Program must meet the admission requirements stated above. Students may apply for Honours after the first, second or third year of their program, but need to plan their program at an early stage in order to be able to meet all Honours Program Requirements. See 3.4 Program Requirements.

Students who wish to change from a Major to an Honours program, must meet the deadline for submission of their application.

Note: The BSc (Honours) in the following programs permits direct entry into first year:

Biochemistry; Cellular, Molecular and Microbial Biology; Ecology; Neuroscience; Plant Biology; and Zoology.

Second Baccalaureate Degrees

Students who have received one or more approved undergraduate degrees (BA, BSc, BEd, etc.) may apply for admission to programs leading to a Second Baccalaureate Degree with a Major Field or a Second Baccalaureate Degree program with Honours in a Major Field.

Students must apply to the Admissions Office and meet all deadlines and requirements. For more information on admission to a second undergraduate degree, refer to A.5.5 in Admissions. For more information regarding requirements for a second degree, refer to 3.4 Program Requirements.

3.3 Enrolment Limitations

Enrolment limitations may be in effect for courses in the Faculty of Science.

Any of the junior (200-level) courses offered by the Faculty of Science may be so limited. Students must consult the current Schedule Builder in their Student Centre for information about registration priorities in such courses.

At the senior level (courses numbered 300 or above), many courses in several departments may have limited enrolment.

3.4 Program Requirements

The following general requirements apply to all programs administered by the Faculty of Science. In addition, there are the course requirements for the individual programs. These are listed in Section 4 (Program Details).

Table 1

The following courses may form part of a student's degree program in Science, but may not be used to satisfy the requirement of 18 units from outside the Faculty.

| |
|---|
| Anthropology 309, 413, 425, 435, 451, 552, 571 |
| Archaeology 417, 555 |
| Business Technology Management 321, 331 |
| Chemical Engineering 427, 501, 535, 537 |
| Civil Engineering 461 |
| Computer Engineering 339, 369, 467 |
| Electrical Engineering 327, 353, 469, 475, 563, 565, 575, (if both 563 and 565 are taken, one may be counted as from outside Science) |
| Engineering 201, 233, 311, 317, 319, 349, 407 |
| Energy and Environment, Engineering 355 |
| Geography 308, 310, 408, 510 |
| Kinesiology 259, 260, 263, 363, 463 |
| Mechanical Engineering 479, 485 |
| Medical Science (all courses in this category) |
| Political Science 399 |
| Psychology 300, 301, 312, 407, 478, 531 |
| Sociology 311, 315 |

A. Major Degree Programs

A student must present an approved list of courses completed with passing grades. This list will be referred to as the program. The program must satisfy the following conditions.

(a) The program must contain at least 120 units with a maximum of 48 units at the 200 level.

(b) The program must contain at least 45 units in a Science field. Maximum allowable courses limits are specified in program regulations for each degree. The field chosen for a program will be referred to as the "major field." The Science fields are listed in Section 4 (Program Details). Only 6 units in the major field may be a "D" or "D+".

(c) The GPA calculated over the program must be at least 2.00, and the GPA for courses in the major field must also be at least 2.00. The program may not contain more than 18 units with "D" or "D+" grades.

(d) Breadth Requirement: The program must contain at least 54 units from outside the major field, of which at least 18 units must be courses selected from Faculties other than the Faculty of Science. Of these 18 units, students must take at least 6 units from the Faculty of Arts.

The 18 units from other faculties may **not** be chosen from among the courses listed in Table 1. The requirement to include 18 units in other areas is intended to broaden the student's perspective beyond ones offered by the Faculty of Science.

Science 311 may be counted among the 18 units from other faculties.

(e) The program must include certain specified courses. The specified courses required for individual programs are listed in Section 4 (Program Details).

(f) No more than 60 units taken at other institutions and acceptable for transfer credit may be included in the program. A maximum of 24 units taken at other institutions and acceptable for transfer credit may be included in the major field.

(g) Credit will not be granted toward Science degrees for Physical Activity courses (i.e., Dance Education Activity/Theory, Outdoor Pursuits Activity/Theory, and Physical Education Activity/Theory).

Notes:

- These requirements may change with every Calendar issue. A given Calendar issue applies to the academic year beginning on July 1 and ending on the following June 30. The time of entry into a program in the Faculty of Science is defined as the first session after admission to the program during which a student successfully completes any courses applicable to the program. A student's program is subject to the course requirements which are in the Calendar current at the time of entry into the program, and a student is allowed five years counted from the time of entry into the program to graduate under these requirements. Students in Co-operative

Education or Internship programs have six years counted from the time of entry into the program to graduate under these requirements.

- Students who exceed this five-year limit must consult with the Head of the Department (or designate) or Program Director (or designate) concerned who will decide on an acceptable set of course requirements for the proposed date of graduation. The Head (or designate) or Program Director (or designate) will communicate the decision to the Associate Dean (Undergraduate), or designate, in writing.
- Course work that forms part of the requirements from a student's major field as listed in Section 4 (Program Details) and which is more than six years old at the time of graduation may be included in the program only with written permission of the Head (or designate) of the Department or Program Director (or designate) concerned.
- Courses taken in the University of Calgary Cummings School of Medicine or Faculty of Veterinary Medicine (and, at the discretion of the Associate Dean, courses taken as part of a degree in Dentistry or Optometry or Medicine or Veterinary Medicine outside of Calgary) may be counted towards a BSc degree in the Faculty of Science if at least 90 units have been taken in a Science program, and if the Science course requirements for a Science Major are met by those 90 or more units. Honours degrees and degrees with distinction will not be granted in this manner. Not all Major programs can be completed in this way in three years.

B. Degrees "With Distinction"

The notation "With Distinction" will be entered in the permanent record and on the graduation parchment of a student successfully completing a Major program with a grade point average of at least 3.60 over the last 90 units taken for the degree. In cases in which the "last 90" must include some but not all of a group of courses taken concurrently, the selection will be made in the manner most advantageous to the student.

A student who has taken part of their course work at another university or who has transferred into the Faculty at a relatively late stage may be granted a degree "With Distinction" at the discretion of the Faculty.

C. Honours Degree Programs

Degrees with Honours are awarded in two classes: Honours and First Class Honours.

The requirements are the same as for the Major Programs, except for the following additions or changes.

Honours Requirements

- A minimum GPA of 3.30 over the last 90 units.
- Completion of Honours requirements as outlined in Section 4 (Program Details).

- The program must contain at least 54 units and no more than 78 units in the major field.

Note: A student who fails to maintain the necessary performance standards or who decides not to continue in an Honours program may transfer to a Major program.

First Class Honours Requirements

In addition to the Honours requirements, successful completion of a department-approved program equivalent to 120 units, with a GPA of at least 3.60 over the last 90 units. A student who has taken part of their course work at another university may be granted a degree with First Class Honours at the discretion of the Faculty.

D. Co-operative Education/Internship Degree Programs

Co-operative Education and Internship programs are five-year degree programs which include 12 to 16 months of supervised work experience. Co-operative Education/Internship programs provide students with the opportunity to experience the links between academic knowledge and employment opportunities. Students who complete the requirements of the Co-operative Education/ Internship program will graduate with "Co-operative Education" or "Internship" designated on their transcripts and degree parchments.

Admission Requirements

Students who wish to enter the Co-operative Education/Internship program are urged to discuss their pre-admission course selection with a Program Advisor in the Undergraduate Science Centre (USC) as early in their program as possible. Co-operative Education/Internship programs are offered to students admitted to the following programs:

- Actuarial Science (Co-op)
- Ecology (Co-op)
- Computer Science (Internship)

To apply to the Co-operative Education/Internship programs students must submit an online application through CareerLink, once they have registered in and/or completed the required courses and have achieved the required GPA. Students should discuss program requirements and sequence prior to completing an application. Course requirements found specified in the Calendar must be completed prior to commencing the first work term. Admission to the Co-operative Education or Internship programs in the Faculty of Science may be competitive and meeting the minimum program requirements does not guarantee admission.

The application deadline is February 1.

Further details about the program sequence may be discussed with a Program Advisor at the Undergraduate Science Centre.

In order to be granted admission to a Co-operative Education/Internship program student must have a full-time academic term; minimum of 9 units remaining in their degree program. Students who have fewer than 9 units remaining to complete their degree requirements are not eligible for admission

to a Co-operative Education/Internship program.

Work Term Assessment

The mandatory work term courses are graded on a credit (CR) or fail (F) basis. A positive assessment requires satisfactory performance on each of the following items:

- a. The Co-operative Education/Internship Coordinator's evaluation of job performance, which is based on an on-site visit.
- b. The employer's evaluation of job performance.
- c. A work term report prepared by the student and evaluated by the Faculty.

Note: Developing and implementing job-search skills is a part of the Co-operative Education/Internship Program. The program does not guarantee that students will obtain work term placements.

Program Sequence

Co-operative Education:

The Co-op work terms may be completed while alternating between academic terms. The first work term is normally taken shortly after completing the courses required for admission. This typically occurs after year two (minimum 60 units) but before completing year four (maximum 105 units). Students must end their Co-operative Education program with a full time academic term; minimum of 9 units.

The combination of Co-op work terms and academic terms will allow completion of the program in five years.

Internship:

The Internship period, consists of the consecutive Internship 503.01, 503.02, 503.03 and optional 503.04 Internship work terms. This typically occurs after year three (minimum 90 units) but before completing year four (maximum 105 units). Students must end their Internship program with a full time academic term; minimum of 9 units.

The combination of Internship and academic terms will allow completion of the program in five years.

Regulations

1. Bachelor of Science Co-operative Education/Internship students must be actively engaged in the Co-operative Education/Internship program. Active engagement is defined by securing a work term within 18 months of gaining admission to the program. Students who do not successfully secure a work term within 18 months of gaining admission to the program will no longer be eligible to participate in the Co-operative Education/Internship program.
2. Bachelor of Science Co-operative Education/Internship students are required to complete a minimum of three four-month work terms. Internship work terms are taken consecutively.
3. Students must end their Co-operative Education/Internship program with a full time academic term (minimum of 9

units). Additionally, students who are admitted to a Co-operative Education/ Internship program but do not complete their work terms before they have fewer than 9 units remaining to complete their degree requirements will be removed from the Co-operative Education/Internship program.

4. The Co-operative Education and Internship courses are in addition to the normal requirements for each degree, i.e., students must complete the same number of required courses as students completing the traditional degree programs, as well as the Co-operative Education/Internship courses.
5. While on a four-month work term a student may take one 3-unit course, provided it does not interfere with their work term placement. Students must ensure they still have a minimum of 9 units to complete in their last academic term.
6. Once students have met graduation requirements, they are no longer eligible to participate in the Co-operative Education/Internship program.
7. If a student's academic performance results in the student being required to withdraw from the Faculty of Science, or being placed on probation, the student will be required to withdraw from the Co-operative Education/Internship program. If the student is required to withdraw from the Co-operative Education/Internship program but has already accepted a work term, the employer will be informed that the student is no longer registered in the Co-op/Internship program. Termination of the student's employment will be at the employer's discretion.
8. Students who receive a Failure (F) on a work term will be required to withdraw from the Co-operative Education/ Internship program and will not receive the Co-operative Education/Internship designation.

For further information please contact the office below:

Undergraduate Science Centre (USC)

Location: Energy Environment Experiential Learning (EEEL) 445

Phone: 403.220.8600

Email address: usc@ucalgary.ca

Website: http://www.ucalgary.ca/science/undergraduate/co_op_internship

E. Double Major and Double Honours Degree Programs

These are single degree programs. A student in a Major program whose program also meets the requirements for a second Major in a different field, in either the Faculty of Science or another faculty, may declare a second Major in this field. The same is true for Honours programs. It is not possible for one of the two programs to be an Honours program and for the other one to be a Major program.

Declaration of the second Major or Honours may be made no later than at the time of the last registration. Special restrictions apply to certain double Major or Honours combinations. Consult the relevant Department in Section 4 (Program Details). All such double Major or Honours combinations must be able to be accommodated under the same rubric (either BSc or BA).

F. Combined Degree Programs Within the Faculty of Science

Students may pursue a combined program of at least 150 units that leads to two degrees from the Faculty of Science. The two degrees will be awarded simultaneously. Interested students should consult with program advisors in the Undergraduate Science Centre and the Associate Dean (Undergraduate).

The two programs may not be from the same Department, except for combinations of Geophysics with Geology or Environmental Science.

G. Second Degree Programs

The graduation requirements for a second degree are the same as those for a degree with a Major field except for the following:

Major Degree Requirements

(a) Up to 60 units counted towards any previous degrees may be counted towards requirements in the second degree. These may not include more than half the minimum number required in the new Major field.

(b) Courses not used toward previous degrees (as determined by the institution awarding those degrees) may be used to reduce the number required in the second degree where applicable.

(c) Students normally will not be admitted to a second degree program in any field in which they already possess a degree. Students with a degree in the Natural Sciences should consult the Undergraduate Science Centre to find out whether they would be permitted to enrol in a program that covers the same subject matter as their Concentration One.

Upon admission to the program, students are advised to contact the Undergraduate Science Centre to discuss their academic plans and obtain general advice regarding the requirements of the second degree. The Undergraduate Science Centre will then prepare a detailed formal assessment outlining the remaining requirements in each individual case.

The second degree will be awarded "With Distinction" if a GPA of at least 3.60 is achieved over the courses completed in the second degree program, excluding those used in point (a).

Note: Departments are under no obligation to compress their course offerings in such a way as to minimize the time spent on a second degree.

Honours Degree Requirements

The graduation requirements for a second degree in Honours is the same as a

degree with Honours, with the following modifications:

- (a) Admissibility will be based on the overall grade point average obtained in the first degree, and grade point averages required for graduation will be calculated using courses completed in the second degree program.
- (b) The student must obtain approval of the Department or Program concerned.
- (c) The permissible duration of the second degree program will be determined by the Associate Dean (Undergraduate), or designate, at the start of the program in conformity with the spirit that governs the duration of a first degree honours program, taking into account what courses remain to be taken in the second degree program.
- (d) The degree will be awarded as First Class Honours if a GPA of at least 3.60 is obtained over the courses completed in the second Honours degree program.

H. Combined and Concurrent Degree Programs with Other Faculties

Students may pursue a combined program of at least 150 units that leads to two degrees, one from the Faculty of Science and one from another faculty. The two degrees will be awarded simultaneously.

Students must meet the admission and graduation requirements of both Faculties involved, as described in the Faculties' sections of this Calendar.

These programs require careful selection of courses to complete the requirements of both faculties. Interested students are urged to contact the Advising Offices of both faculties for advice in choosing their courses, beginning in first year, and should see the Associate or Assistant Deans of the two Faculties involved.

With the Faculty of Arts

BSc or BA (Science) and BSc or BA (Arts) Program

Students intending to pursue this program may enter either the Faculty of Science or the Faculty of Arts. At the time of admission to either faculty, students must apply for the combined degree program and declare two major fields as described in each faculty's section of this Calendar.

Degree Requirements for the BSc or BA (Science) and BSc or BA (Arts) Program

- (i) The Faculties of Science and Arts require the successful completion of at least 42 and not more than 66 units in the Major Field. Faculty and departmental requirements for graduation in a program with a Major Field must be met.
- (ii) Courses taken to satisfy the major field requirements for one of the two degrees may be counted towards the breadth requirement for the other degree.
- (iii) The number of junior courses taken must not exceed 54 units in total.
- (iv) A maximum of 60 units taken at other institutions and acceptable for transfer credit may be included in the combined programs. A maximum of 24 units taken at other institutions and acceptable for transfer credit

may be included in the major field of each program.

With the Haskayne School of Business BComm and BSc (Actuarial Science) Program

For program details, see the Haskayne School of Business section of this Calendar and the Department of Mathematics section in Section 4 (Program Details).

BComm and BSc (Computer Science) Program

For program details, see the Haskayne School of Business section of this Calendar.

BComm and BSc (Mathematics) Program

For program details, see the Haskayne School of Business section of this Calendar and the Department of Mathematics section in Section 4 (Program Details).

Concurrent Degrees with the Werklund School of Education

BSc (General Mathematics in Education) and BEd

For program details, see the Department of Mathematics and Statistics section in Section 4 (Program Details).

BSc (Natural Sciences) and BEd

For program details, see the Natural Sciences section in Section 4 (Program Details).

With the Schulich School of Engineering BSc (Engineering) and BSc (Science) Program

Students intending to pursue this program may enter either the Faculty of Science or the Schulich School of Engineering. Students may either be admitted to both degree programs when they first apply to the University or may seek admission to a second degree program after being admitted. Students must satisfy the requirements for admission to both Faculties and Programs. (See the Admissions section of this Calendar.)

This combined program leads to a Bachelor of Science in Engineering from the Schulich School of Engineering and a Bachelor of Science from the Faculty of Science. The Schulich School of Engineering provides complementary information on Combined Programs in their section of this Calendar.

Note: Because engineering degrees are highly structured, more than 150 units are typically required. Further, students who opt out of this Combined Degree program, particularly if they do so after first year, often require more than four years to complete a single degree.

I. Minor Programs

The course requirements for the Minor Programs are listed in Section 4 (Program Details) under the appropriate Department. Students are cautioned to check the Calendar descriptions of the courses required for the Minor and to include the necessary prerequisites for these courses in their programs.

For a Minor, passing grades must be obtained in at least 30 units in the minor field of which at least 18 units must be numbered

300 or above. For certain major/minor combinations there will be considerable overlap between fields. The degree of permissible overlap must be discussed with the Associate Dean (Undergraduate), or designate, before proceeding. The GPA over all courses counting towards the Minor must be at least 2.00 and only 3 units with a "D" or "D+" grade will be allowed.

3.5 Course Selection and Registration

A. Accuracy of Registration

Students are responsible for ensuring that their annual course selections are in accord with all Calendar requirements, including the completion of prerequisite courses with a satisfactory grade and registration in corequisite courses as appropriate. If registration in any course(s) is contrary to regulations, the Faculty may cancel such registration anytime after the beginning of the term. Registration at all times must be appropriate to the degree program being followed. Students with wholly inappropriate course selections in their registration may have their registration cancelled by the Associate Dean (Undergraduate), or designate. Students should seek advice from that Associate Dean, the staff of the Undergraduate Science Centre, or from the Department or Program concerned.

Students are responsible for ensuring that they meet degree and program requirements. While the Undergraduate Science Centre endeavours to assist all students as they proceed in the various programs, a final and thorough check is not done until application for graduation. Any departure from standard requirements must receive prior authorization in writing from the Associate Dean (Undergraduate), or designate. It is strongly recommended that students consult with the Associate Dean before submitting their final registration.

First-year students in the Faculty of Science who wish to register in senior courses should be aware that in addition to stated prerequisites, senior courses offered by other faculties often require completion of 18 units at the junior level.

Students must be admitted to a program before they will be allowed to register in more than 36 units from the Department offering that program or in any group of courses required for that program.

First-year students should visit the Enrollment Services website (ucalgary.ca/registrar/registration/first-year-students) for registration details from the Office of the Registrar.

B. Introductory Courses for Science Degree Programs

All programs have introductory course requirements. Since these courses are often the prerequisites for more advanced courses, students are advised to take the introductory courses in the manner depicted in Section 4 (Program Details) "Suggested Program Sequences." By so doing, students make it possible to complete their programs in a timely fashion.

C. Prerequisites

A student may not register in a course unless a grade of at least "C-" has been obtained in each prerequisite course, except with a letter of permission from the Head of Department (or designate). It is the responsibility of students to ensure that they meet all prerequisite requirements. Students who do not meet the exact prerequisites/corequisites and do not have Departmental permission to waive those requirements will have their registrations cancelled automatically by the Faculty after the deadline for student change of registration.

D. Withdrawal from Courses

Students will not be permitted to withdraw more than once from a particular course.

Students will be required to withdraw from the Faculty of Science if they have accumulated a total of more than 30 units withdrawals while in attendance at the University of Calgary.

Since students could jeopardize their programs by withdrawing from courses, they should be aware of all potentially adverse consequences of such actions. If after having sought out and weighed all the information, a student still decides to proceed, withdrawal from a course must be done before the deadline specified in the Academic Schedule.

E. Repetition of Courses

A student will be permitted to repeat a particular course only once. This regulation applies not only to individual courses, but also to sets of courses where it is stated that credit for more than one of the sets is not allowed. For example, a student may not take Mathematics 265 twice and then attempt Mathematics 249.

F. Course Load

While five courses taken concurrently represent a full load, some programs prescribe additional courses. Students may elect to take up to six courses in a term, but an extra course represents a substantial burden and may adversely affect overall performance. Undergraduates may register in 600-level courses only with the permission of the Department offering the course and the Associate Dean (Undergraduate).

G. Opportunities to Take Courses at Another Institution for Transfer of Credit

Students may be authorized to take some program course work at another university if registration as a visiting student is acceptable to that university. Students with poor academic performance, such as being on probation or having a large number of withdrawals, will not be afforded this opportunity.

Students may apply online for such authorization by requesting a Letter of Permission through their online Student Centre. Students should check with Advisors in the Undergraduate Science Centre to ensure that such transfer credits advance their particular programs. Once approved, students will be

advised officially as to how the proposed courses will transfer and an appropriate letter will be sent to the Registrar of the other university. The Letter of Permission must be obtained before the student registers for the courses at the other institution.

It will be the responsibility of the student to ensure that an official transcript of grades is forwarded directly to the Registrar of this University in order that appropriate credit may be officially recorded.

Many grade-point-average calculations used by the Faculty of Science do not include transfer courses.

H. Credit in Courses by Special Assessment

Students who feel that they know the material covered in a course without having received formal University credit for that course may apply for special assessment in such a course. Departments are free to determine which, if any, of their courses may be taken by special assessment, by any particular student, and to determine the nature and scheduling of the examination or assessment procedures involved. If special assessment is allowed, students should obtain the form headed "Permission to Take Courses by Special Assessment" from the Office of the Registrar and submit their application to the Department offering the course. A course in which the student was previously registered may not be taken subsequently by special assessment, nor may any course be attempted more than once in this way.

The Faculty will not allow more than 30 units completed by special assessment to count towards a degree.

See also B.10.1 in Academic Regulations for the general University regulations concerning special assessment.

3.6 Assessment

A. Missed Components of Term Work

Any student who is absent from a test or fails to complete a laboratory assignment or similar work for legitimate reasons must discuss an alternative course of action with the instructor. The regulations covering such circumstances are outlined in the sections titled E.3 Attendance and G.7 Deferral of Term Work in the Academic Regulations section of this Calendar. Notification of such eventualities must be given to the instructor within 48 hours.

B. Deferral of Final Examinations

See G.6 in Academic Regulations for the general University regulations governing the deferral of final examinations.

Misreading the examination timetable is not a valid reason for requesting a deferred final examination.

In the event of a foreseeable absence from a final examination, an application for a deferral must be made prior to the examination. In the event of an unforeseen absence from an examination, the Associate Dean (Undergraduate), or designate, should be

notified as soon as possible and an application made within two business days of the examination. Applications made after the deadline, listed on the application form, will not be considered.

C. Supplemental Examinations

Supplemental examinations provide students with an opportunity to demonstrate competence in a course by re-writing the final examination. The primary goal is to allow students a chance to earn a "C-" grade in the course so they can use the course as a prerequisite. As such, if a student passes a supplemental examination, a "C-" will be the highest grade a student can achieve. If a student fails the supplemental examination, the original grade will stand.

Supplemental examinations are not available for all courses. Availability of supplemental exams is guaranteed only for courses that explicitly indicate on their official course outline that a supplemental examination is possible.

Additionally:

- No more than two supplemental examination privileges, in any University of Calgary course, may be granted to a student in one academic year,
- No more than four supplemental examination privileges will be granted to a student over their whole degree program.
- Only one supplemental exam will be allowed per course.

Supplemental examinations will normally be offered at the same time as deferred final examination for that course, during Spring/Summer intersession, or block weeks.

Supplemental examinations may be in a different format than the regular final examination but will cover the same course material as the regular final examination. Supplemental examinations are not normally allowed for deferred examinations. Exceptions require approval from the Dean or designate.

Supplemental exams do not replace the deferred examination process as outlined in section G.6 in Academic Regulations by meeting the criteria set out below.

You are eligible for a supplemental examination if you meet the following requirements:

- Your GPA over your most recent coursework, up to 30 units, is 2.00 or greater,
- You have earned a cumulative grade of "C-" or better on coursework (e.g. laboratories, assignments, mid-term examinations, quizzes), and
- You achieved the minimum grade for any required term-work components as indicated on the course outline e.g. requirement to pass the lab component).

You are not eligible for a supplemental examination if you:

- Have been previously allowed to write a supplemental examination for the course.
- Earned a final grade greater than a "D+" in the course.

- Did not write the final or an approved deferred final examination in the course.
- Were assigned a failing grade in the course due to academic misconduct.
- Are a graduate student.

Application Process:

Students who are eligible for a supplemental examination will be notified by the department offering the course. Students who indicate that they want to write the supplemental examination will be required to pay a \$150.00 fee.

3.7 Student Standing

A. Dean's List

The Dean's List recognizes the outstanding achievement of students in the Faculty. It is compiled annually at the end of the Winter Term. A statement of inclusion on the Dean's List will be recorded on the student's transcript.

To qualify for the Dean's List, a student must achieve a grade point average of 3.60 or higher over all University of Calgary courses taken in the preceding Summer (including Spring Intersession), Fall and Winter Terms on:

- A minimum of 24 units taken at the University of Calgary (while registered in a program in the Faculty of Science), OR
- A minimum of 24 units taken at the University of Calgary plus successful completion of one four-month Co-operative Education work placement (while registered in a program in the Faculty of Science), OR
- A minimum of 12 units taken at the University of Calgary (while registered in a program in the Faculty of Science), plus two Co-op work placements.
- A minimum of 12 units taken at the University of Calgary (while registered in a program in the Faculty of Science), plus successful completion of one or more approved full-time terms abroad, OR
- A program of study assessed by the Student Accessibility Services to be equivalent to (a), (b), (c) or (d) for a particular student.

Notes:

- Where it is appropriate for a student to be assessed under provisions (d) or (e), the student must arrange for all necessary documentation to be received by the Associate Dean (Undergraduate), or designate, no later than May 15.
- Only University of Calgary grades for regular academic courses are used for the Dean's List; grades earned for Co-operative Education work placements or study-abroad terms do not enter into the grade point average calculations for (b), (c) or (d).
- Students on academic sanctions as outlined in section K (Statement on Principles of Conduct) of this Calendar are not eligible for the Dean's List.
- Students with deferred examinations and/or term work after Winter Term may not be eligible to be included on the Dean's List.

B. Academic Review

The progress of students registered in the Faculty is monitored at least once per year after Winter Term. Students will be required to withdraw if they have accumulated a total of more than 30 units withdrawals while in attendance at the University of Calgary.

The academic standing of students registered in the Faculty will be reviewed after each Winter Term provided that they have completed at least 18 units at the University of Calgary since their previous review. Students who have not taken 18 units since the previous review and are either in good standing or on regular academic probation will retain their existing status until the next subsequent review. Students admitted to the Academic Turnaround Program (ATP) will be reviewed as described in B.20 in the Academic Regulations section.

All University of Calgary credit courses, which have been completed since the previous review, are used for the purpose of academic review. Students placed on academic probation, or required to withdraw as a result of the academic performance review, will be so advised in writing.

Notwithstanding the specific regulations pertaining to Student Standing, students' academic standing may be reviewed at any time and those with generally poor academic records may be placed or continued on academic probation or required to withdraw at the discretion of Dean or delegate.

C. Student Standings

(a) A student will be considered in good standing if they achieve a GPA of at least 2.00 over all courses taken since their previous review.

(b) A student will be placed on academic probation if they achieve a GPA of at least 1.70 but less than 2.00 over all courses taken since their previous review and have not been on academic probation within the preceding five years.

(c) A student will be required to withdraw from the faculty if they achieve a GPA less than 2.00 over all courses taken since their previous review and have a probationary period within the last five years.

(d) A student will be required to withdraw from the faculty if they achieve a GPA of less than 1.70 over all courses taken since their previous review.

(e) A student who meets the criteria for (c) or (d) will be invited to participate in the Academic Turnaround Program (ATP) if they have not previously done so. ATP allows students to continue in their program on academic probation with special conditions and enhanced academic support.

D. Academic Turnaround Program (ATP)

For full details about the Academic Turnaround Program students are referred to section B.20 in the Academic Regulations section of this Calendar.

E. Readmission

- Students who have been required to withdraw for unsatisfactory academic

performance are not eligible to take credit courses at the University of Calgary until 12 or more months have elapsed since the date of dismissal.

- Students seeking readmission after being required to withdraw must apply by the deadlines stated in the current Calendar and meet the current admission requirements of the program to which they are seeking admission.
- Readmission is not guaranteed.
- Students should note that it is not normally possible to be readmitted without taking courses to meet the admission average.

Students so readmitted must maintain a grade point average of at least 2.00 on all courses taken in each academic review period after readmission. Failure to do so will result in permanent dismissal from the Faculty of Science. Students who have twice been required to withdraw from one or more Faculties at this or any other institution will not normally be considered for admission at any time.

4. Program Details

4.1 Biological Sciences

Degrees Offered

| Undergraduate Programs ¹ | Core | Enhancements |
|---|------|---|
| Biochemistry | BSc | BSc Honours |
| Biological Sciences | BSc | BSc Honours |
| Cellular, Molecular and Microbial Biology | BSc | BSc Honours |
| Ecology | BSc | BSc Honours, BSc Co-op, BSc Honours Co-op |
| Plant Biology | BSc | BSc Honours |
| Zoology | BSc | BSc Honours |

There are many options for graduate studies leading to MSc and PhD degrees in the area of Biological Sciences. Details of graduate specializations can be found in the graduate section of this calendar.

¹All degrees in the Faculty of Science, except Environmental Science, can be combined with eligible BA and BSc programs from the Faculty of Arts. Refer to Section 3.4 for information on combined degrees, double majors with programs within the Faculty of Science as well as combined degrees with programs from other Faculties. Students interested in pursuing these degrees are encouraged to speak with an advisor in the Undergraduate Science Centre (USC) to develop a degree completion plan.

Programs Offered in Biological Sciences

BSc and BSc Honours in: Biochemistry; Biological Sciences; Cellular, Molecular and Microbial Biology; Ecology; Plant Biology; Zoology

BSc and BSc Honours in Ecology Co-operative Education

Minor in Biological Sciences

Department vs. Faculty Regulations

Programs in the Department of Biological Sciences are governed by a combination of general Faculty of Science regulations and the additional program specific regulations listed below.

It is **essential** for students to be familiar with **both** sets of regulations. It is helpful to read the Faculty regulations in Section 3 first.

Students should consult Academic Requirements in their Student Centre periodically to ensure that requirements are being met. Also students are strongly urged to consult the Department and the Undergraduate Science Centre (USC) at all stages of their program.

Department Information

Student enquiries: 403.220.3140

Department Office: Biological Sciences 186

Other enquiries: 403.220.5261

Fax: 403.289.9311

Website: bio.ucalgary.ca/

Enrolment Limitations

Enrolment Limitations in Programs, Admissions and Student Standing

Admission to programs in the department is competitive. Admission will be granted for Fall Term only and will be based upon academic merit. (New admissions to the University are always subject to A.2 as stated in the Admissions section of this Calendar.)

Applications to the Department of Biological Sciences programs are accepted:

- Directly from High School (see Section 3.2 Admissions) into either the Biological Sciences program, or into Honours Biochemistry; Honours Cellular, Molecular and Microbial Biology; Honours Ecology; Honours Plant Biology; or Honours Zoology.
- From external transfer students and change of program requests from University of Calgary students into the Biological Sciences program.
- Subject to the Honours qualifications set out in Subsection 3.2 – Honours Programs, and to availability of space, students may request placement into any of the Honours programs offered by the Department.
- From external transfer students and change of program requests from University of Calgary students into BSc programs in Biochemistry; Cellular, Molecular and Microbial Biology; Ecology; Plant Biology; and Zoology after completion of a minimum of 30 units.

Notes:

- Students who are considering one of the BSc programs described above should plan to complete Biology 311, 371, 331 and at least one of Biology 313 and Biochemistry 393 by the end of their second year. Students should check the specific requirements for the program into which they plan to transfer, as some programs require both Biology 313 and Biochemistry 393.
- Any student in an Honours program is subject to the provisions for continuation in an Honours program, Subsections 3.2 and 3.4C.
- Honours students in the Biological Sciences program who do not qualify for continuation in honours will be moved

into the Biological Sciences Major BSc Program. Honours students admitted to a specialized program (Biochemistry; Cellular, Molecular and Microbial Biology; Ecology; Plant Biology; or Zoology) who do not qualify for continuation in honours may be moved into the Major BSc Program of their current specialized program. In order to be moved into the Major BSc Program of their current specialized program students must have completed 30 units prior to their review period and meet the minimum GPA requirement for admission into that specialized program. Students in honours in a specialized program who do not meet the preceding requirements will be moved into the Biological Sciences Major BSc program.

- Students with a GPA of less than 2.000 are subject to the provisions of 3.7 Student Standing, B. Performance Review, Probationary Status and Dismissal.
- Students will be notified of the results of their application by email (results will not be provided by telephone).

Enrolment Limitations in Courses

Enrolment in many courses offered by the Department of Biological Sciences is limited by available laboratory or tutorial space. Consult the Schedule Builder in the Student Centre for details regarding enrolment in these courses.

Transfers between Alberta Universities and Colleges

The Departments of Biological Sciences at the Universities of Alberta and Calgary and the Department of Biology at the University of Lethbridge have a transfer agreement in effect. The full details of the Biological Sciences Transfer Agreement are available in the Alberta Transfer Guide published by the Alberta Commission on Admissions and Transfer (ACAT) - acat.gov.ab.ca/.

Ethics in the Biological Sciences

Studies in the Biological Sciences involve the use of living and dead organisms. Students taking laboratory- and field-based courses in these disciplines can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Department strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses or majoring in one of the fields of study offered by the Department of Biological Sciences should ensure that they have fully considered these issues before enroll-

ing. Students are advised to discuss any concern they might have with the Associate Head, Undergraduates of the Department.

4.1.1 Common First and Second Years

See the Faculty of Science subsections on Enrolment Limitations in Section 3 Faculty Regulations and Program Details in Section 4.

Required Courses

18 units - Biology 241, 243, 311, 331, 371 and at least one¹ of Biology 313 and Biochemistry 393

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277 (see **Recommendations** below)

6 units - Computer Science 217 or Data Science 211 and Computer Science 219; or Computer Science 231 and 233; or Computer Science 235 and a senior Computer Science option

or

Geology 201 and one of 202 or 203

or

Physics 211 or 221, and 223 (see **Recommendations** below)

6 units - Major options and/or options combination (see **Second Year** in the **Program Sequence Table** below)

3 units - Chemistry 351

3 units - Chemistry 353 or option²

12 units - Breadth Requirement: Options from outside the Faculty of Science³

¹Students planning to pursue the Biological Sciences, Plant Biology and Zoology programs require both Biology 313 and Biochemistry 393. Students pursuing the Biochemistry and Cellular, Molecular and Microbial Biology programs require Biochemistry 393. Students pursuing the Ecology program require Biology 313. Students in any program may take both courses should they desire. Consult specific program requirements for details.

²Check details of other programs in the Department of Biological Sciences to see where Chemistry 353 is a requirement.

³These 12 units form part of the 18 units options from outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Recommendations

- Biology 241, 243, 311, 331 and 371 and at least one of Biology 313 or Biochemistry 393 should be taken in the sequence described below if students wish to pursue any of the degree programs offered by the Department of Biological Sciences.
- Students who have completed Mathematics 31 should take Mathematics 265.
- Students planning a Biochemistry major must take Physics 211 or 221, and 223.
- Students planning a Zoology major must take either the Physics option (Physics 211 or 221, and 223) or the Geology option (Geology 201 and 202).
- Students planning an Ecology or Zoology major are advised to take a course in linear methods (i.e., Mathematics 211 or 213).

- Prior to registering in the second year, students should consider which program they wish to pursue in the third and subsequent years so that an appropriate choice of major access courses may be made (see **Second Year** in the **Program Sequence Table** below).

Common First and Second Years Program Sequence

| First Year for All Programs | |
|--|--|
| Fall Term | Winter Term |
| Biology 241 | Biology 243 |
| Chemistry 201 or 203 or 211 | Chemistry 201 or 203 or 213 |
| Mathematics 249 or 265 or 275 | Mathematics 211 or 213 or 267 or 277 |
| Choose either Computer Science 217 or 231 or 235 or Geology 201 or Physics 211 or 221 ¹ | Continue Computer Science with Computer Science 219 or 233 or Computer Science option if 235 is chosen or continue Geology with Geology 202 or continue Physics with Physics 223 |
| Non-science option | Non-science option |
| Second Year for All Programs | |
| Non-science option | Non-science option |
| Biology 311 | Biochemistry 393 ¹ or option |
| Option | Biology 313 ¹ or option |
| Biology 371 | Biology 331 |
| Chemistry 351 | Chemistry 353 or option ¹ |
| Choose from the following to prepare for the third and fourth years of the intended major. | |
| Biochemistry: | |
| Chemistry 311 | Chemistry 315 |
| Biological Sciences: | |
| | Option |
| Cellular, Molecular and Microbial Biology: | |
| Option | Cellular, Molecular and Microbial Biology 343 |
| Ecology: | |
| | Biology 315 |
| Plant Biology: | |
| | Plant Biology 327 |
| Zoology: | |
| Option | Zoology 401 or option |

¹Check details of programs in the Department of Biological Sciences to see where this is allowed.

4.1.2 Programs in Biochemistry

Effective 2015, the BSc Honours in Biochemistry degree program has been accredited by the Canadian Society for Chemistry (CSC) for Canadian Chemistry programs. The CSC manages the accreditation of undergraduate chemistry programs nationally and abroad. This program maintains national standards of education and promotes the portability of the qualifications of graduates from such programs.

See the Faculty of Science subsections on Enrolment Limitations in Section 3 Faculty Regulations and Program Details in Section 4.

Courses constituting the field of Biochemistry

- All courses labelled Biochemistry, except Biochemistry 341¹
- Biology 241, 243, 311, 331, 371
- Cellular, Molecular and Microbial Biology 411
- Certain Medical Science courses²
- Certain 600-level courses may be considered to fulfill program requirements. Consult the department for further information.

¹Students may apply a maximum of 9 units from independent project courses numbered 507, 528 and 530 towards their major field; of these 9 units, students are permitted a maximum of 6 units of independent project courses labelled as 507 offered by the Department of Biological Sciences.

²No more than 6 units of such courses (approved by the Department prior to registering in the course) can be counted towards the major field.

Required Courses - Major Program

See also 3.4 Program Requirements, in particular, the regulations on the number of courses at the 200 level and above allowed in a program and on the List of Science-Equivalent Courses in Other Faculties (Table I).

15 units - Biology 241, 243, 311, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Physics 211 or 221, and 223

3 units - Biochemistry 393

12 units - Chemistry 311, 315, 351, 353

12 units - Biochemistry 401, 403, 431, 471

18 units - Chosen from Biochemistry 443, 543, 547, 551, 553, 555, 561, 575, 577 or Cellular, Molecular and Microbial Biology 411

12 units - Options selected from courses offered by the Faculty of Science

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

12 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Required Courses - Honours Program

See also Section 3.4 Program Requirements, in particular, the regulations on the number of courses at the 200 level and above allowed in a program and on the List of Science-Equivalent Courses in Other Faculties (Table I).

15 units - Biology 241, 243, 311, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Physics 211 or 221, and 223

3 units - Biochemistry 393

12 units - Chemistry 311, 315, 351, 353

12 units - Biochemistry 401, 403, 431, and 471

18 units - Chosen from Biochemistry 443, 543, 547, 551, 553, 555, 561, 575, 577 or Cellular, Molecular and Microbial Biology 411

12 units - Options selected from courses offered by the Faculty of Science

6 units - Biochemistry 530

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

6 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Suggested Program Sequence

| Third Year | |
|---|---|
| Biochemistry 401 | Biochemistry 403 |
| Biochemistry 431 | Option from the Field ¹ |
| Biochemistry 471 | Option from the Field ¹ |
| Science Option | Science Option |
| Non-science option | Non-science option |
| Fourth Year | |
| Biochemistry 530 (for Honours), option (for Majors) | Biochemistry 530 (for Honours), option (for Majors) |
| Option from the Field ¹ | Option from the Field ¹ |
| Option from the Field ¹ | Option from the Field ¹ |
| Science Option | Science Option |
| Option | Option |

¹Choose from either Biochemistry 443, 543, 547, 551, 553, 555, 561, 575, 577 or Cellular, Molecular and Microbial Biology 411.

4.1.3 Programs in Biological Sciences

See the Faculty of Science subsections on Enrolment Limitations in Section 3 Faculty Regulations and Program Details in Section 4.

Courses constituting the field of Biological Sciences

- All courses labelled Biochemistry^{1,2}, except Biochemistry 341
- All courses labelled Biology^{1,2}, except Biology 202, 205, 297, 305, 307, 309, 375
- All courses labelled Cellular, Molecular and Microbial Biology^{1,2}
- All courses labelled Ecology^{1,2}
- All courses labelled Plant Biology^{1,2}
- All courses labelled Zoology^{1,2}
- Most courses labelled Marine Science³
- Certain other Medical Science courses⁴
- Neuroscience 411
- Anthropology 413, 425, 435, 451, 571, Archaeology 417, 555, Geography 417, Geology 308, Neuroscience 401⁵
- Certain 600-level courses may be considered to fulfill program requirements. Consult the department for further information.

¹Students may apply a maximum of 9 units from independent project courses numbered 507, 528 and 530 towards their major field; of these 9 units, students are

permitted a maximum of 6 units of independent project courses labelled as 507 offered by the Department of Biological Sciences.

²Certain courses with restricted enrolments are available in the first instance to those Program Honours and Majors who have met all prerequisites and whose programs require such courses. After a specific registration period for those students, other students who have met all prerequisites may be accommodated.

³Applicability to the field depends upon the actual course content. Additional approvals will be granted on a course-by-course basis. Check the list published by the Department each February.

⁴No more than 6 units of such courses (approved by the Department prior to registering in the course) can be counted towards the major field.

⁵No more than 3 units of the courses in this group may be counted towards the major field.

Required Courses - Major Program

See also 3.4 Program Requirements, in particular, the regulations on the number of courses at the 200 level and above allowed in a program and on the List of Science-Equivalent Courses in Other Faculties (Table I).

18 units - Biology 241, 243, 311, 313, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Computer Science 217 or Data Science 211 and Computer Science 219; or Computer Science 231 and 233; or Computer Science 235 and a senior Computer Science option

or

Geology 201 and one of 202 or 203

or

Physics 211 or 221, and 223 (see Recommendations below)

3 units - Biochemistry 393

3 units - Chemistry 351

3 units - Chemistry 353 or option

27 units - Options from the Field: 12 units of which must be at the 400 level or higher

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

30 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Required Courses - Honours Program

18 units - Biology 241, 243, 311, 313, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Computer Science 217 or Data Science 211 and Computer Science 219; or Computer Science 231 and 233; or Computer Science 235 and a senior Computer Science option

or

Geology 201 and one of 202 or 203

or

Physics 211 or 221, and 223 (see Recommendations below)

3 units - Biochemistry 393

3 units - Chemistry 351

3 units - Chemistry 353 or option

33 units - At least 9 units chosen from each of three of the areas that constitute the Fields of Biochemistry, Cellular, Molecular and Microbial Biology, Ecology, Plant Biology and Zoology. Of these 33 units, at least 18 units must be chosen from courses at the 400 level or higher. **Note:** These courses must be different from the 18 units required Biology courses listed above and Biochemistry 393.

6 units - Biology 530¹

18 units - Breadth Requirement: Options from outside the Faculty of Science²

18 units - Options

¹Honours students should plan to complete this course in their final year.

²These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Recommendations

- Major options should be selected to satisfy the requirements for entry into another chosen major program or to satisfy the requirements for the Biological Sciences program. (See Required Courses - Major Program and Required Courses - Honours Program.)
- Courses in Marine Science may be taken for credit during the summer and/or students may elect to spend the fall of either the third or fourth year attending the **Bamfield Fall Program**. Refer to the Marine Science course listings for details.
- Students in the Biological Sciences Major program are encouraged to meet with an academic advisor to plan out their course sequences for third and fourth year based on their areas of interest.

4.1.4 Programs in Cellular, Molecular and Microbial Biology

See the Faculty of Science subsections on Enrolment Limitations in Section 3 Faculty Regulations and Program Details in Section 4.

Courses constituting the field of Cellular, Molecular and Microbial Biology

- Biochemistry 393, 443, 547, 555, 561
- Biology 241, 243, 311, 315, 331, 371, 435
- All courses labelled Cellular, Molecular and Microbial Biology¹
- Marine Science 500², 501², 502², 507²
- Medical Science 401, 519, 541, 543, 545 and certain other Medical Science courses³
- Neuroscience 411
- Plant Biology 401, 543

- Certain 600-level courses may be considered to fulfill program requirements. Consult the department for further information.

¹Students may apply a maximum of 9 units from independent project courses numbered 507, 528 and 530 towards their major field; of these 9 units, students are permitted a maximum of 6 units of independent project courses labelled as 507 offered by the Department of Biological Sciences.

²Applicability to the field depends upon the actual course content. Approval will have to be granted on an individual basis. Check the list published by the Department each February.

³No more than 6 units of Medical Science courses can be counted towards the Major Field; Medical Science courses other than those specifically listed here require Department approval prior to registering in the course.

Required Courses - Major Program

See also 3.4 Program Requirements, in particular, the regulations on the number of courses at the 200 level and above allowed in a program and on the List of Science-Equivalent Courses in Other Faculties (Table I).

15 units - Biology 241, 243, 311, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Computer Science 217 or Data Science 211 and Computer Science 219; or Computer Science 231 and 233; or Computer Science 235 and a senior Computer Science option

or

Geology 201 and one of 202 or 203

or

Physics 211 or 221, and 223

3 units - Biochemistry 393

3 units - Cellular, Molecular and Microbial Biology 343

6 units - Chemistry 351 and 353

3 units - Biochemistry 443

6 units - Cellular, Molecular and Microbial Biology 411, 527

12 units - One of:

Cell Biology Emphasis: Cellular, Molecular and Microbial Biology 403 and three of Cellular, Molecular and Microbial Biology 413, 451, 461, 505, 511, 519, 523, 531, 561

or

Microbiology Emphasis: Cellular, Molecular and Microbial Biology 421, 443 and two of Cellular, Molecular and Microbial Biology 431, 451, 461, 523, 543, 545, 549, 563, Biology 435 (course substitutions permitted with consent of the Department)

6 units - Options from the Field

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

30 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Required Courses - Honours Program

15 units - Biology 241, 243, 311, 331, 371
6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Computer Science 217 or Data Science 211, and Computer Science 219; or Computer Science 231 and 233; or 235 and a senior Computer Science option

or

Geology 201 and one of 202 or 203

or

Physics 211 or 221, and 223

3 units - Biochemistry 393

3 units - Cellular, Molecular and Microbial Biology 343

6 units - Chemistry 351 and 353

3 units - Biochemistry 443

6 units - Cellular, Molecular and Microbial Biology 411, 527

12 units - One of:

Cell Biology Emphasis: Cellular, Molecular and Microbial Biology 403 and three of Cellular, Molecular and Microbial Biology 413, 461, 505, 511, 519, 523, 531, 561

or

Microbiology Emphasis: Cellular, Molecular and Microbial Biology 421, 443 and two of Cellular, Molecular and Microbial Biology 431, 461, 523, 543, 545, 549, 563, Biology 435

3 units - Cellular, Molecular and Microbial Biology 451

3 units - Cellular, Molecular and Microbial Biology 507.95

6 units - Cellular, Molecular and Microbial Biology 530

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

24 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Suggested Program Sequence

| Third Year | |
|---|---|
| Biochemistry 443 | Cellular, Molecular and Microbial Biology 527 |
| Cellular, Molecular and Microbial Biology 411 | Cellular, Molecular and Microbial Biology 413 or 431 or option |
| Cellular, Molecular and Microbial Biology 403 or 443 | Cellular, Molecular and Microbial Biology 451 (for Honours), option from the Field (for Majors) |
| Cellular, Molecular and Microbial Biology 421 or option | Option |
| Non-science option | Non-science option |

| Fourth Year | |
|--|--|
| Cellular, Molecular and Microbial Biology 530 (for Honours), option (for Majors) | Cellular, Molecular and Microbial Biology 530 continued (for Honours), option (for Majors) |
| One of: Cellular, Molecular and Microbial Biology 511, 519, 549 or 563 | Cellular, Molecular and Microbial Biology 507.95 (for Honours), option from the Field (for Majors) |
| One of: Cellular, Molecular and Microbial Biology 511, 519, 549 or 563 | One of: Cellular, Molecular and Microbial Biology 505, 523, 531, 561, 543 or 545 |
| Cellular, Molecular and Microbial Biology 421 or option | One of: Cellular, Molecular and Microbial Biology 505, 523, 531, 561, 543 or 545 |
| Option | Option |

4.1.5 Programs in Ecology

See the Faculty of Science subsections on Enrolment Limitations in Section 3 Faculty Regulations and Program Details in Section 4.

Courses constituting the field of Ecology

- Biology 241, 243, 311, 313, 315, 331, 371, 401, 451, 453, 591
- Biochemistry 393
- Cellular, Molecular and Microbial Biology 343², 461²
- All courses labelled Ecology¹
- Most courses labeled Marine Science³
- Certain Medical Science courses⁴
- Geography 231², 313², 333², 357², 417²
- Plant Biology 327², 541²
- Zoology 401², 403², 515², 571², 577
- Certain 600-level courses may be considered to fulfill program requirements. Consult the department for further information.

¹Students may apply a maximum of 9 units from independent project courses numbered 507, 528 and 530 towards their major field; of these 9 units, students are permitted a maximum of 6 units of independent project courses labelled as 507 offered by the Department of Biological Sciences.

²A maximum of 6 units of such courses may be counted towards the field.

³Applicability to the field depends upon the actual course content. Approval will have to be granted on an individual basis. Check the list published by the Department each February.

⁴No more than 6 units of such courses (approved by the Department prior to registering in the course) can be counted towards the major field.

Required Courses - Major Program

See also 3.4 Program Requirements, in particular, the regulations on the distribution of courses at the 200 level and above allowed in a program and on the List of Science-Equivalent Courses in Other Faculties (Table I).

18 units - Biology 241, 243, 311, 313, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Computer Science 217 or Data Science 211 and Computer Science 219; or Computer Science 231 and 233; or Computer Science 235 and a senior Computer Science option

Geology 201 and one of 202 or 203

or

Physics 211 or 221, and 223

3 units - Biology 315

3 units - Chemistry 351

3 units - Chemistry 353 or option

3 units - Biology 401

3 units - Ecology 425

9 units - Chosen from Ecology 417, 419, 429, 439, 501, 527, 529 or Biology 451

3 units - Chosen from Ecology 413, Marine Science 420, 430, 450, 537, 501 (approval on individual basis depending on topic) or other Bamfield courses or field-based Ecology 507 with approval of the Department

12 units - Options from courses constituting the Field of Ecology

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

27 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Required Courses - Honours Program

18 units - Biology 241, 243, 311, 313, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Computer Science 217 or Data Science 211 and Computer Science 219; or Computer Science 231 and 233; or Computer Science 235 and a senior Computer Science option

or

Geology 201 and one of 202 or 203

or

Physics 211 or 221, and 223

3 units - Biology 315

3 units - Chemistry 351

3 units - Chemistry 353 or option

3 units - Biology 401

3 units - Ecology 425

9 units - Chosen from Ecology 417, 419, 429, 439, 501, 527, 529 or Biology 451

3 units - Chosen from Ecology 413, Marine Science 420, 430, 450, 537, 501 (approval on individual basis depending on topic) or other Bamfield courses or field-based Ecology 507 with approval of the Department

12 units - Options from courses constituting the Field of Ecology

6 units - Ecology 530

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

21 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Suggested Program Sequence

| Third Year | |
|--|--|
| Ecology 417 or 4291 | Biology 401 |
| Ecology 425 | Ecology 419 or 4391 |
| Ecology 413 | Option |
| Option | Option |
| Non-science option | Non-science option |
| Fourth Year | |
| Ecology 530 (for Honours), option (for Majors) | Ecology 530 continued (for Honours), option (for Majors) |
| Ecology 417 or 4291 | Ecology 419 or 4391 |
| Option | Ecology 5011 |
| Option | Option |
| Option | Option |

¹Students need to take three of these five courses

Ecology Co-operative Education

See the subsection on Co-operative Education/Internship Programs in Section 3 (Faculty Regulations) for information on applying. Students should also review the major section on "Co-operative Education/Internship" of this Calendar.

Co-operative Education programs are five-year degree programs that include 12 to 16 months of supervised work experience in various industrial and government workplaces. Minimally, students must be in their second year in the Biological Sciences program with a grade point average of 2.30 before applying for admission to the BSc Ecology Co-operative Education program. A grade point average of 3.30 is required for entry into the BSc Honours Ecology Co-operative Education program. In addition, students must complete the courses outlined for the second year of the Ecology program with the same minimum grade point average before commencing the first co-operative education placement (the summer following second year).

Required Courses

120 units - Same as Ecology Majors or Honours

12 months - Co-operative Education work terms (Co-operative Education 543.01, 543.02, 543.03)

Work Term Assessment

The mandatory work term courses, Co-operative Education 543.01, 543.02, 543.03 and the optional course, Co-operative Education 543.04, are graded on a credit (CR) or fail (F) basis. A positive assessment requires satisfactory performance on each of the following items:

- (a) The Co-operative Education Co-ordinator's evaluation of job performance, which is based on an on-site visit where practical.

(b) The employer's evaluation of job performance.

(c) The student's self-assessment of job performance and the overall job experience, which is normally based on participation in a debriefing or integrative session.

(d) A work term report prepared by the student and evaluated by the Faculty.

Notes:

- The Faculty may approve registration in Co-operative Education 543.04 in conjunction with an optional (fourth) work term.
- All courses in the common second-year program must be completed prior to the start of the first work term.
- Students should consult the Ecology Co-op Co-ordinator and Co-operative Education and Internship Co-ordinator for program planning.

4.1.6 Programs in Plant Biology

See the Faculty of Science subsections on Enrolment Limitations in Section 3 Faculty Regulations and Program Details in Section 4.

Courses constituting the field of Plant Biology

- Biology 241, 243, 311, 313, 315, 331, 371, 401, 435, 451, 453, 505, 619
- Biochemistry 393, 443, 561
- Cellular, Molecular and Microbial Biology 411, 451, 461, 511, 519, 523, 543
- Ecology 413, 425, 419
- Marine Science 420, 500², 501², 502², 507², 525
- Certain Medical Science courses³
- All courses labelled Plant Biology¹
- Certain 600-level courses may be considered to fulfill program requirements. Consult the department for further information.

¹Students may apply a maximum of 9 units from independent project courses numbered 507, 528 and 530 towards their major field; of these 9 units, students are permitted a maximum of 6 units of independent project courses labelled as 507 offered by the Department of Biological Sciences.

²Applicability to the field depends upon the actual course content. Approval will have to be granted on an individual basis. Check the list published by the Department each February.

³No more than 6 units of such courses (approved by the Department prior to registering in the course) can be counted towards the major field.

Required Courses - Major Program

See also 3.4 Program Requirements, in particular, the regulations on the distribution of courses at the 200 level and above allowed in a program and on the List of Science-Equivalent Courses in Other Faculties (Table I).

18 units - Biology 241, 243, 311, 313, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Computer Science 217 or Data Science 211 and Computer Science 219; or Computer Science 231 and 233; or Computer Science 235 and a senior Computer Science option

or

Geology 201 and one of 202 or 203

or

Physics 211 or 221, and 223

3 units - Biochemistry 393

3 units - Chemistry 351

3 units - Chemistry 353 or option

15 units - From Biology 435, 453, Plant Biology 327, 401, 403, 421, 543

6 units - From Biochemistry 561, Biology 451, 505, Plant Biology 541

6 units - Options from the Field

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

30 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Required Courses - Honours Program

18 units - Biology 241, 243, 311, 313, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Computer Science 217 or Data Science 211 and Computer Science 219; or Computer Science 231 and 233; or Computer Science 235 and a senior Computer Science option

or

Geology 201 and one of 202 or 203

or

Physics 211 or 221, and 223

3 units - Biochemistry 393

3 units - Chemistry 351

3 units - Chemistry 353 or option

15 units - From Biology 435, 453, Plant Biology 327, 401, 403, 421, 543

6 units - From Biochemistry 561; Biology 451, 505; Plant Biology 541

6 units - Options from the Field

6 units - Plant Biology 530

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

24 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Suggested Program Sequence

| Third Year | |
|--------------------------|-------------------|
| Plant Biology 403 or 421 | Plant Biology 401 |
| Option | Plant Biology 327 |

| Option | Option |
|---|---|
| Option | Option |
| Non-science option | Non-science option |
| Fourth Year | |
| Plant Biology 530 (for Honours), option from Field (for Majors) | Plant Biology 530 continued (for Honours), option from Field (for Majors) |
| Biology 435 or Plant Biology 541 | Plant Biology 543 |
| Option | One of: Biochemistry 561 or Biology 451 or 505 or option |
| Option | Option |
| Option | Option |

4.1.7 Programs in Zoology

See the Faculty of Science subsections on Enrolment Limitations in Section 3 Faculty Regulations and Program Details in Section 4.

Courses constituting the field of Zoology

- Biology 241, 243, 311, 313, 315, 331, 371, 401, 451, 501, 503, 591
- Biochemistry 393, 443, 547
- Cellular, Molecular and Microbial Biology 403, 411, 461, 505, 527
- Ecology 425, 527
- All courses in the Calendar labelled Zoology¹
- Marine Science 321, 430, 450, 500², 501², 507², 502², 515, 537, 540, 572, 574
- Certain Medical Science courses³
- Neuroscience 401, 411⁴
- Psychology 478⁴
- Certain 600-level courses may be considered to fulfill program requirements. Consult the department for further information.

¹Students may apply a maximum of 9 units from independent project courses numbered 507, 528 and 530 towards their major field; of these 9 units, students are permitted a maximum of 6 units of independent project courses labelled as 507 offered by the Department of Biological Sciences.

²Applicability to the field depends upon the actual course content. Approval will have to be granted on an individual basis. Check the list published by the Department each February.

³No more than 6 units of such courses (approved by the Department prior to registering in the course) can be counted towards the major field.

⁴No more than 3 units from this group of courses may be counted towards the major field.

Required Courses - Major Program

See also 3.4 Program Requirements, in particular, the regulations on the number of courses at the 200 level and above allowed in a program and on the List of Science-Equivalent Courses in Other Faculties (Table I).

18 units - Biology 241, 243, 311, 313, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Physics 211 or 221, and 223; or Geology 201 and one of 202 or 203

3 units - Biochemistry 393

3 units - Chemistry 351

3 units - Biology 315

6 units - Chosen from Zoology 401, 403, 461, 463 or Cellular, Molecular and Microbial Biology 403.

12 units - Chosen from Biology 401, Cellular, Molecular and Microbial Biology 403 or any courses labelled Zoology at the 400 level or above

6 units - Options from courses constituting the Field of Zoology at the 400 level or above

18 units - Breadth Requirement: Options from outside the Faculty of Science¹

33 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table 1 in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Required Courses - Honours Program

18 units - Biology 241, 243, 311, 313, 331, 371

6 units - Chemistry 201 or 211, and 203 or 213

6 units - One of Mathematics 249 or 265 or 275 and one of Mathematics 211 or 213 or 267 or 277

6 units - Physics 211 or 221, and 223; or Geology 201 and one of 202 or 203

3 units - Biochemistry 393

3 units - Chemistry 351

3 units - Biology 315

6 units - Chosen from Zoology 401, 403, 461, 463 or Cellular, Molecular and Microbial Biology 403

12 units - Chosen from Biology 401, Cellular, Molecular and Microbial Biology 403 or any courses labelled Zoology at the 400 level or above

6 units - Zoology 530

6 units - Options from courses constituting the Field of Zoology at the 400 level or above

18 units - Breadth requirement: Options from outside the Faculty of Science¹

27 units - Options

¹These 18 units options are selected from faculties outside the Faculty of Science (check Table 1 in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

Suggested Program Sequence

| Third Year | |
|--|--------------------------|
| Zoology 461 ¹ | Zoology 463 ¹ |
| Zoology 403 ¹ | Zoology 401 ¹ |
| Cellular, Molecular and Microbial Biology 403 ¹ | Biology 315 |
| Option ² | Option |
| Option ¹ | |

| ¹ Students need to take two of these five courses | Non-science option |
|---|--|
| ² It is highly recommended that students take Biochemistry 443 (Note: Chemistry 353 is a prerequisite) | |
| Fourth Year | |
| Zoology 530 (for Honours), option (for Majors) | Zoology 530 continued (for Honours), option (for Majors) |
| Option | Option |
| Option | Option |
| Option | Option |
| Option | Option |

4.1.8 Environmental Science - Biological Sciences Concentration

Students may pursue a BSc program in Environmental Science with a concentration in Biological Sciences. This is a single degree, four year program offered by the Faculty of Science with collaboration from the Faculty of Arts. Program details are listed in 4.6 Non-Departmental Programs. Since this is a multidisciplinary program with restricted entry, students should consult the Director of the Environmental Science program at their earliest opportunity.

4.1.9 Double Major in the Department of Biological Sciences

Programs with two major fields in the Department of Biological Sciences may be completed in the following manner:

- The minimum requirements for both major fields must be fulfilled.
- For all programs the following courses will be counted towards both majors if they are allowed as a major field option: Biology 241, 243, 311, 313, 315, 331 and 371 and Biochemistry 393 and 443.
- For all major fields in the Department of Biological Sciences, no course beyond those specified above will be counted towards both major fields. If a course constitutes a requirement in both major fields, it will be counted towards only one and a substitution must be made to fulfill the requirements of the other major field.
- It is not possible to combine the Biological Sciences major with any other program offered by the Department into a Double-Major program.

For further details consult the Office of Student Affairs, Department of Biological Sciences.

4.1.10 Minor in Biological Sciences

The requirements for a Minor in Biological Sciences are:

- 6 units - Biology 241 and 243
- 24 units - Courses constituting the Field of Biological Sciences at the 300 level or higher but must include at least one of Biology 311, 313, 331, and 371

The 24 units may include a maximum of 3 units from the Field of Biological Sciences

offered by departments other than the Department of Biological Sciences.

Notes:

- This Minor is available only to students who are not majoring in the Department of Biological Sciences or are not Environmental Science or Natural Sciences concentrators in Biological Sciences or BHSc majors in Biomedical Sciences or Bioinformatics or majors in the Neuroscience program. This is the single minor program offered by the Department and none of the other programs exist as Minors. Students must be aware that preference in enrolment in many courses offered by the Department of Biological Sciences is given to Majors or Environmental Science or Natural Sciences Concentrators within the Department.
- No more than 3 units approved Medical Sciences courses can be counted towards the Minor Field.

4.2 Chemistry

Degrees Offered

| Undergraduate Program ¹ | Core | Enhancements |
|------------------------------------|------|--------------|
| Chemistry | BSc | BSc Honours |

| Suspended Programs | Core | Enhancements | Effective Date of Suspension |
|--------------------|-------------|-------------------|------------------------------|
| Chemical Physics | BSc Honours | | Fall 2016 |
| Applied Chemistry | BSc Co-op | BSc Co-op Honours | Summer 2018 |

There are many options for graduate studies leading to MSc and PhD degrees in the area of Chemistry. Details of graduate specializations can be found in the graduate section of this calendar.

¹All degrees in the Faculty of Science, except Environmental Science, can be combined with eligible BA and BSc programs from the Faculty of Arts. Please refer to Section 3.4 for information on combined degrees, double majors with programs within the Faculty of Science as well as combined degrees with programs from other Faculties. Students interested in pursuing these degrees are encouraged to speak with an advisor in the Undergraduate Science Centre to develop a degree completion plan.

Programs Offered

BSc in Chemistry
BSc Honours in Chemistry
Minor in Chemistry

Suspended Program

BSc Honours in Applied Chemistry Co-operative Education
BSc Honours in Chemical Physics
BSc in Applied Chemistry Co-operative Education

Departmental vs. Faculty Regulations

Programs in the Department of Chemistry are governed by a combination of general Faculty of Science regulations and the additional program specific regulations listed below.

It is essential for students to be familiar with both sets of regulations. It is helpful to read the Faculty Regulations in Section 3 first.

Students should consult Academic Requirements in their Student Centre periodically to ensure that requirements are being met. Also, students are strongly urged to consult with the Undergraduate Science Centre (USC) and the Department at all stages of their program.

Departmental Information

Department Office: Science A 229

Telephone: 403.220.5340

Phone: 403.220.5353

Fax: 403.284.1372

Website: chem.ucalgary.ca/

Email: chem.undergrad@ucalgary.ca

Enrolment Limitations

Enrolment Limitations in Programs

Due to limited enrolment capacity in many senior courses in which there is a laboratory component, the Chemistry programs have a maximum capacity. For details on entry to the programs, see Section 3 (Faculty Regulations).

Enrolment Limitations in Courses

Enrolment in many courses offered by the Department of Chemistry is limited by laboratory space or other pedagogical considerations. The following courses are available in the first instance only to those students in good standing who meet the prerequisite(s) and have been admitted into a major or Natural Sciences program concentration that requires the course(s): Chemistry 311, 315, 321, 331, 333, 351, 353, 355, 371, 373, 453, 471, 515, 535 and 555.

Consult the Schedule Builder in the Student Centre for details regarding enrolment in these courses.

International Exchange

Students in Chemistry programs have the opportunity to study abroad through participation in a Departmental international exchange scheme/arrangement. For further details please contact University of Calgary International (ucalgary.ca/uci/).

4.2.1 Programs in Chemistry

Admission

See also 3.2 Admission.

Courses constituting the field of Chemistry

- All courses labelled Chemistry except Chemistry 209, 301, 357, 379, 409, and 579
- Biochemistry 341, 393 and 443

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses)

6 units - Chemistry 201 or 211 (recommended) and Chemistry 203 or 213 (recommended)

6 units - Physics 211 or 221 or 227 and 223

3 units - Mathematics 249; or 265 or 275

3 units - Mathematics 267 or 277

36 units - Chemistry 311, 315, 351, 353, 371, 373, 431, 433, 453, 471; 531 or 533; Biochemistry 341 or 393

15 units - From the Field of Chemistry of which at least 9 units, in addition to Chemistry 531 or 533, must be 500-level courses

3 units - Physics 323 or 355

6 units - Mathematics 211 or 213 and 331

3 units - Science 311

15 units - Breadth Requirement: Options selected from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 15 units, at least 6 units must be from the Faculty of Arts.

24 units - Options

Required Courses - Honours Chemistry

See also Section 3 (Faculty Regulations), Subsections 3.4C (Program Requirements - Honours Degree Programs) and 3.5B (Course Selection - Introductory Courses)

6 units - Chemistry 201 or 211 (recommended) and Chemistry 203 or 213 (recommended)

6 units - Physics 211 or 221 or 227 and 223

3 units - Mathematics 249; or 265 or 275

3 units - Mathematics 267 or 277

42 units - Chemistry 311, 315, 351; 355 or 353; 371, 373, 431, 433, 453, 471, 502; 531 or 533; Biochemistry 341 or 393

15 units - From the Field of Chemistry of which at least 9 units, in addition to Chemistry 531 or 533, must be 500-level courses

3 units - Any Chemistry course at the 500 level (or above) or any other senior Science courses by the consent of the Department

3 units - Physics 323 or 355

6 units - Mathematics 211 or 213 and 331

3 units - Science 311

15 units - Breadth Requirement: Options selected from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 15 units, at least 6 units must be from the Faculty of Arts.

15 units - Options

Required Courses - Minor in Chemistry

6 units - Chemistry 201 or 211 and 203 or 213

12 units - Chemistry 311, 351, 431 and 371 or 373

12 units - From the Field of Chemistry at the 300 level or above

Note: Chemistry 371 and 373 have Physics and Mathematics prerequisites; see the course descriptions for more details.

Suggested Program Sequences

(a) Major Program

| First Year | |
|---------------|---------------|
| Chemistry 211 | Chemistry 213 |

| Physics 211 or 221 or 227 | Physics 223 |
|---|---|
| Mathematics 249 or 265 or 275 | Mathematics 267 or 277 |
| Option | Option |
| Non-science option | Non-science option |
| Second Year | |
| Chemistry 311 | Chemistry 315 |
| Chemistry 351 | Chemistry 353 |
| Physics 323 or option ¹ | Chemistry 371 |
| Mathematics 211 or 213 | Mathematics 331 |
| Science 311 or option ¹ | Science 311 or Physics 355 or option ¹ |
| Third Year | |
| Chemistry 373 | Chemistry 471 |
| Chemistry 431 | Chemistry 433 |
| Chemistry 453 | Biochemistry 341 or 393 |
| Option | Option |
| Non-science option | Non-science option |
| Fourth Year | |
| Chemistry 531 or chemistry course at the 500 level ² | Chemistry 533 or chemistry course at the 500 level ² |
| Chemistry course at the 500 level | Chemistry course at the 500 level |
| Chemistry course at the 300 level or above | Chemistry course at the 300 level or above |
| Option | Option |
| Option | Non-science option |

¹Students require either Physics 323 or 355, and Science 311 and one option.

²Students require Chemistry 531 or 533, and three other 500 level courses from the field of Chemistry.

(b) Honours Program

As above except that an option chosen from the list under the section called Required Courses - Honours Chemistry replaces one of the options in Third Year, and Chemistry 502 replaces two of the options in Fourth Year.

4.2.2 Environmental Science - Chemistry Concentration

Students may pursue a BSc program in Environmental Science with a concentration in Chemistry. This is a single-degree, four-year program offered by the Faculty of Science with collaboration from the Faculty of Arts. Program details are listed in 4.6 Non-Departmental Programs. Since this is a multidisciplinary program with restricted entry, students should consult the Director of the Environmental Science program at their earliest opportunity.

4.2.3 Suspended Programs

Admission to the following programs has been suspended.

Students previously admitted to a suspended program will be supported in the completion of their program. As such, program requirements are listed below for the reference of students already admitted to these programs.

4.2.3.1 Program in Honours Chemical Physics

This program is offered in conjunction with the Department of Physics and Astronomy.

The BSc Honours program in Chemical Physics has been suspended as of Fall 2016. Students interested in this program should seek advice from a program advisor in the Undergraduate Science Centre. Students interested in this area should consider completing a combined degree or minor.

Admission

Admission to this program has been suspended as of Fall 2016.

Student Standing

- Any student in an Honours program is subject to the provisions for continuation in an Honours program, Subsections 3.2 and 3.4C.

- GPA requirements for Honours programs

Students in Chemical Physics must present honours-level performance at the academic review completed after each winter semester. Details on the honours review is found in section A.2 of this calendar. After consultation, students who do not qualify for continuation will be moved into either Chemistry or Physics degrees unless they indicate otherwise and meet the admission requirements for their chosen program. Students with a GPA of less than 2.000 are subject to the provisions of 3.7 Student Standing, B. Performance Review, Probationary Status and Dismissal.

Courses Constituting the Field of Chemical Physics

- Chemistry 201, 203, 211, 213, 331, 333, 351, 353, 355, 371, 373, 402, 471, 502, 571, 573, 575
- Physics 211, 221, 223, 227, 255, 321, 323, 325, 341, 343, 443, 451, 455, 457, 449, 543, 598, 599

Required Courses - Honours Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses)

6 units - Chemistry 201 or 211 (recommended) and Chemistry 203 or 213 (recommended)

6 units - Physics 211 or 221 or 227 and 255 or 323

3 units - Mathematics 249 or 265 or 275¹

3 units - Mathematics 211 or 213

3 units - Mathematics 267 or 277¹

3 units - Computer Science 217

21 units - Chemistry 331, 333, 351, 355 or 353, 371, 373, 471

3 units - One of Chemistry 571 or 573 or 575

15 units - Physics 341, 343, 397, 455, 543

6 units - Chemistry 502 or Physics 598

9 units - Applied Mathematics 307, 309, 433

3 units - Physics 381

18 units - Breadth Requirement: Options selected from faculties other than the Fac-

ulty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

21 units - Options

¹Mathematics 275 and 277 are the recommended sequence of mathematics courses.

Recommendations

Science 311 is recommended as one of the options.

Suggested Program Sequences

Honours Program

| First Year | |
|--------------------------------|---------------------------------------|
| Chemistry 211 | Chemistry 213 |
| Mathematics 249 or 265 or 275 | Mathematics 267 or 277 |
| Mathematics 211 or 213 | Computer Science 217 |
| Physics 221 or 227 | Physics 255 |
| Non-science option | Non-science option |
| Second Year | |
| Chemistry 351 | Chemistry 355 or 353 |
| Physics 341 | Physics 343 |
| Physics 397 | Chemistry 371 |
| Applied Mathematics 307 | Applied Mathematics 309 |
| Non-science option | Non-science option |
| Third Year | |
| Chemistry 373 | Chemistry 471 |
| Chemistry 331 | Chemistry 333 |
| Physics 455 | Physics 381 |
| Applied Mathematics 433 | Option |
| Non-science option | Non-science option |
| Fourth Year | |
| Chemistry 502 or Physics 598 | Chemistry 502 or Physics 598 |
| Physics 543 | Option or Chemistry 571 or 573 or 575 |
| Option or Chemistry 571 or 573 | Option |
| Option | Option |
| Option | Option |

4.2.3.2 Programs in Applied Chemistry Co-operative Education

Admission

Admission to this program has been suspended as of Fall 2018.

Courses Constituting the Field of Applied Chemistry

- All courses labelled Chemistry except Chemistry 209, 301, 357, 409 and 579
- Co-operative Education 503
- Biochemistry 341, 393 and 443

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements -

Major Programs) and 3.5B (Course Selection - Introductory Courses)

6 units - Chemistry 201 or 211 (recommended) and Chemistry 203 or 213 (recommended)

6 units - Physics 211 or 221 or 227 and 223

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 267 or 277

42 units - Chemistry 311, 315, 351, 355 or 353, 371, 373, 425, 431, 433, 453, 471, 515, 531 or 533, Biochemistry 341 or 393

12 units - From the Field of Chemistry of which at least 6 units in addition to Chemistry 515 and 531 or 533 must be 500-level courses

3 units - Physics 323 or 355

6 units - Mathematics 211 or 213 and 331

18 units - Non-science options as follows (Check Table I in 3.4 Program Requirements for ineligible courses):

3 units - Science 311¹

15 units - Breadth Requirement: (check Table I in 3.4 Program Requirements for ineligible courses). Of these 15 units, at least 6 units must be from the Faculty of Arts.

21 units - Options

12 months - Co-operative Education 503.01, 503.02, 503.03

¹Science 311 is limited in enrolment. Students may complete it in either the Fall or Winter Term as dictated by the course capacities.

Work Term Assessment

The mandatory work term courses, Co-operative Education 503.01, 503.02, 503.03 and the additional course, Co-operative Education 503.04, are graded on a credit (CR) or fail (F) basis. A positive assessment requires satisfactory performance on each of the following items:

- The Co-operative Education Co-ordinator's evaluation of job performance, which is based on an on-site visit where practical.
- The employer's evaluation of job performance.
- The student's self-assessment of job performance and the overall job experience, which is normally based on participation in a debriefing or integrative session.
- A work term report prepared by the student and evaluated by the Faculty.

Notes:

- The Faculty may approve registration in Co-operative Education 503.04 in conjunction with an extra (fourth) work term.
- Students should consult the Chemistry Co-op Co-ordinator and Co-operative Education and Internship Co-ordinator for program planning.

Required Courses - Honours Program

See also Section 3 (Faculty Regulations), Subsections 3.4C (Program Requirements - Honours Degree Programs) and 3.5B (Course Selection - Introductory Courses)

6 units - Chemistry 201 or 211 (recommended) and Chemistry 203 or 213 (recommended)

6 units - Physics 211 or 221 or 227 and 223

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 267 or 277

48 units - Chemistry 311, 315, 351, 355 or 353, 371, 373, 425, 431, 433, 453, 471, 502, 515, 531 or 533, Biochemistry 341 or 393

12 units - From the Field of Chemistry of which at least 6 units in addition to Chemistry 515 and 531 or 533 must be 500-level courses

3 units - Physics 323 or 355

6 units - Mathematics 211 or 213 and 331

18 units - Non-science options as follows (Check Table I in 3.4 Program Requirements for ineligible courses):

3 units - Science 311¹

15 units - Breadth Requirement: (check Table I in 3.4 Program Requirements for ineligible courses). Of these 15 units, at least 6 units must be from the Faculty of Arts.

15 units - Options

12 months - Co-operative Education 503.01, 503.02, 503.03

¹Science 311 is limited in enrolment. Students may complete it in either the Fall or Winter Term as dictated by the course capacities.

Recommendations

Of the four work terms indicated in the sequence below, three are required.

Suggested Program Sequences

(a) Major Program

| First Year | | |
|-------------------------------|-------------------------|-------------------------------|
| Chemistry 211 | Chemistry 213 | |
| Mathematics 249 or 265 or 275 | Mathematics 267 or 277 | |
| Physics 211 or 221 or 227 | Physics 223 | |
| Option | Non-science option | |
| Non-science option | Non-science option | |
| Second Year | | |
| Chemistry 311 | Chemistry 315 | Co-operative Education 503.01 |
| Chemistry 331 or 431 | Chemistry 333 or 433 | |
| Chemistry 351 | Chemistry 355 or 353 | |
| Science 311 or option | Science 311 or option | |
| Mathematics 211 or 213 | Mathematics 331 | |
| Third Year | | |
| Co-operative Education 503.02 | Chemistry 425 | Co-operative Education 503.03 |
| | Chemistry 371 | |
| | Biochemistry 341 or 393 | |
| | Physics 355 or option | |
| | Non-science option | |

| Fourth Year | | |
|-------------------------|-------------------------------|--|
| Chemistry 373 | Co-operative Education 503.04 | |
| Chemistry 453 | | |
| Chemistry 515 | | |
| Physics 323 or option | | |
| Non-science option | | |
| Fifth Year | | |
| Chemistry 531 or Option | Chemistry 471 | |
| Option | Chemistry 533 or Option | |
| Option ¹ | Option ¹ | |
| Option | Non-science option | |
| Option | Option | |

¹Students completing an Honours degree in Applied Chemistry will replace the options in their final year with Chemistry 502.

4.3 Computer Science

Degrees Offered

| Undergraduate Programs | Core | Enhancements | Combined Degrees ¹ |
|------------------------|----------------------|--|-------------------------------|
| Computer Science | BSc, BA ² | BSc Honours, BSc Internship, BSc Honours Internship, BA Honours ² | BComm/BSc ³ |

There are many options for graduate studies leading to MSc and PhD degrees in the area of Computer Science. Details of graduate specializations can be found in the graduate section of this calendar.

¹All degrees in the Faculty of Science, except Environmental Science, can be combined with eligible BA and BSc programs from the Faculty of Arts. Please refer to Section 3.4 for information on combined degrees, double majors with programs within the Faculty of Science as well as combined degrees with programs from other Faculties. Students interested in pursuing these degrees are encouraged to speak with an advisor in the Undergraduate Science Centre to develop a degree completion plan.

²The BA program in Computer Science is undergoing review. Students interested in this program should seek advice from a program advisor in the Undergraduate Science Centre. Many options for diversifying a BSc in Computer Science are available to students.

³Combined degree with the Haskayne School of Business.

Programs Offered

BSc and BSc Honours in Computer Science
BA and BA Honours in Computer Science
BSc and BSc Honours in Computer Science Internship

Minor in Computer Science

Department vs. Faculty Regulations

Programs in the Department of Computer Science are governed by a combination of general Faculty of Science regulations and the additional program specific regulations listed below.

It is essential for students to be familiar with both sets of regulations. It is helpful to read the Faculty Regulations in Section 3 first.

Students should consult Academic Requirements in their Student Centre periodically to ensure that requirements are being met.

Also, students are strongly urged to consult with the Undergraduate Science Centre (USC) and the Department at all stages of their program.

Department Information

Department Office: Information & Communications Technologies (ICT) 602

Telephone: 403.220.6015

Undergraduate Advisor: Information & Communications Technologies (ICT) 602

Fax: 403.284.4707

Website: cpsc.ucalgary.ca/

Email: cpsc@cpsc.ucalgary.ca

Accreditation

Effective 2001, the BSc and BSc Honours degree programs have been accredited by the Computer Science Accreditation Council (CSAC) for Computer Science programs. Effective 2001, the BSc degree program with Software Engineering Concentration and effective 2006 the BSc Honours with Software Engineering Concentration have been accredited by the CSAC for Software Engineering programs.

The CSAC is sponsored by the Canadian Information Processing Society (cips.ca/). Its mandate is to ensure that accredited programs meet standards for education in Computer Science and Software Engineering.

Students who graduate from an accredited degree program are eligible for the Information Systems Professional (I.S.P.) designation after two years of professional experience. The I.S.P. designation is recognized as a professional designation under provincial law in most Canadian Provinces, including Alberta.

First Courses in Computer Science

The Department of Computer Science offers the following courses for students who are interested in an introduction to the discipline of computer science or who wish to use computers more effectively. Each of Computer Science 217, 231 and 235 is intended primarily for a group of students (with differing academic objectives) who are interested in an introduction to computer science that includes an introduction to programming and that is available for credit in computer science programs. The pace at which programming concepts are introduced also differs in each course.

- Computer Science 217 is recommended for students wishing to combine studies in computer science with studies in other disciplines, or who are in programs other than computer science and who are interested in a course that includes an introduction to programming. Material related to computer science will be introduced at a pace that is appropriate for students who are unfamiliar with programming or scripting. Upon completion of Computer Science 217, students who are interested in computer science programs would continue by taking Computer Science 219. The latter course includes additional lectures in order

to ensure that students in this course sequence are adequately prepared for senior courses in computer science.

- Computer Science 231 is recommended for computer science majors. Material related to computer science will be introduced at a somewhat faster pace than in Computer Science 217. Upon completion of Computer Science 231, students who are interested in computer science programs would continue by taking Computer Science 233.
- Computer Science 235 is a challenging course intended for exceptional students. This course also includes an introduction to programming and it can be used in place of either Computer Science 217 and 219 or Computer Science 231 and 233 in the requirements for computer science programs. Students completing Computer Science 235 will have additional flexibility when choosing options in computer science and may be able to complete courses that are required for computer science programs more rapidly than would otherwise be possible.
- Computer Science 203 is recommended for students who are not in computer science programs and who are interested in a course that introduces computer system fundamentals and tools, including spreadsheets, and database applications. This course generally does not include an extensive introduction to programming and it is not available for credit for computer science majors or minors.
- Students that have completed Data Science 211 and wish to pursue a Computer Science Degree should take Computer Science 219.

Advanced Placement in Computer Science

Students in International Baccalaureate (IB) and Advanced Placement (AP) programs may be eligible for advanced credit in Computer Science courses, including Computer Science 217 and 219 or 231 and 233. See the Admissions section of this Calendar (A.12 Transfer Credit/Advanced Standing) for additional details.

Other students with backgrounds in Computer Science equivalent to Computer Science 231 or 231 and 233 may request advanced placement in Computer Science in order to have prerequisite requirements for these courses waived, after successful completion of an advanced placement examination. Interested students should see the Admissions section of this Calendar (A.12.2 Advanced Placement (AP) Program) for additional details, and contact the Department of Computer Science to apply.

4.3.1 Programs in Computer Science Admission

See the Faculty of Science subsections on Enrolment Limitations in Section 3 Faculty Regulations and Program Details in Section 4.

In some cases, courses that are no longer offered can be substituted for newer courses listed in the following requirements. Additional information about course substitutions is available from the Department of Computer Science.

Courses constituting the field of Computer Science

- All courses labelled Computer Science except Computer Science 203;
- Mathematics 318, 391, 493;
- All courses labelled Software Engineering;
- Data Science 211 and 311.

Required Courses - BSc Major Program

6 units - One of the following three sets of courses:

- Computer Science 231 and 233
- Computer Science 217 or Data Science 211 and Computer Science 219
- Computer Science 235 and 3 units from the Field of Computer Science at the 300 level or above

21 units - Computer Science 313, 331, 355, 359, 413, 449 and 457

3 units - Software Engineering 300 or 301

12 units - One of Mathematics 211 or 213; one of Mathematics 249 or 265 or 275; one of Mathematics 271 or 273; and one of Statistics 213, 321, or an alternative course in Statistics with the consent of the Department (Statistics 321 is preferred)

3 units - Logic Requirement: Philosophy 279 or 377

3 units - Ethics Requirement: Philosophy 314

24 units - from the Field of Computer Science: 9 units of these must be numbered 500 or above, 12 units at the 400 level or above, and 3 units at the 300 level or above

36 units - Non-Computer Science Requirement: Options that are not in the Field of Computer Science

12 units - Options (see Notes)

Notes:

- Students who complete Computer Science 217, 231 or Data Science 211 are only permitted to count a maximum of 6 units of computer science at the 200 level toward the BSc Major program. Students who complete Computer Science 235 are only permitted to count a maximum of 3 units of computer science at the 200 level toward the BSc Major program.
- Students who have completed Computer Science 319, prior to admission to a program in Computer Science, may use this course in lieu of Computer Science 331 as a program requirement. Students with Computer Science 319 will be required to complete a non-credit, on-line course in order to be qualified for senior courses in theoretical computer science. Students may contact the Department of Computer Science in order to register in this course.

- Courses used to satisfy the above Logic Requirement, Ethics Requirement and Non-Computer Science Requirement must include at least 9 units chosen from faculties other than the Faculty of Science. Of these 9 units, students must take at least 6 units from the Faculty of Arts. The 9 units from other faculties may not be chosen from the courses listed in Table 1 in 3.4 Program Requirements.
- Statistics 321 has one of Mathematics 253 or 267 or 277 as a prerequisite.
- Science 311 may be counted among the 9 units from other Faculties.
- The Department offers several concentrations that can provide focus on specific areas of computer science. Students interested in these concentrations need to choose their options carefully, including the options taken in the first two years of the program, to fulfill the concentration requirements.

Required Courses - BSc Honours Program

6 units - One of the following three sets of courses:

- Computer Science 231 and 233
- Computer Science 217 or Data Science 211 and Computer Science 219
- Computer Science 235 and 3 units from the Field of Computer Science at the 300 level or above

27 units - Computer Science 313, 331, 355, 359, 413, 449, 457 and 502

3 units - Software Engineering 300 or 301

12 units - One of Mathematics 211 or 213, one of Mathematics 249 or 265 or 275, one of Mathematics 271 or 273, and one of Statistics 213, 321, or an alternate course in Statistics with the consent of the Department (Statistics 321 is preferred)

3 units - Logic Requirement: Philosophy 279 or 377

3 units - Ethics Requirement: Philosophy 314

24 units - From the Field of Computer Science: 15 units of these courses must be at the 500 level or above, and 9 units at the 400 level or above

24 units - Non-Computer Science Requirement: Options that are not in the Field of Computer Science

18 units - Options (see Notes)

Notes:

- Students who complete Computer Science 217, 231 or Data Science 211 are only permitted to count a maximum of 6 units of computer science at the 200 level toward the BSc Honours program. Students who complete Computer Science 235 are only permitted to count a maximum of 3 units of computer science at the 200 level toward the BSc Honours program.
- Students who have completed Computer Science 319, prior to admission to a program in Computer Science, may use this course in lieu of Computer Science

331 as a program requirement. Students with Computer Science 319 will be required to complete a non-credit, on-line course in order to be qualified for senior courses in theoretical computer science. Students may contact the Department of Computer Science in order to register in this course.

- Courses used to satisfy the above Logic Requirement, Ethics Requirement and Non-Computer Science Requirement must include at least 18 units chosen from faculties other than the Faculty of Science. Of these 18 units, students must take at least 6 units from the Faculty of Arts.
- The 18 units from other faculties may not be chosen from the courses listed in Table I in 3.4 Program Requirements.
- Statistics 321 has one of Mathematics 253 or 267 or 277 as a prerequisite.
- Science 311 may be counted among the 18 units from other faculties.
- The Department offers several concentrations that can provide focus on specific areas of computer science. Students interested in these concentrations need to choose their options, including the options taken in the first two years of the program, carefully to fulfill the concentration requirements.

Required Courses - BA Major Program

The BA program in Computer Science is undergoing review. Students interested in this program should seek advice from a program advisor in the Undergraduate Science Centre. Many options for diversifying a BSc in Computer Science are available to students.

This program is available to students wishing to complete a double major with an Arts discipline: It is only open to students who are also registered in a BA program offered by the Faculty of Arts. Students interested in this program should contact the Department of Computer Science for advice concerning the choice of courses in Computer Science that would complement their studies in Arts.

6 units - One of the following three sets of courses:

- Computer Science 231 and 233
- Computer Science 217 or Data Science 211 and Computer Science 219
- Computer Science 235 and 3 units from the Field of Computer Science at the 300 level or above

15 units - Computer Science 331, 355, 441, 449, and 481

3 units - Software Engineering 300 or 301

9 units - One of Mathematics 211 or 213, one of Mathematics 249 or 265 or 275, and one of Mathematics 271 or 273

6 units - Logic Requirement: One of Philosophy 279 or 377 and 379

3 units - Ethics Requirement: Philosophy 314

24 units - Taken from the Field of Computer Science: one numbered 500 or above, two

numbered 400 or above, and one numbered 300 or above

48 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the courses from other faculties.

6 units - Options

Notes:

- Students who complete Computer Science 217, 231 or Data Science 211 are only permitted to count a maximum of 6 units of computer science at the 200 level toward the BA Major Program. Students who complete Computer Science 235 are only permitted to count a maximum of 3 units of computer science at the 200 level toward the BA Major program.
- Students who have completed Computer Science 319, prior to admission to a program in Computer Science, may use this course in lieu of Computer Science 331 as a program requirement. Students with Computer Science 319 will be required to complete a non-credit, on-line course in order to be qualified for senior courses in theoretical computer science. Students may contact the Department of Computer Science in order to register in this course.
- Courses used to satisfy the above Logic Requirement, Ethics Requirement and Non-Computer Science Requirement must include at least 18 units chosen from faculties other than the Faculty of Science. Of these 18 units, students must take at least 6 units from the Faculty of Arts.

Recommendations

- Students unable to take Philosophy 279 in first year may substitute Philosophy 377. Philosophy 379 is not required for a BSc in Computer Science but is recommended. This course is required for a BA in Computer Science.
- A course in technical writing, such as Communications Studies 363 or Science 311, is highly recommended. If no such course is available then any course in which a student's writing will be assessed should be considered.
- Courses offered by the Haskayne School of Business are often a good choice for non-science options for future software developers. Space permitting, and provided the Area Chair and Associate Dean (Undergraduate Affairs) in the Haskayne School of Business have given approval, registration in restricted Business Technology Management (BTMA) courses may be permitted. Consult the Undergraduate Program Advising Office in the Haskayne School of Business (Scurfield Hall 351) for details.
- To ensure compliancy with CSAC accreditation breadth requirements, students should ensure that they complete 30

units that are not in computer science or mathematics as part of their degree program, provided that program requirements allow for this course selection.

Recommended Program Sequence BSc (Majors and Honours)

There are many sequences in which courses can be taken in order to complete requirements for the BSc in Computer Science and BSc Honours in Computer Science programs. In general, the following tables simply list one commonly used sequence. For information about alternatives, see the note on "First Courses in Computer Science," above, the preceding list of requirements for whichever Computer Science program is of interest, the above recommendations, and recommendations concerning Mathematics and Statistics courses that are included in the description of Mathematics and Statistics programs.

Students interested in a specific concentration need to choose their computer science, science and non-science options according to the concentration requirements. This includes options taken in years 1 and 2 of the program.

| First Year | |
|---|---|
| Computer Science 231 | Computer Science 233 |
| Mathematics 211 | Mathematics 271 |
| Required course in Mathematics and Statistics | Required course in Mathematics and Statistics |
| Philosophy 279 | Option |
| Option | Non-science option |
| Second Year | |
| Computer Science 331 | Computer Science 313 |
| Computer Science 355 | Computer Science 359 |
| Philosophy 314 or option | Software Engineering 300 |
| Option | Philosophy 379 or option |
| Non-science option | Philosophy 314 or non-science option |
| Third Year | |
| Computer Science 413 ¹ | Option in the Field of Computer Science |
| Computer Science 449 ¹ | Option in the Field of Computer Science |
| Computer Science 457 ¹ | Option in the Field of Computer Science |
| Option | Option |
| Non-science option | Non-science option |
| Fourth Year | |
| Computer Science 502 ² | Computer Science 502 ² |
| Option in the Field of Computer Science | Option in the Field of Computer Science |
| Option in the Field of Computer Science | Option in the Field of Computer Science |
| Option | Option in the Field of Computer Science |
| Option | Option |

¹Students are encouraged to complete these required 400-level courses in Computer Science as soon as

possible. Choice of 500-level options in Computer Science will be limited if this advice is not followed.

²Computer Science 502 is required for the Honours program. Computer Science Majors interested in a research project should consider Computer Science 503.

Concentrations

Students may focus their program on one of nine areas of interest by including a specified set of courses in their Major or Honours degree. Successful completion will mean that the area of concentration will appear on the transcript. The concentrations and course requirements are:

A. Concentration in Computer Game Development

- 3 units from Mathematics 267, 277, 283 or 331
- 3 units from Physics 211, 221 or 227
- 6 units Computer Science 453 and 585
- 3 units from Computer Science 441, 461 or 481
- 3 units from Computer Science 587, 589 or 591
- 3 units from Computer Science 433, 531 or 535
- 6 units selected from:
 - Art 231, 233, 235, 241, 243, 349, 373, 377, 379
 - Drama 223, 225
 - English 265, 393, 395, 399
 - Communications Studies 201
 - Operations Management 301
 - Music 209, 211, 213, 225, 309, 325, 329, 351, 451, 453, 511, 513, 551, or any Music course listed as formerly Music Theory and Composition

Note: Students interested in taking courses offered by the Department of Art to complete these requirements are encouraged to contact that department for permission to enrol in courses normally restricted to BFA Art students.

B. Concentration in Software Engineering

- 6 units Computer Science 594 or 502.06, or Computer Science 503.06 and 3 units chosen from courses labelled Software Engineering
- Computer Science 481
- 9 units chosen from courses labelled Software Engineering, Computer Science 499¹ or 599¹
- 6 units chosen from courses labelled Software Engineering, Computer Science 411, 441, 453, 471, 499¹, 527, 528, 559, 567, 571, 575, 585, 599¹
- 3 units chosen from Computer Science 405, Economics 201 or courses offered by the Haskayne School of Business

Notes:

- The Haskayne School of Business will consider waiving the prerequisites for senior courses (particularly Business Technology Management 463 and 465) on an individual request basis. Students should contact the particular Area Chair in the Haskayne School of Business regarding prerequisite waivers.

- Honours students interested in Software Engineering should consider the use of Computer Science 502.06 to complete the Honours requirement for Computer Science 502.

¹Students interested in using Computer Science 499 or 599 should contact the department to determine which topics, if any, are being offered in a given year that may be used to fulfill the requirements of this concentration.

C. Concentration in Theoretical Computer Science

- 18 units chosen from Mathematics 311, 313, 391, Statistics 321, Philosophy 379, Computer Science 411, 418, 491, 502.02, 503.02, 511, 513, 517, 518, 519, 521, 522, 530, 561, Mathematics 527 or Pure Mathematics 527, of which, a maximum of 6 units may be at the 300 level.

Note: Honours students interested in Theoretical Computer Science should consider the use of Computer Science 502.02 to complete the Honours requirement for Computer Science 502.

D. Concentration in Scientific Computation

- 3 units from Mathematics 267 or 277
- 3 units of courses labelled Mathematics or Statistics 300-level or above
- 6 units Computer Science 471 and 491 or Mathematics 391
- 9 units chosen from Computer Science 453, 461, 531, 535, 559, 571, 572, 583, 599¹ or 601¹, of which, a maximum of 3 units may be at the 400 level
- 3 units from Biology 311, 313, 371, Marine Science 321, Plant Biology 327, 403, 421, Chemistry 311, 331, 351, 371, 373, 402.01, Physics 325, 343, 375, 455, Astrophysics 307, 409, Geology 313, 323, 337, 343, 353, 381, 401, 475, Geophysics 351, 355, or 453. All of these courses require a minimum of 6.0 units of prerequisite courses. Student should identify the prerequisite courses needed for the course they intend to complete from this list. Junior level prerequisite courses should be incorporated into students' first year of studies. Students may contact the Undergraduate Science Centre (USC) for assistance in planning their course work in order to fulfil this requirement.

Note: Honours students interested in Scientific Computation should consider the use of Computer Science 502.05 to complete the Honours requirement for Computer Science 502.

¹Students interested in using Computer Science 599 or 601 should contact the department to determine which topics, if any, are being offered in a given year that may be used to fulfill the requirements of this concentration.

E. Concentration in Human-Computer Interactions

- Computer Science 481
- 6 units chosen from Computer Science 581 (recommended), 583 or 584
- 3 units from Computer Science 453, 502.07, 503.07, 581, 583, 584, Software Engineering 403, 471 or 515 that is not

already being used to meet another concentration requirement

- 6 units chosen from:
 - Anthropology 203
 - Art 317, 321, 331, 334, 399, 401, 431, 491
 - Communications Studies 201, 481
 - Innovation 321, 323
 - Museum and Heritage Studies 201
 - Psychology 200, 201, 203, 300, 301, 365, 369
 - Sociology 201, 311, 313, 315, 341, 345

Notes:

- Honours students interested in Human-Computer Interactions should consider the use of Computer Science 502.07 to complete the Honours requirement for Computer Science 502.
- Students interested in taking courses offered by the Department of Art to complete these requirements are encouraged to contact that department for permission to enrol in courses normally restricted to BFA Art students.

F. Concentration in Computer Graphics

- 3 units from Mathematics 267 or 277
- Computer Science 453
- 6 units from Computer Science 587, 589 and 591
- 6 units from Computer Science 481, 535, 585, 587, 589, 591 or 599¹, that are not already being used to meet another concentration requirement
- 3 units from Art 231, 233, 235, 241, 349, 373, 377, 379, Physics 211, 221, or 227

Notes:

- Honours students interested in Computer Graphics should consider the use of Computer Science 502.03 to complete the Honours requirement for Computer Science 502.
- Students interested in taking courses offered by the Department of Art to complete these requirements are encouraged to contact that department for permission to enrol in courses normally restricted to BFA Art students.

¹Students interested in using Computer Science 599 should contact the department to determine which topics, if any, are being offered in a given year that may be used to fulfill the requirements of this concentration.

G. Concentration in Information Security

- Computer Science 329, 441, 525 and 526
- 3 units from Computer Science 418, Pure Mathematics 418, or Mathematics 318
- 3 units from Computer Science 502.04, 503.04, 527, 528, 530, 577 or Software Engineering 521

Note: Honours students interested in Information Security should consider the use of Computer Science 502.04 to complete the Honours requirement for Computer Science 502. Computer Science 418 is recommended over Pure Mathematics 418.

H. Concentration in Networks and Distributed Computing

- Computer Science 329
- Computer Science 441
- 3 units from Computer Science 559 or 561
- 3 units from Computer Science 525, 526, 528 or 530
- 3 units from Computer Science 502.08 or Computer Science 503.08
- 3 units from Software Engineering 513, Computer Science 550, 567, 568 or 571

Note: Computer Science 526 is recommended over Computer Science 525, 528 or 530.

I. Concentration in Visualization and Analytics

- 3 units from Computer Science 583 or 599.87
- 3 units from Computer Science 471 or 599.44
- 3 units from Statistics 321, 327 or 423
- 9 units of Computer Science 453, 481, 502.03, 502.07, 503.03, 503.07, 583, 599.87, 599.88, or 599.89 that is not already being used to meet another concentration requirement.

Note: Students are strongly encouraged to complete both Computer Science 583 and 599.87.

4.3.2 BSc Major and Honours in Computer Science Internship Programs

The Internship programs in Computer Science are five-year (120 units) degree programs that include a 12- or 16-month Internship period of supervised work experience.

Before starting their first Internship work period, students must meet the admission requirements specified in the Co-operative Education/Internship section of this Calendar. In addition, students must be Computer Science majors or Computer Science honours students, and must have completed (at the relevant application deadline) between 75 and 96 units appropriate to their degree program, including:

- All of Computer Science 313, 319 or 331, 355, and Software Engineering 300 or 301
- Philosophy 279 or 377
- An additional 18 units in the Field of Computer Science numbered 300 or above.

Students should have a minimum grade point average of 2.50 calculated over the most recent course work to a maximum of 30 units at the time of application to the Internship Major program. Honours students in good standing at time of application will be admitted to the Internship Honours program.

See the subsection on Co-operative Education/Internship Programs in Section 3 (Faculty Regulations) for information on applying.

Requirements

Students in the BSc in Computer Science Internship program must meet all requirements for the BSc Major in Computer Science degree program. Students in the BSc Honours in Computer Science Internship

program must meet all requirements for the BSc Honours in Computer Science program. In addition to the above requirements, students must complete the following three courses (which represent the individual Internship work terms):

- Internship 503.01, 503.02, and 503.03 (Internship 503.04 is recommended but not required.)

Students must take all their Internship work terms consecutively and be registered full-time. Upon completion of each Internship work term, the student must present a work term report to the Department of Computer Science Internship Representative. Reports and work terms are evaluated on a CR/F grade, based on job performance and completion of a work term report that meets the standards of the Department of Computer Science. Students should also be aware of the policy concerning course withdrawal, as specified in the Co-operative Education/Internship section of this Calendar.

For further details and information, see the Department of Computer Science web page (cpsc.ucalgary.ca/undergrad/internship/).

Work Term Assessment

The mandatory work term courses, Internship 503.01, 503.02 and 503.03 and the additional course, Internship 503.04, are graded on a credit (CR) or fail (F) basis. A positive assessment requires satisfactory performance on each of the following items:

- The Internship Co-ordinator's evaluation of job performance, which is based on an on-site visit where practical.
- The employer's evaluation of job performance.
- The student's self-assessment of job performance and the overall job experience, which is normally based on participation in a debriefing or integrative session.
- A work term report prepared by the student and evaluated by the Faculty.

Notes:

- The Faculty may approve registration in Internship 503.04.
- Students should consult the Computer Science Internship Co-ordinator and Co-operative Education and Internship Co-ordinator for program planning

Program Sequence

The Internship period, consisting of the consecutive Internship 503.01, 503.02, 503.03 and optional 503.04 Internship work terms, is normally taken shortly after completing the required courses as indicated above. This typically occurs after year three (minimum 90 units) but before completing year four (maximum 105 units).

The combination of Internship and study sessions will allow completion of the program in five years.

4.3.3 Combined Degree Programs

Please see 3.4 Program Requirements of the Faculty of Science section of the Calendar concerning programs that combine studies in multiple disciplines – including Double

Major and Double Honours programs, Combined Degree Programs within the Faculty of Science, and Combined Degree Programs with other Faculties. Combinations involving Computer Science and another Discipline that are commonly pursued include:

- A Double Major or Combined degree programs with those offered by the Department of Mathematics and Statistics.
- A Combined Program with another Science discipline – notably with Biological Science.
- A Combined Program leading to a BComm degree (offered by the Haskayne School of Business) and to a BSc in Computer Science.

Requirements for such programs are often extremely tight. Please consult the Department of Computer Science for advice about course selections if you are interested in these or other program combinations.

4.3.4 Required Courses - Minor Program

- 6 units - One of the following three sets of courses:
 - Computer Science 217 or Data Science 211 and Computer Science 219
 - Computer Science 231 and 233
 - Computer Science 235 and 3 units in the Field of Computer Science at the 300 level or above
- 3 units - Computer Science 319 or 331
- 21 units - From the Field of Computer Science of which 15 units must be numbered 300 or above, and 6 units must be numbered 400 or above

Notes:

- Many senior courses in Computer Science have prerequisites in other disciplines, especially in Mathematics and Statistics.
- Students with Computer Science 319 will be required to complete a non-credit, on-line course in order to be qualified for senior courses in theoretical computer science. Students may contact the Department of Computer Science in order to register in this course.

4.4 Geoscience

Degrees Offered

| Undergraduate Programs ¹ | Core | Enhancements |
|-------------------------------------|------|--------------|
| Geology | BSc | BSc Honours |
| Geophysics | BSc | BSc Honours |

| Suspended Program ¹ | Core | Enhancements | Effective Date |
|-----------------------------------|------|--------------|----------------|
| Applied and Environmental Geology | BSc | BSc Honours | Fall 2015 |

There are many options for graduate studies leading to MSc and PhD degrees in the area of Geosciences. Details of graduate

specializations can be found in the graduate section of this calendar.

'All degrees in the Faculty of Science, except Environmental Science, can be combined with eligible BA and BSc programs from the Faculty of Arts. Please refer to Section 3.4 for information on combined degrees, double majors with programs within the Faculty of Science as well as combined degrees with programs from other faculties. Students interested in pursuing these degrees are encouraged to speak with an advisor in the Undergraduate Science Centre to develop a degree completion plan.

Programs Offered

BSc and BSc Honours in Geology, Geology (Petroleum Geology Concentration), and Geophysics

Minors in Geology and Geophysics

Suspended Programs

BSc in Applied and Environmental Geology

BSc Honours in Applied and Environmental Geology

Double Major and Combined Degree Programs

- Double major programs are allowed combining any two of: (i) Geology or Geology (Petroleum Geology Concentration), (ii) Geophysics, (iii) Earth Science, (iv) Environmental Science (Geology).
- Combined degree programs are allowed combining Geophysics with one of (i) Geology, (ii) Geology (Petroleum Geology Concentration), (iii) Environmental Science (Geology).

Department vs. Faculty Regulations

Programs in the Department of Geoscience are governed by a combination of general Faculty of Science regulations and the additional program specific regulations stated in the following sections.

It is essential for students to be familiar with both sets of regulations. It is helpful to read the Faculty Regulations in Section 3 first.

Students should consult Academic Requirements in their Student Centre periodically to ensure that requirements are being met. Also, students are strongly urged to consult with the Undergraduate Science Centre (USC) at all stages of their program.

APEGA Requirements

The practice of geology and geophysics in Alberta is governed by Provincial law and regulated by the Association of Professional Engineers and Geoscientists of Alberta (APEGA). Students are advised to visit apega.ca/educators/asap/ to fill out an application form for the APEGA Student Advantage Program (ASAP).

In order to meet the requirements of professional registration, specific academic training and four years of appropriate full-time experience as a geologist- or geophysicist-in-training following graduation are needed.

The Majors and Honours BSc programs in Geology, Geology (Petroleum Geology Concentration), Applied and Environmental Geology, and Geophysics, whose course requirements are stipulated in sections 4.4.1 - 4.4.5, with the exception of 4.4.4 Environmental Science - Geology Concentration, meet the current academic requirements for professional registration with APEGA, if

the appropriate options are taken (see the Notes in the Required Courses subsections in sections 4.4.1 - 4.4.5, with the exception of 4.4.4 Environmental Science - Geology Concentration). These academic requirements are available on the APEGA website: apega.ca, and on the Department website (see below).

Department Information

Department Office: Earth Sciences 118

Telephone: 403.220.5841

Fax: 403.284.0074

Website: ucalgary.ca/geoscience

Email: geoscience@ucalgary.ca

Enrolment Limitations

Program Enrolment Limits

1. The Department of Geoscience limits enrolment in all programs. Students may be directly admitted into the Geology or Geophysics programs. Students may also apply to transfer into the Geology (Petroleum Geology Concentration) program after completion of 30 units. As space permits, the Department will accept a certain number of students who wish to gain admission to the Department's programs by transferring from other institutions or programs. Any student requesting admission at this level is subject to section A.5 of the Admissions section of this Calendar. In the event that the number of students choosing any of these programs exceeds the number that can be accommodated by available resources, students will be admitted to that program in descending rank order of academic performance until the enrolment limit is reached.

2. Admission will be granted for Fall Term only and will be based upon academic merit. Due to limited enrolment capacity in many senior courses, it may not always be possible to accommodate every student's choice of optional geology courses in the third and subsequent years.

Course Enrolment Limitations

Many of the second-, third- and fourth-year courses in Geology and Geophysics are limited-enrolment courses, and priority for enrolment is given to students registered in one of the following programs: Geology, Geology (Petroleum Geology Concentration), Geophysics, Environmental Science (Geology Concentration), Natural Sciences (Geoscience Concentration), Earth Science.

4.4.1 Programs in Geology

Admission

See the sections on Enrolment Limitations under the Department of Geoscience and under Section 3 (Faculty Regulations).

Courses constituting the field of Geology

- All courses labelled Geology excluding Geology 209, 297, 301, 305, 307, 308, 377, 471

Geology Program Streams*

Students may focus their studies by following the Hydrogeology/Environmental Geoscience stream or the Solid Earth Geosci-

ence stream. This entails choosing appropriate options, as outlined in the Required Courses - Major Program Section. More information can be found on the Department of Geoscience website.

**A stream is not a separate program, but rather a route or a suggested sequence of courses within the Geology program that students should take to focus their studies in a certain area.*

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

36 units - Geology 201, 202, 313, 323, 333, 337, 343, 353, 381, 435 or 441, 445, 493

3 units - Geophysics 351

18 units - Options from the Field of Geology

- Students interested in the Hydrogeology/Environmental Geoscience stream are advised to take Geology 401 and 403 (foundational courses), and Geology 441, followed by one or more recommended options. Recommended options are Geology 435, 475, 505, 537, 571, 597.
- Students interested in the Solid Earth Geoscience stream are advised to take Geology 431 and 433 (foundational courses), and Geology 435, followed by one or more recommended options. Recommended options are Geology 523, 527, 535, 537, 541, 543, 555.
- To meet APEGA Geology requirements, students should satisfy either (a) or (b):
 - (a) take one of Geology 431, 433, 463, 483
 - (b) take both Geology 401 and 571

6 units - Geology, Geophysics or Engineering (GGE) options from the following (see Notes):

- Petroleum Engineering 507, 513, 515, 523, 525, 533, 543, 563, 573
 - A maximum of two of these may be counted towards APEGA Geology requirements. Some of these courses have Petroleum Engineering 523 as a prerequisite. Students are advised to take Petroleum Engineering 523 in the Fall Term.
- Courses in the Fields of Geology and Geophysics
 - Recommended geophysics options for students interested in the Hydrogeology/Environmental Geoscience stream: Geophysics 355, 565.
 - Recommended geophysics options for students interested in the Solid Earth Geoscience stream: Geophysics 355, 453.

6 units - Physics 211 or 221, and 223

6 units - Chemistry 201 or 211, and 203 or 213

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 267 or 277

3 units - Mathematics 211

3 units - Science 311

6 units - Science options from the following (see Notes):

- Biology 205, 241, 243
- Chemistry 311, 315, 331 or 423, 333 or 433, 351, 353, 371¹, 373¹
- Computer Science 217 or 231 or 235 or Data Science 211; Computer Science 219 or 233
- Mathematics 311, 331¹, 367, 375, 376, 377, 413, 415
- Physics 321¹, 323¹, 229 or 325
- Statistics 205 or 213 or 321 or 327¹

¹Recommended options

15 units - Breadth Requirement (see Notes)

12 units - Options (Science options are recommended -- see Notes)

Notes:

- The Major program may contain a maximum of 66 units from the Field of Geology.
- The Major programs must contain at least 9 units at the 500 level or above from the Field of Geology.
- 600-level courses are available to fourth year students with prerequisites and consent of the Department.
- In order to meet the academic requirements for registration with APEGA, 6 units from the Science Options and/or the Options must be chosen from one or more of biology, chemistry (3 units maximum), computer science, physics (3 units maximum), or statistics.
- Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). These 15 units and Science 311 form the 18 units non-science course requirements selected from faculties other than the Faculty of Science. Of these 15 units, students must take at least 6 units from the Faculty of Arts.

Required Courses - Honours Program

See also Section 3 (Faculty Regulations), Subsections 3.4C (Program Requirements - Honours Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

36 units - Geology 201, 202, 313, 323, 333, 337, 343, 353, 381, 435 or 441, 445, 493

3 units - Geophysics 351

3 units - Geophysics 355 or 453 or 565

One of:

- 6 units - Geology 510 and 12 units options from the Field of Geology
- 3 units - Geology 509 and 15 units options from the Field of Geology
 - Students interested in the Hydrogeology/Environmental Geoscience stream are advised to take Geology 401 and 403 (foundational courses), and Geology 441, followed by one or more recommended options. Recommended options are Geology 435, 475, 505, 537, 571, 597.

- Students interested in the Solid Earth Geoscience stream are advised to take Geology 431 and 433 (foundational courses), and Geology 435, followed by one or more recommended options. Recommended options are Geology 523, 527, 535, 537, 541, 543, 555.

- To meet APEGA Geology requirements, students should satisfy either (a) or (b):

(a) take one of Geology 431, 433, 463, 483

(b) take both Geology 401 and 571

6 units - Geology, Geophysics or Engineering (GGE) options from the following (see Notes):

- Petroleum Engineering 507, 513, 515, 523, 525, 533, 543, 563, 573
- A maximum of two of these may be counted towards APEGA Geology requirements. Some of these courses have Petroleum Engineering 523 as a prerequisite. Students are advised to take Petroleum Engineering 523 in the Fall Term.

- Courses in the Fields of Geology and Geophysics

- Recommended geophysics option for students interested in the Hydrogeology/Environmental Geoscience stream: Geophysics 355, 565.
- Recommended geophysics option for students interested in the Solid Earth Geoscience stream: Geophysics 355, 453.

6 units - Physics 211 or 221, and 223

6 units - Chemistry 201 or 211, and 203 or 213

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 267 or 277

3 units - Mathematics 211

3 units - Science 311

6 units - Science options from the following (see Notes):

- Biology 205, 241, 243
- Chemistry 311, 315, 331 or 431; 333 or 433; 351, 353, 371¹, 373¹
- Computer Science 217 or 231 or 235 or Data Science 211; Computer Science 219 or 233
- Mathematics 311, 331¹, 367, 375, 376, 377, 413, 415
- Physics 321¹, 323¹, 229 or 325
- Statistics 205 or 213 or 321 or 327¹

¹Recommended options

15 units - Breadth Requirement (see Notes)

9 units - Options (Science options are recommended -- see Notes)

Notes:

- The Honours program may contain a maximum of 78 units from the Field of Geology.
- The Honours programs must contain at least 9 units at the 500 level or above from the Field of Geology.

- 600-level courses are available to fourth year students with prerequisites and consent of the Department.

- In order to meet the academic requirements for registration with APEGA, 6 units from the Science Options and/or the Options must be chosen from one or more of biology, chemistry (3 units maximum), computer science, physics (3 units maximum), or statistics.

- Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). These 15 units and Science 311 form the 18 units non-science course requirements selected from faculties other than the Faculty of Science. Of these 15 units, students must take at least 6 units from the Faculty of Arts.

Required Courses - Minor Program

30 units in the Field of Geology

Suggested Program Sequence

(Majors and Honours)

| First Year | |
|--|---|
| Geology 201 | Geology 202 |
| Chemistry 201 or 211 | Chemistry 203 or 213 |
| Mathematics 249 or 265 or 275 | Mathematics 267 or 277 |
| Physics 211 or 221 | Physics 223 |
| Non-science option | Non-science option |
| Second Year | |
| Geophysics 351 | Geology 323 |
| Geology 313 | Geology 333 |
| Geology 381 | Geology 343 |
| Mathematics 211 or 221 | Geology 353 |
| Science 311 | Non-science option |
| Third Year | |
| Geology 337 | Geology 493 |
| Geology 445 | Geology 435 or 441 |
| Geology option | Geology option |
| Geology option | Geology option |
| Non-science option | Science option |
| | Non-science option |
| Fourth Year | |
| Geology option | Science option |
| GGE option ¹ (for Majors); Geophysics 355 or 453 or 565 (for Honours) | GGE option ¹ |
| Geology option (for Majors) or Geology 510 ² (for Honours) | Geology option (for Majors) or Geology 510 ² (for Honours) |
| Option (Science recommended) | Option (Science recommended) |
| Option | Option |

¹Geology, Geophysics or Engineering option from the specified list.

²Geology 510 (a 6-unit course) may be replaced by Geology 509 (a 3-unit course) plus a 3-unit option from the Field of Geology for the Honours program.

4.4.2 Programs in Geology (Petroleum Geology Concentration)

Admission

See the sections on Enrolment Limitations under the Department of Geoscience and under Section 3 (Faculty Regulations).

Courses constituting the field of Geology (Petroleum Geology Concentration)

- All courses labelled Geology excluding Geology 209, 297, 301, 305, 307, 308, 377, 471

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

45 units - Geology 201, 202, 313, 323, 333, 337, 343, 353, 381, 435, 445, 463 or 483, 493, 577, 581

3 units - Option from the Field of Geology

6 units - Geophysics 351 and 559

9 units - Geology, Geophysics or Engineering options from the following:

- Petroleum Engineering 507, 513, 515, 523, 525, 533, 543, 563, 573
 - A maximum of two of these may be counted towards APEGA Geology requirements. Students are advised to take Petroleum Engineering 523 first, and to take it in the Fall Term.
- Courses in the Field of Geology
 - Recommended Options: Geology 401, 463 or 483 or 461 or 583, 537, 541, 545, 561, 579, 597.
- Courses in the Field of Geophysics
 - Recommended Option: Geophysics 355.

6 units - Physics 211 or 221, and 223

6 units - Chemistry 201 or 211, and 203 or 213

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 267 or 277

3 units - Mathematics 211

3 units - Science 311

6 units - Science options: same as for Geology Major program (also, see Notes)

12 units - Options (Science options are recommended - see Notes)

15 units - Breadth Requirement (see Notes)

Notes:

- The Major program may contain a maximum of 66 units in the Field of Geology.
- The Major program must contain at least 9 units at the 500 level or above from the Field of Geology.
- In order to meet the academic requirements for registration with APEGA, 6 units from the Science Options and/or the Options must be chosen from one or more of biology, chemistry (3 units maximum), computer science, physics (3 units maximum), or statistics.

- Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). These 15 units and Science 311 form the 18 units non-science course requirements selected from faculties other than the Faculty of Science. Of these 15 units, students must take at least 6 units from the Faculty of Arts.

Required Courses - Honours Program

See also Section 3 (Faculty Regulations), Subsections 3.4C (Program Requirements - Honours Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

45 units - Geology 201, 202, 313, 323, 333, 337, 343, 353, 381, 435, 445, 463 or 483, 493, 577, 581

3 units - Option from the Field of Geology

6 units - Geophysics 351 and 559

One of:

- 3 units - Geology 509 and 6 units options from the field of Geology, Geophysics or Engineering options listed below
- 6 units - Geology 510 and 3 units options from the field of Geology, Geophysics or Engineering options listed below
 - Petroleum Engineering 507, 513, 515, 523, 525, 533, 543, 563, 573
 - A maximum of two of these may be counted towards APEGA Geology requirements. Students are advised to take Petroleum Engineering 523 first, and to take it in the Fall Term.
- Courses in the Field of Geology
 - Recommended Options: Geology 401, 463 or 483 or 461 or 583, 537, 541, 545, 561, 579, 597.
- Courses in the Field of Geophysics
 - Recommended Option: Geophysics 355.

6 units - Physics 211 or 221, and 223

6 units - Chemistry 201 or 211, and 203 or 213

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 267 or 277

3 units - Mathematics 211

3 units - Science 311

6 units - Science options: same as for Geology Major program (also, see Notes)

12 units - Options (Science options are recommended - see Notes)

15 units - Breadth Requirement (see Notes)

Notes:

- The Honours program may contain a maximum of 78 units in the Field of Geology.
- In order to meet the academic requirements for registration with APEGA, 6 units from the Science Options and/or the Options must be chosen from one or more of biology, chemistry (3 units maximum), computer science, physics (3 units maximum), or statistics.

- Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). These 15 units and Science 311 form the 18 units non-science course requirements selected from faculties other than the Faculty of Science. Of these 15 units, students must take at least 6 units from the Faculty of Arts.

Suggested Program Sequence (Majors and Honours)

| First and Second Years | |
|---|---|
| Same as Geology Major program | |
| Third Year | |
| Geology 337 | Geology 493 |
| Geology 445 | Science option |
| Geology 463 or 483 | Geology option |
| GGE option ¹ | Science Option |
| Non-science option | Non-science option |
| Fourth Year | |
| Geology 577 | Geology 581 |
| Geology 435 | Geophysics 559 |
| GGE option ¹ (for Majors) or Geology 510 (for Honours) | GGE option ¹ (for Majors) or Geology 510 (for Honours) |
| Option (Science recommended) | Option (Science recommended) |
| Option | Option |

¹Geology, Geophysics or Engineering Option from the specified list.

4.4.3 Programs in Geophysics

Admission

See the sections on Enrolment Limitations under the Department of Geoscience and under Section 3 (Faculty Regulations).

Courses constituting the field of Geophysics

- All courses labelled Geophysics excluding Geophysics 365 and 375
- Geology 201, 202 or 203, 341, 343, 381, 445
- Physics 211, 221, 223, 321, 323

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

33 units - Geophysics 351, 355, 419, 453, 457, 517, 547, 549, 551, 557, 559

15 units - Geology 201, 202 or 203, 343, 381, 445

3 units - Applied Mathematics 415 or Mathematics 415

6 units - Chemistry 201 or 211, and 203 or 213

3 units - Computer Science 217 or 231 or 235 or Data Science 211

3 units - Mathematics 249 or 265 or 275

9 units - Mathematics 211; 267 or 277; 331

12 units - Physics 211 or 221, 223, 321, 323

6 units - Science or Engineering options from the following:

- Chemistry 321, 371, 373
- Computer Science 219 or 233
- Data Science 211
- Mathematics 307, 311, 361, 375, 376, 411, 413¹, 421
- Petroleum Engineering 507¹, 513¹, 515, 523¹, 543¹
- Physics 229 or 325, 341, 343, 397, 455, 497
- Statistics 321, 327¹
- Courses in the Field of Geophysics¹
- Courses in the Field of Geology¹

¹Recommended options. Some of the Petroleum Engineering courses have Petroleum Engineering 523 as a prerequisite. Students are advised to take Petroleum Engineering 523 in the Fall Term.

18 units - Breadth Requirement (see Notes)

12 units - Options (science options are recommended)

Notes:

- Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
- The Major program may contain a maximum of 66 units from the Field of Geophysics, and the Honours program may contain a maximum of 78 units from the Field of Geophysics.
- 600-level courses are available to fourth year students with prerequisites and consent of the Department.
- The Majors and Honours programs in Geophysics meet the current academic requirements for professional registration with APEGA.
- Geophysics majors are allowed to replace Mathematics 331 with 367 or 377 in their programs as long as they also take either Applied Mathematics 311 or Mathematics 376 as a Science Option or Option in their programs. Such a replacement should be made by Geophysics majors wishing to do an Applied Mathematics Minor program, as Mathematics 331 is not accepted in the Applied Mathematics minor program.

Required Courses - Honours Program

See also Section 3 (Faculty Regulations), Subsections 3.4C (Program Requirements - Honours Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

36 units - Geophysics 351, 355, 419, 453, 457, 509, 517, 547, 549, 551, 557, 559

15 units - Geology 201, 202 or 203, 343 or 341, 381, 445

3 units - Applied Mathematics 413 or Mathematics 413

3 units - Applied Mathematics 415 or Mathematics 415

6 units - Chemistry 201 or 211, and 203 or 213

3 units - Computer Science 217 or 231 or 235 or Data Science 211

3 units - Mathematics 249 or 265 or 275

9 units - Mathematics 211; 267 or 277; 331

3 units - Statistics 327

12 units - Physics 211 or 221, 223, 321, 323

6 units - Science or Engineering options from the following:

- Chemistry 321, 371, 373
- Computer Science 219 or 233
- Mathematics 307, 311, 361, 375, 376, 411, 421
- Petroleum Engineering 507¹, 513¹, 515, 523¹, 543¹
- Physics 229 or 325, 341, 343, 397, 455, 497
- Statistics 321
- Courses in the Field of Geophysics¹
- Courses in the Field of Geology¹

¹Recommended options. Some of the Petroleum Engineering courses have Petroleum Engineering 523 as a prerequisite. Students are advised to take Petroleum Engineering 523 in the Fall Term.

18 units - Breadth Requirement (see Notes)

3 units - Option (science option is recommended)

Notes:

- Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
- The Honours program may contain a maximum of 78 units from the Field of Geophysics.
- 600-level courses are available to fourth year students with prerequisites and consent of the Department.
- The Honours programs in Geophysics meet the current academic requirements for professional registration with APEGA.
- Geophysics majors are allowed to replace Mathematics 331 with 367 or 377 in their programs as long as they also take either Applied Mathematics 311 or Mathematics 376 as a Science Option or Option in their programs. Such a replacement should be made by Geophysics majors wishing to do an Applied Mathematics Minor program, as Mathematics 331 is not accepted in the Applied Mathematics minor program.

Required Courses - Minor Program

6 units - Geophysics 351 and 355

6 units - Geology 201 and 202

6 units - Physics 211 or 221, and 223

3 units - Geology 343 or Physics 321 or 323

6 units - Geophysics 453 and one of Geophysics 565, Physics 321, or 323.

3 units - One of Geophysics 419, 517, 547, 551, 557, 559

Mathematics and Physics prerequisites for the preceding courses as needed.

Suggested Program Sequence

| First Year | |
|---|---|
| Geology 201 | Geology 202 |
| Mathematics 249 or 265 or 275 | Mathematics 267 or 277 |
| Chemistry 201 or 211 | Chemistry 203 or 213 |
| Physics 211 or 221 | Physics 223 |
| Non-science option | Non-science option |
| Second Year | |
| Geophysics 351 | Geophysics 355 |
| Geology 381 | Mathematics 331 |
| Mathematics 211 | Geology 343 |
| Physics 323 | Physics 321 |
| Non-science option | Non-science option |
| Third Year | |
| Geophysics 453 | Geology 445 |
| Science or Engineering option (for Majors); or Mathematics 413 or Applied Mathematics 413 (for Honours) | Geophysics 457 |
| Computer Science 217 or 231 or 235 or Data Science 211 | Mathematics 415 |
| Option (science recommended) | Geophysics 419 |
| Non-science option | Non-science option |
| Fourth Year | |
| Geophysics 549 | Geophysics 547 |
| Geophysics 517 | Geophysics 557 |
| Geophysics 551 | Geophysics 559 |
| Option (science recommended) or Geophysics 509 (for Honours) | Science or Engineering option (for Majors), or Statistics 327 (for Honours) |
| Option | Option |

4.4.4 Environmental Science - Geology Concentration

Students may pursue a BSc program in Environmental Science with a concentration in Geology. This is a single-degree, four-year program offered by the Faculty of Science with collaboration from the Faculty of Arts. Program details are listed in 4.6 Non-Departmental Programs. Since this is a multidisciplinary program with restricted entry, students should consult the Director of the Environmental Science program at their earliest opportunity.

Note: Students may also pursue BSc programs in Earth Science which is offered by the Faculty of Arts in collaboration with the Faculty of Science.

4.4.5 Suspended Programs

Admission to the following program has been suspended.

Students previously admitted to a suspended program will be supported in the completion of their program. As such,

program requirements are listed below for the reference of students already admitted to these programs.

4.4.5.1 Programs in Applied and Environmental Geology

Admission

Admission to this program has been suspended as of Fall 2015.

See the sections on Enrolment Limitations under the Department of Geoscience and under Section 3 (Faculty Regulations).

Courses constituting the Field of Applied and Environmental Geology

- Geology 201, 202 or 203, 313, 323, 333, 337, 343, 353, 381, 401, 403, 503, 435, 441, 445, 505, 510, 571, 597
- Geophysics 351, 355

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

45 units - Geology 201, 202 or 203, 313 or 423, 323, 333 or 311, 337, 343, 353 or 373, 381, 401, 403 or 503, 445 or 341, 505, 571, 597

3 units - Option from the Field of Geology (Geology 441 is recommended)

6 units - Geophysics 351 or 355, 565

6 units - Physics 211 or 221, 223

6 units - Chemistry 201 or 211, and 203 or 213

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 253 or 267 or 277

3 units - Mathematics 211

3 units - Mathematics 331

3 units - Statistics 327

3 units - Science 311

12 units - Science or Engineering options chosen from the following (see Notes):

- Applied Mathematics 307 or 311, 413, 415
- Chemistry 311, 315, 321¹, 331, 333, 351, 353, 371, or 373
- Civil Engineering 423¹, 523¹, 525¹
- Computer Science 217 or 231 or 235; Computer Science 219 or 233
- Engineering 481¹
- Geology courses (from the Field of Geology)¹
- Geophysics 355¹, 453¹, 457¹, 559¹, or other courses from the Field of Geophysics
- Mathematics 311¹, 349¹, 375, 376, 413¹, 414¹, or Mathematics 321 or Statistics 321
- Petroleum Engineering 507¹, 513¹, 515, 523¹, 543¹
- Physics 321, 323, 325

¹Recommended options

9 units - Option (Science or Engineering options are recommended)

15 units - Breadth Requirement (see Notes)

Notes:

- The Major program may contain a maximum of 66 units from the Field of Applied and Environmental Geology.
- 600-level courses are available to fourth year students with prerequisites and consent of the Department.
- In order to meet the academic requirements for registration with APEGA, the Applied and Environmental Geology Majors program must include, in addition to the physics, chemistry and statistics courses already required in the program, 3 units in one of biology, chemistry, computer science, statistics or physics. This choice must be made from either the 12 units Science or Engineering Options or the 9 units Options for the Applied and Environmental Geology Majors program.
- Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). These 15 units and Science 311 form the 18 units non-science course requirements selected from faculties other than the Faculty of Science. Of these 18 units, students must take at least 6 units from the Faculty of Arts.

Required Courses - Honours Program

See also Section 3 (Faculty Regulations), Subsections 3.4C (Program Requirements - Major Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

45 units - Geology 201, 202 or 203, 313 or 423, 323, 333 or 311, 337, 343, 353 or 373, 381, 401, 403 or 503, 445 or 341, 505, 571, 597

One of:

- 3 units - Geology 509 and 9 units Science or Engineering options chosen from the list below
- 6 units - Geology 510 and 6 units Science or Engineering options chosen from the list below
- Science or Engineering options (see Notes):
 - Applied Mathematics 307 or 311, 413, 415
 - Chemistry 311, 315, 321¹, 331, 333, 351, 353, 371, or 373
 - Civil Engineering 423¹, 523¹, 525¹
 - Computer Science 217 or 231 or 235; Computer Science 219 or 233
 - Engineering 481¹
 - Geology courses (from the Field of Geology)¹
 - Geophysics 355¹, 453¹, 457¹, 559¹, or other courses from the Field of Geophysics
 - Mathematics 311¹, 349¹, 375, 376, 413¹, 414¹, or Mathematics 321 or Statistics 321
 - Petroleum Engineering 507¹, 513¹, 515, 523¹, 543¹

- Physics 321, 323, 325

¹Recommended options

3 units - Option from the Field of Geology (Geology 441 is recommended)

6 units - Geophysics 351 or 355, 565

6 units - Physics 211 or 221, 223

6 units - Chemistry 201 or 211, and 203 or 213

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 253 or 267 or 277

3 units - Mathematics 211

3 units - Mathematics 331

3 units - Statistics 327

3 units - Science 311

9 units - Option (Science or Engineering options are recommended)

15 units - Breadth Requirement (see Notes)

Notes:

- The Honours program may contain a maximum of 78 units from the Field of Applied and Environmental Geology.
- 600-level courses are available to fourth year students with prerequisites and consent of the Department.
- In order to meet the academic requirements for registration with APEGA, the Applied and Environmental Geology Majors program must include, in addition to the physics, chemistry and statistics courses already required in the program, 3 units in one of biology, chemistry, computer science, statistics or physics. This choice must be made from either the 12 units Science or Engineering Options or the 9 units Options for the Applied and Environmental Geology Majors program.
- Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). These 15 units and Science 311 form the 18 units non-science course requirements selected from faculties other than the Faculty of Science. Of these 18 units, students must take at least 6 units from the Faculty of Arts.

Suggested Program Sequence (Majors and Honours)

| First and Second Years Same as Geology Major program | |
|---|---|
| Third Year | |
| Geology 337 ¹ | Geology option (Geology 441 ² recommended) |
| Geology 445 | Mathematics 331 |
| Geology 401 | Science or Engineering Option |
| Geology 403 | Statistics 327 |
| Non-science option | Non-science option |
| Fourth Year | |
| Geology 571 | Geology 505 |
| Geology 597 | Science or Engineering Option |

| | |
|--|--|
| Geophysics 565 | Option (science or engineering recommended) |
| Science or Engineering option (for Majors), or Geology 510 (for Honours) | Science or Engineering option (for Majors), or Geology 510 (for Honours) |
| Option | Option |

¹Geology 337 is a field school that runs for about 15-18 days in the Spring and/or Summer Term.

²Geology 441 is a field school that runs for about 12-14 days in the Summer Term.

Note: Students taking a geology field school course in a term are permitted to register in an additional 15 units in that term (for a total of 18 units).

4.5 Mathematics and Statistics

Degrees Offered

| Undergraduate Programs | Core | Enhancements | Combined/ Concurrent Degrees ¹ |
|------------------------|------|---|---|
| Actuarial Science | BSc | BSc Honours, BSc Co-op, BSc Honours Co-op | BComm/BSc ² |
| Mathematics | BSc | BSc Honours | BComm/BSc ² |
| General Mathematics | BSc | | BSc/BE ³ |

| Suspended Programs | Core | Enhancements | Effective Date |
|------------------------|------|--------------|----------------|
| Undergraduate Programs | | | |
| Applied Mathematics | BSc | BSc Honours | Fall 2018 |
| Pure Mathematics | BSc | BSc Honours | Fall 2018 |
| Statistics | BSc | BSc Honours | Fall 2018 |

There are many options for graduate studies leading to MSc and PhD degrees in the area of Mathematics and Statistics. Details of graduate specializations can be found in the graduate section of this calendar.

¹All degrees in the Faculty of Science, except Environmental Science, can be combined with eligible BA and BSc programs from the Faculty of Arts. Please refer to Section 3.4 for information on combined degrees, double majors with programs within the Faculty of Science as well as combined degrees with programs from other faculties. Students interested in pursuing these degrees are encouraged to speak with a Program Advisor in the Undergraduate Science Centre to develop a degree completion plan.

²Combined Degree with the Haskayne School of Business.

³The BSc/BE³ program is a concurrent degree offered with the Werklund School of Education. Please see section 4.5.9 and the Werklund School of Education section of the calendar for more details.

Programs Offered

BSc and BSc Honours in Actuarial Science
 BSc and BSc Honours in Actuarial Science Co-operative Education
 BSc and BSc Honours in Mathematics
 BComm/BSc Combined Degree in Actuarial Science and Business
 BComm/BSc Combined Degree in Mathematics and Business
 BSc in General Mathematics
 BSc/BE³ Concurrent Degree in General Mathematics in Education

Minors in Actuarial Science, Mathematics and Statistics

Suspended Programs

BSc and BSc Honours in Applied Mathematics
 BSc and BSc Honours in Pure Mathematics
 BSc and BSc Honours in Statistics
 Minors in Applied Mathematics and Pure Mathematics

Department vs. Faculty Regulations

Programs in the Department of Mathematics and Statistics are governed by a combination of general Faculty of Science regulations and the additional program specific regulations listed below.

It is essential for students to be familiar with both sets of regulations. It is helpful to read Section 3 (Faculty Regulations) first.

Students should consult Academic Requirements in their Student Centre periodically to ensure that all requirements are being met. Students are strongly urged to consult the Department or Undergraduate Science Centre (USC) at all stages of their program.

Department Information

Courses offered by the Department bear the labels Mathematics, Statistics and Actuarial Science. The course descriptions appear in the back of this Calendar in three non-continuous alphabetically arranged blocks.

All students intending to pursue a Major or Honours program in Mathematics or Actuarial Science should consult the Associate Head - Undergraduate. The Associate Head - Undergraduate can provide advice on such important matters as specialized programs available within the field, recommended course sequences, possible combinations of Major and Minor fields and recommended undergraduate study leading to graduate study.

Mathematics and Statistics

Department Office: Mathematical Sciences 476

Telephone: 403.220.5203

Fax: 403.282.5150

Website: math.ucalgary.ca/

Email: mathinfo@ucalgary.ca

4.5.1 Programs in Mathematics

Courses constituting the field of Mathematics

- All courses labelled Mathematics except Mathematics 205, 305, 331, 403, 415, 433
- All courses labelled Statistics except Statistics 213, 217, 327
- Actuarial Science 437, 511

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses).

6 units - Mathematics 211 or 213; Mathematics 311 or 313

6 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277

6 units - Two courses selected from:

- Statistics 205,
- Statistics 321
- Either Mathematics 271 or 273*

18 units - Options from the Field of Mathematics

3 units - Computer Science 231 or 217 or 235 or Data Science 211

6 units - Any courses in the Field of Mathematics at the 400 level or above

3 units - Mathematics 516 or 518 or Statistics 517

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

54 units - Options

¹Mathematics 271 and 273 are prerequisites to many Mathematics courses, Statistics 321 is a prerequisite to many Statistics courses.

Note: Course level is not an indicator of the student's year in the program.

Required Courses - Honours Program

In addition to the requirements specified by the Faculty of Science (see Section 3), students are required to complete the following program of study:

6 units - Mathematics 211 or 213*; Mathematics 311 or 313*

6 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277

6 units - Two courses selected from:

- Statistics 205,
- Statistics 321
- Either Mathematics 271 or 273*

18 units - Any courses in the Field of Mathematics

6 units - Any courses in the Field of Mathematics at the 400 level or above

3 units - A course in the Field of Mathematics at the 500 level or above excluding Mathematics 516, 518 and Statistics 517

3 units - Mathematics 518 (with a grade of "B" or higher)

3 units - Computer Science 231 or 217 or 235 or Data Science 211

18 units - Breadth Requirement: Options from Faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other Faculties.

51 units - Options

¹These courses are recommended for students in the Honours Mathematics program.

Note: A grade of "B" or higher in Mathematics 518 is required for the Honours program. Students who do not achieve a grade of "B" or higher in Mathematics 518 may still graduate from the regular BSc in Mathemat-

ics. Whenever applicable and feasible, students in the Honours program should take the advanced version of any course in the field.

Recommendations

Students should consult with the Associate Head - Undergraduate or the Undergraduate Science Centre (USC) on a regular basis throughout their program.

Concentrations

Students may choose to focus their program on one of three areas of interest by including a specified set of courses into their Major degree. Students must apply for concentrations via their Student Centre. Concentrations will appear on the transcript.

Students should carefully plan their course selections to ensure that prerequisites for upper-level courses are obtained. Consultation with the Associate Head - Undergraduate or the Undergraduate Science Centre (USC) on a regular basis is highly recommended.

A. Concentration in Statistics

Students must complete the same requirements as those in the Major program with some substitutions. For clarity, the requirements for the entire program are listed below.

- 6 units - Mathematics 211 or 213; Mathematics 311 or 313
- 6 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277
- 3 units - One of Statistics 205 and either Mathematics 271 or 273
- 6 units - Statistics 321 and 323
- 21 units - Courses labelled Statistics at the 400 level or higher¹ or Actuarial Science 511
- 3 units - Statistics 517
- 3 units - Computer Science 231 or 217 or 235 or Data Science 211
- 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
- 54 units - Options

¹It is recommended that students select one of Statistics 423 or 425, Statistics 429, and one of Statistics 431 or 505.

Honours degree with a Concentration in Statistics

Students wishing to complete an Honours degree in Mathematics with a Concentration in Statistics must have credit for both Mathematics 518 (with a grade of "B" or higher) and Statistics 517. The requirement of Mathematics 518 replaces 3 units of Options.

- 6 units - Mathematics 211 or 213; Mathematics 311 or 313
- 6 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277
- 3 units - One of Statistics 205 and either Mathematics 271 or 273

- 6 units - Statistics 321 and 323
- 21 units - Courses labelled Statistics at the 400 level or higher¹ or Actuarial Science 511
- 3 units - Statistics 517
- 3 units - Mathematics 518 (with a grade of "B")
- 3 units - Computer Science 231 or 217 or 235 or Data Science 211
- 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
- 51 units - Options

¹It is recommended that students select one of Statistics 423 or 425, Statistics 429, and one of Statistics 431 or 505.

B. Concentration in Computational Applied Mathematics

Students must complete the same requirements as those in the Major program with some substitutions. For clarity, the requirements for the entire program are listed below.

- 3 units - Mathematics 211 or 213
- 6 units - Mathematics 311 and 361 or 313 and an Option
- 6 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277
- 3 units - Mathematics 271 or 273
- 6 units - Statistics 321 and 323
- 6 units - Mathematics 367 and 376; or Mathematics 375 and 377
- 3 units - Mathematics 413
- 3 units - Mathematics 307
- 9 units - Mathematics 325, 391 and 493
- 3 units - Mathematics 335 or 355
- 3 units - Computer Science 217 or 231 or Data Science 211
- 3 units - Computer Science 219 or 233
- 3 units - Computer Science 331
- 3 units - Software Engineering 300
- 3 units - Mathematics 516 or 518 or Statistics 517
- 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
- 39 units - Options

Honours degree with a Concentration in Computational Applied Mathematics

Students wishing to complete an Honours degree in Mathematics with a Concentration in Computational Applied Mathematics must complete the above requirements. However, Mathematics 518 (with a grade of "B" or higher) is specifically required and 3 units of Options is replaced by 3 units in the field of Mathematics at the 500 level.

- 3 units - Mathematics 211 or 213
- 6 units - Mathematics 311 and 361 or 313 and an Option
- 6 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277
- 3 units - Mathematics 271 or 273
- 6 units - Statistics 321 and 323
- 6 units - Mathematics 367 and 376; or Mathematics 375 and 377
- 3 units - Mathematics 413
- 3 units - Mathematics 307
- 9 units - Mathematics 325, 391 and 493
- 3 units - Mathematics 335 or 355
- 3 units - Computer Science 217 or 231 or Data Science 211
- 3 units - Computer Science 219 or 233
- 3 units - Computer Science 331
- 3 units - Software Engineering 300
- 3 units - Mathematics 518 (with a grade of "B")
- 3 units - From the Field of Mathematics at the 500 level.
- 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
- 36 units - Options

C. Concentration in Mathematical Finance and Risk Management

Students must complete the same requirements as those in the Major program with some substitutions. For clarity, the requirements for the entire program are listed below.

- 3 units - Mathematics 211 or 213
- 6 units - Mathematics 311 and 361; or 313 and an Option
- 6 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277
- 3 units - Mathematics 271 or 273
- 9 units - Statistics 321, 323, 507
- 6 units - Mathematics 367 and 376; or Mathematics 375 and 377
- 3 units - Mathematics 413
- 3 units - Mathematics 307
- 3 units - Mathematics 335 or 355
- 15 units - Mathematics 383, 391, 493, 581 and 583
- 3 units - Computer Science 217 or 231 or Data Science 211
- 3 units - Computer Science 219 or 233
- 3 units - Mathematics 516 or 518 or Statistics 517
- 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

- 36 units - Options

Honours degree with a Concentration in Mathematical Finance and Risk Management

Students wishing to complete an Honours degree in Mathematics with a Concentration in Mathematical Finance and Risk Management must complete the above requirements. However, Mathematics 518 (with a grade of "B" or higher) is specifically required.

- 3 units - Mathematics 211 or 213
- 6 units - Mathematics 311 and 361; or 313 and an Option
- 6 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277
- 3 units - Mathematics 271 or 273
- 9 units - Statistics 321, 323, 507
- 6 units - Mathematics 367 and 376; or Mathematics 375 and 377
- 3 units - Mathematics 413
- 3 units - Mathematics 307
- 3 units - Mathematics 335 or 355
- 15 units - Mathematics 383, 391, 493, 581 and 583
- 3 units - Computer Science 217 or 231 or Data Science 211
- 3 units - Computer Science 219 or 233
- 3 units - Mathematics 518 (with a grade of "B")
- 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
- 36 units - Options

Recommendations

Students should consult with the Associate Head - Undergraduate or the Undergraduate Science Centre (USC) on a regular basis throughout their program.

Required Courses - Minor Program

30 units from the Field of Mathematics with at least 18 units at the 300 level or higher.

Note: The Mathematics minor is not available to Actuarial Science Majors and General Mathematics Majors. The Mathematics minor is not available in combination with any other Minor program offered by the Department of Mathematics and Statistics.

4.5.2 Programs in Statistics

Courses constituting the Field of Statistics

- Mathematics 211, 213, 249, 265, 267, 273, 275, 277, 311, 313, 367
- Statistics 205, 321, 323
- All Statistics courses numbered 400 or higher
- Actuarial Science 437, 511

Required Courses - Minor Program

- 6 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277
- 6 units - Mathematics 211 or 213; Mathematics 311 or 313
- 6 units - Statistics 321 and 323
- 12 units - Selected from any courses labelled Statistics at the 400 level or Actuarial Science 437 or 511.

Note: The Minor in Statistics is not available to students majoring in Mathematics, Actuarial Science or General Mathematics. Students in the Mathematics program have the option of doing the concentration in Statistics. Students outside the department can complete only one minor offered by the Department of Mathematics and Statistics.

4.5.3 Programs in Actuarial Science

Courses constituting the field of Actuarial Science

- Mathematics 211, 213, 249, 265, 267, 271, 273, 275, 277, 311, 313, 367
- All courses labelled Actuarial Science
- Statistics 321, 323, 421, 429, 505, 507, 533, 543

Courses in Risk Management and Insurance are not included in the field, but are relevant and are recommended electives for Actuarial Science students. Interested students should consult the Department or the Chair in Risk Management and Insurance in the Haskayne School of Business.

Actuarial Science courses, along with Statistics 421, 429, 505 and 507, cover significant portions of the course of study for the early Casualty Actuarial Society Examinations and Society of Actuaries Examinations/Courses. Students are advised to select additional courses in Economics, Finance, Risk Management and Insurance, and Statistics as electives in order to complete the course of study for these professional examinations, and also to prepare for the advanced Casualty Actuarial Society Examinations/Society of Actuaries Examinations/Courses. Students should speak with a Departmental advisor for guidance.

Students who wish to pursue possible credit towards the Society of Actuaries VEE Accounting and Finance requirements are recommended to take Accounting 217 and Finance 317, respectively. Such students must be in good standing and in the third or fourth year of the Actuarial Science program. Certain other prerequisites for these courses may be waived, but Economics 201 and 203 are essential for Finance 317. Students should contact an advisor in Haskayne for registration approval. (Note, although sufficiently high grades in Accounting 217 and Finance 317 should satisfy the Society of Actuaries' requirements, ultimately the Society of Actuaries will make this determination.

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses).

- 3 units - Mathematics 211 or 213
- 3 units - Mathematics 249 or 265 or 275
- 3 units - Mathematics 267 or 277
- 3 units - Mathematics 311 or 313
- 6 units - Statistics 321 and 323
- 6 units - Mathematics 367 and one from the field of Actuarial Science at the 300 level or higher
- 3 units - Computer Science 217 or 231 or 235 or Data Science 211
- 12 units - Actuarial Science 325, 327, 427 and 527

21 units - Selected from:

- Courses labelled Actuarial Science
- Statistics 429, 505, 507, 533, 543

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

42 units - Options

Note: Not every 400- and 500-numbered Statistics and Actuarial Sciences course is offered every year. Students in third year should ensure they take a sufficient number of these in order to graduate at the end of their fourth year.

Required Courses - Honours Program

In addition to the requirements specified by the Faculty of Science (see Section 3), students are required to complete the following program of study:

- 3 units - Mathematics 271 or 273
- 9 units - Mathematics 249 or 265, 267, 367
- 6 units - Mathematics 211 or 213; Mathematics 311 or 313
- 6 units - Statistics 321 and 323
- 3 units - Computer Science 217 or 231 or 235 or Data Science 211
- 12 units - Actuarial Science 325, 327, 427 and 527
- 3 units - Statistics 429
- 21 units - Selected from:

- All Actuarial Science courses;
- Statistics 505, 507, 533, 543

6 units - Selected from:

- All Actuarial Science courses;
- Courses in Economics at the 400 level or above;
- Courses in Risk Management and Insurance at the 300 level or above;
- Courses in Statistics at the 400 level or above.

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

33 units - Options

Recommendations

- Not every 400- and 500-numbered Statistics and Actuarial Sciences course is offered every year. Students should consult with the department office to plan for the upcoming cycle of offered courses as well as for a progress assessment on a regular basis throughout their program.
- Actuarial Science 425 is recommended for students in the Actuarial Science program.
- The following courses are some of the recommended options for Actuarial Science students in second (or subsequent) years:
 - Communications Studies 363
 - At least one of Economics 201 and 301. At least one of Economics 203 and 303
 - Risk Management and Insurance 317 (strongly recommended).
 - Options in first year should be selected with these second year options in mind, in order to satisfy prerequisites. At least one course in Economics is strongly recommended.
- The following courses are some of the recommended options for Actuarial Science students in third and fourth years:
 - Courses in Risk Management and Insurance at the 400 level or above, especially 439 and/or 449.
- While a university program will prepare you to join the ranks of the actuarial profession, it is also important for a student to begin writing the professional examinations of the Society of Actuaries and/or Casualty Actuarial Society as soon as possible - but normally not before the end of second year studies - if they wish to find employment in the actuarial industry after graduation. The professional examinations are normally offered on campus twice a year. For more information, please contact a Departmental advisor.

Required Courses - Minor Program

- 9 units - Mathematics 249 or 265 or 275; Mathematics 267 or 277; Mathematics 211
- 6 units - Statistics 321 and 323
- 3 units - Mathematics 367 or one from the field of Actuarial Science at the 300 level or higher
- 6 units - Actuarial Science 325 and 327
- 6 units - Selected from the following:
- All Actuarial Science courses; Statistics 421, 507, 533, 543

Note: The Minor in Actuarial Science is not available to students majoring in Mathematics or General Mathematics. Students outside the department can complete only one minor offered by the Department of Mathematics and Statistics.

4.5.4 Actuarial Science Co-operative Education Program

Admission

See the subsection on Co-operative Education/Internship Programs in Section 3 (Faculty Regulations) for information on applying. Student should also review the major section on "Co-operative Education/Internship" of this Calendar.

The Actuarial Science Co-operative Education programs are five-year degree programs which include 12 months of supervised work experience in various companies and government agencies. Students who wish to enter the Actuarial Science Co-operative Education program are urged to discuss their pre-admission course selection with a Program Advisor in the Undergraduate Science Centre (USC) as early in their program as possible.

Students should normally have successfully completed at least 48 units appropriate to their degree program, including Mathematics 321 or Statistics 321, Statistics 323 and Actuarial Science 325 and 327, before commencing the first co-operative education placement. Students must have a minimum grade point average of 2.70 in the field before commencing the Co-operative Education major program, or a minimum grade point average of 3.30 in the field before commencing the Co-operative Education honours program.

Requirements

120 units - Same as Actuarial Science Majors or Honours

12 months - Co-operative Education work terms (Co-operative Education 501.01, 501.02, 501.03)

A minimum grade point average of 2.70 must be maintained for continuation in the BSc degree programs. A minimum grade point average of 3.30 must be maintained for continuation in the BSc Honours degree program.

Work Term Assessment

The mandatory work term courses, Co-operative Education 501.01, 501.02, 501.03 and the optional course, Co-operative Education 501.04, are graded on a credit (CR) or fail (F) basis. A positive assessment requires satisfactory performance on each of the following items:

- (a) The Co-operative Education Co-ordinator's evaluation of job performance, which is based on an on-site visit where practical.
- (b) The employer's evaluation of job performance.
- (c) A work term report prepared by the student and evaluated by the Faculty.

Notes:

- The Faculty may approve registration in Co-operative Education 501.04 in conjunction with an optional (fourth) work term.
- Students should consult the Actuarial Science Co-op Co-ordinator and Co-

operative Education and Internship Co-ordinator for program planning.

4.5.5 General Mathematics Program

Courses constituting the field of General Mathematics

- All courses labelled Mathematics, Statistics, and Actuarial Science.

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses).

12 units - Mathematics 211 or 213; Mathematics 311 or 313; Mathematics 249 or 265 or 275; Mathematics 267 or 277

3 units - Computer Science 217 or 231 or 235 or Data Science 211

33 units - Selected from the Field of General Mathematics

3 units - Selected from the Field of General Mathematics at the 400 level or above

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

51 units - Options

Recommendations

Students should consult with the Associate Head - Undergraduate or the Undergraduate Science Centre on a regular basis throughout their program.

4.5.6 Double Major and Major/Minor Combinations

A Major in General Mathematics cannot be combined with any other Major or Minor program offered by the Department of Mathematics and Statistics.

A Major in Mathematics, General Mathematics or Actuarial Science cannot be combined with any Minor offered by the Department of Mathematics and Statistics.

Students may not complete more than one Minor program offered by the Department of Mathematics and Statistics.

A Double Major program combining Mathematics and Actuarial Science may be completed in the following manner:

- The minimum requirements for both major fields must be fulfilled.
- The following 21 units will be counted towards both majors: Mathematics 211 or 213, Mathematics 249 or 265 or 267, Mathematics 267 or 277, Mathematics 311 or 313, Mathematics 367, Statistics 321, 323.
- All remaining courses labelled ACSC or Statistics 421, 429, 505, 533 or 543 will only be counted towards the Actuarial Science Major.
- All remaining courses labelled MATH or STAT (excluding the Statistics courses specified above) will only be counted towards the Mathematics Major.

4.5.7 Concurrent Degree in General Mathematics in Education and BEd

Admission

Students accepted into the BSc (General Mathematics)/BEd concurrent degree program must meet the requirements for admission into the General Mathematics Program. Students interested in Science education should consider the BSc (Natural Sciences)/BEd concurrent degree program. Students registered in undergraduate degree programs in other faculties of the University of Calgary who wish to transfer to the BEd concurrent program can do so if they have completed no more than 36 units. Students in the concurrent degree program should also consult the information on the program in the Werklund School of Education portion of the calendar.

Note: Admission to the program is competitive and meeting the minimum requirements does not guarantee admission. Students interested in the concurrent degree program should consult the Department of Mathematics and Statistics and the Werklund School of Education at the earliest possible opportunity.

Requirements

The 90 units Faculty of Science part of the requirements for a major in the concurrent degree program in General Mathematics and Education are:

3 units - Education 201

3 units - English literature

12 units - Mathematics 211 or 213; Mathematics 311 or 313; Mathematics 249 or 265 or 275; Mathematics 267 or 277

3 units - One of Mathematics 205, 271, 273 or Statistics 205

3 units - Mathematics 319

3 units - Computer Science 217 or 231 or 235 or Data Science 211

24 units) - Selected from the Field of General Mathematics

3 units - Selected from the Field of General Mathematics at the 400 level or higher

36 units - Options. See the Werklund School of Education section of the Calendar for how these options are to be distributed.

Notes:

- Students who withdraw from the Education component of the concurrent degree program will be required to complete additional courses to obtain the BSc in General Mathematics.
- The General Mathematics in Education degree is only awarded to students who complete all five years of the degree program. Students seeking the concurrent degree should follow the recommended course sequence exactly.

Recommended Course Sequence

Although this course sequence appears flexible with respect to course choices, students should carefully plan their course selections to ensure that prerequisites for upper-level courses are obtained. For example, students

interested in taking senior statistics courses should take Statistics 321 and 323 in Year 2; students interested in senior Mathematics courses should take Mathematics 315 or 335 or 355 or 376 in Year 2.

First Year

1. Education 201 and 3 units - English literature

2. Mathematics 249 or 265 or 275 and 211 or 213

3. Mathematics 267 or 277 and 3 units from: Mathematics 205, 271, 273, Statistics 205

4. Computer Science 217 or 231 or 235 or Data Science 211

5. Open option: 9 units

Second Year

1. Mathematics 311 or 313

2. 12 units - Selected from the Field of General Mathematics

3. 3 units - Mathematics 319

4. 12 units - Open options

Third Year

1. 12 units - Selected from the Field of General Mathematics

2. 3 units - Selected from the Field of General Mathematics at the 400 level or higher

3. 12 units - Open options

4. 3 units - Senior-level open options

Fourth Year

1. Education 420/427

2. Education 430/435

3. Education 440/445

4. Education 450/456

5. Education 460/465

Fifth Year

1. Education 520/525

2. Education 530/535

3. Education 540/546

4. Education 551/556

5. Education 560

It is recommended that some courses in the history or philosophy of science and technology be included in the program. Possibilities are: Engineering 481, Science, Technology and Society 325, 341, History 371, Philosophy 367. It is the responsibility of the student to include the prerequisites for such courses.

4.5.8 Combined BComm (Business)/BSc (Actuarial Science or Mathematics) Program

Requirements

Students must meet the program requirements, as outlined in the regulations for each Faculty, with the following exceptions.

In these combined degrees, Statistics 321 and 323 replace Statistics 213 and 217, respectively, which are required in the Bachelor of Commerce program. Normally, courses taken to satisfy the Bachelor of Science (Actuarial Science) or Bachelor of Science (Mathematics) programs in the combined degree may be used, respective of level, to satisfy some or all of the non-commerce

breadth requirements in the Bachelor of Commerce program. It is recommended that students consult with advisors in the Hasckayne Undergraduate Programs Office and the Undergraduate Science Centre.

4.5.9 Environmental Science - Statistics Concentration

Students may pursue a BSc program in Environmental Science with a concentration in Statistics. This is a single-degree, four-year program offered by the Faculty of Science with collaboration from the Faculty of Arts. Program details are listed in 4.6 Non-Departmental Programs. Since this is a multidisciplinary program with restricted entry, students should consult the Director of the Environmental Science program at their earliest opportunity.

4.5.10 Suspended Programs

Admission to the following programs has been suspended.

Students previously admitted to a suspended program will be supported in the completion of their program. As such, program requirements are listed below for the reference of students already admitted to these programs.

4.5.10.1 Programs in Applied Mathematics

Admission to these programs has been suspended as of Fall 2017.

Courses Constituting the Field of Applied Mathematics

- Mathematics 211, 213, 249, 265, 267, 273, 275, 277, 307, 311, 313, 315, 325, 335, 361, 355, 367, 375, 376, 377, 383, 391, 403, 413, 431, 445, 447, 476, 493, 501, 503, 505, 521, 545, 581, 583
- Statistics 321, 323

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses).

3 units - Mathematics 211 or 213

3 units - Mathematics 249 or 265 or 275

9 units - Mathematics 267 or 277 and Mathematics 311 or 313 and Statistics 321

6 units - Mathematics 367 and any course offered in the Field of Applied Mathematics at the 300 level or higher

3 units - Mathematics 376

3 units - Computer Science 231 or 217 or 235

3 units - Mathematics 315 or Statistics 323

6 units - Two from:

- Physics 211 or 221 or 227, 223 or 255 or 355
- Astrophysics 303
- Chemistry 201 or 211 and 203 or 213
- Computer Science 233, 313, 331
- Biology 241, 243
- Geophysics 355, 565

6 units - Mathematics 361 and 413

3 units - Mathematics 335 or 355
 3 units - Mathematics 445 or 447
 3 units - Mathematics 307
 3 units - Mathematics 391
 3 units - Applied Mathematics 425 or 476 or 493

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

45 units - Options

Note: Mathematics 311 and 411 may be replaced by Mathematics 313 and a field course at the 300 level or higher, with permission.

Required Courses - Honours Program

In addition to the requirements specified by the Faculty of Science (see Section 3), students are required to complete the following program of study:

3 units - Mathematics 273
 9 units - Mathematics 249 or 265, 267, 367
 3 units - Statistics 321
 6 units - Mathematics 211 or 213 and 311 or 313
 3 units - Mathematics 315 or Statistics 323
 3 units - Mathematics 431 or 383
 3 units - Mathematics 355
 3 units - Mathematics 447
 3 units - Mathematics 545*
 3 units - Mathematics 307
 12 units - Mathematics 376, 391, 476 and 413
 3 units - Computer Science 217 or 231 or 235
 6 units - Any 500-level or above course in Applied Mathematics

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

42 units - Options

*No substitutions will be allowed for Mathematics 545.

Note: Mathematics 213 and 313 are the preferred sequence for the honours program.

Note: The following substitutions allow students to enter the honours program later in their studies:

(a) The calculus sequence Mathematics 265, 267, 367 may be replaced by Mathematics 281, 283, 381 or an equivalent sequence with permission from the Department of Mathematics and Statistics;

(b) Mathematics 273 may be replaced by a grade of "B+" or better in Mathematics 271 with permission;

(c) Mathematics 213 may be replaced by a grade of "B+" or better in Mathematics 211 or 221 with permission;

(d) Mathematics 355 may be replaced by a grade of "B+" or better in Mathematics 335 with permission.

Concentrations

Students may focus their program on one of two areas of interest by including a specified set of courses into their Major degree. Successful completion will mean that the area of concentration will appear on the transcript. Students should carefully plan their course selections to ensure that prerequisites for upper-level courses are obtained. Consultation with the Undergraduate Director on a regular basis is highly recommended.

A. Concentration in Mathematical Finance and Risk Management

3 units - Statistics 323
 6 units - Computer Science 231 and 233; or Computer Science 235 and Actuarial Science 325
 3 units - Mathematics 307
 3 units - Mathematics 335 or 355
 3 units - Mathematics 445 or 447
 6 units - Statistics 421 and 507
 3 units - Mathematics 313 or 361
 18 units - Mathematics 381, 391, 413, 493, 581, and 583
 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
 33 units - Options

B. Concentration in Computational Applied Mathematics

3 units - Statistics 323
 6 units - Computer Science 231 and 233 or 235 and 3 units senior-level Computer Science option or Applied Mathematics option
 3 units - Mathematics 271 or 273
 3 units - Computer Science 331
 3 units - Software Engineering 301
 3 units - Mathematics 307
 3 units - Mathematics 335 or 355
 3 units - Mathematics 445 or 447
 3 units - Mathematics 361
 15 units - Mathematics 325, 391, 413, 493, and 503
 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
 3 units - choose one of Biology 241, Chemistry 201 or 203 or 211, Physics 211, 221 or 227
 39 units - Options

Required Courses - Minor Program

3 units - Mathematics 211 or 213
 3 units - Mathematics 249 or 265 or 275
 3 units - Mathematics 267 or 277
 3 units - Mathematics 311 or 313
 6 units - Mathematics 271 or 273 and Mathematics 367
 3 units - Mathematics 375 or 376
 9 units - Any courses from the Field of Applied Mathematics at the 300 level or higher

4.5.10.2 Programs in Pure Mathematics

Admission to these programs has been suspended as of Fall 2017.

Courses Constituting the Field of Pure Mathematics

- Mathematics 211, 213, 249, 265, 267, 271, 273, 307, 311, 313, 315, 318, 319, 322, 327, 335, 355, 361, 367, 371, 376, 429, 431, 445, 447, 501, 505, 511, 515, 521, 525, 527, 545
- Statistics 321, 323

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses).

3 units - Mathematics 211 or 213
 3 units - Mathematics 249 or 265 or 275
 9 units - Mathematics 267 or 277 and Mathematics 311 or 313 and Statistics 321
 6 units - Mathematics 367 and any course offered in the Field of Pure Mathematics at the 300 level or higher
 3 units - Mathematics 271 or 273
 3 units - Mathematics 315
 3 units - Computer Science 217 or 231 or 235
 3 units - Mathematics 376
 3 units - Statistics 323 or Computer Science 233 or Physics 211 or 221
 3 units - Mathematics 361
 3 units - Mathematics 431
 3 units - Mathematics 335 or 355
 3 units - Mathematics 445 or 447
 3 units - Mathematics 307
 3 units - Mathematics 318, 322, 327, 371, or 515

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

48 units - Options

Note: Mathematics 311 and 411 may be replaced by Mathematics 313 and a field course at the 300 level or higher, with permission.

Required Courses - Honours Program

In addition to the requirements specified by the Faculty of Science (see Section 3), stu-

dents are required to complete the following program of study:

3 units - Mathematics 273

9 units - Mathematics 213 and 313 and Statistics 321

9 units - Mathematics 249 or 265, 267, 367

3 units - Computer Science 231 or 217 or 235

3 units - Mathematics 315

3 units - Mathematics 431

9 units - Mathematics 355, 447 and 545*

12 units - Four courses in the Field of Pure Mathematics at the 400 level or higher with at least 3 unites at the 500 level or higher

6 units - Two from:

Mathematics 376 or Statistics 323, Computer Science 233, 313, 331, Physics 211 or 221 or 227, 223, Philosophy 279 or 377

15 units - Selected from the Field of Pure Mathematics

6 units - Selected from any course labelled Mathematics or Statistics at the 300 level or above

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

24 units - Options

*No substitutions will be allowed for Mathematics 545.

Required Courses - Minor Program

30 units - Selected from the Field of Pure Mathematics.

4.5.10.3 Programs in Statistics

Admission to these programs has been suspended as of Fall 2017.

Courses constituting the field of Statistics

- Mathematics 211, 213, 249, 253, 265, 267, 273, 275, 277, 311, 313, 367
- Statistics 205, 321, 323
- All Statistics courses numbered 400 or higher
- Actuarial Science 437, 511

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses).

3 units - Mathematics 211 or 213

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 267 or 277

9 units - Mathematics 311 or 313, Statistics 321 and 323

6 units - Mathematics 367 and one from the Field of Statistics at the 300 level or higher

3 units - Computer Science 231 or 217 or 235

9 units - Statistics 421, 429 and 517

18 units - Selected from any courses in the Field of Statistics at the 400 level or above

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

48 units - Options

Required Courses - Honours Program

Students are expected to enrol in honours courses upon their decision to become honours majors. In addition to the requirements specified by the Faculty of Science (see Section 3), students are required to complete the following program of study:

3 units - Mathematics 273

9 units - Mathematics 249 or 265, 267, 367

12 units - Mathematics 211 or 213, Mathematics 311 or 313, Statistics 321 and 323

3 units - Computer Science 217 or 231 or 235

9 units - Statistics 421, 429 and 517

24 units - Selected from any courses in the Field of Statistics at the 400 level or above

3 units - Mathematics 335 or 355

3 units - Mathematics 445 or 447

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

36 units - Options

Note: The following substitutions allow students to enter the honours program later in their studies:

(a) Mathematics 273 may be replaced by a grade of "B+" or better in Mathematics 271 with permission.

(b) Mathematics 213 may be replaced by a grade of "B+" or better in Mathematics 211 or 221 with permission.

(c) Mathematics 213 may be replaced by a grade of "B+" or better in Mathematics 211 or 221 with permission.

4.6 Non-Departmental Programs: Data Science, Environmental Science, Nanoscience, Natural Sciences, Neuroscience

4.6.1 Data Science

Programs Offered in Data Science

- Minor in Data Science

Program vs. Faculty Regulations

Regulations governing the Minor in Data Science are a combination of general Faculty of Science regulations and the additional program specific regulations listed below. It is essential for students to be familiar with both sets of regulations. It is helpful to read section 3 (Faculty Regulations) first.

Program Information

Student enquiries: Undergraduate Science Centre (USC) – Energy Environment and Experiential Learning (EEEL) 445

Website: <http://www.ucalgary.ca/science/data-science/>

Enrolment Limitations

Enrolment Limitations in Program

The number of spaces in the Data Science Minor is limited and entry is competitive.

Enrolment Limitations in Courses

In the first instance, enrolment in Data Science courses is available to Data Science Minors who meet the prerequisite(s). Depending on space availability, other students who meet the prerequisite(s) may register in a course. Consult the Schedule Builder in the Student Centre for details regarding enrolment in these courses.

4.6.1.1 Programs in Data Science

Admission

In order to be admitted to the Minor, student must have successfully completed a minimum of 15 units. Additionally, students require a minimum GPA of 3.00 calculated using the most recent course work to a maximum of 30 units. See A.5.3 for GPA computation guidelines.

Students must apply online via their Student Centre.

Students will be considered for admission on a competitive basis, and meeting the minimum requirements does not guarantee admission.

See also 3.2 Admission.

Courses Constituting the Field of Data Science

- All courses labelled Data Science
- Biology 315
- Business Technology Management 431, 531
- Computer Science 217, 231, 235, 329, 471, 481, 583
- Ecology 425
- Economics 395, 495, 497
- Engineering 233, 319
- Geology 597
- Geomatics Engineering 563
- Geophysics 517, 549, 557
- Linguistics 560
- Management Studies 391
- Mathematics 211
- Medical Science 401, 519
- Political Science 399
- Psychology 300, 301
- Sociology 311, 315, 355
- Software Engineering 519.47
- Statistics 205, 217, 321, 323, 327, 423, 425, 429, 431, 505, 519, 523, 531, 533, 541, 543

Required Courses - Minor

3 units - Data Science 201

3 units - One of Data Science 211, Computer Science 217, 231, 235

6 units - Statistics Requirement fulfilled by one of the following options:

- a. 6 units - Data Science 305 and one of: Statistics 205, 217, 327, Biology 315, Economics 395, Engineering 319, Linguistics 560 or Political Science 399
- b. 6 units - Statistics 321 and 323
- c. 6 units - Psychology 300 and 301
- d. 6 units - Sociology 311 and 315

3 units - One of Data Science 311, Computer Science 471

3 units - Data Science 501

12 units - Additional Courses from the Field of Data Science with no more than 6 units from courses in a single subject area

4.6.2 Environmental Science

Programs Offered

BSc in Environmental Science

BSc Honours in Environmental Science

The Environmental Science program is a single, four-year multidisciplinary program offered by the Faculty of Science with collaboration from the Faculty of Arts. This multidisciplinary program is flexible in scope. Students must select one of six areas of concentration: Biological Sciences, Chemistry, Geography, Geology, Physics, or Statistics.

For program advice, see the Program Director and/or the Undergraduate Science Centre (USC).

Program vs Faculty Regulations

The Environmental Science program is governed by a combination of general Faculty of Science and Faculty of Arts regulations, as well as the additional program specific regulations listed below. In cases where the regulations of the two Faculties are different, students in the Environmental Science program will follow the regulations listed in the Faculty of Science section.

It is essential for students to be familiar with all regulations and it is helpful to read Section 3 of the Faculty of Science regulations first.

Program Information

Office: Energy Environment Experiential Learning (EEEL) 426

Telephone: 403.220.8979

Website: ucalgary.ca/ensc

Email: ensc@ucalgary.ca

Admission and Enrolment Limitations

Enrolment is limited in the Environmental Science program. Students may be admitted directly into the Environmental Science program and, once admitted, a place in the program is assured for students advancing through the second and subsequent years with satisfactory performance. Admission will be granted for Fall Term only and will be based upon academic merit.

As space permits, a certain number of students who wish to gain admission to

the second or third year of the program by transferring from other institutions or programs will be accepted. Any student requesting admission at this level must meet a competitive grade point average calculated over the most recent course work, to a maximum of 30 units. The competitive grade point average will be established annually and will not be lower than 2.50. Students applying for admission must meet the competitive admission average of their chosen concentration.

Courses Constituting the Fields in Areas of Concentration

For each area of concentration, the field will be Environmental Science 401, 501, 502, 504, 505 plus the total of all courses that constitute the major field offered by the department in which the concentration is taken.

4.6.2.1 Program Requirements

(a) Major Program

The student must present an approved list of courses completed with passing grades. This list, referred to as the program, must satisfy the following conditions:

A. (a) The program must contain the equivalent of at least 120 units, with at least 72 units numbered 300 or above.

(b) The GPA for the program must be at least 2.00 and the GPA for courses in the major field must also be at least 2.00.

(c) The program may not contain more than 18 units "D" or "D+" grades, or more than 6 units in the field with a "D" or "D+" grade.

B. (a) The program may not contain more than 60 units credits transferred from other institutions.

(b) A maximum of 24 units transfer credits are allowed in the field.

C. The program must contain:

(a) At least 54 units from outside the major field, of which at least 18 units must be from outside the Faculty of Science. Of these 18 units, students must take at least 6 units from the Faculty of Arts. Environmental Science 503 may be counted among the 18 units from other faculties. A list of recommended courses is available at ucalgary.ca/ensc/academicadvice.

(b) Environmental Science 401, 501, 502, 503

(c) Biology 241, 243, 313

(d) Ecology 417 or 419

(e) Specific Science and Arts courses, depending on the area of concentration chosen by the student.

The entire 120 units, including the courses in Science and Arts specific to each concentration, are as follows:

Concentration in Biological Sciences

21 units - Biology 241, 243, 311, 313, 315, 331, 371

3 units - Biochemistry 393

6 units - Options from the Field of Biological Sciences²

3 units - Ecology 417 or 419

3 units - Ecology 425

6 units - Chemistry 201 or 211 and 203 or 213

15 units - Chemistry 311, 315, 351, 353 and one of 321 or 515

6 units - Mathematics 249 or 265 or 275; and Mathematics 211 or 213 or 267 or 277

6 units - Physics 211 or 221 and 223; or Geology 201 and 202 or 203

3 units - Geography 211 or Geology 201

3 units - Geography 415¹

15 units - Environmental Science 401, 501, 502, 503

9 units - Options from faculties other than the Faculty of Science, as noted in 4.6.1.1C (a)²

6 units - Options from the Faculty of Arts²

15 units - Options

¹Environmental Science students may contact the Department of Geography for consent to register in this course.

²See ucalgary.ca/ensc/academicadvice for a list of recommended courses.

³Environmental Science 201 is highly recommended to be completed as an option in the program.

Concentration in Chemistry

9 units - Biology 241, 243, 313

3 units - Ecology 417 or 419

6 units - Chemistry 201 or 211 and 203 or 213

33 units - Chemistry 311, 315, 321, 351, 353, 371, 431, 515; 423 or 425; 433 or 373; 521 or 541

3 units - Option from the Field of Chemistry

3 units - Statistics 327 or Biology 315

3 units - Geology 201

6 units - Mathematics 249 or 265 or 275; and Mathematics 267 or 277

9 units - Physics 211 or 221; and 223 and 323

15 units - Environmental Science 401, 501, 502, 503

9 units - Options from faculties other than the Faculty of Science, as noted in 4.6.1.1C (a)¹

6 units - Options from the Faculty of Arts¹

15 units - Options^{1,2}

¹See ucalgary.ca/ensc/academicadvice for a list of recommended courses.

²Environmental Science 201 is highly recommended to be completed as an option in the program.

Concentration in Geography and Arts

9 units - Biology 241, 243, 313

3 units - Ecology 417 or 419

6 units - Chemistry 203 and 321

12 units - Geography 308, 310, 408, and 412

6 units - Geography 500 or 502 or 503 or 504 or 506 or 510

9 units - Geography 380; and 482 or 484; and 567 or 584 or 586

6 units - Geography 324; and 426 or 530 or 532 or 538

9 units - Geography 352; 483; and 454 or 458

3 units - Statistics 327 or Biology 315

6 units - Economics 201 and 377
 6 units - Mathematics 249 or 265 or 275; and Mathematics 211 or 213 or 267 or 277
 15 units - Environmental Science 401, 501, 502, 503
 3 units - Anthropology 203 or Sociology 201
 3 units - Anthropology 313 or 355 or 395 or Environmental Science 201 or Indigenous Studies 201 or 317 or Sociology 307²
 6 units - Options from the Faculty of Arts¹
 18 units - Options^{1,2}

¹See ucalgary.ca/ensc/academicadvice for a list of recommended courses.

²Environmental Science 201 is highly recommended.

Concentration in Geology

9 units - Biology 241, 243, 313
 3 units - Ecology 417 or 419
 9 units - Chemistry 201 or 211; 203 or 213; and 321
 39 units - Geology 201, 202 or 203, 313 or 423, 323, 333 or 311, 337, 341 or 343, 353 or 373, 381, 401, 475, 403 or 503, and 505
 9 units - Mathematics 211 or 213; and 249 or 265 or 275; and 253 or 267 or 277
 6 units - Physics 211 or 221, and 223
 3 units - Statistics 327 or Biology 315
 15 units - Environmental Science 401, 501, 502, 503
 9 units - Options from faculties other than the Faculty of Science, as noted in 4.6.1.1C (a)¹

6 units - Options from Faculty of Arts¹
 12 units - Options²

¹See ucalgary.ca/ensc/academicadvice for a list of recommended courses.

²Environmental Science 201 is highly recommended to be completed as an option in the program.

Concentration in Physics

9 units - Biology 241, 243, 313
 3 units - Ecology 417 or 419
 6 units - Chemistry 203 and 321
 3 units - Geology 201
 18 units - Mathematics 211 or 213; 275¹ or 281; 277¹ or 283; 375¹, 377¹, 311
 36 units - One of four sequences of Physics courses:
 Option I: Physics 227, 355, 229, 341, 343, 397, 443, 449, 455, 561, 663 and one of Physics 375, 457, 497, 501², 507, 509, 543, or 593 or 599
 Option II: Physics 223, 227, 323, 229, 341, 343, 397, 443, 449, 455, 561 and one of Physics 375, 457, 497, 501², 507, 509, 543, 593, 599 or 663
 Option III: Physics 211 or 221, 355, 321, 229, 341, 343, 397, 443, 449, 455, 561 and one of 375, 457, 497, 501², 507, 509, 543, 593, 599 or 663
 Option IV: Physics 211 or 221, 223, 321, 323, 229, 341, 343, 443, 449, 455, 561 and one of 375, 457, 501², 507, 509, 543, 593, 599 or 663

3 units - Statistics 327 or Biology 315
 15 units - Environmental Science 401, 501, 502, 503

9 units - Options from faculties other than the Faculty of Science, as noted in 4.6.1.1C (a).

6 units - Options from Faculty of Arts³
 12 units - Options⁴

¹The sequence Mathematics 249 or 265, 267, 367 plus Mathematics 311 can be used in place of Mathematics 275, 277, 375, 377 but is not recommended. Mathematics 267 plus 177 can be used in place of Mathematics 277.

²Physics 501 requires Physics 457 as a prerequisite.

³See ucalgary.ca/ensc/academicadvice for a list of recommended courses.

⁴Environmental Science 201 is highly recommended to be completed as an option in the program.

Concentration in Statistics

9 units - Biology 241, 243, 313
 3 units - Ecology 417 or 419
 6 units - Chemistry 203 and 321
 3 units - Geology 201
 6 units - Physics 211 or 221 and 223
 12 units - Mathematics 211 or 213; and 249 or 265 or 275; and 267 or 277; and 367
 15 units - Statistics 321, 323, 421, 429, 517
 3 units - Statistics 327 or Biology 315
 12 units - Four of Statistics 423, 425, 505, 407 or 507, 519, 523, 525, 531
 3 units - Computer Science 217 or Data Science 211
 15 units - Environmental Science 401, 501, 502, 503

9 units - Options from faculties other than the Faculty of Science, as noted in 4.6.1.1C (a).

6 units - Options from the Faculty of Arts¹
 18 units - Options²

¹See ucalgary.ca/ensc/academicadvice for a list of recommended courses.

²Environmental Science 201 is highly recommended to be completed as an option in the program.

(b) Honours Programs

The GPA requirements for the Honours program are specified in the Faculty of Science section of this Calendar in 3.4C Program Requirements, Honours Program. The course requirements are the same as for the Major programs except students must have a minimum of 54 units in their field and include one of Environmental Science 504 or 505 in their program, preferably in their final year of study. Students in an honours program may have a maximum of 78 units in their major field.

Suggested Program Sequences

Biological Sciences

| First Year | |
|--|--------------------------------------|
| Biology 241 | Biology 243 |
| Chemistry 201 or 211 | Chemistry 203 or 213 |
| Mathematics 249 or 265 or 275 | Mathematics 211 or 213 or 267 or 277 |
| Physics 211 or 221 or Geology 201 ¹ | Physics 223 or Geology 202 |
| Option | Option ³ |

| Second Year | |
|--|--|
| Biology 371 | Biology 315 |
| Geography 211 or Geology 201 ¹ | Biology 313 |
| Chemistry 351 | Chemistry 353 |
| Chemistry 311 | Chemistry 315 |
| Option | Option |
| Third Year | |
| Biology 311 | Biology 331 |
| Ecology 425 | Ecology 419 or Option from the Field of Biological Sciences ² |
| Environmental Science 401 ¹ | Geography 415 |
| Option from the Field of Biological Sciences | Biochemistry 393 |
| Option | Option |
| Fourth Year | |
| Environmental Science 501 ¹ | Environmental Science 503 |
| Environmental Science 502 | Environmental Science 502 |
| Chemistry 321 or 515 | Option |
| Ecology 417 or Option from the Field of Biological Sciences ² | Option |
| Option | Option |

¹Field course typically offered in the last two weeks before the beginning of the regular Fall Term.

²At least one of Ecology 417 or 419 must be completed.

³Environmental Science 201 is highly recommended.

Chemistry

| First Year | |
|--|-------------------------------|
| Chemistry 201 or 211 | Chemistry 203 or 213 |
| Mathematics 249 or 265 or 275 | Mathematics 267 or 277 or 275 |
| Physics 211 or 221 | Physics 223 |
| Biology 241 | Biology 243 |
| Option | Option ³ |
| Second Year | |
| Chemistry 351 | Chemistry 353 or 355 |
| Chemistry 311 | Chemistry 315 |
| Geology 201 | Biology 313 |
| Physics 323 | Statistics 327 |
| Option | Option |
| Third Year | |
| Chemistry 432 | Ecology 419 or Biology 315 |
| Environmental Science 401 ¹ | Chemistry 371 |
| Chemistry 321 | Chemistry 434 or Option |
| Chemistry 373 or Option | Chemistry 425 or Option |
| Option | Option |
| Fourth Year | |
| Environmental Science 501 ¹ | Environmental Science 503 |
| Environmental Science 502 | Environmental Science 502 |
| Chemistry 515 | Chemistry 521 or 541 |

| | |
|------------------------------------|--------|
| Ecology 417 or Option ² | Option |
| Chemistry 423 or Option | Option |

¹Field course typically offered in the last two weeks before the beginning of the regular Fall Term.

²At least one of Ecology 417 or 419 must be completed.

³Environmental Science 201 is highly recommended.

Geography and Arts

| First Year | |
|--|--|
| Biology 241 | Biology 243 |
| Economics 201 | Anthropology 203 or Sociology 201 |
| Mathematics 249 or 265 or 275 | Mathematics 211 or 267 or 277 |
| Chemistry 203 | Option ³ |
| Option | Option |
| Second Year | |
| Geography 308 | Biology 313 |
| Geography 352 | Geography 310 |
| Anthropology 313 or 355 or 395 or Indigenous Studies 201 or 317 or Sociology 307 | Geography 324 |
| Chemistry 321 | Geography 380 |
| Option | Statistics 327 or Biology 315 |
| Third Year | |
| Environmental Science 401 ¹ | Ecology 419 or Option ² |
| Geography 412 | Geography 408 |
| Geography 321 | Geography 482 or 484 |
| Chemistry 321 | Geography 567 or 584 or 586 |
| Ecology 417 or Option ² | Economics 377 |
| Fourth Year | |
| Environmental Science 501 ¹ | Environmental Science 503 |
| Environmental Science 502 | Environmental Science 502 |
| Geography 500 or 502 or 503 or 504 or 506 or 510 | Geography 500 or 502 or 503 or 504 or 506 or 510 |
| Geography 426 or 530 or 532 or 538 | Ecology 419 or Option ² |
| Ecology 417 or Option ² | Option |

¹Field course typically offered in the last two weeks before the beginning of the regular Fall Term.

²At least one of Ecology 417 or 419 must be completed.

³Environmental Science 201 is highly recommended.

Geology

| First Year | |
|-----------------------------------|-----------------------------------|
| Geology 201 | Geology 202 |
| Biology 241 | Biology 243 |
| Mathematics 249 or 265 or 275 | Mathematics 267 or 277 or 275 |
| Physics 211 or 221 | Physics 223 |
| Chemistry 201 or 211 ¹ | Chemistry 203 or 213 ¹ |
| Second Year | |
| Geology 313 | Geology 323 |
| Option | Geology 333 |

| Mathematics 211 or 213 | Geology 343 |
|--|------------------------------------|
| Option | Geology 353 |
| Geology 381 | Statistics 327 or Biology 315 |
| Third Year | |
| Chemistry 321 | Biology 313 |
| Geology 401 | Option |
| Environmental Science 401 ^{2,3,4} | Option |
| Geology 337 ^{3,4} | Option |
| Geology 475 | Option |
| Fourth Year | |
| Environmental Science 501 ^{2,4} | Environmental Science 503 |
| Environmental Science 502 | Environmental Science 502 |
| Geology 403 | Geology 505 |
| Ecology 417 or Option ⁵ | Ecology 419 or Option ⁵ |
| Option | Option |

¹Chemistry 201 and 203 are offered in both Fall and Winter Terms and may be taken in any order. Chemistry 211 and 213 are recommended for students majoring in Chemistry and other students with strong backgrounds in chemistry. Chemistry 211 is a prerequisite to Chemistry 213.

²Field course typically offered in the last two weeks before the beginning of the regular Fall Term.

³Environmental Science 401 and Geology 337 are field schools that run prior to the Fall Term. Geology 337 is offered with dates throughout the month of August. Students will need to carefully select a section of Geology 337 that is compatible with their section of Environmental Science 401.

⁴Students taking a field school course(s) in a term are permitted to register in additional units during that term to a maximum of 30 units during the regular term.

⁵At least one of Ecology 417 or 419 must be completed.

Physics

| First Year | |
|--|------------------------------------|
| Physics 227 ¹ | Physics 229 |
| Biology 241 | Biology 243 |
| Mathematics 275 | Mathematics 277 |
| Chemistry 203 | Mathematics 211 or 213 |
| Option | Option ⁴ |
| Second Year | |
| Physics 341 | Physics 355 |
| Physics 397 | Physics 343 |
| Mathematics 375 | Mathematics 377 |
| Geology 201 | Statistics 327 or Biology 315 |
| Biology 313 or Option | Biology 313 or Option |
| Third Year | |
| Environmental Science 401 ² | Physics 443 |
| Physics 323 | Physics 561 |
| Physics 449 | Physics Option |
| Physics 663 | Option |
| Mathematics 311 | Option |
| Fourth Year | |
| Environmental Science 501 ² | Environmental Science 503 |
| Environmental Science 502 | Environmental Science 502 |
| Physics 455 | Ecology 419 or Option ³ |

| | |
|------------------------------------|--------|
| Chemistry 321 | Option |
| Ecology 417 or Option ³ | Option |

¹Students who achieve a grade of "A-" or better in Physics 211 or 221 may use either of these courses in place of Physics 227.

²Field course typically offered in the last two weeks before the beginning of the regular Fall Term.

³At least one of Ecology 417 or 419 must be completed.

⁴Environmental Science 201 is highly recommended.

Statistics

| First Year | |
|--|--|
| Physics 211 or 221 | Mathematics 267 |
| Biology 241 | Biology 243 |
| Mathematics 211 or 213 | Physics 223 |
| Mathematics 265 | Statistics 327 or Biology 315 |
| Option | Option ³ |
| Second Year | |
| Statistics 321 | Statistics 323 |
| Mathematics 367 | Computer Science 217 or Data Science 211 |
| Chemistry 203 | Biology 313 |
| Option | Option |
| Option | Option |
| Third Year | |
| Environmental Science 401 ¹ | Statistics option |
| Statistics 421 | Statistics option |
| Statistics 429 | Ecology 419 or Option ² |
| Geology 201 | Option |
| Option | Option |
| Fourth Year | |
| Environmental Science 501 ¹ | Statistics option |
| Environmental Science 502 | Environmental Science 502 |
| Ecology 417 or Option ² | Statistics option |
| Chemistry 321 | Statistics 517 |
| Option | Environmental Science 503 |

¹Field course typically offered in the last two weeks before the beginning of the regular Fall Term.

²At least one of Ecology 417 or 419 must be completed.

³Environmental Science 201 is highly recommended.

4.6.2.2 Double Major and Combined Degree Programs

No degree combination will be allowed where both parts of the combination are in the same field of specialization (i.e. Double Major, Major-Minor, Combined Degree, Second Bachelor's Degree). The double major combination BSc Environmental Science specialization in Biological Sciences/BSc Ecology and BSc Environmental Science specialization in Biological Sciences/BSc Biological Sciences will not be allowed, however all other combinations of Major programs in Biological Sciences and BSc Environmental Science specialization in Biological Sciences will be allowed.

Double major programs are allowed combining any two of: (i) Geology or Geology (Petroleum Geology Concentration), (ii) Applied

and Environmental Geology, (iii) Geophysics, (iv) Earth Science, (v) Environmental Science (Geology).

Double degree programs are allowed combining Geophysics with one of (i) Geology, (ii) Geology (Petroleum Geology Concentration), (iii) Applied and Environmental Geology, (iv) Environmental Science (Geology).

There is no Minor program available in Environmental Science.

4.6.3 Nanoscience

Programs Offered in Nanoscience

- Minor or Concentration in Nanoscience

Note: If applications exceed the capacity of the Minor and Concentration in Nanoscience, priority will be given to students in satisfactory standing in the BSc or BSc (Honours) in Applied Chemistry, Biochemistry, Biological Sciences, Cellular, Molecular and Microbial Biology, Chemistry, Chemical Physics, Ecology, Geology, Geophysics, Physics, Plant Biology or Zoology.

Program vs. Faculty Regulations

Regulations governing the Minor or Concentration in Nanoscience are a combination of general Faculty of Science regulations and the additional program specific regulations listed below. It is essential for students to be familiar with both sets of regulations. It is helpful to read Section 3 (Faculty Regulations) first.

Students should consult Academic Requirements in their Student Centre periodically to ensure that requirements are being met.

Program Information

Program Student Office: Science B 149

Student enquiries: 403.220.8367

Fax: 403.210.8126

Website: ucalgary.ca/nanoscience

Email: nanosci@ucalgary.ca

Enrolment Limitations

Enrolment Limitations in Program

The number of spaces in the Nanoscience Concentration and Minor is limited and entry is competitive.

Enrolment Limitations in Courses

In the first instance, enrolment in Nanoscience courses is available to Nanoscience Concentrators or Minors in satisfactory standing who meet the prerequisite(s). Depending on space availability, other students who are in satisfactory standing and meet the prerequisite(s) may register in a course. Consult the Schedule Builder in the Student Centre for details regarding enrolment in these courses.

4.6.3.1 Programs in Nanoscience

Admission

Students in satisfactory standing may select the Nanoscience Concentration or Minor after they have completed at least 21 units. **Note:** If applications exceed the capacity of the Minor or Concentration in Nanoscience, priority will be given to students in satisfactory standing in the BSc or BSc Honours in

Applied Chemistry, Biochemistry, Biological Sciences, Cellular, Molecular and Microbial Biology, Chemistry, Chemical Physics, Ecology, Geology, Geophysics, Physics, Plant Biology or Zoology. See also 3.2 Admission.

Any course used to satisfy Major or Honours field requirements may not be applied to the Nanoscience Concentration or Minor.

Courses Constituting the Field of Nanoscience

The Field of Nanoscience is defined as:

- Biology 241, 243
- Chemistry 201, 203, 211, 213
- Geology 201, 202, 203
- All courses labelled 200-level Mathematics except Mathematics 205
- All courses labelled Nanoscience
- Physics 211, 221, 223, 227, 255, 355

Required Courses - Concentration

See also Section 3 (Faculty Regulations), Subsection 3.4A (Program Requirements - Major and Honours Programs) and Subsection 3.5B (Course Selection and Registration - Introductory Courses for Science Degree Programs).

1. 3 units - One of Mathematics 249, 265 or 275
2. 3 units - One of Mathematics 267, 277, 211 or 213
3. 6 units - One of the following sets of courses:

- Biology 241 and 243
- Chemistry 201 or 211 and 203 or 213
- Geology 201 and 202 or 203
- Physics 211 or 221 and 223; or Physics 227 and 255; or Physics 227 and 355

4. 6 units - Nanoscience 301 and 401

5. 3 units - Additional Nanoscience courses

Note: Students may complete no more than 6 units additional courses labelled Nanoscience beyond those listed above.

Required Courses - Minor

Same as for the Concentration up to (4):

- 12 units - Nanoscience 301, 401, 502

- 6 units - Additional Nanoscience courses

Note: Students may complete no more than 6 units additional courses labelled Nanoscience beyond those listed above.

4.6.4 Natural Sciences

Degrees Offered

| Undergraduate Programs ¹ | Core | Enhancements | Combined Degrees |
|-------------------------------------|------|--------------|----------------------|
| Natural Sciences | BSc | BSc Honours | BSc/BEd ² |

¹All degrees in the Faculty of Science, except Environmental Science, can be combined with eligible BA and BSc programs from the Faculty of Arts. Refer to Section 3.4 for information on combined degrees, double majors with programs within the Faculty of Science as well as combined degrees with programs from other Faculties. Students interested in pursuing these degrees are encouraged to speak with an advisor in the Undergraduate Science Centre to develop a degree completion plan.

²Concurrent Degree with the Werklund School of Education

Programs Offered

BSc in Natural Sciences

BSc Honours in Natural Sciences

BSc (Natural Sciences) and BEd

Program vs. Faculty Regulations

Regulations governing programs in Natural Sciences are a combination of general Faculty of Science regulations and the additional program specific regulations listed below. It is essential for students to be familiar with both sets of regulations. It is helpful to read Section 3 (Faculty Regulations) first.

Students should consult Academic Requirements in their Student Centre periodically to ensure that requirements are being met.

Program Information

Program Office: Energy Environment Experiential Learning (EEEL) 426

Telephone: 403.220.8979

Fax: 403.210.8126

Website: natsci.ucalgary.ca

Email: sciemail@ucalgary.ca

Enrolment Limitations

A graduation requirement for students in the Natural Sciences program is the completion of two concentrations; see "Application to Concentrations". Entry into a given concentration may be subject to enrolment limitations. Students should refer to Subsection 3.3 on Enrolment Limitations under Section 3 (Faculty Regulations), and the sections on enrolment limitations under the regulations of the Department offering the courses in which the student is interested. Students who apply for a concentration in an area with enrolment limitations will be subject to the same selection criteria as students intending to major in that area.

4.6.4.1 Programs in Natural Sciences

Admission

See also Section 3 (Faculty Regulations), Subsection 3.2 (Admission).

Application to Concentrations and Registration Limitations

The program requires students to choose two concentrations¹, denoted Concentration One (C1) and Concentration Two (C2) respectively, from the following list: Biology, Chemistry, Computer Science, Energy Science, Geoscience, Mathematics or Physics. Entry into a given concentration may be subject to enrolment limitations. (See Enrolment Limitations.)

Students may apply to their concentrations with their initial application to the University. However, students may also initially apply to Natural Sciences with no concentrations in the event that they are uncertain which areas they wish to specialize in or they do not meet the competitive average of their desired concentration(s). Students will find that it is in their best interest to

declare their concentrations at the earliest possible opportunity.

Students may not register in more than 60 units if they have not been admitted to a concentration. Students should also be aware they will be blocked from taking more than 36 units in a major field to which they have not been admitted.

It is not possible for students in the Natural Sciences program to choose a minor in either area of their concentrations. However, students may complete a minor outside of their areas of concentration. Furthermore, Natural Sciences students may not select a second major or combined degree in areas of their two concentrations.

Courses Constituting the Major Field of Natural Sciences

The major field of an individual's Natural Sciences program is defined as:

- The total of all courses that constitute the major fields offered by departments in which the two concentrations are taken.
- Science 301, 317, 403, 421, 423, 427, 431, 433, 501, 502, 507, 529.

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

1. Major Field Courses (Concentrations One and Two)

The program must contain two concentrations as described under Application to Concentrations.

The courses in the two concentrations must be selected as follows:

Students require a minimum of 30 units in their C1. Students may not exceed 36 units in their C1. Within those courses completed for their C1, students must complete a minimum of 3 units at the 400 level or higher.

Students require a minimum of 18 units in their C2. Students may not exceed 30 units in their C2.

The combination of units in C1 plus C2 may not exceed 60 units.

2. Natural Science Specific Courses

3 units - Science 301

3 units - Science 403

3 units - Science 501 or Science 529 (for Energy Science concentrators)

3. Other Courses outside the Major Field

18 units - Non-science options as follows (check Table I in 3.4 Program Requirements for ineligible courses; Science 311 may be counted among these courses):

Chosen from Faculties other than the Faculty of Science. Of these 18 units, students must take at least 6 units from the Faculty of Arts.

4. Science Breadth

The program must include the following:

- 6 units in Mathematics¹, selected from Mathematics 211 or 213, Mathematics 249 or 265 or 275, Mathematics 267 or 277. Note: Students who have completed Mathematics 31 should take Mathematics 265 unless they are interested in

pursuing programs in Physics and Astronomy, in which case they should take Mathematics 275.

- 3 units in Computer Science¹ selected from Computer Science 217 or 231 or 235 or Data Science 211.
- At least 6 units from each of four different Science Departments¹.
- 6 units of course work accompanied by a laboratory component¹ (taken from any of the Departments of Biological Sciences, Chemistry, Geoscience, and Physics and Astronomy).

¹Apply these courses to either (1) Major Field Courses or (3) Other Courses outside the Major Field as appropriate.

Required Courses - Honours Program

See also Section 3 (Faculty Regulations), Subsections 3.4C (Program Requirements - Honours Degree Programs) and 3.5B (Introductory Courses for Science Degree Programs).

1. Major Field Courses (Concentrations One and Two)

The program must contain two concentrations as described under Application to Concentrations.

The courses in the two concentrations must be selected as follows:

Students require a minimum of 30 units in their C1. Students may not exceed 36 units in their C1. Within those courses completed for their C1, students must complete a minimum of 6 units at the 400 level or higher.

Students require a minimum of 18 units in their C2. Students may not exceed 30 units in their C2.

The combination of units in C1 plus C2 may not exceed 60 units.

2. Natural Science Specific Courses

3 units - Science 301

3 units - Science 403

3 units - Science 501 or Science 529 (for Energy Science concentrators)

6 units - Science 502

3. Other Courses outside the Major Field

18 units - Non-science options as follows (check Table I in 3.4 Program Requirements for ineligible courses; Science 311 may be counted among these courses):

Chosen from Faculties other than the Faculty of Science. Of these 18 units, students must take at least 6 units from the Faculty of Arts.

4. Science Breadth

The program must include the following:

- 6 units in Mathematics¹, selected from Mathematics 211 or 213; Mathematics 249 or 265 or 275; Mathematics 267 or 277. Note: Students who have completed Mathematics 31 should take Mathematics 265 unless they are interested in pursuing programs in Physics and Astronomy, in which case they should take Mathematics 275.
- 3 units in Computer Science¹ selected from Computer Science 217, 231, 235 or Data Science 211.

• At least 6 units from each of four different Science Departments¹.

• 6 units of course work accompanied by a laboratory component¹ (taken from any of the Departments of Biological Sciences, Chemistry, Geoscience, and Physics and Astronomy).

¹Apply these courses to either (1) Major Field Courses or (3) Other Courses outside the Major Field as appropriate.

Required Courses - Concentration One

Biology Concentration. The minimum requirements for a C1 in Biology are as follows:

6 units - Biology 241 and 243

9 units - Biology 311, 331, 371

3 units - Biochemistry 393 or Biology 313

9 units - Courses from the Field of Biological Sciences at the 300 level or higher

3 units - Courses from the Field of Biological Sciences at the 400 level or higher

Note: Natural Sciences students are not permitted to take more than 6 units from courses numbered 507 offered by the Department of Biological Sciences.

Chemistry Concentration. The minimum requirements for a C1 in Chemistry are as follows:

6 units - Chemistry 201 or 211; and 203 or 213

12 units - Chemistry 311, 431, 351; and 371 or 373

9 units - Courses from the Field of Chemistry at the 300 level or higher

3 units - Courses from the Field of Chemistry at the 400 level or higher

Computer Science Concentration¹. The minimum requirements for a C1 in Computer Science are as follows:

6 units - One of the following three sets of courses:

- Computer Science 217 or Data Science 211 and Computer Science 219

- Computer Science 231 and 233

- Computer Science 235 and 3 units senior Computer Science Option

3 units - Computer Science 319 or 331

18 units - Courses in the Field of Computer Science

3 units - Courses in the Field of Computer Science at the 400 level or higher

¹Students interested in completing a C1 in Computer Science should complete Philosophy 279 in their first year.

Energy Science Concentration. The minimum requirements for a C1 in Energy Science are as follows:

3 units - Chemistry 203 or 213

3 units - Physics 211 or 221 or 227

3 units - Physics 223 or 255 or 355

3 units - Energy and Environment, Engineering 355

3 units - Chemistry 321 or 425

15 units - Chosen from energy science content: Science 317, 421, 423, 427, 431, 433, Physics 323 or 397

Note: Energy Science students completing a Concentration Two in Physics will have the Physics courses count toward both concentrations. No Physics courses beyond required Physics courses can count toward both Energy Science and a Physics concentration. Energy Science students completing a Concentration Two in Chemistry will have Chemistry 203 count toward both concentrations.

Geoscience Concentration. The minimum requirements for a C1 in Geoscience are as follows:

15 units - Geology 201, 202 or 203, 343 or 341, 381, and Geophysics 351 or 355

12 units - Courses in the Fields of Geology and/or Geophysics at the 300 or 400 levels¹

3 units - Courses in the Fields of Geology and/or Geophysics at the 400 level or higher¹

¹Students pursuing a Geoscience concentration are free to mix and match appropriate Geology and Geophysics options. It is recommended that students intending to apply for admission into the Geology program (including the Petroleum Geology concentration) take Geology 313, 381, 323, 333 while students intending to apply for admission into the Geophysics program take Geophysics 351 or 359, 453, 457 and an additional Geology or Geophysics option. For more details, see the Geoscience Program Section of this Calendar.

Mathematics Concentration. The minimum requirements for a C1 in Mathematics are as follows:

3 units - Mathematics 211 or 213

3 units - Mathematics 249 or 265 or 275

3 units - Mathematics 267 or 277

6 units - Mathematics 311 or 313; and Statistics 321

3 units - Mathematics 367 or 375

9 units - Courses in the Field of General Mathematics.

3 units - Courses in the Field of General Mathematics at the 400 level or higher

Physics Concentration. The minimum requirements for a C1 in Physics are as follows:

6 units - Either Physics 211 or 221 and 321; or Physics 227 and 3 units Physics option

6 units - Either Physics 223 and 323; or 255 or 355 and 397

15 units - Courses in the Field of Physics¹ at the 300 level or higher

3 units - Courses in the Field of Physics¹ at the 400 level or higher

¹Students completing either a C1 or C2 in Physics may use courses in Astrophysics to satisfy requirements from the Field of Physics.

Required Courses - Concentration Two

Biology Concentration. The minimum requirements for a C2 in Biology are as follows:

A minimum of 18 units to a maximum of 30 units selected from the major Field of Biological Sciences.

Chemistry Concentration. The minimum requirements for a C2 in Chemistry are as follows:

A minimum of 18 units to a maximum of 30 units selected from the major Field of Chemistry

Computer Science Concentration. The minimum requirements for a C2 in Computer Science are as follows:

A minimum of 18 units to a maximum of 30 units selected from the major Field of Computer Science.

Energy Science Concentration. A Concentration Two in Energy Science is not permitted.

Geoscience Concentration. The minimum requirements for a C2 in Geoscience are as follows:

A minimum of 18 units to a maximum of 30 units selected from the major Field of Geology and/or Geophysics.

Mathematics Concentration. The minimum requirements for a C2 in Mathematics are as follows:

A minimum of 18 units to a maximum of 30 units selected from the major Field of General Mathematics.

Physics Concentration. The minimum requirements for a C2 in Physics are as follows:

A minimum of 18 units to a maximum of 30 units selected from the major Field of Physics and/or Astrophysics.

Suggested Program Sequences

| First Year | |
|--|--|
| Mathematics ¹ | Mathematics ¹ |
| Concentration 1 | Concentration 1 |
| Concentration 2 | Concentration 2 |
| Computer Science 217 or 231 or 235 or Data Science 211 or option | Computer Science 217 or 231 or 235 or Data Science 211 or option |
| Non-science option | Non-science option |
| Second Year | |
| Concentration 1 | Science 301 |
| Concentration 1 | Option |
| Concentration 2 | Concentration 2 |
| Science Breadth option | Concentration 1 |
| Non-science option | Non-science option |
| Third Year | |
| Science 403 | Option |
| Concentration 1 | Concentration 1 |
| Concentration 2 | Concentration 1 |
| Option | Concentration 2 |
| Non-science option | Non-science option |
| Fourth Year | |
| Option | Science 501 ² |
| Concentration 1 (400 level or higher) | Concentration 1 (400 level or higher) ³ |
| Science 502 ³ | Science 502 ³ |
| Option | Option |
| Option | Option |

¹Students should refer to registration materials at the following website (ucalgary.ca/degreeguide/) to determine

recommended first-year Mathematics courses based on their concentration.

²Energy Science Concentrators must take Science 529 instead of Science 501.

³Required for Honours, replaced by options in the Major program.

Notes:

1. The schedule is adjustable to accommodate individual programs. Options include any courses that are prerequisite to the concentration courses, but are from another field, and also include the Science Breadth requirements.

2. If Mathematics courses or Computer Science courses are part of a C1 or C2, the number of C1 and C2 slots in this schedule can be reduced accordingly as per degree requirements.

4.6.4.2 Concurrent Degree in Natural Sciences and BEd

Admission

Students accepted into the BSc (NTSC)/BEd concurrent degree program must meet the requirements for admission into the Natural Sciences Program and the departments of their two concentrations. Students will be required to choose two concentrations from Biology, Chemistry or Physics when applying for admission; it is not possible to complete the concurrent degree with the other concentrations offered within the Natural Sciences. Students interested in Mathematics education should consider the BSc (General Mathematics)/BEd concurrent degree program. Students in the concurrent degree program should also consult the information on the program in the Werklund School of Education portion of the calendar

Note: Admission to the program is competitive and meeting the minimum requirements does not guarantee admission. Students interested in the concurrent degree program should consult the Undergraduate Science Centre at the earliest possible opportunity.

Continuation

Students must maintain satisfactory standing in both the Faculty of Science and the Werklund School of Education throughout their degree to remain in the concurrent degree program. For more information, refer to the Faculty Regulations sections of both faculties. All education requirements must be completed at the University of Calgary. Please consult the Werklund School of Education for more full details on the education portion/regulations of the concurrent degree.

Program Structure

The program is divided into a Science portion, which consists of 90 units and an Education portion, which consists of 60 units. The outline of the concurrent degree is shown in the suggested course sequence below. Students will complete the first three full years (90 units) in the Faculty of Science. In years 4 and 5, students will complete the education portion of the degree. Students should consult the Werklund School of Education for complete details of years 4 and 5 of their degree. In the Education portion of the program in Year 5, a project course is

required amalgamating Science and Education. This course replaces the 500-level Science project course (Science 501) and an option required in the regular Natural Sciences program.

Science Portion (90 units)

In the Science portion, the following concentrations are possible: Biology, Chemistry and Physics.

The requirements are the same as for the Natural Sciences Major program as specified in the Program Structure except that the 6 units Natural Science specific course requirements (Science 301, 501) and the 18 units Non-Science options are replaced by:

3 units - English literature

3 units - Education 201

3 units - Science 403

15 units - Options

Education Portion (60 units)

For details see the information in the Werklund School of Education portion of the calendar.

Suggested Course Sequence

First Year

1. 3 units - Education 201

2. 3 units - English literature

3. 6 units - Mathematics¹

4. 6 units - Concentration 1

5. 6 units - Concentration 2

6. 6 units - Computer Science 217 or 231 or 235 or Data Science 211 or option

Second Year

1. 3 units - Open option

2. 3 units - Science Breadth²

3. 12 units - Concentration 1

4. 6 units - Concentration 2

5. 6 units - Option

Third Year

1. 3 units - Science 403

2. 9 units - Concentration 1

3. 3 units - Concentration 1 at the 400 level or higher

4. 6 units - Concentration 2

5. 9 units - Option

Fourth Year

1. Education 420/427

2. Education 430/435

3. Education 440/445

4. Education 450/456

5. Education 460/465

Fifth Year²

1. Education 520/525

2. Education 530/535

3. Education 540/546

4. Education 551/556

5. Education 560

¹Students should refer to registration materials at the following website (ucalgary.ca/degreetguide/) to determine

recommended first-year Mathematics courses based on their concentration.

²Refer to the Science Breadth Requirement found in 4.6.3.1 Required Courses - Major Program - 4. Science Breadth. A Computer Science course is recommended.

Note: This schedule is somewhat adjustable to accommodate individual programs. Options include any courses that are pre-requisite to the concentration courses, but are from another field, and also include the Science Breadth Requirements.

4.6.5 Neuroscience

Degrees Offered

Undergraduate

Neuroscience

BSc Honours

Programs Offered

BSc Honours in Neuroscience

Note: There is no Minor offered in Neuroscience.

Program vs. Faculty Regulations

Regulations governing programs in Neuroscience are a combination of general Faculty of Science regulations and the additional program specific regulations listed below. It is essential for students to be familiar with both sets of regulations. It is helpful to read Section 3 (Faculty Regulations) first.

Students should consult Academic Requirements in their Student Centre periodically to ensure that requirements are being met.

Program Information

Program Office: Energy Environment Experiential Learning (EEEL) 426

Telephone: 403.220.8979

Fax: 403.210.8126

Website: ucalgary.ca/bscneuro

Email: bscneuro@ucalgary.ca

Enrolment Limitations

Enrolment Limitations in Program

The number of spaces in Neuroscience program is limited and entry into this program is competitive.

Enrolment Limitations in Courses

In the first instance, enrolment in Neuroscience courses is available to Neuroscience students in satisfactory standing who meet the prerequisite(s). Depending on space availability, other students who are in satisfactory standing and meet the prerequisite(s) may register in a course. Consult the Schedule Builder in the Student Centre for details regarding enrolment in these courses.

Ethics in Neuroscience

Studies in Neuroscience involve the use of living and dead organisms. Students taking laboratory- and field-based courses in this discipline can expect involvement with and experimentation on such materials. Students perform dissections on dead or preserved organisms in some courses. In particular courses, students experiment on living organisms, their tissues, cells, or molecules. Sometimes field work requires students to

collect a variety of living materials by many methods, including humane trapping.

All work on humans and other animals conforms to the Helsinki Declaration and to the regulations of the Canadian Council on Animal Care. The Program strives for the highest ethical standards consistent with stewardship of the environment for organisms whose use is not governed by statutory authority. Individuals contemplating taking courses in the Neuroscience program should ensure that they have fully considered these issues before enrolling. Students are advised to discuss any concern they might have with the Program Director.

4.6.5.1 Programs in Neuroscience

Admission and Student Standing

New applicants should refer to A.2 in the Admissions section of this Calendar for general regulations regarding admission requirements to the University of Calgary.

Bachelor of Science Honours in Neuroscience program is limited to 30 students each year. Admission is based on high school averages or university GPA.

New applicants are considered for admission to the first or third years of the Bachelor of Science Honours in Neuroscience degree program only. There is no second year admission. To be eligible for first year admission consideration, applicants must be coming directly from high school and/or presenting no more than 6 units transferable post-secondary courses (including University of Calgary courses). To be considered for admission to third year, transfer applicants must have completed 60 units transfer courses and have earned a GPA that meets the standard for admission into an honours program (Section 3.2 Admission and 3.4C Program Requirements). Transfer admission into this program is highly competitive and a GPA of at least 3.70 is required in order to be considered for a transfer, although does not guarantee admission. Students will be evaluated on their academic performance as outlined for the honours review and must have completed or be currently enrolled in the following courses. These courses must include the following or their equivalents:

- Biochemistry 341 or 393
- Biology 241, 243, 311 and 331
- Chemistry 351 and one of 201 or 211 and one of 203 or 213
- Mathematics 211 or 213 and one of Mathematics 249 or 265 or 275
- Physics 211 or 221, and 223
- Psychology 200, 300 and 301

Additionally, it is recommended that students take Psychology 375 and one of Computer Science 217 or 231 or Data Science 211, or their equivalents, prior to transferring.

Students who have obtained a Bachelor degree in Biological Sciences, Psychology or Zoology, or an equivalent degree, may not enrol in the Bachelor of Science Honours in Neuroscience degree, as Biological Sciences, Psychology and Zoology are integral

components of the Bachelor of Science Honours in Neuroscience degree. Students with such degrees are encouraged to seek a second degree in the other discipline (Psychology or Biological Sciences/Zoology, as appropriate) or to consider applying to a graduate degree in Psychology, Biological Sciences or Neuroscience.

Students who hold an approved Bachelor's degree recognized by the University of Calgary (BA, BSc, BEd, etc.) in disciplines other than Psychology or Biological Sciences, who wish to pursue the Bachelor of Science Honours in Neuroscience degree as a second or subsequent undergraduate degree are advised that they will be required to follow the admission procedures and meet the requirements in place for transfer applicants to the program. For additional regulations regarding admission to a second undergraduate degree, refer to A.5.5 Second-Degree Students in the Admissions section of this Calendar.

Note: Any student in an Honours program is subject to the provisions for continuation in an Honours program, Subsections 3.2 and 3.4C.

GPA Requirements

Students in Neuroscience must present honours-level performance at the academic review completed after each winter semester. Details on the honours review is found in section A.2 of this calendar. Students who do not qualify for continuation will be moved into the Biological Sciences program in the Department of Biological Sciences unless they indicate otherwise and meet the admission requirements for their chosen program. Students with a GPA of less than 2.000 are subject to the provisions of 3.7 Student Standing, B. Performance Review, Probationary Status and Dismissal.

Note: Students in Neuroscience may take no more than 36 units that would fulfill major field requirements in Biological Sciences programs or the Psychology program respectively. Students who wish to transfer out of Neuroscience into either Biological Sciences or Psychology must apply to transfer by the application deadline and will be able to take more such courses once admitted to their new program.

Courses Constituting the Honours Field of Neuroscience

- Biology 241, 243, 311, 331
- Psychology 200 or 205, 300, 301, 375
- All courses labelled Neuroscience, excluding Neuroscience 321

Required Courses - Honours Program

See also Section 3 (Faculty Regulations), Subsection 3.4A (Program Requirements - Major and Honours Programs) and Subsection 3.5B (Course Selection and Registration - Introductory Courses for Science Degree Programs).

3 units - Biochemistry 341 or 393

12 units - Biology 241, 243, 311 and 331

9 units - Chemistry 351 and one of 201 or 211 and one of 203 or 213

3 units - Computer Science 217 or 231 or Data Science 211

3 units - Mathematics 211 or 213

3 units - One of Mathematics 249 or 265 or 275

24 units - Neuroscience 201, 301, 401, 411, 421, 500, 511

15 units:

- At least 3 units in the area of *Human Neuroscience* chosen from: Neuroscience 479 or 521
- At least 3 units in the area of *Biological Neuroscience* chosen from: Neuroscience 475 or 531
- At least 3 units in the area of *Behavioural Neuroscience* chosen from: Neuroscience 474, 477, or 478

6 units - Physics 211 or 221, and 223

3 units - Philosophy 275 or 279

12 units - Psychology 200 or 205, 300, 301, 375

6 units - Zoology 461 and 463

21 units - Options

Notes:

- Students transferring into the third year of the Neuroscience program can replace Neuroscience 301 with Neuroscience 507.
- Students are advised to register for courses as soon as they are eligible to ensure the best selection. Furthermore, students are advised to follow the course recommendations for each year as many courses serve as prerequisites for subsequent courses.
- At the time of graduation, students who have not achieved a GPA of 3.30 over the last 90 units will be awarded a BSc Neuroscience (i.e., without the Honours designation).
- Students who wish to be considered for graduation based on course work completed through a professional program as outlined in section 3.4.A must complete all the requirements above with the exception of Neuroscience 500, 511, 521 and 531.

Required Courses - Major Program

The non-Honours, BSc in Neuroscience program is not open for enrolment, but may be awarded in cases where students do not meet requirements for being awarded the BSc (Honours) in Neuroscience.

3 units - Biochemistry 341 or 393

12 units - Biology 241, 243, 311 and 331

9 units - Chemistry 351 and one of 201 or 211 and one of 203 or 213

3 units - Mathematics 211 or 213

3 units - Mathematics 249 or 265 or 275

15 units - Neuroscience 201, 301, 401, 411, 421

9 units:

- At least 3 units in the area of *Human Neuroscience* chosen from: Neuroscience 479 or 521

- At least 3 units in the area of *Biological Neuroscience* chosen from: Neuroscience 475 or 531

- At least 3 units in the area of *Behavioural Neuroscience* chosen from: Neuroscience 474, 477 or 478

6 units - Physics 211 or 221, and 223

3 units - Philosophy 275 or 279

12 units - Psychology 200 or 205, 300, 301, 375

6 units - Zoology 461 and 463

39 units - Options

Suggested Program Sequence

| First Year | | |
|-----------------------------------|--|------------------|
| Fall | Winter | Spring |
| Biology 241 | Biology 243 | Neuroscience 301 |
| Chemistry 201 ¹ or 211 | Chemistry 2031 or 213 | |
| Physics 211 or 221 | Physics 223 | |
| Neuroscience 201 | Mathematics 211 or 213 or 249 or 265 | |
| Psychology 200 | Philosophy 275 or 279 or Computer Science 217 or 231 or Data Science 211 | |

| Second Year | |
|--|---------------------|
| Biology 311 | Biochemistry 393 |
| Chemistry 351 | Biology 331 |
| Psychology 300 | Psychology 301 |
| Philosophy 275 or 279 or Computer Science 217 or 231 or Data Science 211 | Psychology 375 |
| Mathematics 211 or 213 or 249 or 265 | Option ² |

| Third Year | |
|------------------|--------------------------------|
| Neuroscience 421 | Zoology 463 |
| Zoology 461 | Neuroscience 401 |
| Neuroscience 475 | Neuroscience 411 |
| Neuroscience 479 | Neuroscience 474 or 477 or 478 |
| Option | Non-science option |

| Fourth Year | |
|---|---|
| Neuroscience 500 | Neuroscience 500 |
| Option | Neuroscience 511 |
| Neuroscience 474, 477, 478, 521, or 531 | Neuroscience 474, 477, 478, 521, or 531 |
| Option | Option |
| Non-science Option | See below ³ |

¹Chemistry 201 and 203 are offered both in Fall and Winter Terms and may be done in any order.

²Students who wish to complete a full year of Organic Chemistry may register in Chemistry 353 or 355.

³Since students complete Neuroscience 301 in Spring of their first year, this slot is left open.

4.6.5.2 Double Majors including Neuroscience

Programs with two Major fields that include Neuroscience may be completed in the following manner:

- Both Majors must be Honours.
- The minimum requirements for both Major fields must be fulfilled.
- It is not possible to combine Neuroscience with any of Biological Sciences Honours, Psychology Honours or Zoology Honours.

If Neuroscience is combined with another Major in the Department of Biological Sciences, then:

Biology 241, 243, 311, 331 and Biochemistry 393 will be counted towards both Honours. For any other course that is a requirement for both programs that course may be counted towards only one and a substitution must be made to fulfill the requirements of the other Honours field.

For further details consult the Neuroscience Program Student Office.

4.6.5.3 Combined Degrees

It is not possible to undertake a combined Neuroscience degree with a degree in Biological Sciences, Psychology or Zoology. If Neuroscience is combined with another Major in the Department of Biological Sciences (i.e., Biochemistry; Cellular, Molecular & Microbial Biology; Ecology or Plant Biology), then:

Biology 241, 243, 311, 331 and Biochemistry 393 will be counted towards both degrees. For any other course that is a requirement for both programs that course may be counted towards only one and a substitution must be made to fulfill the requirements of the other degree.

4.6.5.4 Minor with Neuroscience

There is no Minor offered in Neuroscience. Students in the Bachelor of Science Honours in Neuroscience may not also minor in Psychology or Biological Sciences, as these programs are already integral components of the Bachelor of Science Honours in Neuroscience degree.

4.7 Physics and Astronomy

Degrees Offered

| Undergraduate Programs ¹ | Core | Enhancements |
|-------------------------------------|------|--------------|
| Physics | BSc | BSc Honours |
| Astrophysics | BSc | BSc Honours |

| Suspended Program | Core | Enhancements | Effective Date |
|-------------------|-------------|--------------|----------------|
| Chemical Physics | BSc Honours | | Fall 2016 |

There are many options for graduate studies leading to MSc and PhD degrees in the area of Physics and Astrophysics. Details of

graduate specializations can be found in the graduate section of this calendar.

¹ All degrees in the Faculty of Science, except Environmental Science, can be combined with eligible BA and BSc programs from the Faculty of Arts. Please refer to Section 3.4 for information on combined degrees, double majors with programs within the Faculty of Science as well as combined degrees with programs from other faculties. Students interested in pursuing these degrees are encouraged to speak with an advisor in the Undergraduate Science Centre to develop a degree completion plan.

Programs Offered

BSc in Physics, Astrophysics

BSc Honours in Physics, Astrophysics

Minors in Physics and Astrophysics

Suspended Program

BSc Honours in Chemical Physics

Department vs. Faculty Regulations

Programs in the Department of Physics and Astronomy are governed by a combination of general Faculty of Science regulations and the additional program specific regulations listed below.

It is essential for students to be familiar with both sets of regulations. It is helpful to read the Faculty Regulations in Section 3 first.

Students should consult Academic Requirements in their Student Centre periodically to ensure that requirements are being met. Also, students are strongly urged to consult with the Undergraduate Science Centre (USC) and the Department at all stages of their program.

Department Information

Department Office: Science B 605

Telephone: 403.220.5385

Fax: 403.289.3331

Website: phas.ucalgary.ca

4.7.1 Programs in Physics

Courses constituting the field of Physics

- All courses labelled Physics except Physics 271, 303 or 371
- Astrophysics 609
- Mathematics 433

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses).

6 units - Physics 227 and 229

3 units - Mathematics 211 or 213

3 units - Mathematics 265 or 275 or 249¹

3 units - Mathematics 277, or Mathematics 267¹

3 units - Computer Science 217 or Data Science 211

3 units - Chemistry 201 or 209 or 211 or Biology 241

3 units - Chemistry 203 or 213 or Biology 205 or Computer Science 219 or Astrophysics 305

39 units - Physics 341, 343, 355, 375, 381, 397, 443, 449, 455, 457, 497, 501, and 599 or 598

3 units - 400- or 500-level Physics option

3 units - Mathematics 311 or 313

6 units - Mathematics 367 and 376; or Mathematics 375 and 377

3 units - Physics 435 or Mathematics 433

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

6 units - Science options

18 units - Options

¹The recommended sequence for Mathematics courses in Physics and Astronomy is Mathematics 265, 267, 376 and 367.

Note: Students can a) have obtained an "A-" or better in Physics 211/221 or b) have completed both Physics 211/221 and Physics 321 in order to satisfy their program requirement of Physics 227. Students who have completed either of these options must visit the Undergraduate Science Centre (EEEL 445) to have this substitution applied to their student record.

Required courses - Honours Program

See also Section 3 (Faculty Regulations), Subsections 3.4C (Program Requirements - Honours Degree Programs) and 3.5B (Course Selection - Introductory Courses).

6 units - Physics 227 and 229

3 units - Computer Science 217 or Data Science 211

3 units - Chemistry 201 or 209 or 211 or Biology 241

3 units - Chemistry 203 or 213 or Biology 205 or Computer Science 219 or Astrophysics 305

3 units - Mathematics 211 or 213

3 units - Mathematics 265¹ or 275 or 249

3 units - Mathematics 267¹ or 277

3 units - Mathematics 311 or 313

6 units - Mathematics 367¹ and 376¹; or Mathematics 375 and 377

3 units - Physics 435 or Mathematics 433

54 units - Physics 341, 343, 355, 375, 381, 397, 443, 449, 451, 455, 457, 481, 497, 501, 543, 597 and 598

18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.

3 units - Science option

9 units - Options

¹The recommended sequence for Mathematics courses in Physics and Astronomy is Mathematics 265, 267, 376, and 367.

Note: Students can a) have obtained an "A-" or better in Physics 211/221 or b) have completed both Physics 211/221 and Physics 321 in order to satisfy their program requirement of Physics 227. Students who have completed either of these options must visit the Undergraduate Science Centre (EEEL 445) to have this substitution applied to their student record.

Suggested Program Sequences

(a) Major Program

| First Year | |
|---|---|
| Physics 227 | Physics 229 |
| Mathematics 211 or 213 | Computer Science 217 or Data Science 211 |
| Mathematics 265 | Mathematics 267 |
| Chemistry 201 or 209 or 211 or Biology 241 | Chemistry 203 or 213 or Biology 205 or Computer Science 219 or Option (if taking Astrophysics 305 in second year) |
| Non-science option | Non-science option |
| Second Year | |
| Physics 341 | Physics 355 |
| Physics 397 or Astrophysics 305 | Physics 343 |
| Mathematics 311 or 313 | Physics 381 |
| Mathematics 376 | Mathematics 367 |
| Physics 375 | Non-science option |
| Third Year | |
| Physics 449 | Physics 443 |
| Physics 455 | Physics 457 |
| Physics 435 | Physics 497 |
| Physics 397 (if not taken in second year) or option | Option |
| Non-science option | Non-science option |
| Fourth Year | |
| Physics 599 (Physics 598 may be taken instead) | Physics 501 |
| 400- or 500-level Physics option | Option |
| Science option | Science option |
| Option | Option |
| Non-science option | Option |

(b) Honours Program

| First and Second Years | |
|---------------------------------------|--------------------|
| Same as for the Physics Major program | |
| Third Year | |
| Physics 449 | Physics 451 |
| Physics 455 | Physics 457 |
| Physics 481 | Physics 497 |
| Physics 435 | Physics 443 |
| Non-science option | Non-science option |
| Fourth Year | |
| Physics 598 | Physics 598 |
| Physics 543 | Physics 501 |
| Physics 597 | Option |

| | |
|--------------------|----------------|
| Science option | Science option |
| Non-science option | Option |

Minor in Physics

- 6 units Physics 211 or 221 or 227; and Physics 223 or 229
- 24 units at the 300 level or higher in the Field of Physics
- Mathematics prerequisites as needed

4.7.2 Programs in Astrophysics

Courses constituting the field of Astrophysics

- All courses labelled Astrophysics
- Physics 211, 221, 223, 227, 229, 321, 323, 341, 343, 355, 375, 381, 397, 435, 443, 449, 451, 455, 457, 481, 497, 535, 543, 575, 598, 593, 599

Required Courses - Major Program

See also Section 3 (Faculty Regulations), Subsections 3.4A (Program Requirements - Major Programs) and 3.5B (Course Selection - Introductory Courses).

- 3 units - Astrophysics 305
- 6 units - Physics 227 and 229
- 3 units - Mathematics 211 or 213
- 3 units - Mathematics 265¹ or 275 or 249
- 3 units - Mathematics 267¹ or 277
- 3 units - Chemistry 201 or 211 or 209
- 3 units - Computer Science 217 or Data Science 211
- 9 units - Astrophysics 307, 401, 403
- 24 units - Physics 341, 343, 355, 375, 381, 443, 449 and 455
- 6 units - Two of Physics 481, Astrophysics 503 or Astrophysics 509
- 9 units - 400- or 500-level Physics option
- 3 units - Mathematics 311 or 313
- 6 units - Mathematics 367¹ and 376¹; or Mathematics 375 and 377
- 3 units - Physics 435 or Mathematics 433
- 3 units - Science options
- 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
- 15 units - Options

¹The recommended sequence for Mathematics courses in Physics and Astronomy is Mathematics 265, 267, 376, and 367.

Note: Students can a) have obtained an "A-" or better in Physics 211/221 or b) have completed both Physics 211/221 and 321 in order to satisfy their program requirement of Physics 227. Students who have completed either of these options must visit the Undergraduate Science Centre (EEEL 445) to have this substitution applied to their student record.

Required Courses - Honours Program

- 3 units - Astrophysics 305
- 6 units - Physics 227 and 229

- 3 units - Mathematics 211 or 213
- 3 units - Mathematics 265¹ or 275 or 249
- 3 units - Mathematics 267¹ or 277
- 3 units - Chemistry 201 or 211 or 209
- 3 units - Computer Science 217 or Data Science 211
- 9 units - Astrophysics 307, 401, 403
- 24 units - Physics 341, 343, 355, 375, 381, 443, 449 and 455
- 9 units - Physics 481, Astrophysics 503 and 509
- 3 units - Mathematics 311 or 313
- 6 units - Mathematics 367¹ and 376¹; or Mathematics 375 and 377
- 3 units - Physics 435 or Mathematics 433
- 15 units - Physics 451, 457, 501, 543 and 599.
- 18 units - Breadth Requirement: Options from faculties other than the Faculty of Science (check Table I in 3.4 Program Requirements for ineligible courses). Of these 18 units, at least 6 units must be from the Faculty of Arts. Science 311 may be counted among the 18 units from other faculties.
- 9 units - Options

¹The recommended sequence for Mathematics courses in Physics and Astronomy is Mathematics 265, 267, 376, and 367.

Note: Students can a) have obtained an "A-" or better in Physics 211/221 or b) have completed both Physics 211/221 and 321 in order to satisfy their program requirement of Physics 227. Students who have completed either of these options must visit the Undergraduate Science Centre (EEEL 445) to have this substitution applied to their student record.

Suggested Program Sequence

(a) Major Program

| First Year | |
|-----------------------------|--|
| Physics 227 | Physics 229 |
| Mathematics 211 or 213 | Computer Science 217 or Data Science 211 |
| Mathematics 265 | Mathematics 267 |
| Chemistry 201 or 211 or 209 | Non-science option |
| Non-science option | Non-science option |
| Second Year | |
| Astrophysics 305 | Physics 355 |
| Physics 341 | Physics 343 |
| Mathematics 311 or 313 | Physics 381 |
| Mathematics 376 | Mathematics 367 |
| Physics 375 | Astrophysics 307 |
| Third Year | |
| Astrophysics 401 | Astrophysics 403 |
| Physics 449 | Physics 443 |
| Physics 455 | Astrophysics 503 or 509 (whichever is offered) |
| Physics 435 | Option |
| Non-science option | Option |
| Fourth Year | |

| | |
|----------------------------------|----------------------------------|
| Physics 481 | 400- or 500-level Physics option |
| 400- or 500-level Physics option | 400- or 500-level Physics option |
| Non-Science option | Option |
| Option | Option |
| Science option | Non-science option |

(b) Honours Program

| | |
|---|--|
| First and Second Years Same as for the Astrophysics Major program | |
| Third Year | |
| Astrophysics 401 | Astrophysics 403 |
| Physics 449 | Physics 451 |
| Physics 455 | Physics 457 |
| Physics 435 | Physics 443 |
| Non-science option | Astrophysics 503 or 509 (whichever is offered) |
| Fourth Year | |
| Physics 481 | Astrophysics 509 or 409 (whichever is offered) |
| Option | Physics 501 |
| Physics 543 | Physics 599 |
| Option | Option |
| Non-science option | Non-science option |

Note: Honours students can elect to do Physics 598 instead of 599 and an option.

Minor in Astrophysics

3 units - Astrophysics 305

15 units - Physics 227¹, 229¹, 341¹, 355, 381

6 units - Astrophysics 401 and 403

6 units - Courses from the Field of Astrophysics (in addition to those specifically required above)

Note: The preceding courses require prerequisites in Mathematics and Computer Science; see the course descriptions for more details.

¹The sequence Physics 211 or 221, 223, 321 and 323 may be substituted for the sequence Physics 227, 229, 341 and 355.

4.7.3 Environmental Science - Physics Concentration

Students may pursue a BSc program in Environmental Science with a concentration in Physics. This is a single-degree, four-year program which is offered by the Faculty of Science with collaboration from the Faculty of Arts. Program details are listed in 4.6 Non-Departmental Programs. Since this is a multidisciplinary program with restricted entry, students should consult the Director of the Environmental Science program at their earliest opportunity.

4.7.4 Suspended Programs**4.7.4.1. Chemical Physics Program (Honours)**

This program has been suspended as of Fall 2016. Students interested in this program should seek advice from a program advisor in the Undergraduate Science Centre. Stu-

dents interested in this area should consider completing a double degree or minor.

4.8 International Foundations Program (IFP) – Faculty of Science

A student who meets the admission requirements for the Faculty of Science degree programs (see A.5 Undergraduate Admission Requirements in this Calendar for more information), and the minimum English language proficiency scores outlined in Section A.11.1 (International Foundations Program), may be admitted to the first year of an undergraduate academic program concurrent with English language and support courses.

The IFP Pathways Route only accepts students for start in September.

Students admitted to IFP Pathways with the Faculty of Science complete a curriculum that includes BSc courses combined with intensive English language and academic course support.

IFP Pathways Science students take first-year science courses within the Faculty of Science, concurrently with English language and support courses within IFP, commencing in the Summer Intersession. Students also take three courses in the Spring intersession of the Spring/Summer Term later in their degree. This allows students to complete the first year Science program without any delays. The IFP Pathways Science students' language and academic course support consists of 7 unpaired courses:

- Unpaired courses focus on foundational academic communication skills, including reading, listening, speaking, and composition.

Grades for IFP Pathways courses are not used in the calculation of grade point averages for degree programs unless specifically allowed by that program. In addition, IFP Pathways courses may not be used for credit toward a degree program.

Students admitted to IFP Pathways Faculty of Science must complete IFP Pathways and cannot submit English language proficiency scores for early exit.

For information on admission to the IFP Pathways Science program, refer to R.1 International Foundations Program Admission.

The below charts outline the first year program progression for IFP Pathways students based on their program.

4.8.1 Biological Sciences (IFP Pathways Science)

IFP Pathways Science students must complete the below first year progression if they are majoring in Biochemistry; Biological Sciences; Cellular, Molecular and Microbial Biology; Ecology; Plant Biology or Zoology.

| Summer | Fall | Winter | Spring |
|------------------------------------|--|--|-----------------------------|
| IFPX 248: Academic Success in STEM | IFPX 242: Intermediate Language and Skills Development | IFPX 342: Advanced Language and Skills Development | IFPX 346: Technical Writing |

| Summer | Fall | Winter | Spring |
|---|--|--|--------------------|
| IFPX 240: Introduction to Academic Writing for STEM | IFPX 246: Intermediate Academic Writing for STEM | IFPX 340: Advanced Academic Writing for STEM | Non-Science option |
| | Biology 241 | Biology 243 | |
| | Mathematics 249* or 265* or 275 | Mathematics 267* or 277 | |
| | Chemistry 201* or 211 | Chemistry 203* or 213 | |

**Courses typically taken. Please refer to the Course Listings for more information on the prerequisite and content differences between sets of courses.*

Delayed: 6 units from one of the following pairs: Computer Science 217 and 219; Geology 201 and 202; or Physics 211 and 223; and 3 units of non-Science option (to be taken in Spring Intersessions later in degree).

4.8.2 Chemistry (IFP Pathways Science)

IFP Pathways Science students must complete the below first year progression if they are majoring in Chemistry.

| Summer | Fall | Winter | Spring |
|---|--|--|-----------------------------|
| IFPX 248: Academic Success in STEM | IFPX 242: Intermediate Language and Skills Development | IFPX 342: Advanced Language and Skills Development | IFPX 346: Technical Writing |
| IFPX 240: Introduction to Academic Writing for STEM | IFPX 246: Intermediate Academic Writing for STEM | IFPX 340: Advanced Academic Writing for STEM | Non-Science option |
| | Chemistry 201* or 211 | Chemistry 203* or 213 | |
| | Mathematics 249* or 265* or 275 | Mathematics 267* or 277 | |
| | Physics 211* or 221 | Physics 223 | |

**Courses typically taken. Please refer to the Course Listings for more information on the prerequisite and content differences between sets of courses.*

Delayed: 6 units of open options; 3 units of non-Science option (to be taken in Spring Intersessions later in degree).

4.8.3 Computer Science (IFP Pathways Science)

IFP Pathways Science students must complete the below first year progression if they are majoring in Computer Science.

| Summer | Fall | Winter | Spring |
|---|--|--|-----------------------------|
| IFPX 248: Academic Success in STEM | IFPX 242: Intermediate Language and Skills Development | IFPX 342: Advanced Language and Skills Development | IFPX 346: Technical Writing |
| IFPX 240: Introduction to Academic Writing for STEM | IFPX 246: Intermediate Academic Writing for STEM | IFPX 340: Advanced Academic Writing for STEM | Statistics 213 |
| | Computer Science 217 or 231* | Computer Science 219 or 233* | |
| | Mathematics 249* or 265* or 275 | Mathematics 267* or 275 | |
| | Mathematics 211* or 213 | Philosophy 279 | |

**Courses typically taken. Please refer to the Course Listings for more information on the prerequisite and content differences between sets of courses.*

Delayed: 6 units of open options; 3 units of non-Science option (to be taken in Spring Intersessions later in degree).

4.8.4 Geoscience (IFP Pathways Science)

IFP Pathways Science students must complete the below first year progression if they are majoring in Geology or Geophysics.

| Summer | Fall | Winter | Spring | Summer |
|---|--|--|---------------------------------|-------------------------|
| IFPX 248: Academic Success in STEM | IFPX 242: Intermediate Language and Skills Development | IFPX 342: Advanced Language and Skills Development | IFPX 346: Technical Writing | Mathematics 267* or 277 |
| IFPX 240: Introduction to Academic Writing for STEM | IFPX 246: Intermediate Academic Writing for STEM | IFPX 340: Advanced Academic Writing for STEM | Mathematics 249* or 265* or 275 | |
| | Geology 201 | Geology 202 | | |
| | Chemistry 201* or 211 | Chemistry 203* or 213 | | |
| | Physics 211* or 221 | Physics 223 | | |

*Courses typically taken. Please refer to the Course Listings for more information on the prerequisite and content differences between sets of courses.

Delayed: 6 units of non-Science options (to be taken in Spring Intersessions later in degree).

Note: Due to the prerequisite requirements for second-year Geoscience courses, it will be necessary for students to complete Mathematics 267 in the Summer Intersession.

4.8.5 Mathematics and Statistics (IFP Pathways Science)

IFP Pathways Science students must complete the below first year progression if they are majoring in Mathematics, General Mathematics or Actuarial Science.

| Summer | Fall | Winter | Spring |
|---|--|--|-----------------------------|
| IFPX 248: Academic Success in STEM | IFPX 242: Intermediate Language and Skills Development | IFPX 342: Advanced Language and Skills Development | IFPX 346: Technical Writing |
| IFPX 240: Introduction to Academic Writing for STEM | IFPX 246: Intermediate Academic Writing for STEM | IFPX 340: Advanced Academic Writing for STEM | Non-Science option |
| | Mathematics 249* or 265* or 275 | Mathematics 267* or 277 | |
| | Computer Science 217* or 231 | Mathematics 211* or 213 | |
| | Option | Option | |

*Courses typically taken. Please refer to the Course Listings for more information on the prerequisite and content differences between sets of courses.

Delayed: 6 units of Arts options; 3 units of non-Science options (to be taken in Spring Intersessions later in degree)

4.8.6 Physics and Astronomy (IFP Pathways Science)

IFP Pathways Science students must complete the below first year progression if they are majoring in Astrophysics.

| Summer | Fall | Winter | Spring |
|---|--|--|-----------------------------|
| IFPX 248: Academic Success in STEM | IFPX 242: Intermediate Language and Skills Development | IFPX 342: Advanced Language and Skills Development | IFPX 346: Technical Writing |
| IFPX 240: Introduction to Academic Writing for STEM | IFPX 246: Intermediate Academic Writing for STEM | IFPX 340: Advanced Academic Writing for STEM | Chemistry 201* or 211 |
| | Physics 227 | Physics 255 | |
| | Mathematics 275 | Mathematics 277 | |
| | Mathematics 211* or 213 | Astrophysics 213 | |

*Courses typically taken. Please refer to the Course Listings for more information on the prerequisite and content differences between sets of courses.

Delayed: 3 units in Computer Science 217; 6 units of non-Science options (to be taken in Spring Intersessions later in degree)

IFP Pathways Science students must complete the below first year progression if they are majoring in Physics.

| Summer | Fall | Winter | Spring |
|---|--|--|-----------------------------|
| IFPX 248: Academic Success in STEM | IFPX 242: Intermediate Language and Skills Development | IFPX 342: Advanced Language and Skills Development | IFPX 346: Technical Writing |
| IFPX 240: Introduction to Academic Writing for STEM | IFPX 246: Intermediate Academic Writing for STEM | IFPX 340: Advanced Academic Writing for STEM | Chemistry 201* or 211 |
| | Physics 227 | Physics 255 | |
| | Mathematics 275 | Mathematics 277 | |
| | Mathematics 211* or 213 | Computer Science 217* or 231 | |

*Courses typically taken. Please refer to the Course Listings for more information on the prerequisite and content differences between sets of courses.

Delayed: 3 units from Chemistry 203, Biology 241 or Astrophysics 213; 6 units of non-Science options (to be taken in Spring Intersessions later in degree)

4.8.7 Natural Sciences (IFP Pathways Science)

IFP Pathways Science students who are majoring in Natural Sciences must complete a first year progression appropriate to their concentrations. Students may contact the Undergraduate Science Centre (USC) for assistance determining the courses required for their concentrations.

| Summer | Fall | Winter | Spring |
|---|--|--|-----------------------------|
| IFPX 248: Academic Success in STEM | IFPX 242: Intermediate Language and Skills Development | IFPX 342: Advanced Language and Skills Development | IFPX 346: Technical Writing |
| IFPX 240: Introduction to Academic Writing for STEM | IFPX 246: Intermediate Academic Writing for STEM | IFPX 340: Advanced Academic Writing for STEM | Option |

| | | | |
|--|----------------------------------|---|--|
| | Concentration 1* | Concentration 1* | |
| | Mathematics 249* or 265* or 275* | Mathematics 211* or 213*; or 267* or 277* | |
| | Concentration 2* | Concentration 2* | |

*Students should contact the Undergraduate Science Centre (USC) to confirm the appropriate courses for their concentration. Students may also refer to the Course Listings for more information on the prerequisite and content differences between sets of courses.

Delayed: 3 units in Computer Science 217; 6 units of non-Science options (to be taken in Spring Intersessions later in degree).

Note: If Mathematics courses or Computer Science courses are part of a C1 or C2, the number of C1 and C2 slots in this schedule can be reduced accordingly as per degree requirements.

4.8.8 Environmental Science (IFP Pathways Science)

IFP Pathways Science students who are majoring in Environmental Science must complete a first year progression appropriate to their concentration. Students may contact the Undergraduate Science Centre (USC) for assistance determining the courses required for their concentration.

| Summer | Fall | Winter | Spring |
|---|--|--|-----------------------------|
| IFPX 248: Academic Success in STEM | IFPX 242: Intermediate Language and Skills Development | IFPX 342: Advanced Language and Skills Development | IFPX 346: Technical Writing |
| IFPX 240: Introduction to Academic Writing for STEM | IFPX 246: Intermediate Academic Writing for STEM | IFPX 340: Advanced Academic Writing for STEM | Concentration Course* |
| | Concentration Course* | Chemistry 203 | |
| | Mathematics 249* or 265* or 275* | Second Mathematics determined by concentration* | |
| | Biology 241 | Biology 243 | |

*Students should contact the Undergraduate Science Centre (USC) to confirm the appropriate courses for their concentration. Students may also refer to the Course Listings for more information on the prerequisite and content differences between sets of courses.

Delayed: 9 units appropriate to the concentration chosen (to be taken in Spring Intersessions later in degree)

*Physics concentrators should take Mathematics 275.

5. Administration

Faculty Administrative Officers

Dean

L. Rigg

Vice Dean

C. Graham

Associate Deans

W. Benoit, Teaching, Learning and Student Engagement

N. Chibry, Undergraduate Programs and Student Affairs

F. Maurer, Innovation and Strategic Partnership

S. Vamosi, Diversity, Equity and Inclusion

Faculty of Social Work

1. Summary of Degree Programs

Degrees Offered

| |
|---------------|
| Undergraduate |
| BSW |
| Graduate |
| MSW |
| PhD |

Undergraduate

Bachelor of Social Work (BSW)

The Faculty of Social Work provides post-secondary education throughout Alberta. The BSW degree, accredited by the Canadian Association for Social Work Education, prepares students for generalist practice. Students may pursue the BSW degree on a full-time or part-time basis. Students have up to five years to complete the 3rd and 4th year of the BSW program.

The BSW program is administered from three locations:

Calgary: BSW Calgary and BSW Online (Virtual Learning Circle).

Edmonton (for Central and Northern Alberta Region): BSW Edmonton and Community-Based Learning Circles in Grande Prairie and Red Deer.

Lethbridge (for Southern Alberta Region): BSW Lethbridge and Community-Based Learning Circles in Medicine Hat.

The Learning Circles program prepares students for practice that is geographically relevant and particularly sensitive to the needs of Indigenous peoples. Students in the Community-Based Learning Circles program must be available to attend course offerings in Alberta communities where the Community-Based Learning Circles are being offered. The Virtual Learning Circle program delivers the curriculum through a blended learning approach, integrating online learning with some in-person classes in Calgary.

The Faculty of Social Work's admission routes into its different programs are described in the section 3.1 Admissions.

Graduate

Master of Social Work (MSW)

The Faculty offers a Master's program accredited by the Canadian Association for Social Work Education leading to the MSW degree. The objective of the MSW program is to prepare students for advanced professional practice in social work. The Faculty of Social Work offers MSW programs in Calgary, Edmonton, and Lethbridge. In all locations, students choose between the

course-based or the thesis route to the degree, except for the MSW in Leadership in the Human Services Specialization, which is only course-based.

In Calgary, MSW students are admitted annually and choose from one of the three Specializations: Clinical Social Work Practice, Leadership in the Human Services, or International and Community Development. Students without an undergraduate degree in social work must complete nine Foundation courses prior to taking any Specialization courses. BSW graduates are admitted directly into the Specialization.

In Edmonton, the Faculty of Social Work offers only the Clinical Social Work Practice Specialization. Students without an undergraduate degree in social work must complete nine Foundation courses prior to taking any Specialization courses. BSW graduates are admitted directly into the Specialization.

In Lethbridge, the Faculty of Social Work offers only the Clinical Social Work Practice Specialization and only to students with a BSW. Lethbridge does not offer the Foundation component.

The course-based MSW in Leadership in the Human Services Specialization is administered through Calgary as a blended program and is accessible to students regardless of home location.

More details about the MSW program may be found in the Faculty of Graduate Studies Calendar at grad.ucalgary.ca.

Doctor of Philosophy (PhD) in Social Work

The PhD program offers a research-based degree and is intended to produce highly qualified social work researchers and teachers. The Faculty of Social Work operates from campuses in Calgary, Edmonton, and Lethbridge. Please check the faculty's website to determine the program location for the year that you apply.

For further information please consult the Faculty of Graduate Studies Calendar at grad.ucalgary.ca.

MSW/MBA

Applications to this program are suspended until 2023.

Graduate Certificate and Diploma

A Graduate Certificate and Diploma in Mental Health and Addictions is offered in Calgary. Information about this program can be obtained from the Student Services Office in the Faculty of Social Work or from the Faculty's website at fsw.ucalgary.ca/. Applications to the Graduate Certificate and Diploma are not being accepted for Fall 2019.

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2. Faculty Information

Contact Information

Location: Professional Faculties 3256

Student Information: 403.220.2011/403.220.5430/403.220.2124/1.877.282.0667

Dean's Office: 403.220.5945

Dean's Office Email: browna@ucalgary.ca

Student Services Email: socialwk@ucalgary.ca

Website: fsw.ucalgary.ca

Additional Information

Students interested in pursuing the BSW in Calgary or through the Virtual Learning Circle program must contact:

Student Services

Faculty of Social Work, University of Calgary
PF 3256, 2500 University Drive N.W.

Calgary, Alberta

T2N 1N4

Telephone: 403.220.2011/403.220.5430/403.220.2124 or toll free 1.877.282.0667

Email: bswinfo@ucalgary.ca

The BSW is regularly offered in Edmonton. In addition, Central and Northern Alberta communities currently hosting the BSW Learning Circles program are: Grande Prairie, Red Deer and West Yellowhead.

Students interested in studying in the Central and Northern Alberta Region must contact:

Student Services

Faculty of Social Work, University of Calgary
Central and Northern Alberta Region

3-250, 10230 Jasper Avenue

Edmonton, Alberta

T5J 4P6

Telephone: 780.492.3888 or toll free 1.888.492.2083

Email: fswcnar@ucalgary.ca

The BSW program is regularly offered in Lethbridge. The Southern Alberta community currently hosting the Learning Circles program is Medicine Hat.

Students interested in studying in Southern Alberta Region must contact:

Student Services

Faculty of Social Work, University of Calgary
Southern Alberta Region
4401 University Drive, University Hall Room
526

Lethbridge, Alberta
T1K 3M4

Telephone: 403.329.2794 or toll free
1.866.329.2794

Email: fswsar@ucalgary.ca

Introduction**International Definition of Social Work**

“Social work is a practice-based profession and an academic discipline that promotes social change and development, social cohesion, and the empowerment and liberation of people. Principles of social justice, human rights, collective responsibility and respect for diversities are central to social work. Underpinned by theories of social work, social sciences, humanities and indigenous knowledge, social work engages people and structures to address life challenges and enhance wellbeing.”

(<http://ifsw.org/get-involved/global-definition-of-social-work/>)

Faculty of Social Work Vision

Creating social well-being and just societies.

Faculty of Social Work Mission

- Dedicated to promoting societies that respect human dignity and worth, meet basic human needs, are anti-oppressive, inclusive, and based on principles of social justice.
- Committed to learners by providing and building a knowledge base and set of skills in environments designed to stimulate and support a spirit of critical inquiry.
- Focused on serving as a catalyst for positive community impact through the creation and dissemination of knowledge and innovation.

Objectives

The Faculty of Social Work prepares BSW graduates to address individual, family, community, and social concerns in the context of diverse and changing societies. Graduates are prepared to draw upon a variety of assessment and intervention methods to help achieve social well-being outcomes with appropriate structural supports across the life span.

The program is based on the social work tenets of mobilizing strengths of individuals and groups, social engagement and civil societies, respect for diversity, inclusion, equitable participation, and social justice.

The program is grounded in the vision and mission of the Faculty, inquiry based methods of learning, the Codes of Ethics and Standards of Practice of the social work profession, and the national accreditation standards for schools of social work.

Opportunities

The BSW program provides students with the professional knowledge, theory, and skills of social work including a wide range

of experiential opportunities to integrate this learning in supervised practice settings. Upon graduation, students are prepared to practice as generalist social workers in a wide variety of social welfare fields in a continuously changing world. Areas of practice may include child welfare, family violence, community development, health, gerontology, mental health and addictions, social policy development, and working with individuals, families, groups, organizations, and communities.

Social Work Students' Association

The Social Work Students' Association (SWSA) is actively involved in the governance of the Faculty, with representatives on Faculty Council and Faculty committees. The society is an active advocate of student interests and issues, and a sponsor of social events for charitable causes. The Association is active in all regions and all students in the faculty are eligible for membership.

Professional Conduct

The study of social work practice places students in a position of special trust with professional social workers and their clients. The Faculty recognizes that social work education occurs both inside and outside the classroom and has the responsibility to ensure that its graduates are competent and ethical. Students are expected to comply with all university policies and regulations in addition to professional standards for the Social Work profession as outlined by the Canadian Association for Social Workers, Code of Ethics (2005): https://casw-acts.ca/sites/casw-acts.ca/files/documents/casw_code_of_ethics.pdf and the Alberta College of Social Work Standards of Practice (2013): acs.w.ab.ca/document/1327/final_standardsofpractice_20131104.

Students are expected to ensure they are both familiar and compliant with these standards.

3. Faculty Regulations**3.1 Admissions**

Applicants must meet the basic University admission requirements outlined in A.5 Undergraduate Admission Requirements section of this Calendar. Students who lack university admission requirements cannot be admitted to the Faculty. In addition, applicants must have a minimum grade point average of 2.30 calculated over the most recent course work to a maximum of 30 units of University of Calgary courses and/or transfer courses taken at other institutions. All grades within a term will be included except where the number of courses taken within a term exceeds 30 units, in which case, the highest grades will be used.

Students are admitted to the Fall Term only. Admission quotas limit enrolment in each of the routes. Therefore, not all qualified applicants may be admitted.

All applicants, including current University of Calgary students, must submit the University of Calgary online Application for Admission and upload the required support-

ing documents by the deadline dates specified below. All applicants must also provide two reference letters (one of which must be academic). Detailed application instructions can be obtained from the Faculty of Social Work website at: fsw.ucalgary.ca. Admission requirements for part-time students are the same as those listed for full-time students.

Applicants can only apply to one location. Applicants who wish to switch their location choice (e.g. from Calgary to Edmonton or Lethbridge) must contact the Student Services Office prior to March 1. Requests for change will be considered at the discretion of the Faculty.

Application Deadlines

Application and documentation deadline for the Bachelor of Social Work program: March 1.

Transcript deadline: March 15.

Also refer to ucalgary.ca/future-students/undergraduate/apply.

University Transfer Route (including After Degree)

The University Transfer route is available in Calgary, Edmonton and Lethbridge and through the Community-Based Learning Circles and Virtual Learning Circle programs.

Applicants to the University Transfer (UT) route must meet the following requirements:

- Minimum of 57 units non-social work university transferable courses, OR an undergraduate degree in another discipline from a recognized institution
- Successful completion of Social Work 201 or equivalent
- Admissibility to the University of Calgary
- English 30-1 or an acceptable equivalent
- Minimum admission grade point average of 2.30 on a 4.00 scale
- Proficiency in English language

All courses must have been completed by the end of the Winter Term (except Social Work 201) preceding the Fall Term for which entry is sought. Winter, Spring and Summer courses taken in the terms immediately preceding admission will not be used in the calculation of the admission GPA. However, applicants must successfully complete their Winter courses and must maintain a GPA sufficient to satisfy the University admission requirements.

Social Work 201 is a prerequisite for admission into the University Transfer route and must be completed prior to admission.

The Faculty of Social Work evaluates applications on the following criteria:

1. Admission Grade Point Average. The grade point average is calculated on the most recently completed 30 units, starting with courses completed prior to the application deadline.
2. Relevant work/volunteer experience.
3. Admission essay.
4. Two letters of reference. One of these should be from an academic source (e.g. previous instructor). The other should be

from a professional (e.g. a former employer or supervisor) who is qualified to comment on the applicant's suitability for undergraduate studies in social work.

Applicants wishing to take the BSW degree program at the University of Calgary may complete their 57 non-social work units from the required 60 units for admission, via the Faculty of Arts.

Notes:

- Applicants who have graduated with a social work diploma from a college that does not have an agreement with the Faculty of Social Work are considered University Transfer applicants. They will normally receive credit for 30 unspecified units of transfer credit, including the equivalent of Social Work 201 from their diploma program. These applicants will be required to take up to 30 additional units of non-social work university transferable courses, to meet the minimum admission requirements for the University Transfer route. Please contact one of the undergraduate student advisors in the Faculty of Social Work for further information.
- Applicants with a complete non-Social Work four-year degree and with the equivalent of two years of full-time paid or a minimum of 3000 hours of paid and/or volunteer work in the human services field, may consider applying to the MSW program. Applicants are strongly encouraged to consult with Student Services in the Faculty of Social Work prior to submitting an application to the MSW program.

Alberta Social Work Diploma Route

The Alberta Social Work Diploma route is available in Calgary, Edmonton, Community-Based Learning Circles and Virtual Learning Circle. The Lethbridge location may be available subject to faculty approval.

Applicants to the diploma route must meet the following requirements:

- Completed a Social Work Diploma at an Alberta Community College or University that has a transfer agreement with the Faculty of Social Work, and
- Completed a minimum of 24 units of university transfer non-Social Work courses (normally as part of the Social Work Diploma program).
- Minimum admission grade point average of 2.30 on a 4.00 scale.

Note: Applicants who have graduated with a social work diploma from a college that does not have an agreement with the Faculty of Social Work, will normally receive transfer credit for 30 unspecified units including the equivalent of Social Work 201 from their diploma program. These applicants will be required to take an additional 30 units of non-social work university transferable courses, to meet the minimum admission requirements for the University Transfer route. Please contact one of the undergraduate student advisors in the Faculty of Social Work for further information.

The Faculty of Social Work evaluates applications on the following criteria:

1. Admission Grade Point Average. The cumulative grade point average achieved on the Social Work Diploma will be used to calculate the admission average. For students still working on their diploma the cumulative GPA will be calculated on the most recently completed courses, starting with the Fall Term prior to the application deadline.
2. Admission essay.
3. Relevant volunteer/work experience.
4. Two letters of reference. One of these should be from an academic source (e.g. previous instructor). The other should be from a professional (e.g. a former employer or supervisor) who is qualified to comment on the applicant's suitability for undergraduate studies in social work.

Second Baccalaureate Degree

Students who have received one or more approved undergraduate degrees (BA, BSc, BEd, etc.) may apply for admission to the Bachelor of Social Work program (University Transfer/After-Degree route).

Students must apply using the University of Calgary online application system and submit all required supplementary documents by the application deadline. For more information regarding admission to a second undergraduate degree, refer to A.5.5 in Undergraduate Admissions.

3.2 Registration

Course Load

The normal course load is 15 units in Fall and Winter.

In the Community-Based Learning Circles and Virtual Learning Circle, the normal course load is 9 units in Fall and Winter.

All students are strongly encouraged to complete their Social Work 500 level courses during Spring and Summer.

Accuracy of Registration

All students are responsible for the completeness and accuracy of their registration and for arranging their course selections to meet all program requirements as detailed in this Calendar.

Transfers Between Locations for Current BSW Students

Current BSW students who wish to transfer to another location must apply for a location transfer by February 1 for the following Fall. Students must:

1. Discuss the possibility of transfer with faculty advisors from both the location they wish to leave and the location they wish to transfer to. The decision will be made through consultation between the program directors and field co-ordinators at the two locations.
2. Fill out and submit the Request for Transfer Between Locations form to Student Services at the current location, prior to the deadline.

Interruption of Program Leading to a Degree

Students who interrupt their degree program in the Faculty of Social Work are advised that after an absence of one calendar year (twelve consecutive months) from academic study at the university level, they may be required to comply with any regulations that may have come into effect in regard to their program requirements during their absence. Students who choose not to attend for a year (twelve consecutive months) will not be required to re-apply for admission. However, they must notify the Faculty of Social Work in writing by February 1 of their intention to return the following Fall. Students who interrupt their degree program for two or more years (twenty-four consecutive months) will be required to re-apply for admission. Students who are required to withdraw for academic reasons will not normally be readmitted.

Other Requirements

Most courses have a web-based component. In order to take advantage of this, students must be familiar with navigating the Internet and have access to a computer. Some courses may be available only online or through combined online and web-based video-conferencing. Email is routinely used to distribute course, program and faculty specific information to students. A University of Calgary email address is required. Small computer labs are available for student use in Calgary, Edmonton, and Lethbridge.

3.3 Course Work

Field Practicum

Field practicum courses provide an opportunity for the student to learn through direct social work practice. Successful completion of these courses is a requirement for continuation in the program. In all BSW program routes, students are required to complete a number of 300-level Social Work courses before registering in field practica. Students are advised to review the curriculum plan specific to their route.

The field practicum courses are Social Work 410 and 412. All continuing students planning to enrol in the field practicum courses must register in the appropriate course(s). Students will be assigned placements in the field practicum based on availability and student interest and choices made by agencies. Information on field placement arrangements, including international placements, is available from the Director of Field Education.

Students are expected to be in practicum for a specific number of hours per week for the duration of their scheduled term. The practicum represents a significant time commitment. Students must ensure that they are aware of field requirements, and available for field placements as scheduled, in order to complete their practica within the appropriate terms.

Notes:

- Students must maintain concurrent registration in practica and related integrative

seminars (that is, the practicum Social Work 410 must be taken at the same time as the integrative seminar Social Work 411 and the practicum Social Work 412 must be taken at the same time as the integrative seminar Social Work 413).

- Students registered in the field practicum courses, Social Work 410 and 412, are required to attend the practicum during Reading Week in both the Fall and Winter Terms. Students should also note that Social Work practicum courses will normally run one week past the last day of lectures in Fall and Winter Terms.
- International students must have a valid work permit for their practica in Canada. The work permit must be presented to the Field Education Office in the Faculty of Social Work prior to the start of the practicum.

Police Information Check

Students are advised that agencies that offer social work practicum placements may require a current Police Information Check (PIC) prior to acceptance into a placement. The placement agency has the discretion to refuse a placement based on a Police Information Check. Registration with the Alberta College of Social Workers (ACSW) also requires a Police Information Check. Students who are concerned about the presence of a criminal record should contact the police department to discuss the process for eliminating or erasing such a record. Students are obligated to inform the Faculty immediately of any change in status of their criminal record. Alberta Health Services (AHS) requires the Faculty of Social Work to document a PIC for all students placed in AHS practica.

Immunization Requirements

Many practicum settings require students to be immunized prior to a practicum placement, e.g., Alberta Health Services see www.albertahealthservices.ca/assets/info/hp/cdc/if-hp-cdc-ipsm-std-imm-post-sec-stud-08-302.pdf.

Students must meet immunization requirements prior to the start of all practicum courses if required by their practicum agency.

Student Advising

The Faculty of Social Work Student Services Offices in Calgary, Edmonton and Lethbridge advise students on academic matters and University regulations. Students can drop-in or book an appointment with Student Services staff through the online booking system.

3.4 Student Standing

Promotion and Graduation Requirements

1. Academic performance and professional suitability (see Professional Conduct) will be monitored throughout the program and assessed at the end of each Winter Term.

2. Once admitted to the BSW program, students are allowed a maximum of 6 units of "D" or "D+" grades within their program.

3. A student who fails or withdraws from a field practicum course (Social Work 410 or 412) will fail or be required to withdraw from the corequisite courses (Social Work 411 and 413). In addition, the student may be required to withdraw from the program. Normally, students may register in practicum courses a maximum of two times.

4. A cumulative grade point average of 2.30 or above is required on all courses taken towards the BSW degree. Normally, a student who has obtained a cumulative GPA of at least 2.00 but less than 2.30 will be placed on academic probation. Students whose cumulative GPA falls below 2.00 will be required to withdraw.

5. Students who are required to withdraw from the Faculty of Social Work will not normally be readmitted.

6. A maximum of 6 units of Social Work courses will be allowed for transfer credit.

To be awarded the Bachelor of Social Work degree from the University of Calgary, students must meet all program requirements as described under 4. Program Details. All students must complete a minimum of 30 units at the University of Calgary to obtain a degree from this institution. In the case of a student repeating a required course, the GPA for graduation purposes (not degrees with distinction) shall include only the higher grade.

Minor Field Programs

Students may formally declare a Minor Field and have this officially recorded on their transcript of record provided they satisfy the requirements for the relevant Minor Field program. This declaration must be made no later than the time of their last registration.

Minor Fields may be taken from Continuing Education and the Faculties of Arts, Education, Medicine, Science, and the Haskayne School of Business. Students must satisfy the Minor Field requirements of the relevant Faculty.

Graduation "With Distinction"

The notation "With Distinction" will be inscribed on the permanent record and graduation parchment of all BSW students whose grade point average on the last 27 units of University of Calgary Social Work graded courses places them in the top 10 per cent of the Faculty's graduates. A minimum GPA of 3.60 will be required.

3.5 Timeline for Program Completion

Degree requirements for all students must be completed within five consecutive 12-month periods from the date of initial registration in the Faculty of Social Work.

4. Program Details

4.1 BSW (Calgary, Edmonton, Lethbridge)

4.1.1 University Transfer Route (including After-Degree)

Students are required to complete a total of 60 units in the following configuration:

- 51 units of Social Work required courses, including: Social Work 355, 361, 363, 365, 371, 383, 391, 393, 395, 397, 399, 410, 411, 412, 413; and
- 9 units of Social Work elective courses at the 500 level.

Note: All required 300-level Social Work courses must be completed prior to registering in Social Work 410 or 412.

4.1.2 Alberta Social Work Diploma Route

Students are required to complete a total of 60 units in the following configuration:

- 24 units of Social Work required courses, including: Social Work 355, 361, 363, 365, 371, 412, 413;
- 9 units of Social Work courses at 500 level;
- 24 units of non-Social Work courses; and
- 3 units of either 500 level Social Work or non-Social Work course.

Notes:

- All required 300-level Social Work courses must be completed prior to registering in Social Work 412.
- All required non-Social Work courses will normally be completed prior to registering in Social Work 412.
- If students have completed additional University of Calgary transferable courses outside those required for the diploma, it is the student's responsibility to request the transfer of credits for those additional courses at the time of admission.

4.2 Learning Circles

Introduction

The Faculty of Social Work offers two BSW Learning Circles programs, namely the Community-Based Learning Circles and the Virtual Learning Circle. These programs provide an undergraduate curriculum that is culturally and geographically relevant. Course content is innovative and aligned with traditional philosophies and knowledge systems. Community collaboration and flexible delivery methods are key features of these programs.

Students in the Community-Based Learning Circles must be available to attend course offerings in Alberta communities where the Community-Based Learning Circles are being offered.

The BSW Virtual Learning Circle program delivers the curriculum through a blended learning approach, integrating online learning with some face-to-face classes in Calgary. Students must have reliable online access and be able to travel to Calgary for

an annual five-day residency in both years. For more information on the BSW Virtual Learning Circle program consult the Student Services Office in Calgary or the Faculty's website: fsw.ucalgary.ca.

Applicants should refer to A.2 Undergraduate Admission section of this Calendar for regulations regarding University admission requirements.

Core content in the Learning Circles curriculum is grouped into four theme areas:

- Generalist Practice in Context (Social Work 300, 301)
- Research in Context (Social Work 302, 303)
- Diversity and Oppression (Social Work 304, 305)
- Social Work Methods (Social Work 306, 307)

Each theme area is comprised of 9 units, including one theme course (6 units) and one additional 3 unit course. Students can complete the four theme areas over two academic years.

These form the basis for courses that are listed as Social Work 300-level courses (Social Work 300, 301, 302, 303, 304, 305, 306, and 307). Courses related to local practicum placements are listed as Social Work 400-level courses (Social Work 410, 411, 412 and 413). Social work option courses for Community-Based Learning Circles and Virtual Learning Circle students have the same 500-level designation as option courses for the students in Calgary, Edmonton and Lethbridge.

Notes:

- Social Work 300, 301, 302, 303, 304, 305, 306, and 307 cannot be taken by students in Calgary, Edmonton and Lethbridge.
- Social Work option courses may be taken at any time in the program.

4.2.1 Learning Circles University Transfer Route (including After-Degree)

Students are required to complete a total of 60 units in the following configuration:

- 54 units of Social Work required courses, including: Social Work 300, 301, 302, 303, 304, 305, 306, 307, 410, 411, 412, 413; and
- 6 units of Social Work elective courses at the 500 level.

Note: With prior approval of the Faculty of Social Work, University Transfer students may take Social Work 410 (Practicum I) and 411 (Integrative Seminar I) in their final semester of required social work theme courses. Upon completion of Social Work 410 and 411, University Transfer students may take Social Work 412 (Practicum II) and 413 (Integrative Seminar II).

4.2.2 Learning Circles Alberta Social Work Diploma Route

Students are required to complete a total of 60 units in the following configuration:

- 45 units of social work required courses, including: Social Work 300, 301, 302, 303, 304, 305, 306, 307, 412, 413; and
- 15 units of non-Social Work courses.

Note: All required 300-level Social Work courses and non-Social Work courses must be completed prior to registering in Social Work 412.

4.3 Interprofessional Health Education

The Faculties and Departments of Education, Medicine, Nursing, Social Work, Community Rehabilitation and Disability Studies, and Psychology, along with Alberta Health Services, jointly sponsor courses in Interprofessional Health Education (IPHE). The courses provide the foundation for sound and evidence-informed interprofessional practice in the fields of health, mental health, and addictions where comorbidity is common. Interprofessional Health Education (IPHE) 501 and 503 may be taken by Social Work undergraduate students and credited either as a 500-level Social Work option OR as a non-Social Work option.

5. Administration

Faculty Administrative Officers

Dean

J.D. Sieppert

Associate Deans,

A.M. McLaughlin, Central and Northern Alberta Region

C. Walsh, Research and Partnerships

S.M. Kwok, Southern Alberta Region

J. Ayala, Teaching and Learning

Faculty of Veterinary Medicine

1. Summary of Degree Programs

Degrees Offered

| |
|----------------------|
| Undergraduate |
| Professional |
| DVM |
| Graduate |
| MSc |
| PhD |

Doctor of Veterinary Medicine

The Faculty of Veterinary Medicine offers a four-year professional degree leading to a Doctor of Veterinary Medicine (DVM). Completion of at least two years of post-secondary instruction at a recognized university or at a college providing university-equivalency in coursework is required prior to application to the DVM program. Please refer to Admissions under the Faculty Regulations section for further details.

Graduate

Graduate work supervised by members of the Faculty of Veterinary Medicine leading to the Master of Science (MSc) and Doctor of Philosophy (PhD) degrees is offered under the administration of the Faculty of Graduate Studies. Graduate degrees are linked to research conducted in basic biomedical, clinical, population and public health or related disciplines. The Veterinary Medical Sciences graduate program is designed specifically for animal health related research. Details of specific programs appear in the Faculty of Graduate Studies Calendar and on the Faculty website. Post-DVM clinical training positions are also available.

2. Faculty Information

Contact Information

Location: Teaching Research & Wellness Building, 2nd floor, Foothills Campus

Student Information:

General Inquiries: 403.210.3961

DVM Admissions Inquiries: 403.220.8699

Graduate Studies Admission Inquiries: 403.210.6628

Clinical Training Programs Inquiries: 403.210.6116

Faculty Number: 403.210.3961

Email addresses:

General Inquiries: vetmed@ucalgary.ca

Dean's Office: vetdean@ucalgary.ca

DVM Admissions Inquiries: vet.admissions@ucalgary.ca

Graduate Studies Admission Inquiries: vmgrad@ucalgary.ca

Website: vet.ucalgary.ca/

Introduction

The University of Calgary Faculty of Veterinary Medicine (UCVM) offers an accredited program leading to a Doctor of Veterinary Medicine (DVM) degree and eligibility for licensure in North America. UCVM also offers graduate education and advanced clinical training programs. The DVM program is offered and administered by the Faculty of Veterinary Medicine. Graduate studies under the supervision of UCVM faculty members are administered through the Faculty of Graduate Studies.

The Mission of the Faculty is to meet the veterinary, animal, and public health needs of Alberta through:

- Excellence in delivery of a comprehensive undergraduate veterinary medical education, emphasizing production animal health, ecosystem and public health, equine health and investigative medicine;
- Excellence in clinical, diagnostic and professional teaching and service, in collaboration with our partners in the Distributed Veterinary Learning Community;
- Excellence in the creation and distribution of new knowledge through research, graduate veterinary education, and continuing education in animal health, disease, and welfare, and its relation to human health.

Our education, research and service activities will contribute to the promotion and protection of animal and human health and welfare in Alberta, Canada and internationally.

Pattern

The DVM program is accredited by the AVMA-CVMA (American and Canadian Veterinary Medical Associations) Council on Education and is based on an integrated core-elective model. The core program provides a comprehensive general veterinary education covering all the major domestic species, including food producing animals, equine and companion animals, and the major exotic animal species. The core

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program also includes public and ecosystem health, wildlife and conservation medicine, professional and communication skills, research skills and comparative medicine. The core program prepares students for general veterinary practice, with an emphasis on skills for successful practice in rural communities and provides a foundation to pursue all careers in veterinary medicine. The elective programs cover all areas of general veterinary practice and provide enhanced opportunities in four Areas of Emphasis:

- **Production animal health:** population and individual animal health of all food and other production animal species; educating veterinarians to meet the needs of the livestock industry and rural Alberta.
- **Ecosystem and public health:** animal and public health at the interface of domestic animals, wildlife, humans and the environment; educating veterinarians to meet the needs of society through public and private practice in areas related to public health, food safety, environmental and agricultural interfaces, wildlife/conservation/zoo medicine and health.
- **Equine health:** population and individual care of horses; educating veterinarians to meet the needs of the horse industry, horse owners, and rural Alberta.
- **Investigative Medicine:** comparative medicine and biomedical research; encouraging students to pursue careers advancing animal and human health through research (basic, clinical, applied, or population health).

The DVM program is delivered over four calendar years and includes nine semesters of instruction. The first three years are two semesters in length and follow the University academic calendar. They include on-campus and off-campus learning experiences. A number of extracurricular learning activities are also available. The fourth (practicum) year is the equivalent of three semesters - 40 weeks of practicum rotation experiences, plus two additional weeks for assessment, delivered over a full calendar year. Through our Distributed Veterinary Learning Community (DVLCC) students will gain valuable hands-on clinical, diagnostic and profes-

sional experience in the fourth year of the program. The DVLC is comprised of private and public practices, non-government organizations, federal and provincial agencies and other animal industry partners who work with UCVM faculty to provide an exciting collaborative environment and outstanding learning opportunities for our DVM students.

The DVM curriculum provides a balance of opportunities for students to learn comparative medicine and discipline-based knowledge, to acquire and practice clinical and professional skills, and to develop diagnostic reasoning ability during the first three years. Early exposure to clinical material at the individual animal and population levels is provided in the Clinical Presentations courses, which integrate basic, preclinical, clinical and population health material.

Clinical skills courses offered in each semester of the first three years enable students to have early and frequent contact with animals, where they learn and practice clinical skills necessary for the practicum year. Professional Skills courses in each of the first three years cover clinical communications, ethics, jurisprudence, business operations, informatics, and research.

Delivery of final year practicum rotations through the DVLC provides a wealth of clinical and professional experiences, preparing students for the broad range of career opportunities available within the veterinary profession. The Distributed Veterinary Teaching Hospital gives students access to a large case load that includes a significant proportion of primary care cases, in addition to more complex cases. Scheduling of the final year over 12 months provides opportunity to capture seasonality in clinical experiences.

In the fourth year, practicum rotations are organized into four different courses. All students must take a course in Laboratory Diagnostics (four weeks) and a course in General Veterinary Practice, involving clinical rotations covering the major domestic species and rural community practice (16 weeks). Students also choose one of four Areas of Emphasis programs (10 weeks) in the following areas: production animal health, equine health, ecosystem and public health, and investigative medicine. Students also follow a course of Clinical Enrichment rotation electives (10 weeks) which cover all major species and areas of veterinary medicine, including small animal, food animal, wildlife and zoo medicine, public practice, international, ecosystem health, and many other electives.

Opportunities

Graduates of the DVM program are eligible for licensure to practice in Canada, but the DVM degree does not itself confer the right to practice. The Alberta Veterinary Medical Association (ABVMA) is the professional organization governing the practice of veterinary medicine in Alberta under the authority of the Veterinary Profession Act. Students interested in exploring matters relative to license to practice in Alberta should refer to the ABVMA website (abvma.ca/). For infor-

mation relative to license to practice in the other provinces in Canada, students should contact the appropriate provincial veterinary association.

Student Services

The Office of Student Experience in the Faculty of Veterinary Medicine serves as the first point of contact for students requiring assistance with any aspect of student life.

Resources

The Faculty of Veterinary Medicine is located on the Foothills Campus and at the Spy Hill Campus, including the Clinical Skills Building, the Veterinary Sciences Research Station, and the Wildlife Research Station. The Foothills campus is located approximately one kilometre south of the main campus of the University of Calgary and functions as home-base for the Faculty, containing faculty and administrative offices, educational space, the Health Sciences Library, a student bookstore, food services, and many of the core research facilities. The Dean's Office is located on the second floor of the Teaching, Research, and Wellness (TRW) building.

The Spy Hill campus is approximately 17 kilometres north-west of the Foothills campus. The Clinical Skills Building (CSB) is the site of clinical and professional skills education during the first three years of the DVM program. The CSB has educational facilities for anatomy, animal handling, medical exercises, surgical exercises, diagnostic imaging, diagnostic support, and pathology instruction. There are outside holding pens for cattle and horses, and kennel facilities for dogs and cats. The CSB also has classrooms, small group teaching rooms, laboratory facilities, and all the necessary support areas. Primary student support services are provided at the Foothills Campus and main campus; however, additional administrative and student support space (e.g. kitchen, lounge area, learning commons) are available at the CSB to support students and activities while they are at that location. The Wildlife Research Station and the Veterinary Sciences Research Station are also located at the Spy Hill campus and support the educational and research activities of the Faculty.

The first three years of the DVM program are delivered predominantly at the Foothills and Spy Hill Campuses, with students spending approximately 50 per cent of their time at each site. Students are responsible for their own travel between sites, with classes scheduled to allow full day activities at each site. During the final year of the DVM program, students complete their practicum rotations on and off campus. Many practicum rotations occur in private veterinary practices and other institutional settings that together constitute the Faculty of Veterinary Medicine's Distributed Veterinary Learning Community. Many of the off-campus sites are located within a 90 minute drive of Calgary, while others are distributed across Alberta and beyond, including international sites. As part of the DVM program, students

must participate in learning opportunities at partner sites and may be required to live in close proximity to the site to facilitate on-call responsibilities. While travel support is provided, students are responsible for their travel arrangements to partner locations and for their own accommodation arrangements.

3. Faculty Regulations

3.1 Admissions

The Faculty of Veterinary Medicine generally accepts 30-32 students per year. Students must be Alberta residents, as defined by the Province of Alberta. The Admissions Committee recommends students for admission to the program on the basis of academic and non-academic factors. Students are assessed academically on performance in their last four full undergraduate terms and in the required courses (see Minimum Academic Requirements below). Selected applicants are invited for an interview where non-academic factors are assessed. At interview day, applicants are required to complete an on-site essay and participate in a series of interviews and other activities. The interview day will normally take place on a week-end in March at the Foothills campus. Applicants must attend interview day at their own expense. Three references are required. References must include an instructor at a post-secondary institution, a supervisor from a work/volunteer setting and a personal reference who is a non-relative.

Consistent with UCVM's mandate, preference will be given to applicants who demonstrate the attributes for successful careers in veterinary practice that support rural development and sustainability, and for careers related to our areas of emphasis. While no specific animal or veterinary-related experience is required, such experience is an asset. Understanding of the veterinary profession and animal industries relevant to the applicant's career interests is expected. This can be obtained through practical experience or through other means.

The application deadline will normally be in November for admission in the next fall term, with interviews in March in Calgary. The exact dates will be published each fall on our website and included in the application manual. Applicants will typically be notified of the Admissions Committee's decision no later than mid-June in the year of admission.

Applicants to the University of Calgary Faculty of Veterinary Medicine should ensure they have read the application manual which can be found on the Faculty website vet.ucalgary.ca/dvmapplication. The application manual details the latest requirements, processes and timelines for admissions.

Eligibility

To be eligible to apply, you must be an Alberta resident. The Alberta Government Guidelines within the Student Financial Assistance Regulations will be used to determine residency status. Details of the residency requirements can be found on the

Alberta Government website at: studentaid.alberta.ca/before-you-apply/eligibility/.

Proof of Alberta residency will be required with your application. Supporting documents could include: Alberta Health Care card or Alberta driver's license. If you have any questions regarding your residency status, please email: vet.admissions@ucalgary.ca.

The Faculty of Veterinary Medicine does not normally accept applications from students who have withdrawn, who have been required to withdraw, or who have been expelled from any school or college of veterinary medicine.

In selecting students, no consideration shall be given to factors irrelevant to performance such as gender, age, race, or religion. Nor will the vocation of an applicant's parent, guardian, or spouse be a consideration in the selection process.

Physical and learning disabilities must not prevent the applicant, upon graduation, from demonstrating competency in the skills and procedures expected of an individual who has completed a DVM degree in an accredited institution.

Minimum Academic Requirements

Normally, the minimum academic requirements for an applicant to be considered for admission are:

(a) Completion of four or more terms (semesters) of full-time post-secondary undergraduate education at a recognized university or at a college providing university-equivalency in coursework. A full-time term is defined as a minimum of four courses per term (semester) completed during the standard Fall (September to December) and/or Winter (January to April) Terms. Repeat attempts on a course may not be used to meet the requirements of a full-time term (see "d" below). The third and/or fourth terms may be in progress at the time of application but at least four terms of undergraduate education must be completed by April 30th of the year of admission.

(b) A minimum combined grade point average (GPA) of 3.00 ("B" or its equivalent) over each of the last four full-time terms of undergraduate academic years, as defined above. The combined GPA of the last three undergraduate terms as of January of the year of admission will be used to calculate GPA for interview eligibility and selection. The last four terms as of April of the year of admission will be used to calculate GPA to determine eligibility and rank for admission. Applicants may use the average GPA of courses from their most recent graduate program to count towards their most recent full-time term provided that the graduate degree will be completed in the year of application prior to registration in the DVM program.

(c) A minimum overall average of 3.00 ("B" or its equivalent) with a passing grade in each of the following required courses. Once this requirement has been met, the average GPA from the required courses will not be used further in the admissions process.

Two Introductory Biology courses
Two Introductory Chemistry courses
One Introductory English course
One Introductory Organic Chemistry course
One Introductory Statistics course
One Introductory Biochemistry course
One Introductory Genetics course
One Introductory Ecology course

A required course may not be repeated more than once for consideration. Grades achieved in a course or its equivalent completed three or more times will not be considered. No more than four of the required courses may be repeated.

Applicants must have completed or be in the process of completing the required courses, with at least seven of the ten required courses being completed before December 31 in the year preceding admission. In-progress courses must be completed by April 30 of the year of admission. Repeat courses may not be used towards meeting the definition of a full-time term (see "b" above). A grade that is achieved from a repeat attempt on a required course cannot be used towards the four-term GPA.

(d) Courses completed more than 10 years prior to the application date will not normally be considered in the admissions process. Rare exceptions may be made for applicants who have continued to work or study in a health sciences-related field following completion of an undergraduate degree.

Applicants are advised to monitor the UCVM website for any exceptions or changes to these requirements. Students requesting an exception to any aspect of the minimum academic requirements must do so at the time of application by completing the necessary section of the application form. Such requests will normally only be considered on submission of a complete application.

English Language Proficiency

English language proficiency must be demonstrated for all applicants for whom English is not their first language. English language proficiency can be demonstrated in one of the following ways:

(a) Completion of at least two full years within a degree program offered by an accredited university in a country which the University of Calgary recognizes as English language proficiency exempt.

(b) A minimum score of 92 on the Internet-based TOEFL (Test of English as a Foreign Language) and a minimum score of 50 on the Test of Spoken English (TSE); or a minimum score of 237 on the computer-based TOEFL and a minimum score of 50 on the TSE; or a minimum score of 580 on the paper-based TOEFL and a minimum score of 50 on the TSE.

Applications

Online application forms and the current-year application manual for the Faculty of Veterinary Medicine are available on the Faculty website vet.ucalgary.ca/dvmapplication. Applicants to the University of Calgary

Faculty of Veterinary Medicine should ensure they have read the application manual and are familiar with the latest requirements and processes regarding the admissions process. Application deadlines are strictly followed.

Applications will be considered from those applicants who meet the stated residency, English and Minimum Academic Requirements. Application packages are to be submitted by the established deadlines along with the application fee. A current set of official transcripts must be submitted directly to the UCVM Admissions office. Applicants should delay submission of the first transcript until final marks from their Fall Term are available; the final submission deadline for Fall transcripts will be established each year but will normally be in the last week of January. Applicants are also required to provide official transcripts for the Winter Term as soon as they are available; the final submission deadline for Winter transcripts will be established each year but will normally be in the last week of May. Please consult the current year application manual for details.

Transcripts should be sent directly to the UCVM Admissions Office:

UCVM Admissions
TRW 2D03, 3280 Hospital Drive NW
Calgary, AB T2N 4Z6

Offers of Admission will be sent by email, typically during the first two weeks of June. You will have five working days to reply either by email (vet.admissions@ucalgary.ca) or telephone (403.220.8699) to this offer. You will have five working days from the date of your email or telephone call to submit (hand delivery, regular mail or courier) the signed acceptance page. You must also submit a deposit of \$500.00 electronically to your Student Centre. Such deposits will be applied to the first year's fees. Failure to do so may result in the position being assigned to another applicant. An applicant who accepts a position but later rescinds the acceptance will forfeit the entire \$500.00 deposit.

Official acceptance letters will be mailed upon receipt of the signed acceptance page and deposit. Letters to waitlisted students and students not offered admission will be sent in the second week of June. If and when additional spaces become available, waitlisted students will be notified immediately. Please note that placements may be available well into the summer.

3.2 Registration

Successful applicants are required to have or receive immunization for tetanus and rabies following admission.

Accuracy of Registration

The Faculty of Veterinary Medicine will directly register successful applicants and ongoing students into all required yearly courses. Payment of fees is the student's responsibility through the Online Student Centre via MyUofC web portal. For more information refer to B.15 Payment of Fees or Notification of Financial Assistance in

the Academic Regulations section of this Calendar.

Deferrals

Students wishing to apply for deferral should make this request in a letter to the Dean, care of the UCVM Admissions Office within 15 days of the date at the top of their acceptance letter. Requests for deferred admission will only be considered from applicants who have accepted the offer of admission and paid the \$500.00 acceptance fee. The applicant must clearly explain the reason for the deferral request. Deferrals will be considered for academic and/or non-academic reasons, including completion of degrees. Deferral requests for attending other veterinary schools will not be accepted. It is at the sole discretion of the Dean to grant or deny a deferral. Deferrals will normally be for one year only.

Interruption of Program Leading to a Degree

Students who voluntarily withdraw from the DVM program and who wish to return must re-apply to the program through the Admissions Office if they withdrew from first year, or for advanced standing through the Associate Dean (Academic) if they withdrew from second-fourth year. Students contemplating a withdrawal from the program are cautioned that there is an enrolment limitation for the program and that re-entry will be conditional on the availability of space and on academic performance.

3.3 Course Work

Students in the DVM program must take the full complement of required courses in each year of the four year program. There is no provision for students entering the program to take courses on a part-time basis and course credits or exemptions will not normally be provided. Under certain circumstances, incumbent students registered in the program may be permitted to repeat specific courses (and not the entire year), and therefore may enrol in a subset of the program while they repeat those courses.

Policies Relative to Practicum Experiences

Students will be required to complete practicum experiences at sites outside of the city of Calgary in locations throughout the province and further afield. Schedules for student's practicum experiences will also include evenings, nights, and weekends. Students must demonstrate satisfactory practicum performance as outlined in the objectives of the course. Participation in all activities that are related to practicum courses is mandatory.

A student may be prohibited from attending or completing a practicum experience if there is evidence that the student has acted in a manner that is detrimental to participant safety, patient care or client relations. A student who wishes to appeal such a decision will follow the appeals process as outlined under 3.6 Appeals Process.

3.4 Student Standing

For continuation of study in the DVM program in the Faculty of Veterinary Medicine, a student must satisfy the conditions as presented below.

The regular University grading system will normally apply to all courses in the DVM program. To calculate the grade point average (GPA) for the year under review, grades will be weighted on the basis of course credits. Courses that are given a grade of CR/F will not be included in the calculation of the GPA.

General Requirements

1. To be promoted to the next year of the DVM program, a student must achieve a satisfactory academic standing and clear any failed or incomplete courses.
2. At the discretion of the Associate Dean (Academic), supplemental privileges may be granted to a student who has received a "D+", "D", or "F" grade in a course. The student must make application to write the supplemental examination to the Associate Dean (Academic) within seven days of the notification of the final grade for the semester within which the "D+", "D", or "F" grade was received.
3. Any student granted a supplemental privilege must meet with the Associate Dean, (Academic) who will inform the student of resources available that might help the student with his or her academic difficulties.
4. A student will be deemed to have failed a course if they attain an "F" grade in the course and they are not eligible for a supplemental privilege, or if they attain an "F" grade in the course and they subsequently fail to attain a grade of "C-" on a supplemental exam.
5. Successful completion of a supplemental exam (a "C-" or above) will not result in a grade higher than "C-" being awarded for the course. If a student who originally received a "D+" or "D" on a course receives a grade lower than a "D", the previously achieved "D" will stand.
6. A student may be granted supplemental privileges only once for a course. Any student who fails a course once, then attains an "F" grade after repeating the same course, will be required to withdraw from the DVM program.
7. No more than two supplemental privileges may be granted to a student in one year of the program, and no more than four supplemental privileges will be granted to a student over the whole program. Any student who attains an "F" grade in a fifth course over the program will be required to withdraw from the DVM program.
8. Upon review of the academic performance of a student who fails one course they may be required to repeat the course, repeat all courses in the year, depending upon the nature and size of the course failed, or withdraw from the program. Upon review of the academic performance of a student who fails two courses, they will be

required to repeat the year or withdraw from the program.

9. Students must normally repeat a failed course, or year, in the academic year immediately following that in which the failure occurred.

10. Normally, students may carry a maximum of one course with a grade of "D" or "D+" in their program. Students who receive a grade of "D" or "D+" in a second course must raise the mark to "C-" through a supplemental exam before being considered for promotion to the next year of the program.

11. Students required to withdraw from the DVM program will not normally be considered for re-admission.

12. Normally, students must complete the requirements of the DVM Program within 6 years of first enrolment. Failure to complete the program within this time will normally result in the student being required to permanently withdraw from the program.

Students Previously in Satisfactory Standing

1. With a GPA of 2.00 or higher, and a pass in all courses for the year under review will retain the standing of satisfactory academic performance.
2. With unsatisfactory academic performance, will be placed on probationary status.
3. With a GPA of less than 1.70 in any year under review will be required to withdraw from the DVM program.

Students on Probation

1. Upon completion of first or second year will have their probation cleared if they attain a GPA of at least 2.00 and pass all courses by the end of second or third year respectively.
2. Upon completion of the third year of the program will not be permitted to proceed to fourth year until they have cleared probation. The Associate Dean, Academic will establish appropriate remediation requirements that must be fulfilled in order for the students to clear probation and obtain the standing of satisfactory performance. These remediation requirements may include repeating a component of a course, one or more entire courses, or an entire year.
3. Will be required to withdraw from the DVM program if their GPA at the end of the following year is less than 2.00. This is consistent with University regulations, which state that students will be required to withdraw rather than be placed on probation for a second time.

3.5 Graduation

Requirements

Students must have successfully completed all required components of the program.

Students will not be allowed to graduate while on probation or with any failed fourth year courses. The Associate Dean (Academic) will establish appropriate remediation requirements that must be fulfilled in order for students to clear probation and obtain

the standing of satisfactory performance. These remediation requirements may include repeating one or more practicum rotations, one or more entire courses, or the entire fourth year.

Degrees "With Distinction"

The notation "With Distinction" will be inscribed on the permanent record and graduation parchment of all DVM students with no failures whose grade point average is 3.60 or better across all courses taken during the DVM program.

3.6 Appeals Process

Students may appeal any decision. Students should be familiar with I. Reappraisal of Graded Term Work and Academic Assessments (final grades) and J. Student Appeals to the University Appeals Committee and University Appeals Tribunal in the Academic Regulations section of this Calendar. Appeals at the Faculty level must be submitted in writing to the Associate Dean (Academic) within 15 calendar days of the event or ruling giving rise to the appeal. Any appeal must specify (a) exactly what is being appealed, (b) the grounds for the appeal, and (c) the remedy sought.

3.7 Fees and Expenses

Please refer to the Tuition and General Fees section within the Calendar for details on DVM tuition and general fees. In addition to tuition and general fees, DVM students may be assessed a safety equipment fee.

4. Program Details

4.1 Doctor of Veterinary Medicine Introduction

The Faculty of Veterinary Medicine of the University of Calgary offers a four-year professional degree leading to a Doctor of Veterinary Medicine (DVM). The first three years of the program follow the regular academic year, while the fourth year is scheduled for 40 weeks, with two additional weeks for assessment, across the entire calendar year (May-April).

The DVM program is accredited by the AVMA-CVMA Council on Education and is based on an integrated core-elective model. The core program provides a comprehensive general veterinary education covering all the major domestic species, including food producing animals, equine and companion animals, and the major exotic animal species. The core program also includes public and ecosystem health, wildlife and conservation medicine, professional and communication skills, research skills and comparative medicine. The core program prepares students for general veterinary practice, with an emphasis on skills for successful practice in rural communities and provides a foundation to pursue all careers in veterinary medicine. The elective programs cover all areas of general veterinary practice and provide enhanced opportunities in four Areas of Emphasis: production animal health, ecosystem and public health, investigative medicine, and equine health.

Admissions

Applicants to the DVM program should refer to the Admissions requirements under 3. Faculty Regulations section. Please consult our website for additional details: vet.ucalgary.ca.

Course Requirements

All courses in the first three years are required, but students have a choice of elective content within some courses. In fourth year, all students are required to take Veterinary Medicine 570 (Laboratory Diagnostics), Veterinary Medicine 580 (General Veterinary Practice) and Veterinary Medicine 590 (Clinical Enrichment).

In fourth year, each student must also choose one of the following elective courses:

- Veterinary Medicine 582: Production Animal Health
- Veterinary Medicine 583: Ecosystem and Public Health
- Veterinary Medicine 584: Equine Health
- Veterinary Medicine 585: Investigative Medicine

Regulations

See 3. Faculty Regulations.

Program Sequence

| First Year | |
|---|--|
| Veterinary Medicine 300: Clinical Presentations I | Veterinary Medicine 342: Pathologic Basis of Disease |
| Veterinary Medicine 305: Clinical Skills I | Veterinary Medicine 343: Immunology |
| Veterinary Medicine 307: Professional Skills I | Veterinary Medicine 344: Principles of Epidemiology |
| Veterinary Medicine 320: Anatomy and Histology | Veterinary Medicine 345: Introduction to Nutrition |
| Veterinary Medicine 321: Physiology | Veterinary Medicine 360: Introduction to Veterinary Medicine |
| Veterinary Medicine 322: Behaviour | |
| Veterinary Medicine 323: Animals, Health and Society | |
| Veterinary Medicine 324: Genetics and Molecular Biology | |

| Second Year | |
|--|--|
| Veterinary Medicine 400: Clinical Presentations II | Veterinary Medicine 442: Clinical Pathology |
| Veterinary Medicine 405: Clinical Skills II | Veterinary Medicine 443: Clinical Pharmacology and Toxicology |
| Veterinary Medicine 407: Professional Skills II | Veterinary Medicine 444: Diagnostic Imaging |
| Veterinary Medicine 410: Basic Surgical Principles | |
| Veterinary Medicine 420: Health Management | Veterinary Medicine 450: Selected Topics in Areas of Emphasis I |
| Veterinary Medicine 421: Systemic Pathology | Veterinary Medicine 451: Selected Topics in Areas of Emphasis II |
| Veterinary Medicine 422: Virology | Veterinary Medicine 460: Applied Nutrition |

| | |
|--|---|
| Veterinary Medicine 423: Bacteriology | Veterinary Medicine 461: Outbreak Investigation |
| Veterinary Medicine 424: Parasitology | Veterinary Medicine 462: Foreign Animal Disease |
| Veterinary Medicine 440: Public Health and Risk Analysis | Veterinary Medicine 463: Field Experiences in Areas of Emphasis |

| Third Year | |
|---|---|
| Veterinary Medicine 500: Clinical Presentations III | Veterinary Medicine 540: Food Animal Medicine and Surgery |
| Veterinary Medicine 505: Clinical Skills III | Veterinary Medicine 541: Theriogenology |
| Veterinary Medicine 507: Professional Skills III | Veterinary Medicine 542: Emergency and Critical Care |
| Veterinary Medicine 520: Advanced Health Management | Veterinary Medicine 550: Zoological Medicine |
| Veterinary Medicine 521: Equine Medicine and Surgery | Veterinary Medicine 551: Laboratory Animal Medicine |
| Veterinary Medicine 522: Small Animal Medicine and Surgery | Veterinary Medicine 561: Ecosystem and Public Health Field Course |
| Veterinary Medicine 523: Anesthesiology and Therapeutics | Veterinary Medicine 531: Selected Topics in Small Ruminant, South American Camelid and Non-traditional Livestock Production |
| Veterinary Medicine 530: Selected Topics in Clinical Medicine | |

| Fourth Year |
|--|
| Students take four courses in fourth year. The year is scheduled over a total of 40 weeks across an entire year with an additional two weeks for assessment, commencing immediately after completion of third year (May-April). All four courses are comprised of practicum rotations that are also scheduled across the entire calendar year. |
| Veterinary Medicine 570: Laboratory Diagnostics |
| Veterinary Medicine 580: General Veterinary Practice |
| Veterinary Medicine 590: Clinical Enrichment |
| One of the following elective courses: |
| Veterinary Medicine 582: Production Animal Health |
| Veterinary Medicine 583: Ecosystem and Public health |
| Veterinary Medicine 584: Equine Health |
| Veterinary Medicine 585: Investigative Medicine |

5. Administration

Faculty Administrative Officers Dean

B. Singh

Associate Deans

R. McCorkell, Academic

T. Schiller, Clinical Programs

J. Thundathil, Graduate Education

H. Schaeztl, Research

Werklund School of Education

1. Summary of Degree Programs

The Werklund School of Education offers five Bachelor of Education (BEd) undergraduate degree pathways:

- Four-Year BEd
 - Fall-start on-campus pathway
 - Summer-start Community-Based blended delivery pathway
- Five-Year Concurrent BEd
- Two-Year After-Degree BEd for holders of approved degrees
 - Fall-start on-campus pathway
 - Summer-start Community-Based blended delivery pathway

All students in the Five-Year Concurrent BEd and Two-Year After-Degree BEd pathways must choose a route - Elementary route (kindergarten through grade 6) or Secondary route (grades 7 through 12) and a Teachable Subject Area. Students in the Four-Year Community-Based BEd pathway will be in a K-12 route and apply for ONLY a Teachable Subject Area, not a route. Students in the Four-Year BEd (On-Campus) pathway may declare a Route, depending upon desired Teachable Subject Area. Some Areas offer a K-12 focus. Students should refer to 'Degrees Offered', below.

PLEASE NOTE: Bachelor of Education degree pathways are offered on a full-time basis only. Part-time studies are not permitted without the express permission of the Associate Dean, and only under very exceptional circumstances.

Degrees Offered

| Undergraduate Degrees |
|-----------------------------|
| Four-Year BEd |
| Two-Year (After-Degree) BEd |
| Five-Year (Concurrent) |

Four-Year BEd (On-Campus)

| Elementary | Secondary | K-12 |
|---------------------------|----------------------------|---------------------------|
| Early Childhood Education | English Language Arts | English Language Learners |
| English Language Arts | Fine Arts - Visual Studies | Second Languages |
| Fine Arts | Fine Arts – Drama | |
| Mathematics | Mathematics | |
| Science | Science – Biology | |
| Social Studies | Science – Physics | |
| | Social Studies | |

Four-Year BEd (Community-Based)

| K-12 |
|-----------------------|
| English Language Arts |
| Mathematics |
| Science |
| Social Studies |

Two-Year BEd (After-Degree - On-Campus)

| Elementary | Secondary |
|---------------------------|-------------------------|
| Early Childhood Education | English Language Arts |
| English Language Learners | Fine Arts – Visual Arts |
| English Language Arts | Fine Arts – Drama |
| Fine Arts - Visual Arts | Fine Arts - Music |
| Fine Arts - Drama | French |
| Fine Arts - Music | Mathematics |
| French | Physical Education |
| Inclusive Education | Science – Biology |
| Mathematics | Science – Chemistry |
| Physical Education | Science – Physics |
| Science | Second Languages |
| Second Languages | Social Studies |
| Social Studies | |

Two-Year BEd (After-Degree) Community-Based

| Elementary | Secondary |
|-----------------------|-----------------------|
| English Language Arts | English Language Arts |
| French | French |
| Mathematics | Mathematics |
| Science | Science – Biology |
| Social Studies | Science – Chemistry |
| | Science – Physics |
| | Social Studies |

Five-Year BEd (Concurrent)

| Elementary | Secondary |
|---------------------------|-------------------------|
| Early Childhood Education | English Language Arts |
| English Language Learners | Fine Arts – Music |
| English Language Arts | Fine Arts – Drama |
| Fine Arts - Music | Fine Arts – Visual Arts |
| Fine Arts - Drama | Fine Arts – Dance |
| Fine Arts - Visual Arts | French |
| French | Mathematics |
| Inclusive Education | Physical Education |
| Mathematics | Second Languages |
| Physical Education | Science - Biology |
| Second Languages | Science - Chemistry |
| Science | Science - Physics |
| Social Studies | Social Studies |

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| Co-operating Faculties for Five-Year (Concurrent) | Major | |
|---|--|--|
| Arts/Education | BA/BEd BFA/BEd BMUS/ BEd BSc/BEd | Canadian Studies/Education Dance (Dance Pedagogy)/ Education Development Studies/Education Drama/Education English/Education French/Education Geography/Education History/Education International Indigenous Studies/ Education International Relations/ Education Multidisciplinary**/Education Music/Education Political Science/Education Sociology/Education Second Languages/Education Visual Studies/Education |
| Kinesiology/ Education | BKIN/BEd | Kinesiology (Leadership in Pedagogy and Coaching)/ Education |
| Science/ Education | BSc/BEd | General Mathematics/Education Natural Sciences*/Education |

*Only the following Natural Sciences Concentrations are approved within the Five-Year Concurrent program with Education (Biology, Chemistry, Physics), and Concentration 1 must align with the corresponding Teachable Subject Area in Education.

**Students majoring in BA Multidisciplinary may apply to any Teachable Subject Area in the Five-Year Concurrent program as long as they have a declared a minor that is not the same as a minor in the Teachable Subject Area, per the chart below:

Concurrent Elementary Route Multidisciplinary Focus Alignment

| Teachable Subject Area | can combine with: |
|---------------------------|---|
| Early Childhood Education | Primary Focus in Drama, Music or Psychology |
| English Language Arts | Primary Focus in English |
| English Language Learners | Primary Focus in Linguistics |
| French | Primary Focus in French |
| Inclusive Education | Primary Focus in Psychology |

(continued on next page...)

| | |
|------------------|---|
| Mathematics | Secondary Focus in Data Science, Statistics or Mathematics |
| Science | Secondary Focus in Biological Sciences, Chemistry, or Physics |
| Second Languages | Primary Focus in Arabic Language and Muslim Cultures, Chinese, East Asian Studies, Japanese, or Spanish |
| Social Studies | Primary Focus in Canadian Studies, Development Studies, Geography, History, International Indigenous Studies, International Relations, Law and Society, Political Science, or Sociology |

Graduate

MA
MSc
MEd
MC
PhD
EdD

Graduate Programs in Education

Information on graduate work appear in the Graduate Studies Calendar. For more information see ucalgary.ca/pubs/calendar/grad/ current or contact the Graduate Programs in Education (GPE) Office.

Location: Education Tower 114

Telephone: 403.220.5675

Fax: 403.282.3005

Email address: gpe@ucalgary.ca

Website: werklund.ucalgary.ca/gpe/

2. Faculty Regulations

Students in the Werklund School of Education are governed by the academic regulations contained within the individual program sections and also the Admissions and Academic Regulations sections of the Calendar. Students are advised to read and consider all regulations and if there are any questions, they should consult the student advisors in the relevant faculties.

2.1 Advising and Program Information

Undergraduate Programs in Education Office

Undergraduate Programs in Education (UPE) is the home of undergraduate programs in the Werklund School of Education. In addition to housing the Associate Dean, the Directors of Student Experience and Directors of Field Experience, UPE connects students with any academic assistance they require. Services include:

- Program advising for future and current students
- Field Experience advising
- Career advising
- Graduation checks
- Changes of Program
- Leaves of Absence requests
- Letters of Permission for study at other institutions
- Academic Requirements support
- Student registration

Location: Education Tower 230

Phone: 403.220.5639

Email: upe@ucalgary.ca

Website: werklund.ucalgary.ca/upe

Other Advising Offices

Students in the BEd Concurrent program must also consult with an advisor from their co-operating faculty. Undergraduate Advising Offices are found in Arts, Science and Kinesiology.

Arts Students' Centre

Location: Social Sciences 102

Phone: 403.220.3580

Email: artsads@ucalgary.ca

Website: arts.ucalgary.ca/undergraduate

Undergraduate Science Centre

Location: Energy Environment & Experiential Learning (EEEL) 445

Phone: 403.220.8600

Email: usc@ucalgary.ca

Website: ucalgary.ca/science/undergraduate/usc

Faculty of Kinesiology Advising Office

Location: Kinesiology B 142

Phone: 403.220.7018 or 403.220.3407

Email: knesinfo@ucalgary.ca

Website: ucalgary.ca/knes/undergraduate

2.2 Objectives

The teaching profession requires that teachers have a solid background in one or more academic disciplines and a demonstrable mastery of the knowledge and skills associated with effective teaching. Programs in the Werklund School of Education recognize these demands and promote inquiry and life-long professional growth, as well as university-school and community collaboration that will integrate theory with practice. Program graduates are eligible to apply for Alberta provincial teaching certification from kindergarten to grade 12.

2.3 Career Opportunities

Eligibility to Teach in Alberta

Alberta provincial teaching certification is a two-stage process and it requires separate evaluations by separate governing bodies.

- Alberta Education issues teaching certificates.
- The Alberta Teachers' Association (ATA), through the Teacher Qualifications Service (TQS), determines salary.

Both evaluations are required to be eligible to teach in Alberta public schools.

Certification

To be eligible to teach in Alberta, a valid teaching certificate issued by the Province of Alberta is required. After the successful completion of the BEd program, a student may be recommended for an Alberta Interim Professional Certificate by the Werklund School of Education. Typically all of the required units needed for certification are included within the courses taken as a part of the BEd program.

Note: In order to meet certification requirements students who are in the Two-Year After-Degree BEd program are required to present 3 units in English Literature or French Literature in addition to the courses taken as a part of the BEd.

Typically, these are taken as a part of the student's first degree, or they can be taken following the completion of the first degree, as they are required for admission into the BEd After-Degree program.

Teachers Certified in Other Jurisdictions

Teachers who have been certified to teach in other jurisdictions (other provinces and other countries) and who wish to teach in Alberta must contact Alberta Education, Teacher Development and Certification Branch to have their credentials evaluated.

Certification Enquiries

All enquiries concerning certification should be directed to the Alberta Education website.

Teacher Qualifications for Salary Purposes

Evaluations for salary purposes are determined by the Teacher Qualification Service (TQS), Alberta Teachers' Association, and not by Alberta Education or the University of Calgary.

For more information, please refer to the Teacher Qualifications Service website.

Careers in Education

The majority of teacher education graduates can expect to work as kindergarten/elementary and/or secondary teachers. Indeed, the role of classroom teacher is one that permits graduates to work most closely with young people and allows for the greatest direct service to educational communities. The modern context of education demands that graduates be prepared to go beyond the traditional role of classroom teacher. To teach successfully, graduates must be prepared to work closely and effectively with students, colleagues, parents, and the community in virtually every aspect of educational decision-making. Furthermore, graduates must understand and embrace that it is imperative to extend their formal education throughout their careers. The successful completion of a BEd program is only the beginning of a teacher's academic and professional learning.

Increasingly, Education students are finding employment in community and workplace settings. Teachers develop numerous skills that are highly valued in community, government, and business organizations.

Many graduates will choose from one or more additional careers in education, nearly all of which require successful experience as a school-based practitioner, permanent professional certification, and a master's or doctoral degree in education:

- Curriculum developer
- Assessment designer
- Administrator
- Staff developer

- Staff officer for a teachers' professional association
- Author of instructional resources
- College instructor
- University professor

2.4 Police Information Check

All applicants to the Werklund School of Education are required to provide a current Police Information Check which includes a Criminal Record Check and a Vulnerable Sector Search. Students who are not residents of Calgary must arrange for a Police Information Check through their nearest police service or RCMP detachment in the area where they reside. In order to be considered "current", the Police Information Check must be completed and dated after July 1st in the year of admission and every 12 months thereafter. Online Police Information Checks (ePICs) will not be accepted.

The original Police Information Check must be presented in person to the administration in the Undergraduate Program Office in the Werklund School of Education prior to the start of the academic year, with the exception of Community-Based and Teaching Across Borders students, who must submit a scanned copy to upefield@ucalgary.ca by the same date. All students must also present the original police information check to the partner school administration on the first day of each Field Experience (Education 440, 465, 540, 560). Students will also be required to complete and return the "Notice Regarding Requirement for Police Information Checks – Student" form signed and witnessed electronically to the upefield@ucalgary.ca no later than one week prior to the first day of classes.

Students who are concerned about the presence of a criminal record should contact the police department to discuss the process for eliminating or erasing such a record. Students who do not present a clear Police Information Check will not be placed in a Field Experience and as a result, cannot continue in the Education program. Successful completion of Field Experience is required for graduation.

A Police Information Check is required for all community or service learning placements. Failure to present a clear Police Information Check will result in the student being unable to complete their Field Experience or community placement. Students are obligated to inform the Faculty immediately of any change in status of their criminal record.

2.5 Student Affairs

Education Students' Association

The Education Students' Association (ESA) is a professional organization and a student local of the Alberta Teachers' Association (ATA). Through its relationship with the Werklund School of Education, it provides an important liaison between students and the profession. It is expected that all Education students will join the society, actively promote its professional interests, and participate in its social activities.

For more information, please visit the ESA website.

3. Werklund School of Education Regulations

3.1 Admission

New applicants should refer to A.5 in the Admissions section of this Calendar for regulations regarding University admission requirements.

English Language Proficiency

In addition to the admission requirements of the Werklund School of Education, all applicants must demonstrate English Language Proficiency to be considered for admission to an undergraduate program. These requirements are outlined in the A.11 in the Admissions section of this Calendar, specific to Education, and include both written and spoken components.

3.1.1 Four-Year BEd Program

Students wishing to enter the Four-Year Bachelor of Education degree program (either the on-campus or the Community-Based pathways) must meet minimum admission requirements as set out in A.5 in the Admissions section of this Calendar.

The on-campus pathway of this program begins in the Fall Term and has only one intake per year.

The Community-Based pathway of this program begins in the Summer Term and has only one intake per year; it is a blended delivery mode of instruction and is intended for students who live in rural and remote locations in Alberta.

Enrolment in the Werklund School of Education is limited and students will be admitted on a competitive basis. Meeting the minimum requirements does not guarantee admission to the Werklund School of Education.

Transfer to the Four-Year BEd Program

Students transferring from other faculties and institutions must meet the deadlines and competitive admission requirements in place for the program to which they are applying. For more information refer to A.5 in the Admissions section of this Calendar.

Students who have received one or more approved undergraduate degrees (BA, BSc, etc.) may apply for admission to the Two-Year BEd (After-Degree) Program. Degree holders are not eligible for admission to the Four-Year BEd. For more information regarding admission to a second undergraduate degree, refer to A.5.5 in Admissions.

To qualify for a degree, a transfer student must successfully complete all required Education (EDUC) courses while registered in the Werklund School of Education.

It is required that all Four-Year students complete Education 201 at the University of Calgary prior to entering their first semester of 400-level Education courses.

3.1.2 Five-Year BEd (Concurrent) Program

New applicants should refer to A.5 in the Admissions section of this Calendar for regulations regarding University admission requirements.

High school course requirements for admission to the Five-Year BEd (Concurrent) program are determined by the co-degree faculty (Faculty of Arts, Science or Kinesiology). The Werklund School of Education does not have additional course requirements for admission to the Concurrent program. Enrolment in the Werklund School of Education is limited and students will be admitted on a competitive basis. Meeting the minimum requirements for the Faculty of Arts, Science, or Kinesiology, or the minimum requirements for the BEd, does not guarantee admission to the Werklund School of Education.

Change of Program to the Five-Year BEd (Concurrent) Program

Students who wish to complete a change of program can have up to 60 units in transferable courses at the post-secondary level by the end of the Winter Term preceding their desired Fall Term admission. See A.5.3.1 Transfer Admission Requirements for more information.

The standard structure within the Five-Year Concurrent BEd program is for students to do the first three years within their co-operating faculty (Faculty of Arts, Science, or Kinesiology) and the last two years within Education. Students must end the Concurrent BEd program completing 500-level Education courses.

3.1.3 Two-Year BEd (After-Degree) Program

To be considered for admission, applicants must present a degree with at least 90 units from an accredited post-secondary institution recognized by the University of Calgary.

Admission to the program is on a competitive basis by Route and Teachable Subject Area; therefore, meeting the minimum requirements does not guarantee admission.

For students currently completing a degree, admission offers are conditional subject to successful completion of the current degree or coursework, prior to commencement of the BEd (After-Degree) program.

For students in the Two-Year After-Degree Community-Based BEd pathway, the program begins in the Summer Term and has only one intake per year; it is a blended delivery mode of instruction and is intended for students who live in rural and remote locations.

Course Requirements for Admission to the Two-Year BEd (After-Degree) Program

Elementary Route

To be eligible for admission, all applicants must complete 3 units in English literature or French literature prior to entering the program.

Applicants in the Elementary-French Teachable Subject Area must be proficient in

French and will be required to demonstrate their proficiency prior to admission to the program.

Secondary Route

Applicants must present an undergraduate degree with an academic major or a minimum of 30 units, of which only 12 units can be at the first year level, in the Teachable Subject Area the applicant chooses, except for Fine Arts, where a degree in the Teachable Subject Area is required.

To be eligible for admission, all applicants must complete 3 units in English literature or French literature, prior to entering the program.

To be eligible for the following Teachable Subject Areas, applicants are required to meet the degree requirements listed below:

Visual Studies (Fine Arts)

Applicants must present a degree with a major in art.

Drama Education (Fine Arts)

Applicants must present a degree with a major in drama.

English Language Arts

Applicants must present a degree with a major in English. Applicants who do not have a degree with a major in English must present a minimum of 30 units in a range of areas that may include: historical surveys of English literature; critical reading and writing; Canadian literature; popular genres of literature; children's literature; and, world literature.

French

Applicants must present one of the following: a degree taught in French (in one or more of the following areas: French literature, science, mathematics, history, or the equivalent), a major in French, or a minimum of 30 units in French. Applicants must be fully competent in oral and written French and demonstrate this competency through a proficiency interview prior to admission to the program.

Mathematics

Applicants must present a degree with a major in mathematics, or a degree with a minimum of 30 units that demonstrate proficiency in at least five of the following areas: calculus, number systems, number theory, linear algebra, geometry, probability, statistics, applied mathematics, discrete mathematics, or history of mathematics.

Music (Fine Arts)

Applicants must present a degree with a major in music. Secondary music teachers need to be proficient on an instrument, have a coherent understanding of music theory and history, sophisticated conducting and aural skills in a choral/instrumental environment, plus a working knowledge of appropriate repertoire and musical concepts. Applicants should be prepared to instruct in a beginner band/choral environment.

Physical Education

Applicants must present a degree from a CCUPEKA PE accredited undergraduate

program and/or graduate from a KNES/PE undergraduate program. Applicants who do not have a degree with a major in kinesiology, or a degree that is not from an accredited program, must present a minimum of 30 units, in a range of the following areas that include: anatomy, human physiology, exercise physiology, biomechanics, motor learning/control, sport or health psychology, growth and development, health education, physical education for special populations, and activity-based courses. Students should have prior experience and be prepared to instruct activity-based courses in a Physical Education environment.

Second Languages

Applicants must present one of the following: a degree taught in a second language (in one or more of the following areas: literature, history, mathematics, science, or the equivalent), a major in a second language, or a minimum of 30 units in a second language. Please note that Education courses in the Second Languages teachable subject area will be taught in English. Field Experience placements cannot be guaranteed in the particular second language.

Biology (Science)

Applicants must present a degree with a major in biology. Applicants who do not have a degree with a major in biology must present a minimum of 30 units that demonstrate proficiency in five of the following areas: biochemistry, botany, cellular microbiology, molecular microbiology, ecology, evolutionary theory, genetics, human anatomy, physiology, and zoology. Other areas of knowledge which are important for secondary biology teachers include biological conservation, genetic engineering, and immunology.

Chemistry (Science)

Applicants must present a degree with a major in chemistry. Applicants who do not have a degree with a major in chemistry must present a minimum of 30 units in five of the following areas: inorganic, organic, physical, analytical chemistry, biochemistry, quantum mechanics, and thermodynamics. Other areas of knowledge which are important for secondary chemistry teachers include electrochemistry, industrial chemistry, and spectroscopy.

Physics (Science)

Applicants must present a degree with a major in physics. Applicants who do not have a degree with a major in physics must present a minimum 30 units that demonstrate proficiency in five of the following areas: classical mechanics, electromagnetism, modern physics, optics, quantum mechanics, statistical mechanics, relativity theory, and thermodynamics. Other areas of knowledge which are important for secondary physics teachers include acoustics, atmospheric physics, biophysics, and environmental physics.

Social Studies

Applicants must have completed a minimum of 30 units across the following three areas with at least 3 units per area:

1. History

Applicants must present course work in Canadian history, European history, or world history. Courses with a major focus on history, although not designated as history courses, may be considered as suitable background. In these cases, a course outline must be submitted for review.

2. Geography

Applicants must present course work in physical geography, human geography, or other courses with a focus on human interaction with physical and cultural environments.

3. Social Sciences

Applicants must present course work in the social sciences. Suitable courses may include: political science, sociology, economics, anthropology, and archaeology, cultural studies, women's studies, native studies, religious studies, Canadian studies, globalization, indigenous studies, international relations, philosophy and psychology.

3.2 Registration and Courses

3.2.1 Accuracy of Registration

Students are responsible for the completeness and accuracy of their registration and for arranging their course selections to meet all degree and program requirements as detailed in this Calendar. Any departure from standard degree and program requirements specified in this Calendar must receive prior written authorization by the Associate Dean, Undergraduate Programs in Education or other designate of the Associate Dean.

Registration at all times should be appropriate to a student's current degree program and pathway unless a student receives explicit permission from the Associate Dean, Undergraduate Programs in Education. Students with inappropriate course selections may require extra courses and additional time to complete their degrees. Students are responsible for correctly registering in all courses.

3.2.2 Registration Planning and Consultation

Students are ultimately responsible for the accuracy of their registration, and for ensuring that they meet their degree requirements, therefore it is important for all students to check their records and registration regularly with the online program-monitoring system and meet with the relevant program advisors for guidance on any questions.

Due to the non-standard nature of BEd Education (EDUC) courses, dates will not necessarily align with the Academic Schedule. Exceptions cannot be made for any commitments that are scheduled during course instruction time or the field experience in the BEd program. Students are advised not to make other commitments during the program, and are encouraged to consult with Education Student Advisors.

As students approach the completion of their programs, it is strongly recommend-

ed that students meet with a student advisor for a graduation check. Otherwise, a complete program audit is not done until a student applies for graduation when the consequences of any problems can be very serious, including denial of graduation, and therefore ineligibility for teacher certification.

Students should ensure that they comply with the dates and deadlines for registration set by the University (see B. Registration in the Academic Regulations section of this Calendar) and allow sufficient time before these deadlines to plan their registration and consult with the student advisors. Due to the nature of a professional degree program, registration dates and deadlines may be different from standard University courses; students should view information regarding individual courses through their Student Centre at my.ucalgary.ca.

3.2.3 Residency

Students in the Community-Based pathways of the Four-Year BEd and the Two-Year BEd (After-Degree) programs must attend face-to-face on-campus instruction during two intensive weeks during the Summer Term and then will continue with an online blended component for the remainder of the term, unless express permission is given by the Undergraduate Programs Office for other accommodations. The Orientation activities that occur during this period are mandatory. Courses with a blended delivery mode have scheduled synchronous sessions throughout the term that must be attended.

Students in the on-campus pathways of the Four-Year BEd, Five-Year BEd Concurrent and Two-Year BEd (After-Degree) take courses predominantly on-campus.

Previously completed coursework from other post-secondary institutions or the University of Calgary which is more than six years old at the time of admission may be included in the program only with written permission of the Associate Dean.

3.2.4 Course Load

The BEd program is a full-time program. Only students admitted to the BEd will be permitted to register in 400 and 500 level Education (EDUC) courses.

Additional Courses

Since the BEd program is a full-time professional program, students are not allowed to take more than 15 units per each Fall or Winter Term, or to take courses from outside the Werklund School of Education during an Education term, without the express permission of the Associate Dean. After-Degree BEd students may wish to take additional courses during non-Education terms, and can do so with permission from the Undergraduate Programs in Education Office, provided the courses do not interfere with Education terms, and these courses will be designated as Extra-to-Degree upon graduation of the Education program.

Courses From Other Institutions

All Education (EDUC) courses must be taken through the Werklund School of Education.

Students in the Four-Year BEd program may choose to take additional coursework at another institution to use towards their required non-Education courses. Students may apply online for authorization by requesting a Letter of Permission through their online Student Centre. Students should check with undergraduate student advisors in the Werklund School of Education to ensure that the courses taken would meet requirements prior to enrolling.

Students in the Five-Year BEd (Concurrent) program should consult with their co-operating Faculty if they are interested in taking courses from another institution to be used towards their non-education degree requirements.

Students in the Two-Year BEd (After-Degree) and Two-Year BEd (After-Degree) Community-Based pathway programs may choose to take additional coursework at another institution to meet certification requirements prior to admission to the program, however, all Education (EDUC) courses must be taken at the Werklund School of Education. The GPA calculation for certification purposes are based only on Education (EDUC) courses.

After a request for a Letter of Permission is approved, a letter will be sent to the Registrar of the other university. The Letter of Permission must be obtained before the student registers for the courses at the other institution.

It will be the responsibility of the student to ensure that an official transcript of grades is forwarded directly to the Registrar of the University of Calgary in order that appropriate credit may be officially recorded.

Students with poor academic performance, including those on probation or having a large number of withdrawals, will not be allowed to take courses at another institution.

3.2.5 Withdrawal from Courses

Before withdrawing from Education courses, students are required to seek approval from the Director based on the student's BEd program pathway, prior to the deadline date for withdrawal. Students are also encouraged to meet with a student advisor for guidance prior to requesting approval for a withdrawal. Students will not be able to continue to the next Education semester, until all courses in the previous Education semester(s) have been successfully completed.

Withdrawal from one or more courses or from all courses in an Education semester can have serious consequences. Students are referred to B.14 Withdrawal from Courses and Withdrawal from the Term in the Academic Regulations section of this Calendar.

Students may not withdraw from a Field Experience course once it has commenced (Education 440, 465, 540, 560), except with permission. A school may decide to terminate a Field Experience early if it is deemed that there is a risk to the partner school, partner teacher or to its students. Early termination of a Field Experience by the school or by the student will normally result in a

failing grade for the course. In exceptional circumstances credit may be awarded or a withdrawal granted, at the discretion of the Director, Student Experience and the Director, Field Experience.

Students will be required to withdraw from the BEd program if they have withdrawn from more than 15 units of Education (EDUC) courses, with a maximum of 30 units in all courses taken during their current program. Students who are required to withdraw will be advised in writing.

3.2.6 Repetition of Courses

A student may repeat an Education course previously attempted only once. Permission from the Associate Dean is required to repeat a course more than once, and is granted only under exceptional circumstances.

Students repeating courses taken at the University of Calgary will not have the original grade, failure or otherwise, removed from the transcript of record. The transcript of record will indicate both the original grade and the repeated course with its final grade in the semester in which it was taken.

3.2.7 Field Experience Courses

Field Experience courses (Education 440, 465, 540, 560) are fundamental to the BEd program and must be successfully completed in sequence before a student can progress to the next term. If a student is unsuccessful, receiving a failing grade (non-credit) OR a withdrawal (W), in a Field Experience course they will require permission from the Director, Field Experience to attempt the course a second time. Should the student be unsuccessful in their second attempt at the course they will be required to withdraw from the BEd program.

Field Experiences take priority over any other professional or personal commitments. The only acceptable reasons for missing Field Experience are illness, family emergency, religious observance, approved professional development or approved University activity. The number of days of absence allowed varies by Field Experience course and will be detailed in the course outline as provided by the instructor at the beginning of the course. Additional days of absence will not be allowed except with the express permission of the Director, Field Experience.

3.2.8 Deferral of Term Work

Students who are not able to complete assignments or other required coursework, including exams, due to unforeseen circumstances by the dates published in the course outline should contact their instructor to request an extension, prior to the original deadline. Students will be required to provide documentation to support their request. Should a student require an extension that is beyond five days after the last day of lectures, the student must apply for a Deferral of Term Work. Deferrals are not guaranteed, will not exceed 30 days past the last day of lectures, and will be granted at the discretion of the Associate Dean, or delegate. In exceptional cases where students have been granted a deferral of term work with a deadline that extends into the

following semester, they will be permitted to begin subsequent courses, but if the deferral of term work is not successfully completed by the agreed upon deadline, they will be withdrawn from those classes. Should a student not meet the agreed upon deadline on an approved Deferral of Term Work, they will receive a zero on that course component.

3.2.9 Leave of Absence

Students are allowed to request a leave of absence for a period of up to one year after successful completion of one term in the BEd program. Only one leave of absence will be granted for the duration of the BEd program. Students will be notified in writing if they are approved for a Leave of Absence.

Students who wish to take a leave of absence must make a formal request in writing to the Director of Student Experience. Students returning to the program after a leave of absence must notify the Werklund School of Education by March 1st if they are planning to return for the Fall Term (or Summer Term for students in a Community-Based BEd pathway) and by October 1st if they are planning to return for the Winter Term. Due to the prescribed nature of the BEd programs, students returning from a year-long Leave of Absence must register no later than the next available term in which their required courses are offered.

Students who do not return to the program after their leave of absence will be required to re-apply for admission (see section 3.3 Readmission).

Students may not interrupt their degree program in the Werklund School of Education unless they are on an approved Leave of Absence. Students who have not registered in a given academic year without an approved Leave of Absence will be removed from the program, and will be required to re-apply.

3.2.10 Duration of Study

Four-Year BEd degree program:

Students must complete the Four-Year BEd, including those in the Community-Based pathway degree program within seven years from initial admission into the BEd program.

Five-Year BEd (Concurrent) degree program:

Students must complete the Five-Year BEd (Concurrent) program within seven years from initial admission into the BEd program.

Two-Year BEd (After-Degree) degree program:

Students must complete the Two-Year BEd (After-Degree), including those in the Community-Based pathway, degree program within five years from initial admission into the BEd program.

3.3 Student Standing and Academic Review

Students in either pathway of the Four-Year BEd degree program will have their academic standing reviewed after each Education Term. Additionally, students will have an Academic Review completed after each Winter term, within which all courses taken since the previous Winter Term will be used;

this includes courses taken at the University of Calgary as well as those taken at other institutions on an approved Letter of Permission. Students in the Four-Year Community-Based BEd pathway must submit transcripts by June 1st each year if they have taken any courses outside of the University of Calgary in the previous year, so that an academic review can be performed. If transcripts are not received by June 1st, future Education (EDUC) course enrolment will be impacted.

Students in the Five-Year BEd (Concurrent) degree program will have their academic standing reviewed using completed courses in their co-degree prior to commencing the Education portion of their degree, to determine if they are eligible to progress to their Education coursework in the subsequent Fall Term. They will also have their academic standing reviewed after each Fall and Winter Term while in their Education coursework. Students in the Five-Year BEd (Concurrent) degree program must have completed all of their co-degree requirements before the final year of the Concurrent program (the second Education year).

Academic and Progression Reviews for both Four-Year and Concurrent BEd pathways, require a minimum of 18 units of courses to be conducted. If fewer than 18 units have been completed since the prior review, the new review will be cumulative over the last two academic years.

Students in either pathway of the Two-Year BEd (After-Degree) degree program will have their academic standing reviewed after each Fall and Winter Term. Courses Extra-to-Degree that are taken during the BEd After-Degree program (in non-Education semesters) will be included in Academic Reviews.

A student's academic standing may be reviewed at any time at the discretion of the Associate Dean.

Satisfactory Academic Standing

Students who have successfully completed all courses with a minimum GPA of 2.50, calculated based on all courses taken since the student's last academic review, are in satisfactory academic standing.

Unsatisfactory Academic Standing

Students are referred to section F.3.2 Unsatisfactory Standing in the Academic Regulations section of this Calendar for more information.

Students who have achieved a GPA of less than 2.50, calculated based on all courses taken since the student's last academic review, are considered to have an unsatisfactory academic standing in the Werklund School of Education and may be:

- Placed on academic probation, or
- Required to withdraw from the program

Academic Probation

- A student who has achieved a GPA of at least 2.00 but less than 2.50, calculated based on all courses taken since the student's last academic review, will be placed on academic probation until their next academic review.

- A student who has failed an Education (EDUC) course in the BEd program, will be placed on academic probation for one year.
- Students may only be on academic probation once during their BEd program.
- Students placed on academic probation will be advised in writing.

Required Withdrawals

- A student who has achieved a GPA of less than 2.00, calculated based on all courses taken since the student's last academic review, will automatically be required to withdraw from the BEd program.
- A student who is on academic probation and has achieved a GPA of less than 2.50, calculated based on all courses taken since the student's last academic review, will be required to withdraw from the BEd program.
- Students will be required to withdraw from the BEd program if they have withdrawn from more than 15 units Education (EDUC) courses in the BEd program, with a maximum of 30 units in all courses taken during their current program.
- A student on probation who receives a second failing grade in any Education (EDUC) course, not necessarily the same course that they previously received a failing grade in, will be required to withdraw from the BEd program.
- A student can only be on academic probation once during their BEd program. If a student's academic standing falls such that they would be on academic probation a second time during their BEd program, they will be required to withdraw from the BEd program.
- Students required to withdraw will be advised in writing.
- Five-Year Concurrent students who are required to withdraw in their co-degree will be discontinued from the BEd portion of their degree as they cannot continue in Education without the co-degree.

Reinstatement to Satisfactory Academic Standing

Students on academic probation who have achieved a GPA of 2.50 or higher, calculated based on all courses taken since the student's last academic review, will be reinstated to satisfactory academic standing.

Students who have successfully completed the course in which they received a failing grade, will be reinstated to satisfactory academic standing and may proceed to the next term, provided they have a current GPA of 2.50 or higher.

Readmission After Unsatisfactory Academic Performance

Students who have been required to withdraw from the Werklund School of Education, other Faculties at the University of Calgary or other post-secondary institutions may not apply for admission to the BEd program in the twelve month period following their required withdrawal.

Admission to the BEd program after unsatisfactory academic performance is not guaranteed. Applicants must apply by the deadlines stated in the current Calendar, meet the current admission requirements of the BEd program and obtain express permission from the Director, Student Experience or Associate Dean, Undergraduate Programs in Education before they can return to the program. In addition to the online admission application, students must write a letter to the Associate Dean requesting re-admission to the BEd program.

Students re-admitted after having been required to withdraw from the Werklund School of Education due to unsatisfactory academic performance are admitted on probation and must maintain a grade point average of at least 2.50 on all courses taken in each semester after re-admission. Failure to do so will result in permanent withdrawal from the Werklund School of Education.

Mitigating Circumstances

Students who would normally be required to withdraw on the basis of their academic performance or excessive withdrawals may instead be placed on academic probation, if they have experienced serious mitigating circumstances and can demonstrate that they have good prospects for future success. Students who believe that they fall into this category should provide written documentation to the Associate Dean, Undergraduate Programs as soon as possible and no later than the end of the term.

Students in the Five-year Concurrent BEd, who are required to withdraw from the Education portion of their degree may be permitted to remain in their non-education degree through a change of program.

Voluntary Withdrawal from Program

Students must notify Undergraduate Programs in Education in writing of their intention to withdraw. After a voluntary withdrawal from the program, students will be required to re-apply for admission.

Readmission

Students who have left the BEd program, for any reason, will need to re-apply for admission. Readmission is not guaranteed. Applicants must apply by the deadlines stated in the current Calendar, meet the current admission requirements of the BEd program and obtain express permission from the Director, Student Experience or Associate Dean, Undergraduate Programs in Education before they can return to the program. Students seeking re-admission to the BEd program may need to retake some or all of their previously completed Education coursework, as determined by the Associate Dean, in order to meet program and certification requirements.

Newly admitted students who do not attend the term to which they were admitted must reapply for admission, and will be considered using the admission criteria in effect at the time of re-application.

3.3.1 Progression

Normally students in the BEd program (all pathways) will take their required courses in the prescribed sequence. Students must successfully complete all 400-level Education (EDUC) courses prior to proceeding to the subsequent 500-level courses. Students must have a minimum 2.50 GPA to be eligible to progress into future Education terms.

Students in the Four-Year BEd (either the on-campus or Community-Based pathways) should have completed Education 201 before proceeding to any 400-level Education courses, and have completed all other requirements of their degree before proceeding to the 500-level Education courses, taken in the final year of the program. Students must have achieved a minimum GPA of 2.50, calculated on all courses taken since the student's last academic review, to be eligible to progress into any Education term. Failure to meet the minimum GPA results in being placed on academic probation.

Students are expected to complete the first three years of the Five-Year Concurrent BEd in their non-Education faculty. Students in the third year of the Concurrent program will normally be allowed to proceed into the fourth year, the first in Education (400-level EDUC courses), provided they have achieved a minimum GPA of 2.50, calculated on all courses taken since the student's last academic review, successfully taken Education 201 at the University of Calgary, and have completed all of the non-Education degree requirements of their degree.

3.4 Standards of Professionalism

As a professional degree, the Bachelor of Education requires that students abide by a high standard of professionalism in every aspect of their academic and non-academic behaviour. The Werklund School of Education recognizes that teacher preparation and learning occurs both inside and outside the classroom and has the responsibility to ensure that its student teachers and graduates are competent and conduct themselves in accordance with the standards and expectations of the profession. As such, lack of professionalism, may be grounds for determining whether the student should continue in the program, with or without conditions, or be dismissed from the Bachelor of Education program.

The Director of Field Experience may prohibit a student from attending or completing a Field Experience if there is evidence that the student has acted in a manner that may be deemed harmful to oneself or others, or commits any other serious contravention of the Alberta Teachers' Association (ATA) Code of Professional Conduct. Students will have the opportunity to make submissions and present evidence to address concerns about their attending a Field Experience.

Students have 15 working days from the date the Director of Field Experience prohibits them from attending or completing a

Field Experience to submit an appeal to the Dean of the Werklund School of Education.

Reasons for which a student may be deemed unsuitable for the teaching profession, and the Bachelor of Education, are related to the Alberta Teachers' Association (ATA) Code of Professional Conduct and include, but are not limited to, the following:

- Concealment or distortion of the truth on the Application for Admission to the Bachelor of Education program or the University of Calgary.
- Persistent and/or serious conduct that contravenes the University of Calgary Statement on Principles of Conduct.
- Academic misconduct, including, but not limited to, plagiarism.
- Behaviour which would jeopardize the standing or reputation of the Werklund School of Education or the University of Calgary.
- Behaviour that may be deemed harmful, whether physically or emotionally, to others, such as school children, partner teachers, partner schools, colleagues, staff, instructors, or others associated with the Werklund School of Education.
- Persistent and/or serious medical condition that affects the student's ability to perform as a teacher if that condition negatively affects judgment and interferes with the ability to function within a professional context.
- Persistent substance abuse (e.g., alcoholism, drug addiction, use of illegal drugs) that interferes with the ability to function within a professional context.
- Criminal behaviour which would result in a change to a student's Police Information Check and/or Vulnerable Sector Check.
- Persistent and or/serious conduct that contravenes the policies of the Field Experience setting (applies to students in Field Experience).
- Harassment, physical, verbal, or emotional in nature, of a student or colleague, regarding, but not restricted to, behaviour, values, or roles related to race, ethnicity, religion, marital status, gender, sexual orientation, age, socio-economic status, income source or amount, political affiliation, disability or diagnosis, or national origin, that would interfere with the provision of teaching.
- Persistent and/or serious inability to form professional relationships.

4. BEd Program Details

The Bachelor of Education program recognizes that teaching is one of the most important and challenging professions in society; therefore, a teacher should be knowledgeable, thoughtful, and deeply caring about the responsibilities associated with education.

The BEd program focuses on teachers as experts of learning in Teachable Subject Areas for the elementary, secondary and K-12 routes, field experiences linked to

partner research schools, and integration across program components (courses). The Bachelor of Education program will:

- Foster professional competencies that are appropriate to a complex and rapidly changing world;
- Have an applied and critical knowledge of theories of learning and learners;
- Develop the specialized knowledge associated with teaching a discipline, and in fostering an interdisciplinary approach;
- Critically evaluate and respond to the contexts of contemporary learning in relation to changing sociocultural, political, economic, environmental, and technical realities within the broader public sphere;
- Foster a critical and pragmatic knowledge of diversity in education;
- Contribute actively to knowledge in the field of education;
- Understand the legal, moral, and ethical frameworks of contemporary education;
- Respond to the diverse needs of students;
- Build research capacity as teacher professionals.

The program is delivered through plenaries, seminars, and field experiences.

4.1 Course Requirements Common to All Programs

The following courses are required for all Bachelor of Education students in the Werklund School of Education.

Education 420
Education 427
Education 430
Education 435
Education 445
Education 450
Education 456
Education 460
Education 520
Education 525
Education 530
Education 535
Education 546
Education 551
Education 556

The following Field Experience courses must be completed successfully with a grade of "CR" (Completed Requirements):

Education 440
Education 465
Education 540
Education 560

4.2 Four-Year BEd Program

The Four-Year BEd program consists of 120 units, with a minimum of 72 units at the 300 level or higher, to be distributed according to the following list:

- 57 units in Education courses including:
 - Education 201 (to be taken in Year 1)

- Education 420, 427, 430, 435, 440, 445, 450, 456, 465
- Education 520, 525, 530, 540, 546, 551, 556, 560
- 30 units in courses in Teachable Subject Areas including:
 - Teachable Subject Area courses (24 units)
 - Education 460, 535 (6 units)
- 18 units in required Non-Education Foundational Courses (see list below)
 - Course in English or French Literature (3 units)
 - Course in Creative and Performing Arts (3 units)
 - Course in Psychology (3 units)
 - Course in Physical Education or Health and Wellness (3 units)
 - Course in Sciences (3 units)
 - Course in Canadian Studies (3 units)
- 15 units in elective courses

Non-Education Foundational Courses

English or French Literature

- English 203, 253.01, 253.02, 253.03, 253.04, 302, 303, 305, 307, 309, 311, 351, 353, 361, 372, 376, 378, 381, 382, 387, 393, 395, 396, 399, 401, 403, 405, 406, 410, 411, 412, 413, 426, 429, 431, 438, 441, 445, 449, 451, 453, 461, 463, 465, 471, 472, 473, 477, 481, 486, 487, 491, 493, 499, 508, 509, 515, 525, 527
- French 339, 353, 399, 439, 449, 453, 455, 457, 459, 463, 499, 511, 565, 599

Psychology

- All courses labelled Psychology (PSYC)

Visual or Performing Arts

- All courses labelled Art (ART), Art History (ARHI), Dance (DNCE), Drama (DRAM), Dance Education (DCED), Music (MUSI), Music Education (MUED), School of Creative and Performing Arts (SCPA)

Science

- All courses offered by the Faculty of Science or Schulich School of Engineering

Canadian Studies

- All courses labelled Canadian Studies (CNST)
- Anthropology 346, 355, 410
- French 439
- Geography 326
- History 211, 213, 337, 340, 341, 345, 347, 349, 351, 357, 431, 437, 438, 439, 442, 443, 447, 450, 520, 521, 523, 526, 528, 529
- Indigenous Languages 301, 303
- Indigenous Studies 201, 303, 305, 343, 397, 415, 502
- Law and Society 201, 335
- Political Science 321, 345, 422, 426, 427, 428, 431, 435, 444, 451, 521, 523, 531, 551
- Sociology 307, 309, 405, 427, 467
- Urban Studies 451

Physical Education or Health and Wellness

- All courses labelled Dance Education (DCED), Health and Society (HSOC), Kinesiology (KNES), Physical Education (PHED)
- Anthropology 331
- Communication and Media Studies 393
- Psychology 204
- Sociology 321, 399
- Social Work 201

Teachable Subject Areas (On-Campus Pathway)

In addition to the required Education, non-Education foundational, and elective courses, students are required to complete 24 units in their teachable subject area as listed below.

| | |
|---|--|
| Early Childhood Education (Early Years) 24 units | Required: <ul style="list-style-type: none"> • Art 309 or 342 • Mathematics 205 • Education 309 • Science 331 • English 303 and 396 • 6 units at the 300 level or above from the Faculty of Arts, Science or Kinesiology |
| English Language Arts (Elementary) 24 units | Required: <ul style="list-style-type: none"> • English 253.01 or 253.02 or 253.03 or 253.04 or 203 • English 265, 303, 305 and 307 • English 372 or 396 • 6 units in English at the 300 level or above |
| English Language Arts (Secondary) 24 units | Required: <ul style="list-style-type: none"> • English 253.01 or 253.02 or 253.03 or 253.04 or 203 • English 265, 303, 305, 307 and 372 • One of English 311, 376 or 396 • 3 units in English at the 300 level or above |
| English Language Learners (K-12) 24 units | Required: <ul style="list-style-type: none"> • Linguistics 201, 221, 301, and 316 • 12 units in Linguistics (LING) or English (ENGL) at the 300 level or above |
| Fine Arts (Elementary) 24 units | Required: <ul style="list-style-type: none"> • Art 309 and 342 • Music 211, 213 and 225 • Drama 203 or 205 • Drama 360 |
| Fine Arts (Secondary) 24 units | Required: <ul style="list-style-type: none"> • Drama 209 and 210 • Drama 223, 225, 242, and 243 • 6 units from Drama 360; or 345 and 347 (recommended to be taken together); or 346 and 348 (recommended to be taken together); or 365 and 367 (recommended to be taken together) |
| Fine Arts Education – Visual Studies (Secondary) 24 units | Required: <ul style="list-style-type: none"> • Art 231, 233, 251, 309 • Art 342 • 9 units in Art (ART) at the 300 level or above |

| | |
|---|--|
| Mathematics (Elementary) 24 units | Required: <ul style="list-style-type: none"> Mathematics 205 and 211 One of Mathematics 249 or 265 or 275 One of Mathematics 271 or 273 Statistics 205 Education 305 6 additional units chosen from Mathematics, Statistics, Actuarial Science, or Data Science, of which 3 units are at the 300 level or above. Students are highly recommended to take Data Science 211 |
| Mathematics (Secondary) 24 units | Required: <ul style="list-style-type: none"> Mathematics 205 and 211 One of Mathematics 249 or 265 or 275 One of Mathematics 271 or 273 Statistics 205 Education 305 6 additional units chosen from Mathematics, Statistics, Actuarial Science, or Data Science, of which 3 units are at the 300 level or above. It is highly recommended that students take Data Science 211 |
| Science (Elementary) 24 units | Required: <ul style="list-style-type: none"> Science 331 Astronomy 207 Geology 209 Mathematics 205 12 additional units in courses labelled ASPH, ASTR, BIOL, CHEM, CPSC, GLGY, GOPH, or PHYS, of which 6 units are at the 300 level or above |
| Science – Biology (Secondary) 24 units | Required: <ul style="list-style-type: none"> Biology 241, 243, 305, 309, 311, 331 and 371 3 additional units in the Field of Biological Sciences at the 300 level or above |
| Science – Physics (Secondary) 24 units | Required: <ul style="list-style-type: none"> Physics 211 or 221 Physics 223, 321, 323, 325, 397 and 497 Physics 303 or 371 |
| Second Languages (K-12) 24 units | Required: One of the following: <ul style="list-style-type: none"> Chinese 353 and 21 additional units in Chinese, of which 6 units are at the 400 level 24 units in German, of which 6 units must be taught in German at the 400 level Japanese 331 and 21 additional units in Japanese, of which 3 units are at the 400 level Russian 331 and 21 additional units in Russian Arabic Language and Muslim Cultures 331 and 21 additional units in Arabic Language and Muslim Cultures |
| Social Studies (Elementary) 24 units | Required: <ul style="list-style-type: none"> Canadian Studies 201 History 211 and 213 Geography 254 12 additional units in a range of disciplinary areas (Anthropology, Archaeology, Communication and Culture, Canadian Studies, Economics, Geography, History, Indigenous Studies, Law and Society, Political Science, Psychology, Sociology, Religious studies, Urban Studies, Women's Studies), of which 9 units are at the 300 level or above |

| | |
|--|---|
| Social Studies (Secondary) 24 units | Required: <ul style="list-style-type: none"> Canadian Studies 201 History 211 and 213 Geography 254 12 additional units in a range of disciplinary areas (Anthropology, Archaeology, Communication and Culture, Canadian Studies, Economics, Geography, History, Indigenous Studies, Law and Society, Political Science, Psychology, Sociology, Religious studies, Urban Studies, Women's Studies), of which 9 units are at the 300 level or above |
|--|---|

Teachable Subject Areas (Community-Based Pathway)

In addition to the required Education, non-Education, and elective courses, students are required to complete 24 units in their teachable subject area as listed below.

| | |
|--|---|
| English Language Arts (K-12) 24 units | Required: <ul style="list-style-type: none"> 24 units in the Field of English, of which 9 units are at the senior level. |
| Mathematics (K-12) 24 units | Required: <ul style="list-style-type: none"> 24 units in the Field of Mathematics, of which 9 units are at the senior level. |
| Science (K-12) 24 units | Required: <ul style="list-style-type: none"> 24 units in the Field of Science, Biology, Chemistry, or Physics, of which 9 units are at the senior level |
| Social Studies (K-12) 24 units | Required: <ul style="list-style-type: none"> 3 units in the Field of History 3 units in the Field of Geography 18 units in a range of the following fields, of which 9 units are at the senior level: Anthropology, Archaeology, Canadian Studies, Economics, Geography, History, Indigenous Studies, Law and Society, Political Science, Psychology, Sociology, Religious Studies, Urban Studies, and/or Women's Studies |

4.2.1 Minor Fields

Four-Year Bachelor of Education students may formally declare a Minor, and have this officially recorded on their transcript of record. Available Minor Programs can be found at Minor Programs and more detailed information with the individual faculty.

Students should be aware that due to the composition of their degree requirements, completing a Minor may require that students take more than the minimum-mandated 120 units required of a Four-Year Bachelor of Education. Students are not normally permitted to count more than 36 units from their Minor Fields in their degrees. Students should refer to the sub-section of Faculty of Arts, 3.2.14 Unauthorized Concentrations.

Students may not declare a Minor within the same field in which they are already pursuing a Teachable Subject Area. Students interested in declaring a Minor must receive permission from Undergraduate Programs in Education.

4.2.2 Bridging to Community-Based Bachelor of Education

The Bridging to Community-Based Bachelor of Education pathway provides students that do not meet the subject requirement for English 30-1 or do not have a competitive average for admission in to the Four-Year Bachelor of Education Community-Based Program the opportunity to upgrade.

Students must be located in a rural or remote location to be eligible for this bridging pathway. Students must apply for the Four-Year Bachelor of Education Community-Based program, and meet all other admission requirements mandated. Students solely deficient English 30-1 and/or not meeting the competitive average requirement will be considered for the Bridging pathway. Students should refer to A.5.1.1 Admission Requirements.

The Bridging to Community-Based Four-Year Bachelor of Education Route only accepts students for a July start.

Students will take English Academic Success (equivalent to English 30-1; non-credit), which is conducted largely online with some on-campus time, commencing in the Summer Term. Students then take three online courses in the Fall Term, and an additional three online courses in the following Winter Term. Five of the six credit courses may be used to count toward elective courses in the four-year BEd program.

The chart below outlines the first year program progression for Bridging to Community-Based Four-Year Bachelor of Education program.

Bridging to Four-Year Community-Based Bachelor of Education students must complete the first year progression (below) with a minimum grade of "B-" in the English Academic Success course, along with successful completion of all 6 (Fall and Winter) courses of the Bridging Pathway to the Community-Based Four-Year Bachelor of Education program with an overall minimum GPA of 2.50. Students in the Bridging pathway are not normally eligible for a Leave of Absence, and if they step out of the program or are unsuccessful in any of the courses, they will need to re-apply for the next intake.

| Summer | Fall | Winter |
|-------------------------|------------------------|------------------------|
| Education 101 (blended) | Education 205 (online) | Education 211 (online) |
| | Education 207 (online) | Education 213 (online) |
| | Education 209 (online) | Education 215 (online) |

Students admitted to the Bridging Pathway Community-Based Bachelor of Education program must successfully complete 21 units in order to progress to the first year

of the Four-Year Community-Based BEd program.

4.3 Five-Year BEd (Concurrent) Program

The Werklund School of Education in partnership with the Faculties of Arts, Science, and Kinesiology offers a number of Five-Year BEd (Concurrent) degree programs.

The following Education courses must be completed. Consult with the partner faculty for the required non-Education courses.

- Education 201, 420, 427, 430, 435, 445, 450, 456, 460, 520, 525, 530, 535, 546, 551, 556

The following Field Experience courses must be completed successfully with a grade of "CR" (Completed Requirements):

- Education 440, 465, 540, 560

The following Non-Education course is required for teacher certification:

- 3 units – English or French Literature

4.4 Two-Year BEd (After-Degree) Program

The following Education courses must be completed.

- Education 420, 427, 430, 435, 445, 450, 456, 460, 520, 525, 530, 535, 546, 551, 556

The following Field Experience courses must be completed successfully with a grade of "CR" (Completed Requirements):

- Education 440, 465, 540, 560

Note: Community-Based pathway students must meet the same course requirements, and should refer to section 3.2.3 for residency requirements.

5. International Foundations Program IFP

The International Foundations Program (IFP) focuses on students who meet the admission requirements for their University of Calgary degree faculty, except for the requirement of English Language Proficiency. For more information, refer to section R. International Foundations Program in the Calendar.

6. Administration

Faculty Administrative Officers

Dean

D. Sumara

Vice Dean

M. Jacobsen

Associate Deans

J. Groen, Graduate Programs

C. Kawalilak, International

H.D. Sewell, International Foundations Program

J. Brandon, Professional and Community Engagement (PACE)

S. Roy, Research

J. Lock, Teaching & Learning

A. Burns, Undergraduate Programs

Continuing Education

1. Summary of Programs

Credit Programs

Continuing Education offers Workplace Learning as a minor field of study towards selected undergraduate degrees offered at the University of Calgary. A Degree in Workplace Learning helps students develop the knowledge and skills they need to function effectively in a rapidly changing workplace and provides them with strategies to facilitate both their own and their colleagues' learning. The Minor in Workplace Learning is recognized as a degree minor in several University of Calgary Faculties including Arts, Kinesiology and Science. This minor field of study is composed of 30 units or 400 hours of specified Continuing Education certificate credit.

See 4.1 Minor in Workplace Learning for more information.

Non-Degree Credit Programs

Continuing Education offers a wide range of seminars, courses, certificate and diploma programs, and professional designations to individuals seeking opportunities for professional development and personal enrichment, as well as to organizations seeking training for employees. Major programming areas include business, management and professional designation programs, languages, liberal arts, fine arts, adult education, writing and computer and business technology.

Continuing Education provides educational opportunities for lifelong learners seeking superior quality programming and instruction. Courses and programs serve local, online, and international communities, and are aligned with the academic mandate of the University of Calgary.

Certificates/Designations

Continuing Education certificate and diploma courses have been developed with part-time learners in mind and are offered at convenient times and in formats suitable for adults. Most courses are taught in the classroom. Many are offered online or in a blended format – partly in the classroom and partly online. Some certificates can be achieved completely through online learning.

See conted.ucalgary.ca for more information.

2. Information

Contact Information

Student Information: 403.220.2866;
1.866.220.4992 (outside Calgary)

Email address: conted@ucalgary.ca

Website: conted.ucalgary.ca

Locations:

Domestic Programs - Energy Resources Research Building 3512 – 33 Street N.W.

English Language Programs – Education Tower – 11th Floor

Resources

Upgrading Courses (Academic Preparation)

Courses are offered through Continuing Education for students who require academic upgrading in Biology, Chemistry, English, Mathematics and Physics for admission to the University of Calgary. Information on admission to the University of Calgary may be found at: ucalgary.ca/future-students.

3. Admission

Because of the wide diversity of programs administered, admission requirements, registration procedures and general regulations vary. It is recommended that prospective students contact the Continuing Education office to obtain detailed information regarding their areas of interest. (See Contact Information). Registrants must be 18 years of age or older to enrol and participate in a course offered through Continuing Education unless otherwise specified. Successful completion of a Grade 12 diploma and relevant work experience are recommended. If English is not your first language, please review the English language proficiency requirements. A degree or diploma are not typically required.

4. Program Details

4.1 Minor in Workplace Learning Introduction

Continuing Education offers a Minor in Workplace Learning, which helps students develop the knowledge and skills they need to function effectively in a rapidly changing workplace as well as provides them with strategies to facilitate both their own and their colleagues' learning.

The Minor in Workplace Learning is recognized in several University of Calgary Faculties including Arts, Kinesiology and Science. A Minor field of study is composed of 30 units or 400 hours of specified certificate credit.

Requirements

In order to complete the requirements for a Minor in Workplace Learning, students must complete 400 hours of instruction. This requires completion of:

Business Management Certificate

(a) One of the 300-hour University of Calgary Management Certificate program (excluding Environmental Management); (b) 60 hours of instruction from an array of courses in the Certificate in Adult Learning; and (c) the "capstone" 40-hour course Learning in the Workplace; or

Certificate in Adult Learning

(a) The 300-hour University of Calgary Certificate in Adult Learning; (b) 60 hours of instruction from the wide range of courses offered in the Management Certificate program; and (c) the "capstone" 40-hour course Learning in the Workplace.

Other Requirements

1. Students must meet undergraduate admission requirements.
2. Successful completion of the 30 units of advanced credit (12 units at the junior level and 18 units at the senior level) for the Minor in Workplace Learning will be recorded with the designation "CR" instead of a grade. Calculation of a GPA will be based on the remaining courses taken to complete the degree.
3. The transfer credits granted can only be applied to the admitting University of Calgary faculty (Arts, Kinesiology, or Science). There is no further transferability to other faculties.
4. The Minor in Workplace Learning will be recognized as transfer courses in your undergraduate program. Most University of Calgary degrees require at least half the courses to be counted toward the degree to be University of Calgary courses, not transfer courses. Please check with your undergraduate academic advisor to determine if there are any limitations on transferring the Minor in Workplace Learning with other transfer credits you have been granted.
5. Students who have completed the 400-hour requirement for the Minor in Workplace Learning may be eligible for undergraduate credit whether or not the Minor is claimed.
6. Continuing Education is responsible for deciding the suitability for advanced credit of certificate programs from other institutions.
7. Students may take regular undergraduate courses prior to completing the Minor in Workplace Learning.

Courses of Instruction

How to Use

This section contains the descriptions of courses offered at the University of Calgary. The courses are arranged in alphabetical order by course title not by abbreviation. In order to better understand the notations used throughout this section, an illustrated example of a course description is provided.

All courses listed are not necessarily offered every year and students should consult the Schedule of Classes for an official listing of those courses that will be offered in a given term.

Since this Calendar is published a considerable time before the opening of the academic year, the University reserves the right to make whatever changes circumstances may require including the cancellation of a particular course.

To understand course acronyms, refer to Course Descriptions.

For information on the grading system, refer to F.1 Grading System and Transcripts.

Sample Course Description

See numbered footnotes for explanations of the information commonly provided in a course description.

Biology 241¹ 3 units; (3-3)²

Energy Flow in Biological Systems

An introduction to the energetics of life from molecules through ecosystems. Topics include: energy in biological systems; how different organisms obtain, store and use energy; energy budgets of organisms; and energy flow through cells and ecosystems.

Prerequisite:³ Biology 30 and Chemistry 30.

Antirequisite:⁴ Credit for Biology 241 and 205 will not be allowed. Credit for more than two of Biology 231, 233, 241, 243 will not be allowed.

Notes:⁵ Biology 241 is a prerequisite for Biology 243. Not recommended for students seeking a single course, general-interest overview of the biological sciences. Those seeking such a course should consider Biology 205.

Some courses may include the notations:

MAY BE REPEATED FOR CREDIT⁶

NOT INCLUDED IN GPA⁷

¹Course Numbers: e.g. Biology 241 (BIOL 241)

The number of the course indicates the level of the course:

Supplementary study for degree: courses labelled in the 100s

Junior level: 200s

Senior level: 300s and 400s

Upper level undergraduate: 500s

Graduate level: 600s and 700s

²Hours of Instruction: e.g. 3 units; (3-3)

Fees and graduation are determined using "units". The unit weight of the course is indicated in the calendar by the first part of the course hours, e.g. "3 units".

The hours of instruction expected per week are indicated by the numbers contained in the brackets. The first number represents the number of lecture hours per week and the second number represents the number of lab hours per week. For example, (3-0) would indicate 3 hours of lectures per week and no labs. For (2-3), there would be 2 hours of lectures per week, along with 3 hours of lab per week.

A course labelled (3-3/2) means that there are 3 hours of lecture per week and 3 hours of lab every other week.

A course may also have tutorial and/or seminar hours assigned. These are indicated with an "S" or a "T", e.g., 3-2T or 3-1S.

To calculate the total hours of expected instruction given the weekly course hours provided in the calendar, one should take the total expected weeks of instruction and multiply by the number of weekly hours in the brackets. For example, Biology 241 (3-3), the total expected lecture hours are 3 (hours) x 12 (weeks) = 36 hours, and similarly 3 x 12 = 36 lab hours. A course designated 6 units; (3-0) would be 3 (hours) x 24 (weeks) = 72 hours, which may be taught over the course of two terms or entirely in one term, provided total hours equal 72. Courses may be taught during block week, in 3 week approved sessions, 6 week approved sessions, 12 week terms, over 24 weeks or 2 terms, or for approved non-standard dates. Whatever the duration of the course, the total instructional hours should remain the same.

Courses that use blended learning teaching formats, may meet the required instructional hours using alternate methods such as online instruction. Courses indicated as independent study or independent research include an hourly designation expected of the student to full-fill their independent work and may not have scheduled instruction time. Practicum and field study courses may indicate the total hours of instruction in the brackets instead of a weekly designation used by other courses. For example, Nursing 289 has 6 units; (247 hours) listed as the course hours.

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3Prerequisites: Courses that must be completed or currently registered in before a student may be able to register in this course.

Corequisites: Must be completed at the same time as this class.

4Antirequisites: Certain courses carry the notation "Not open to students with credit in course number XXX" or "Credit for course number XXX and course number XXX will not be allowed." Students may take these courses if they wish, but credit for both courses will not be granted towards their degree.

Some antirequisites may include cross-listed courses such as Cellular, Molecular and Microbial Biology 561 and Medical Science 561 or Nursing 221 and Kinesiology 259. These courses are listed under two faculties and can only be taken for credit from one faculty, but not both. The credit is determined by the student's registration in either class.

5Notes: This contains any information that may be helpful regarding enrolment in the course. Some examples are: "A supplementary fee will be assessed to cover additional costs associated with this course", or "This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped".

6May Be Repeated for Credit

Some courses are decimalized in order to accommodate different unique topics of study e.g. 499.01, 499.02. If this notation is present, students are allowed to take multiple topics belonging to one course number.

7Not Included in GPA

A course with this notation is graded as CR (Completed Requirements) or F (Fail). The course is not included in the calculation of the grade point average.

Courses of Instruction by Faculty

School of Architecture, Planning and Landscape

Architectural Studies ARST
Environmental Design EVDS
Environmental Design Architecture EVDA
Environmental Design Landscape EVDL
Environmental Design Planning EVDP
Sustainability Studies SUST

Faculty of Arts

African Studies AFST
American Sign Language ASL
Anthropology ANTH
Arabic Language and Muslim Cultures ALMC
Archaeology ARKY
Art ART
Art History ARHI
Arts ARTS
Arts and Science Honours ASHA
Canadian Studies CNST
Central and East European Studies CEST
Chinese CHIN
Communication and Culture CMCL
Communication and Media Studies COMS
Comparative Literature COLT
Dance DNCE
Development Studies DEST
Drama DRAM
Earth Science EASC
East Asian Language Studies EALS
East Asian Studies EAST
Economics ECON
English ENGL
Film FILM
French FREN
Geography GEOG
German GERM
Greek GREK
Greek and Roman Studies GRST
History HTST
Indigenous Languages INDL
International Relations INTR
Italian ITAL
Japanese JPNS
Latin LATI
Latin American Studies LAST
Law and Society LWSO
Linguistics LING
Museum and Heritage Studies MHST
Music MUSI
Music Education MUED
Music Performance MUPF
Philosophy PHIL
Political Science POLI
Psychology PSYC
Religious Studies RELS
Romance Studies ROST
Russian RUSS

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School of Creative and Performing Arts SCPA
 Slavic SLAV
 Sociology SOCI
 South Asian Studies SAST
 Spanish SPAN
 Strategic Studies STST
 Term Abroad Program TAP
 Transportation Studies TRAN
 Urban Studies UBST
 Wellbeing WELL
 Women's Studies WMST

Cumming School of Medicine

Community Health Sciences MDCH
 Health and Society HSOC
 Medical Science MDSC
 Medicine MDCN

Haskayne School of Business

Accounting ACCT
 Business and Environment BSEN
 Business Technology Management BTMA
 Energy Management ENMG
 Entrepreneurship and Innovation ENTI
 Finance FNCE
 Management Studies MGST
 Marketing MKTG
 Operations Management OPMA
 Organizational Behaviour and Human Resources OBHR

Professional Land Management PLMA
 Real Estate Studies REAL
 Risk Management and Insurance RMIN
 Strategy and Global Management SGMA
 Supply Chain Management SCMA
 Tourism Management TOUR

Faculty of Kinesiology

Dance Education DCED
 Kinesiology KNES
 Physical Education PHED

Faculty of Law

Law LAW

Faculty of Nursing

Nursing NURS

Schulich School of Engineering

Biomedical Engineering BMEN
 Chemical Engineering ENCH
 Civil Engineering ENCI
 Computer Engineering ENCM
 Electrical Engineering ENEL
 Energy and Environment, Engineering ENEE
 Energy Engineering ENER
 Engineering ENGG
 Environmental Engineering ENEN
 Geomatics Engineering ENGO
 Manufacturing Engineering ENMF
 Mechanical Engineering ENME
 Petroleum Engineering ENPE
 Software Engineering for Engineers ENSF

Faculty of Science

Actuarial Science ACSC
 Astronomy ASTR
 Astrophysics ASPH
 Biochemistry BCEM
 Biology BIOL
 Biostatistics BIST
 Cellular, Molecular and Microbial Biology CMMB
 Chemistry CHEM
 Computer Science CPSC
 Data Science DATA
 Ecology ECOL
 Environmental Science ENSC
 Geology GLGY
 Geophysics GOPH
 Information Security ISEC
 Marine Science MRSC
 Mathematics MATH
 Medical Physics MDPH
 Nanoscience NANS
 Neuroscience NEUR
 Physics PHYS
 Plant Biology PLBI
 Science SCIE
 Space Physics SPPH
 Statistics STAT
 Zoology Z00L

Faculty of Social Work

Social Work SOWK

Faculty of Veterinary Medicine

Veterinary Medicine VETM

Werklund School of Education

Education EDUC
 Education Bridge to Teaching EDBT
 Educational Psychology EDPS
 Educational Research EDER

Collaborating Faculties

Community Rehabilitation (MD, SW) CORE
 Computational Media Design (AR, EV, SC) CMDA
 Indigenous Studies (AR, SW) INDG
 Innovation (AR, EN, HA, SC) INNO
 Interprofessional Health Education (KN, NU, SW) IPHE
 Language (AR, ED) LANG
 Software Engineering (EN, SC) SENG
 Sustainable Energy Development (EN, EV, LA, HA) SEDV
 Transportation Studies (AR, EN) TRAN

Other

Academic Writing ACWR
 Co-operative Education COOP
 Energy and Environmental Systems EESS
 International Foundations Program IFPX
 International Foundations Program Business IFPB
 International Foundations Program Engineering IFPE
 Public Policy PPOL
 Internship INTE
 University UNIV
 University Exchange UNEX

Course Descriptions

Academic Writing ACWR

For more information about these courses see the Department of Communication, Media and Film website: commfilm.ucalgary.ca/.

Junior Courses

Academic Writing 201 **3 units; (3-1T)**

Introduction to Academic Writing

An introduction to academic writing and to the genres of narrative, critical, and essay writing. Emphasis on developing an effective writing process, reading critically, developing arguments, and using and citing sources. Some emphasis on oral presentations may be included.

Note: Certain sections may be restricted to students in particular programs.

Academic Writing 203 **3 units; (3-1T)**

Introduction to Research Writing

An introduction to inquiry-based research writing, from formulating good research questions to conducting an information search, developing an argument, using sources effectively, and revising and editing. A focus on oral presentations may also be included.

Senior Course

Academic Writing 303 **3 units; (3-0)**

Discipline-based Academic Writing

An intermediate level course in the writing styles, genres and modes of evidence and reasoning

appropriate to academic writing in a specific discipline or disciplines. Emphasis on connections between reading, writing, critical reasoning and, where appropriate, other discourse forms such as oral and electronic presentation.

Accounting ACCT

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Junior Course

Accounting 217 3 units; (3-1T)

Introductory Financial Accounting

Introduction to accounting for business organizations. Reporting of financial results of operations and financial position to investors, managers, and others. Emphasis on the use of accounting information for decision making.

Prerequisite(s): Admission to the Haskayne School of Business, and 12 units including Mathematics 249 or 251 or 265 or 281.

Antirequisite(s): Credit for Accounting 217 and any of Accounting 301, 317 or Business and Environment 291 will not be allowed.

Senior Courses

Accounting 301 3 units; (3-0)

Accounting Principles

Introduction to basic accounting principles and practices. Emphasis is placed on the accounting cycle and the key financial statements necessary for business decisions. Introduces basic financial and managerial accounting concepts.

Prerequisite(s): 24 units including Entrepreneurship and Innovation 201.

Antirequisite(s): Credit for Accounting 301 and any of 217, 317 or 323 will not be allowed.

Note: Not available for credit towards the Bachelor of Commerce degree. Preference in enrolment is given to students who have declared a Management and Society Minor. Will not act as a prerequisite for any higher level accounting course.

Accounting 323 3 units; (3-1T)

Introductory Managerial Accounting

An introduction to the use of accounting within an organizational context. Emphasis is placed on the development and dissemination of accounting information necessary for effective management including: planning, directing, motivating, and controlling activities and behaviours.

Prerequisite(s): Admission to the Haskayne School of Business, and Accounting 217 or 317.

Antirequisite(s): Credit for Accounting 323 and 301 will not be allowed.

Accounting 341 3 units; (3-1T) or (3-0.5T)

Intermediate Financial Accounting I

Financial accounting from a producer point of view. Topics include cash, receivables, inventories, short and long-term investments, intangible assets and capital assets including the appropriate financial statement considerations.

Prerequisite(s): Admission to the Haskayne School of Business and Accounting 217 or 317, and 323.

Accounting 343 3 units; (3-1T)

Intermediate Financial Accounting II

Financial accounting from a producer point of view. Topics include accounting for liabilities,

shareholders equity, leases, future income taxes, pensions, accounting changes and earnings per share including the relevant financial statement considerations.

Prerequisite(s): Admission to the Haskayne School of Business and Accounting 341.

Accounting 361 3 units; (3-1T) or (3-0.5T)

Cost Accounting

The production of accounting data for the purpose of decision-making, control and evaluation. Topics covered are in the cost classifications and methods of cost establishment, cost data appropriate for decision models, standards and controls.

Prerequisite(s): Admission to the Haskayne School of Business and Accounting 323.

Accounting 421 3 units; (3-1T) or (3-0.5T)

Taxation

Taxation levied on profits, sales, property and estates and its impact upon management decisions. Consideration will be given to the biases and shifts implicit in any system of taxation.

Prerequisite(s): Admission to the Haskayne School of Business, and 54 units including Accounting 217 or 317.

Accounting 423 3 units; (3-0)

Advanced Taxation

Focuses on tax planning. Extends the material covered in the introductory tax course with an examination of specialized topics in personal and corporate income tax. Topics include detailed review of taxation of corporations, income trusts, partnerships, business reorganization, amalgamations, winding-up of businesses, sale of an incorporated business, tax consequences of leaving Canada and death of a taxpayer.

Prerequisite(s): Admission to the Haskayne School of Business and Accounting 421.

Accounting 425 3 units; (3-0)

Auditing

A conceptual study of audit evidence, basic audit techniques, professional ethics, audit reports.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units including Accounting 341.

Accounting 443 3 units; (3-1T)

Advanced Financial Accounting

Topics include accounting for business combinations and intercorporate investments, foreign currency transactions and translation, bankruptcy, partnerships, and not-for-profit organizations.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units including Accounting 343.

Accounting 445 3 units; (3-0)

Accounting Theory

Examines the origins of financial accounting and current theories on the use of financial accounting information by investors, regulators, standard setters, and other corporate stakeholders.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units including Accounting 343.

Accounting 465 3 units; (3-0)

Managerial Control Systems

Case approach to Management Control Systems explaining the use of accounting data from a

managerial perspective. Emphasis is placed on how managers use planning and control to accomplish a firm's strategies.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units including Accounting 361.

Accounting 559 3 units; (3-0)

Selected Topics in Accounting

Investigation of selected topics in Accounting.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units including Accounting 343. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Accounting 601 3 units; (3-0)

Introductory Financial Accounting

Introduction to accounting for business organizations. Reporting of financial results of operations and financial position to investors, managers, and others. Emphasis on the use of accounting information for decision-making.

Accounting 603 3 units; (3-0)

Management Accounting

Breakeven analysis, activity-based costing and management, budgeting, productivity measures, and other tools and techniques that are part of a planning and control system that will help the manager make better economic decisions.

Prerequisite(s): Accounting 601.

Accounting 641 3 units; (3-0)

Intermediate Financial Accounting I

Provides detailed coverage of the Generally Accepted Accounting Principles (GAAP) primarily related to assets. Emphasizes the theory behind the methods, the strengths and weaknesses of such methods and the need for sound professional judgment.

Prerequisite(s): Accounting 601 and 603; or consent of the Haskayne School of Business.

Accounting 643 3 units; (3-0)

Intermediate Financial Accounting II

Builds on Intermediate Financial Accounting I with coverage of the Generally Accepted Accounting Principles (GAAP) primarily related to liabilities and owners' equity. Emphasizes the theory behind the methods, the strengths and weaknesses of methods and the need for sound professional judgment.

Prerequisite(s): Accounting 641.

Accounting 661 3 units; (3-0)

Cost Accounting

Provides intermediate level discussions to the production and analysis of costs used for pricing, production and investment decisions, revenue analysis, performance evaluation, management incentive systems and strategy analysis.

Prerequisite(s): Accounting 603.

Accounting 672 1.5 units; (3-1T)

Financial Accounting Concepts

Introduction to accounting for business organizations emphasizing the use and analysis of financial statements for decision-making purposes.

Prerequisite(s): Admission to the Master of Management Program.

Accounting 674 1.5 units; (3-1T)

Managerial Accounting Concepts

Introduction to the use of accounting within an organizational context. Emphasis is placed on the development and dissemination of accounting information necessary for effective management.

Prerequisite(s): Admission to the Master of Management Program.

Accounting 721 3 units; (3-0)

Taxation

Discusses the core concepts, regulations, and interpretations underlying the Canadian individual and corporate income taxation. Emphasis is on who is taxable, on what income, when and how tax is calculated. Tax planning opportunities will be identified by using long-term and clientele-based techniques.

Prerequisite(s): Accounting 601.

Accounting 723 3 units; (3-0)

Advanced Taxation

Focuses on tax planning. It extends the material covered in the introductory tax course with an examination of specialized topics in personal and corporate income tax.

Prerequisite(s): Accounting 721.

Accounting 725 3 units; (3-0)

Auditing

Discusses the techniques and theory behind the external auditor's provision of assurance services on financial information. Topics include: the demand for assurance, the role of auditors in providing assurance, auditor independence, audit reports, and audit liability.

Prerequisite(s): Accounting 641.

Accounting 741 3 units; (3-0)

Financial Statement Analysis

Covers the theories, concepts and practices of financial statement analysis with an emphasis placed on applications.

Prerequisite(s): Accounting 603.

Accounting 743 3 units; (3-0)

Advanced Financial Accounting

Focuses on advanced accounting methods related to inter-corporate investments and financial reporting. Topics include accounting for business combinations and inter-corporate investments, foreign currency transactions and translation, bankruptcy, partnerships, and not-for-profit organizations.

Prerequisite(s): Accounting 643.

Accounting 745 3 units; (3-0)

Accounting Theory

Examines the conceptual framework underlying the preparation of financial accounting information, and the theories and propositions on the use of such information by investors, regulators, standard setters, and other corporate stakeholders.

Prerequisite(s): Accounting 643.

Accounting 765 3 units; (3-0)

Managerial Control Systems

Emphasis is placed on how managers use planning and control to accomplish a firm's strategies. Uses a case approach to management control systems explaining the usefulness of accounting data from a managerial perspective.

Prerequisite(s): Accounting 661.

Accounting 789 3 units; (3S-0)

Seminar in Accounting

Development of and solutions to current issues and problems in accounting.

Prerequisite(s): Accounting 603 or consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Accounting 797 3 units;(3S-0)

Advanced Seminar in Accounting

Advanced accounting research topics.

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Accounting 799 3 units; (3S-0)

Doctoral Seminars in Accounting

799.01. Seminar in Financial Accounting

799.02. Seminar in Managerial Accounting

799.04. Seminar in Taxation

Actuarial Science ACSC

For more information about these courses see the Department of Mathematics and Statistics: math.ucalgary.ca/.

Senior Courses

Actuarial Science 325 3 units; (3-1T)

Theory of Interest/Mathematics of Finance

Measurement of interest, elementary annuities, general annuities, amortization schedules and sinking funds, bonds and other securities.

Prerequisite(s): One of Mathematics 249, 265 or 275.

Actuarial Science 327 3 units; (3-1T)

Life Contingencies I

The survival function, force of mortality, life tables, analytical laws of mortality, life insurance, continuous and discrete life annuities, recursion equations. Introduction to benefit premiums and/or insurance and annuity models with interest as a random variable as time permits.

Prerequisite(s): A grade of "C" or higher in Statistics 321.

Actuarial Science 425 3 units; (3-0)

Intermediate Topics in Finance and Investment

Selected topics relevant to students with an interest in actuarial science, enterprise risk management, financial mathematics, etc. Topics include financial instruments; sources and cost of capital; portfolio selection; CAPM and alternatives; dividend policy; taxation; basic option pricing theory;

stock valuation; measurement and assessment of financial performance; risk management.

Prerequisite(s): Actuarial Science 325 and Statistics 323; or Actuarial Science 325 and 60 units and consent of the Department.

Antirequisite(s): Credit for Actuarial Science 425 and Finance 317 will be not be allowed without consent of the Department.

Note: Students with credit for Finance 317 but requiring Actuarial Science 425 for VEE credit from the Society of Actuaries should consult with the Department.

Actuarial Science 427 3 units; (3-0)

Life Contingencies II

Benefit premiums, premium principles, fully continuous and fully discrete premiums. Benefit reserves and their analysis. Insurance models including expenses. Multiple-state models.

Prerequisite(s): Actuarial Science 327; Statistics 323; one of Mathematics 311, 313, 367 or 375.

Actuarial Science 437 3 units; (3-0)
(formerly Statistics 437)

Actuarial Models

Basic distributional quantities; characteristics of actuarial models; continuous models; Basic and advanced discrete distributions; frequency and severity with coverage modifications (deductibles, policy limits, coinsurance); aggregate loss models.

Prerequisite(s): Statistics 323.

Actuarial Science 511 3 units; (3-0)

Generalized Linear Models for Actuaries

Description of insurance data, response distributions, exponential family responses and estimation, GLMs, models for count data, categorical and continuous responses. Applications include: personal injury insurance, vehicle insurance, diabetes deaths, third party claims, and degree of vehicle crash. Software for fitting GLMs will be discussed.

Prerequisite(s): Statistics 323.

Actuarial Science 513 3 units; (3-0)

Fundamentals of Actuarial Practice

An introduction to the foundations of actuarial science including the history and development of insurance, the actuarial profession, and the professional societies. Standards of practice and codes of ethics and conduct. An examination of the contexts and environments (including the legal, political, and societal) in which actuarial work takes place. Foundational skills required by actuaries, with an emphasis on communication.

Prerequisite(s): Actuarial Science 327 and Statistics 321.

Antirequisite(s): Credit for Actuarial Science 513 and 539.02 will not be allowed.

Actuarial Science 515 3 units; (3-0)

Models for Financial Economics

Survey of financial derivatives, valuation of derivatives using binomial trees, Black-Scholes-Merton equation, dynamic hedging, Brownian motion and Ito's Lemma.

Prerequisite(s): Actuarial Science 325 and Statistics 321.

Antirequisite(s): Credit for Actuarial Science 515 and 539.04 will not be allowed.

Actuarial Science 517 3 units; (3-0)

Estimating Unpaid Claims in General Insurance

Data collection, adjusting premiums, trending losses, development triangles, expected method,

frequency-severity method, Bornhuetter Ferguson method, Benktander method, Cape Cod method, impact of changing conditions on projection method.

Prerequisite(s): Actuarial Science 327.

Antirequisite(s): Credit for Actuarial Science 517 and 539.06 will not be allowed.

Actuarial Science 519 **3 units; (3-0)**

Quantitative Financial Risk Management

Risk measures, correlations and copulas, various approaches to modelling market and credit risk, liquidity risk, enterprise risk management.

Prerequisite(s): Actuarial Science 327.

Actuarial Science 527 **3 units; (3-0)**

Life Contingencies III

Multiple life functions, dependent and independent models, related annuities and insurances. Multiple decrement models: time until and causes of death. Associated single decrement tables. Applications of multiple decrement theory. Asset shares. Business and regulatory considerations.

Prerequisite(s): Actuarial Science 327; Statistics 323; one of Mathematics 311, 313, 367 or 375; and one of Computer Science 217, 231, 235 or Data Science 211.

Actuarial Science 531 **3 units; (3-0)**

Loss Distributions and Their Estimations

Review of mathematical statistics; estimation based on complete and modified data; frequentist estimation; Bayesian estimation; simulation in actuarial modelling; model selection.

Prerequisite(s): Actuarial Science 327; Statistics 323; one of Mathematics 311, 313, 367 or 375.

Antirequisite(s): Credit for Actuarial Science 531 and 533 will not be allowed.

Actuarial Science 535 **3 units; (3-0)**

Mathematics of Demography

Conventional and adjusted measures of mortality; measures of fertility; measures of morbidity; North American demographic characteristics and trends; evaluation of demographic data; projections for stable and stationary populations; actuarial applications of demographic characteristics and trends.

Prerequisite(s): Actuarial Science 327 and Statistics 323.

Actuarial Science 537 **3 units; (3-0)**

Credibility Theory

Limited fluctuation credibility; full and partial credibility; greatest accuracy credibility; Bayesian methodology; credibility premium; Buhlmann model; Buhlmann-Straub model; empirical Bayes method; bonus-malus system.

Prerequisite(s): Actuarial Science 327; Statistics 323; and one of Mathematics 311, 313, 367 or 375.

Antirequisite(s): Credit for Actuarial Science 537 and either 533 or 637 will not be allowed.

Actuarial Science 539 **3 units; (3-0)**

Special Topics in Actuarial Science

Offered under various subtitles.

Prerequisite(s): Actuarial Science 327; Statistics 323; and one of Mathematics 311 or 313 or 367 or 375.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Note: In addition to the prerequisites listed below, consent of the Department is a prerequisite for all graduate courses.

Actuarial Science 600 **1.5 units; (3S-0)**

Research Seminar

A professional skills course, focusing on the development of technical proficiencies that are essential for students to succeed in their future careers. The emphasis is on delivering professional presentations and using modern actuarial techniques and statistical research tools. Ethics and professionalism are also covered.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Actuarial Science 611 **3 units; (3-0)**

Generalized Linear Models for Actuaries

Description of insurance data, response distributions, exponential family responses and estimation, GLMs, models for count data, categorical and continuous responses. Applications include: personal injury insurance, vehicle insurance, diabetes deaths, third party claims, and degree of vehicle crash. Software for fitting GLMs will be discussed.

Prerequisite(s): Statistics 323 or Mathematics 323, and Statistics 429.

Actuarial Science 617 **3 units; (3-0)**

Estimating Unpaid Claims in General Insurance

Data collection, adjusting premiums, trending losses, development triangles, expected method, frequency-severity method, Bornhuetter Ferguson method, Benktander method, Cape Cod method, impact of changing conditions on projection method.

Prerequisite(s): Actuarial Science 327.

Antirequisite(s): Credit for Actuarial Science 617 and either 517 or 539.06 will not be allowed.

Actuarial Science 619 **3 units; (3-0)**

Quantitative Financial Risk Management

Risk measures, correlations and copulas, various approaches to modelling market and credit risk, liquidity risk, enterprise risk management.

Prerequisite(s): Actuarial Science 327.

Actuarial Science 627 **3 units; (3-0)**

Advanced Life Contingencies

Multiple life functions, dependent and independent models, related annuities and insurances. Multiple decrement models: time until and causes of death. Associated single decrement tables. Applications of multiple decrement theory. Asset shares. Business and regulatory considerations.

Prerequisite(s): Actuarial Science 327; and one of Statistics 323 or Mathematics 323; and one of Mathematics 311 or 313 or 353 or 367 or 375 or 381; and one of Computer Science 217 or 231 or 235.

Antirequisite(s): Credit for Actuarial Science 627 and 527 will not be allowed.

Actuarial Science 637 **3 units; (3-0)**

Credibility Theory

Limited fluctuation credibility; full and partial credibility; greatest accuracy credibility; Bayesian methodology; credibility premium; Buhlmann

model; Buhlmann-Straub model; empirical Bayes method; bonus-malus system.

Prerequisite(s): Actuarial Science 327; Statistics 323 or Mathematics 323; and one of Mathematics 311 or 313 or 353 or 367 or 375 or 381.

Antirequisite(s): Credit for more than one of Actuarial Science 537, 637 and 533 will not be allowed.

Actuarial Science 639 **3 units; (3-0)**
(formerly Statistics 639)

Conference Course in Actuarial Modelling

Topics in advanced actuarial theory and practice, such as: insurance risk models; practical analysis of extreme values; advanced property and casualty rate making; actuarial aspects of financial theory.

MAY BE REPEATED FOR CREDIT

African Studies AFST

For more information about these courses see the Department of Anthropology and Archaeology website: <https://antharky.ucalgary.ca/>.

Senior Courses

African Studies 301 **3 units; (3-0)**

Introduction to African Studies

An interdisciplinary perspective on the people and ecologies of the African continent. The major theme will be the processes and effects of social, religious, political, economic, historical and cultural change on the lives of Africans.

African Studies 400 **6 units; (9-0)**

Field Study in Africa

A field course for interdisciplinary study of a country or region of Africa, emphasizing the geographical, archaeological, historical, cultural, political, economic and artistic aspects.

Prerequisite(s): Consent of the Program Coordinator.

African Studies 501 **3 units; (3S-0)**

Seminar

Study of a particular topic(s) or region(s) from an interdisciplinary and comparative perspective. Students will be required to examine how political, social, economic and cultural factors intersect to shape various issues in the African setting.

Prerequisite(s): One of African Studies 301, Anthropology 317, History 401, or Political Science 371.

American Sign Language ASL

For more information about these courses see the School of Languages, Linguistics, Literatures and Cultures website: slllc.ucalgary.ca/.

American Sign Language 201 **3 units; (3-1)**

Beginners' American Sign Language I

Introduction to American Sign Language (ASL) and the culture of deaf people. Covers material in matriculation-level ASL. It teaches basic communication and conversational skills in ASL and is for students with no background in ASL.

Note: Preference in enrolment is given to students in Medicine, Nursing, and Social Work.

American Sign Language 203 3 units; (3-1)

Beginners' American Sign Language II

Continuation of American Sign Language 201.

Prerequisite(s): American Sign Language 201.

Note: Preference in enrolment is given to students in Medicine, Nursing, and Social Work.

Anthropology ANTH

For more information about these courses see the Department of Anthropology and Archaeology website: <https://antharky.ucalgary.ca/>.

Junior Courses

Anthropology 201 3 units; (3-0)

Introduction to Biological Anthropology

Introduction to the major fields of biological anthropology including evolutionary theory and processes, human paleontology, primatology, genetics, osteology, human adaptation, development, and variation, with special emphasis on the path of human evolution.

Antirequisite(s): Credit for Anthropology 201 and Archaeology 203 will not be allowed.

Anthropology 203 3 units; (3-0)

Introduction to Social and Cultural Anthropology

The nature of human society: its elements, its variability and its perpetuation. Comparisons of institutions (political, economic, religious, educational and sexual) in both small-scale and large-scale societies.

Senior Courses

Anthropology 303 3 units; (3-0)

Business in Cultural Context

Ways in which differences in cultural values and practices affect the form and nature of interaction between business parties, especially those of differing national/cultural/ethnic backgrounds.

Anthropology 305 (formerly Archaeology 305) 3 units; (3-0)

Human Variation and Adaptation

Some of the major problems involved in interpreting modern and recent human diversity. Emphasis on the interaction between human cultural and biological systems and on cultural influences upon human biological diversity.

Prerequisite(s): One of Anthropology 201 or Archaeology 203 or Biology 241 or 205.

Anthropology 309 3 units; (3-1)

Human Evolution

Investigation of the major phases of human evolution, with an emphasis on understanding how, when and why specific adaptations evolved. In laboratories, students learn to reconstruct behaviour from anatomical and palaeontological evidence.

Prerequisite(s): Anthropology 201 or Archaeology 203.

Antirequisite(s): Credit for Anthropology 309 and either Archaeology 333 or 327.03 will not be allowed.

Anthropology 311 3 units; (3-0)

Primate Behaviour

Primate behaviour and related topics, including social dynamics, sociobiology, socio-ecology, dominance, aggression, kinship, sexual behaviour,

socialization, learning, cognition, communication, ape language, and conservation.

Anthropology 313 3 units; (3-0)

Anthropology of the Environment

Cross-cultural perspectives on human-environment relationships and application to contemporary problems concerning conservation, resource management and environmentalism.

Prerequisite(s): Anthropology 203.

Antirequisite(s): Credit for Anthropology 313 and 399.03 will not be allowed.

Anthropology 317 3 units; (3-0)

Ethnographic Survey of Africa South of the Sahara

Traditional societies in sub-Saharan Africa, concentrating on a number of classical social anthropological field work studies.

Prerequisite(s): Anthropology 203.

Anthropology 319 3 units; (3-0)

Ethnographic Survey of North Africa

Ethnographic survey of the peoples of North Africa, including the Sahara, and historical analysis of their incorporation within the contemporary nation states of the region.

Prerequisite(s): Anthropology 203.

Anthropology 321 3 units; (3-0)

Ethnographic Survey of Latin America

A survey of cultural traditions of Mexico, the Caribbean, and Central and South America as they have evolved since the sixteenth century.

Prerequisite(s): Anthropology 203.

Anthropology 323 3 units; (3-0)

Culture and Society of China

Diversity of social and cultural patterns in imperial and contemporary times.

Prerequisite(s): Anthropology 203.

Anthropology 329 3 units; (3-0)

Topics in Ethnographic Survey of Selected World Areas

Selected topics in the anthropology of world areas.

Prerequisite(s): Anthropology 203.

MAY BE REPEATED FOR CREDIT

Anthropology 331 3 units; (3-0)

Sex and Gender

Cross-species and cross-cultural perspective on sex and gender.

Anthropology 341 3 units; (3-0)

Medical Anthropology

A survey of anthropological approaches to disease, illness and the maintenance of health.

Prerequisite(s): Anthropology 203.

Anthropology 343 3 units; (3-0)

Militarism and Militarization

Comparative global ethnographic survey of militarization processes. Examples will be drawn from contemporary and historical societies, with a particular emphasis on the wide variety of institutions and communities necessary to the production of violence, and on their relationship to the larger society.

Prerequisite(s): Anthropology 203.

Antirequisite(s): Credit for Anthropology 343 and 315 will not be allowed.

Anthropology 346 (formerly Anthropology 210) 3 units; (3-0)

Development of Indigenous-Settler Relations in Canada

An exploration of Indigenous-Settler relations in Canada from first contact to present, including the development of Indian policy, the Indian Act, treaties, residential schools, and Sixties Scoop.

Antirequisite(s): Credit for Anthropology 213 and 346 will not be allowed.

Anthropology 350 3 units; (1-2)

Laboratory Practice in Biological Anthropology

Examines the basic concepts and methods of biological anthropology using an experiential learning model. Coverage includes genetics, osteology, primatology, paleoanthropology, and human biology with a strong emphasis on the role of evolutionary theory throughout.

Prerequisite(s): Anthropology 201 or Archaeology 203.

Anthropology 355 3 units; (3-0)

Ethnographic Survey of Canada's Indigenous Peoples

A critical overview of the historical, social, political, economic, environmental, and cultural contexts related to health, justice, education, gender, traditional practices, and identity of Indigenous Peoples, Nations, cultures, and organizations across Canada.

Prerequisite(s): Anthropology 203.

Anthropology 357 3 units; (3-0)

Anthropology of Development

Cultural dimensions of local and international development policy, programming, and evaluation.

Prerequisite(s): One of Anthropology 203, Development Studies 201 or Indigenous Studies 201.

Anthropology 361 (formerly Anthropology 461) 3 units; (3-0)

History of Anthropology

Historical survey of anthropological thought from the enlightenment to the present.

Prerequisite(s): Anthropology 203.

Anthropology 363 3 units; (3-0)

Magic, Witchcraft, and Gods: Anthropology of Religion

Contemporary anthropological theoretical perspectives on topics such as divination, ritual, witchcraft, magic and symbolism in both indigenous and world religions. The relationship of religion to healing, gender and power is also examined.

Prerequisite(s): Anthropology 203.

Anthropology 371 (formerly Anthropology 471) 3 units; (3-0)

Political Anthropology

Comparative analysis of power, authority, dependency relations, and processes of governance, from the perspective of social and cultural anthropology.

Prerequisite(s): Anthropology 203.

Anthropology 379 3 units; (3-0)

Urban Anthropology

A study of tribalism, ethnicity, sub-cultures, social networks and related phenomena in urban societ-

ies. Attention will be paid to planning and applied urban anthropology.

Prerequisite(s): Anthropology 203.

Anthropology 385 3 units; (3-0)
(formerly Anthropology 485)

Economic Anthropology

Comparative analysis of production, distribution and consumption in local and globalized contexts. Examines theories of exchange, the effects of capitalism, and the relation between economy and culture.

Prerequisite(s): Anthropology 203.

Anthropology 393 3 units; (3-0)

Anthropology of Global Systems

Investigates the complex relationship between the global and the local by examining the social, cultural, economic, and political changes in specific localities as a result of the global rise of capitalism.

Prerequisite(s): Anthropology 203.

Antirequisite(s): Credit for Anthropology 393 and 387 will not be allowed.

Anthropology 395 3 units; (3-0)

Anthropology of Science

An introduction to the culture and the politics of science. Examines conceptual and daily practices in the laboratory, the scientific method, the training of scientists, the work of scientific collaboration and the intersection between scientists and wider political, racial, gendered and religious issues. Special consideration will be given to the anthropology of scientific controversy.

Prerequisite(s): Anthropology 203.

Antirequisite(s): Credit for Anthropology 395 and 399.06 will not be allowed.

Anthropology 399 3 units; (3-0)

Topics in Anthropology

Examination of select problems in Anthropology. Topics may be drawn from all subfields in the discipline.

MAY BE REPEATED FOR CREDIT

Anthropology 400 3 units; (0-3T)

Independent Study

Selected topics in anthropology may be offered for Majors and Honours students.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Anthropology 410 3 units; (3-0)
(formerly Anthropology 310)

Contemporary Indigenous Affairs in Canada

Investigation of current issues concerning Canada's Indigenous peoples, including land claims, self-government, Indigenous rights, health, education, housing, employment and other social issues.

Prerequisite(s): One of Anthropology 210, 213 or 346.

Anthropology 411 3 units; (3-0)

Methods and Analysis for Anthropology

An introduction to research design, data collection, and analysis as used in anthropology. Cross-cultural research design and methods, use of participant observation and personal documents will be emphasized.

Prerequisite(s): One of Anthropology 391 or 490.

Anthropology 412 3 units; (3-0)
(formerly Anthropology 505.11)

The Primate Fossil Record

A review of the evolution of the primates, covering the morphological and taxonomic diversity of fossil primates, environmental and chronological context for primate evolution, and current debates and problems in the field of primate evolution. In class laboratories focus on the diversity of primate dietary, locomotor, and social adaptations, and how these are inferred from the fossil record.

Prerequisite(s): Anthropology 309 and 311.

Anthropology 413 3 units; (3-3)

Methods in Primatology

Focus on observational methods and analysis, with practical application in laboratory study at the Calgary Zoo.

Prerequisite(s): Anthropology 311.

Antirequisite(s): Credit for Anthropology 413 and 351 will not be allowed.

Note: Students will be required to cover the costs associated with compulsory field trips.

Anthropology 421 3 units; (3-0)

Contemporary Latin American Society

An examination of selected issues in the anthropological study of contemporary Latin America.

Prerequisite(s): Anthropology 321.

Anthropology 425 3 units; (3-0)

Primate Cognition

Causes and consequences of primate sociality, such as brain structure and evolution, kin recognition, Theory of Mind, social perception and awareness, and similarities and differences in communication and cognition between human and non-human primates.

Prerequisite(s): Anthropology 311.

Antirequisite(s): Credit for Anthropology 425 and 505.03 will not be allowed.

Anthropology 427 3 units; (3-0)

Women in East Asian Societies

Comparison of women's roles in China, Japan, and Korea, with particular reference to family structure and economic organization.

Prerequisite(s): Anthropology 323.

Anthropology 435 3 units; (3-0)

Evolution of Human Behaviour

Analysis of evolutionary principles and processes (such as natural selection, sexual selection, kin selection, parental investment) as they are applied to the current study of human and non-human primate behaviour. Special emphasis on socioecological approaches to primate behaviour.

Prerequisite(s): Anthropology 311.

Anthropology 441 3 units; (3-0)

Problems in the Anthropology of Health

An examination of selected problems in the anthropology of health. Topics may include models of health in Canada, etiological claims in health research, and anthropology of pharmaceuticals.

Prerequisite(s): Anthropology 341.

Anthropology 449 3 units; (3-0)
(formerly Anthropology 349)

Anthropology of HIV/AIDS

Examines the individual, clinical, epidemiological, cultural, social, psychological, political, economic,

and public policy dimensions of HIV/AIDS along with its meaning and importance on a global level from an anthropological perspective.

Prerequisite(s): Anthropology 341.

Antirequisite(s): Credit for Anthropology 449 and 399.01 will not be allowed.

Anthropology 451 3 units; (3-0)

Topics in Primate Behavioural Ecology and Conservation

Advanced topics in the behavioural ecology and conservation biology of non-human primates, including related theory and field techniques.

Prerequisite(s): Anthropology 311.

MAY BE REPEATED FOR CREDIT

Anthropology 467 3 units; (3-0)

Soldiering: Perspectives on Military Life

An anthropological approach to soldiering in the aftermath of the Second World War. Questions the idea of a universal soldier, soldiers' shifting relationship to the nation-state, the rise of privatized warfare and the creation of global military communities. Special attention will be paid to the rise of humanitarian military regimes, military occupation, new technologies of warfare and non-human soldiers.

Prerequisite(s): Anthropology 343.

Anthropology 479 3 units; (3-0)

Housing and Society

Examines interactions between housing and social organization in cross-cultural context. Emphasizes the varied types of built form, their cultural meanings, implications for social life within households and for society more broadly, and their political and economic consequences. Pays particular attention to contemporary housing problems such as homelessness and urban sprawl.

Prerequisite(s): One of Anthropology 379, Geography 351 or 452.

Antirequisite(s): Credit for Anthropology 479 and Geography 479 will not be allowed.

Anthropology 490 3 units; (3-0)

Anthropological Theory

Examination of the fundamentals of anthropological theory through key concepts in anthropology since the nineteenth century, such as race, history, society, function, structure, gender and representation.

Prerequisite(s): Anthropology 203.

Antirequisite(s): Credit for Anthropology 391, 365 and 490 will not be allowed.

Anthropology 501 3 units; (3-0)

Advanced Topics in Social and Cultural Anthropology

Arranged for various topics of anthropology on the basis of special interest and need.

Prerequisite(s): Anthropology 203 and one senior Anthropology course and consent of the Department.

MAY BE REPEATED FOR CREDIT

Anthropology 505 3 units; (3-0)

Advanced Topics in Biological Anthropology

Arranged for various topics of biological anthropology on the basis of special interests and need.

Prerequisite(s): Anthropology 311 and one senior primatology course and consent of the Department.

MAY BE REPEATED FOR CREDIT

Anthropology 506 3 units; (3-0)

Anthropological Genetics

Examines the principles of evolutionary genetics with a focus on applications to current topics in Anthropology such as behaviour, life history, adaptation, migration and disease. Explores the contents of the primate genome as well as human and non-human primate genetic variation in an evolutionary framework.

Prerequisite(s): Anthropology 350, completion of 72 units and consent of the Department.

Antirequisite(s): Credit for Anthropology 506 and 505.13 will not be allowed.

Anthropology 523 3 units; (3-0)
(Archaeology 523)

Human Ecology

Current directions in various subfields of human ecology as they apply to Anthropology, Archaeology, and Geography.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Anthropology 523 and Geography 523 will not be allowed.

Anthropology 534 3 units; (3-0)

Biological Anthropology Perspectives on Health

The biocultural study of human health among contemporary and past populations via cross-cultural studies of health and healing, child growth and development, reproductive health, aging, infectious disease, immune function, and the impact of stress on physical and mental health.

Prerequisite(s): Anthropology 201 and one of Anthropology 203 or Archaeology 201 and a minimum of 12 units in courses labelled Anthropology.

Antirequisite(s): Credit for Anthropology 534 and Archaeology 533.92 will not be allowed.

Anthropology 541 3 units; (36 hours)

Field Study in Social and Cultural Anthropology

Research projects carried out off campus under the supervision of a member of academic staff and resulting in a graded project report.

Prerequisite(s): Consent of the Department.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Anthropology 552 6 units; (72 hours)

Field Studies: Topics in Primatology

Intensive training and practice in field methods of observational primate behaviour or behavioural ecology.

Prerequisite(s): Consent of the Department.

Corequisite(s): Anthropology 553.

Note: Normally offered during Spring Intersession. A supplementary fee will be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

Anthropology 553 3 units; (36 hours)

Primate Behavioural Research Design

Design of a research project, including the identification and operationalization of a research question and the collection and analysis of data.

Prerequisite(s): Consent of the Department.

Corequisite(s): Anthropology 552.

Note: Normally offered during Spring Intersession. A supplementary fee will be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

Anthropology 571 3 units; (3S-0)

Honours Seminar in Biological Anthropology

Current theoretical and methodological issues will be explored in a discussion-based seminar format.

Prerequisite(s): Anthropology 413 and admission to the Anthropology Honours Program.

Anthropology 573 3 units; (3S-0)

Honours Seminar in Social and Cultural Anthropology

Current theoretical and methodological issues will be explored in a discussion-based seminar format, with the possibility of development of a research project.

Prerequisite(s): Anthropology 411 and admission to the Anthropology Honours Program.

Anthropology 589 3 units; (3-0)
(formerly Archaeology 589)

Nutritional Anthropology

The study of human dietary practices from biological and cultural perspectives. Subjects covered include the development of nutritional anthropology, principles of nutrition, principles of ecology, diet from an evolutionary, comparative and historic perspective, the impact of undernutrition on human physiology, and behaviour and methods in nutritional anthropology.

Prerequisite(s): Consent of the Department.

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Anthropology 601 3 units; (3-0)

Conference Course in Anthropology

A specialized area of Anthropology selected on the basis of particular interest and need.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Anthropology 603 3 units; (3S-0)

Thesis Development

A reading and conference course in the student's substantive area conducted jointly by at least two faculty members.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Anthropology 605 3 units; (3-0)

Professional Skills for Anthropologists

Training and practice in research/teaching skills: grantsmanship, conference and classroom presentations, academic publishing, job interviews.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Anthropology 605 and 601.90, or the equivalent, will not be allowed.

NOT INCLUDED IN GPA

Anthropology 611 3 units; (3-0)

Methods in Anthropological Research

A variety of topics relevant to research and the logic of inquiry in Anthropology.

Prerequisite(s): Consent of the Department.

Anthropology 613 3 units; (3-0)

Current Issues in Methodology in Primatology

A variety of topics relating to aspects of data collection and data analysis in primatology, with a focus on ecological and behavioural data.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Anthropology 631 3 units; (3-0)

Anthropological Theory

Prerequisite(s): Consent of the Department.

Anthropology 635 3 units; (3-0)

Primatological Theory

Seminar dealing with the theoretical material of primatological and biobehavioural perspectives in Anthropology.

Prerequisite(s): Consent of the Department.

Anthropology 641 3 units; (3-0)

Seminar in Civil-Military Relations

Comparative analysis of relations between civil society and military institutions. A critical approach to analyzing how civil and military institutions mutually constitute each other, rather than taking the military and civilian sectors as a given. Special attention will be paid to twentieth-century militarization as a social process that has dramatically changed the shape of both civilian and military spheres.

Prerequisite(s): Consent of the Department.

Anthropology 659 3 units; (3-3)

Primatology

Specialized topics and laboratory training in this field will vary from year-to-year and may include: behavioural ecology, biomechanics, evolution, biosociality, and field methodology.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Anthropology 701 3 units; (3-0)

Independent Studies

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Arabic Language and Muslim Cultures ALMC

For more information about these courses see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

Language Placement information see 4.59 Placement in Language Courses.

Arabic Language and Muslim Cultures 202 3 units; (4-0)

Beginners Arabic I

A comprehensive course for students with no prior knowledge of the language. Includes training in listening, speaking, reading and writing of Modern Standard Arabic in its cultural context.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: See 4.59 Placement in Language Courses.

Arabic Language and Muslim Cultures 204 3 units; (4-0)

Beginners' Arabic I

Continuation of Arabic Language and Muslim Cultures 202.

Prerequisite(s): Arabic Language and Muslim Cultures 202.

Arabic Language and Muslim Cultures 301 3 units; (4-0)

Continuing Arabic I

A comprehensive course that includes further training in listening, speaking, reading and writing Modern Standard Arabic in its cultural context. Development of increased sophistication in language production and cultural understanding.

Prerequisite(s): Arabic Language and Muslim Cultures 204.

Arabic Language and Muslim Cultures 303 3 units; (4-0)

Continuing Arabic II

A continuation of Arabic Language and Muslim Cultures 301.

Prerequisite(s): Arabic Language and Muslim Cultures 301.

Arabic Language and Muslim Cultures 309 3 units; (3-2)

Arabic Culture in an Immersion Setting

Introduction to contemporary Arabic culture through research projects and life experience.

Prerequisite(s): Arabic Language and Muslim Cultures 204.

Corequisite(s): Arabic Language and Muslim Cultures 311.

Note: Normally offered during Spring/Summer intersessions in an Arabic-speaking country.

Arabic Language and Muslim Cultures 311 3 units; (3-1)

Modern Standard Arabic Language

Stresses oral skills and cultural understanding in an immersion setting. While the focus will be on speaking and aural comprehension, reading and writing will also be covered.

Prerequisite(s): Arabic Language and Muslim Cultures 204.

Corequisite(s): Arabic Language and Muslim Cultures 309.

Note: Normally offered during Spring/Summer intersessions in an Arabic-speaking country. A supplementary fee will be assessed to cover additional costs associated with this course.

Arabic Language and Muslim Cultures 313 3 units; (4-0)
(formerly Arabic Language and Muslim Cultures 213)

Reading Classical Arabic

An introduction to Arabic grammar and syntax through readings of classical sources.

Prerequisite(s): Arabic Language and Muslim Cultures 204.

Arabic Language and Muslim Cultures 317 3 units; (3-0)

Muslim Civilization I

Comparative study of Muslim civilization from Africa, the Arab and Persianate world, Asia and the West up to the end of the eighteenth century.

Note: Taught in English.

Arabic Language and Muslim Cultures 319 3 units; (3-0)

Muslim Civilization II

Comparative study of Muslim civilization from Africa, the Arab and Persianate world, Asia, and the West focusing on the developments of the nineteenth, twentieth and twenty-first centuries.

Note: Taught in English. May be repeated for a maximum credit of 9 units.

MAY BE REPEATED FOR CREDIT

Arabic Language and Muslim Cultures 331 3 units; (3-0)

Intermediate Arabic I

A comprehensive course that increases the command of the structure of modern standard Arabic through reading materials; develops reading and writing skills and comprehension. Development of increased sophistication in language production and cultural understanding.

Prerequisite(s): Arabic Language and Muslim Cultures 303.

Arabic Language and Muslim Cultures 333 3 units; (3-0)

Intermediate Arabic II

A continuation of Arabic Language and Muslim Cultures 331.

Prerequisite(s): Arabic Language and Muslim Cultures 331.

Arabic Language and Muslim Cultures 343 3 units; (4-0)

Topics in Colloquial Spoken Arabic I

Introduction to the everyday spoken language used in a particular Arabic-speaking country or region. Spoken varieties of Arabic taught may include Egyptian, Levantine, Gulf Varieties, and North African.

Prerequisite(s): Arabic Language and Muslim Cultures 204.

MAY BE REPEATED FOR CREDIT

Arabic Language and Muslim Cultures 345 3 units; (4-0)

Topics in Colloquial Spoken Arabic II

A continuation of the everyday spoken language used in a particular Arabic-speaking country or region. Spoken varieties of Arabic taught may include Egyptian, Levantine, Gulf Varieties, and North African.

Prerequisite(s): The corresponding language in Arabic Language and Muslim Cultures 343.

MAY BE REPEATED FOR CREDIT

Arabic Language and Muslim Cultures 354 3 units; (3-0)

Topics in Arabic Language and Linguistics

Exploration of aspects of the Arabic language through classical and modern sources. Topics may include the history of the Arabic language, Arabic in Muslim contexts, the varieties of Arabic, Arabic linguistics, and the grammatical tradition.

Prerequisite(s): Arabic Language and Muslim Cultures 204.

MAY BE REPEATED FOR CREDIT

Arabic Language and Muslim Cultures 358 3 units; (3-3)
(formerly Arabic Language and Muslim Cultures 357)

Topics in Cinema of Muslim Societies

Exploration of the diversity of national and regional cinemas in predominantly Muslim societies of the world.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

Arabic Language and Muslim Cultures 360 3 units; (3-0)

Topics in Muslim Literatures

Study of literary texts within the context of the rich, diverse traditions and cultures of predominantly Muslim societies of the world.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

Archaeology ARKY

For more information about these courses see the Department of Anthropology and Archaeology website: <https://antharky.ucalgary.ca/>.

Junior Courses
Archaeology 201 3 units; (3-3)

Introduction to Archaeology

Basic principles of archaeology. How archaeological remains are located, recovered and interpreted.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Archaeology 205 3 units; (3-0)

Ancient Peoples and Places

An overview of Old and New World archaeology; the emergence of humans; development of humans and culture from hunting/gathering to agricultural and ancient urban societies.

Senior Courses
Archaeology 303 3 units; (3-0)

Archaeology of North America

Prehistoric cultural developments in North America.

Archaeology 306 6 units; (72 hours)

Field Course in Archaeological Techniques

Practical application of modern field techniques in archaeology, including excavation, recording and analysis of sites, artifacts and related materials.

Prerequisite(s): Consent of the Department.

Note: Normally offered during the Spring and/or Summer Intersession. A supplementary fee will be assessed to cover additional costs associated with this course.

Archaeology 307 3 units; (3-0)

Introduction to Ethnoarchaeology

Theory, method, ethics and the contributions of ethnoarchaeological research to archaeology and other disciplines are explored using worldwide examples.

Archaeology 317 3 units; (3-0)

Archaeology of the Ancient Puebloan Southwest

Survey of the Puebloan archaeology of southwestern North America and their pre-

Puebloan ancestors. Topics include changes in hunter-gatherer mobility and economy, the rise of agriculture in the American Southwest, the rise of integrative communities and religious belief systems, as well as responses to violence, disease, climate change, and the immigration of non-Puebloan outsiders.

Antirequisite(s): Credit for Archaeology 317 and 427 will not be allowed.

Archaeology 321 **3 units; (3-0)**

Mammoths to Maize, Medicine Wheels and Warriors: Archaeology of the Canadian Plains

Introduction to Canadian Plains archaeology. Processes of cultural and social change on the northern plains over the last 12,000 years from early hunters of Ice-Age megafauna to tribal level farming societies are explored from a Canadian Plains perspective.

Antirequisite(s): Credit for Archaeology 321 and 421 will not be allowed.

Archaeology 325 **3 units; (3-0)**

Ancient Civilizations

The rise and achievements of the earliest civilizations in both the Old and New Worlds. Emphasis will be placed on the civilizations of Mesopotamia, Egypt, India, China, Mesoamerica and the Andes.

Archaeology 327 **3 units; (3-0)**

Topics in Archaeology and Popular Culture

Archaeology is examined in terms of its place in contemporary society. Topics may include the use of archaeological evidence by special interest groups; archaeology as viewed by the media; ethical questions relating to the practice of archaeology.

MAY BE REPEATED FOR CREDIT

Archaeology 329 **3 units; (3-0)**

Fringe Archaeology

Explores popular, fantastic and alternate interpretations of archaeological remains presented in the press and popular media and analyzes the logical flaws in pseudoscientific explanations. Students hone their critical thinking skills and discover the "real story" about our past revealed by the science of archaeology.

Antirequisite(s): Credit for Archaeology 329 and 327.01 will not be allowed.

Archaeology 331 **3 units; (3-0)**

Archaeology and the Media

Explores how the ancient world, human evolution, archaeologists, and archaeology are represented in a range of media (e.g. films, books, video games, websites, newspapers). Examines how archaeologists use digital media and social media sites to conduct research, as well as disseminate information to indigenous communities and the general public.

Antirequisite(s): Credit for Archaeology 331 and 327.02 will not be allowed.

Archaeology 335 **3 units; (3-0)**

African Stone Age

Introduction to the African Stone Age, with emphasis on sub-Saharan Africa. Major cultural developments are explored through archaeological data, as well as other disciplines, including biogeography and zooarchaeology. Topics include early human origins and the behaviour of early humans during the middle Pleistocene, as well as the Later Stone Age. Focus on major chronological events

and the cultural processes that characterize the Paleolithic era on the continent.

Antirequisite(s): Credit for Archaeology 335 and 435 will not be allowed.

Archaeology 341 **3 units; (3-0)**

Ancient Mexico

Ancient cultures of Mexico, excluding the Maya, from their beginnings to the historic period. Emphasis on the civilizations of the Olmecs, Zapotecs, Teotihuacanos, Toltecs and Aztecs.

Archaeology 343 **3 units; (3-0)**

The Ancient Maya

Ancient Maya, from their beginnings to the historic period. Emphasis on the Classic Maya civilization, from AD 200-900.

Archaeology 345 **3 units; (3-0)**

The Legacy of Mesoamerica

Traditional native cultures of Middle America. Emphasis is on technology, social organization, economic systems, religions, arts and languages, particularly in the culture centres of Mexico.

Archaeology 347 **3 units; (36 hours)**

Regional Studies in Latin American Archaeology

A general survey of the archaeology of the region and an intensive look at the archaeology of the immediate vicinity, including visits to sites and museums. Content varies according to region in Latin America where course is taught. Individual and group study are interspersed with formal instruction.

Prerequisite(s): Consent of the Department.

Note: Normally offered as part of a group study program. A supplementary fee will be assessed to cover additional costs associated with this course.

Archaeology 353 **3 units; (3-0)**

Archaeology of South America

Reviews the major events and cultural processes in Pre-Columbian South America beginning with the first hunting cultures. Emphasis is on central and Andean and northern lowland South American civilizations.

Archaeology 355 **3 units; (3-0)**

Native Cultures of the Amazon

A survey of the culture and linguistics of aboriginal South America, with emphasis on the lowland regions.

Archaeology 357 **3 units; (3-0)**

The Incas and Their Successors

Traditional cultures of the Ecuadorian, Peruvian and Bolivian Andes. Special emphasis is placed on the social, political and economic organizations of the Inca empire.

Archaeology 395 **3 units; (3-0)**

African Archaeology

African archaeology from the earliest times to the ethnographic present, particularly on Holocene cultures, including hunters and foragers, sedentary farmers, and urban societies.

Prerequisite(s): Archaeology 201 or 205.

Archaeology 399 **3 units; (3-0)**

Ethnohistory of Africa

Examples of African ethnohistory are explored using the techniques found in African historical archaeology including oral history and traditions,

ethnoarchaeology, genetics, archaeology, historical records and art history.

Archaeology 401 **3 units; (3-0)**

Archaeology of the Near East

Survey of the prehistory of the Near East, starting with the earliest traces of human activity up to the Bronze Age. Topics include adaptations to a varied environment, successive human migrations out of Africa, the nature of the Middle-Upper Palaeolithic transition, the agricultural revolution, and the world's earliest cities and states.

Prerequisite(s): Archaeology 201 or 205.

Archaeology 415 **3 units; (3-0)**

Lithic Technology

Study and analysis of tools and other artifacts, including their forms, methods of manufacture and use.

Prerequisite(s): Archaeology 201.

Archaeology 417 **3 units; (3-0)**

Zooarchaeology

The study and analysis of osteological remains used in reconstructing the subsistence strategies of past peoples.

Prerequisite(s): Archaeology 201.

Note: Preference in enrolment is given to students who have declared a Major in Archaeology.

Archaeology 419 **3 units; (3-0)**

Tipi, Buffalo, and Vision: People of the Plains

Explores traditional Plains cultures as recorded in ethnographic accounts and First Nations oral traditions.

Antirequisite(s): Credit for Archaeology 419 and Anthropology 419 will not be allowed.

Archaeology 423 **3 units; (3-0)**

Archaeology of the Arctic

Prehistory/history of N. E. Asia, Alaska, Canada and Greenland. Emphasis will be placed on ecological and ethnographical data.

Prerequisite(s): Archaeology 201 or 205 or 303.

Archaeology 437 **3 units; (3-0)**

Paleolithic Archaeology in the Old World

A global survey of Old World prehistoric hunter-gatherers with an emphasis on factual data, analytical techniques, and interpretive trends in the study of the Paleolithic era.

Prerequisite(s): Archaeology 201 or 203.

Antirequisite(s): Credit for Archaeology 437 and 533.14 will not be allowed.

Archaeology 439 **3 units; (3-0)**

African Complex Societies

Ancient African complex societies with an emphasis on state development south of the Sahara. Topics include why these states developed, their participation in internal and international systems of exchange, technological developments, belief systems that supported power structures, and the reasons for their collapse. Time period covered is from the rise of the ancient state of Egypt to the colonial period.

Archaeology 443 **3 units; (3-0)**

Hunter-Gatherer Archaeology

An overview of the history of hunter-gatherer studies in anthropology and archaeology. Introduces

current theoretical issues in hunter-gatherer research.

Prerequisite(s): Archaeology 201.

Antirequisite(s): Credit for Archaeology 443 and 531.81 will not be allowed.

Archaeology 451 **3 units; (3-0)**

Introduction to Method and Theory

A survey of contemporary approaches to the study of archaeology.

Prerequisite(s): Archaeology 201 and 60 units.

Archaeology 453 **3 units; (3-2)**

Fundamentals of Geoarchaeology

Analytical methods used in geoarchaeology. The interpretation of site and regional context, provenance, and paleoenvironment, and the application of dating methods, chemical and isotopic methods, and remote sensing. Case studies and experiential learning through field examples.

Prerequisite(s): 3 units from Archaeology 201, Geography 211, 310, Geology 201, 209.

Archaeology 455 **3 units; (3-0)**

Paleoindian Archaeology

Comprehensive overview of early hunter-gatherer archaeology in North and South America, including the Clovis/pre-Clovis debate, theoretical issues surrounding early hunting and mobility, the migration to the Americas during the last ice age, and cultural ecological dynamics.

Prerequisite(s): Archaeology 201.

Archaeology 471 **3 units; (3-2)**

Ceramic Analysis

The production of pottery: raw materials and techniques. Form, function and decoration. Ceramic ecology. Field processing and sampling. Classification: a survey of approaches. Ceramics and archaeological inference. Practical exercises.

Prerequisite(s): Archaeology 201.

Archaeology 490 **3 units; (3S-0)**

Current Topics in Archaeology

Examination of current theoretical, methodological, or topical issues in archaeology.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Archaeology 503 **3 units; (3-0)**

Gender in Prehistory

The theoretical background for feminist archaeology and some of the important advances in Old and New World gender studies. Topics include the relationship of gender hierarchy to the rise of the state; contrasts between the ideological representation of gender and culture practice; and an overarching theme of critical analysis relating the present to the past.

Prerequisite(s): Archaeology 451.

Archaeology 506 **6 units; (72 hours)**

Advanced Archaeological Field Techniques

Training in the more advanced aspects of field work.

Prerequisite(s): Archaeology 201 and 306.

Note: Normally offered during the Spring and/or Summer Intersession. A supplementary fee will be assessed to cover additional costs associated with this course.

Archaeology 515 **3 units; (3-3)**

Paleoethnobotany

The study of the uses of plants for food and other purposes such as tools by people in the past through archaeological remains and ethnobotanical research with contemporary people. Macroscopic and microscopic plant remains, such as phytoliths, starch grains, seeds, and charcoal are employed to reconstruct the past environments of ancient people. Theoretical and ethnobotanical issues such as folk taxonomy and ownership of traditional knowledge are explored.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Archaeology 515 and 533.26 will not be allowed.

Archaeology 523 **3 units; (3-0)**
(Anthropology 523)

Human Ecology

Current directions in various subfields of human ecology as they apply to Anthropology, Archaeology, and Geography.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Archaeology 523 and Geography 523 will not be allowed.

Archaeology 531 **3 units; (3-0)**

Advanced Topics in Archaeology

Investigation of various theoretical, methodological, analytical, and/or topical issues in archaeology.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Archaeology 537 **3 units; (3-0)**

Topics in Mesoamerican Archaeology

Focus on particular time periods or themes in Mesoamerican archaeology and ethnohistory.

Prerequisite(s): 6 units from Archaeology 341, 343, 345, 347.

MAY BE REPEATED FOR CREDIT

Archaeology 555 **3 units; (3-2)**

Human Osteology

Identification and interpretation of human skeletal and dental remains. Emphasis is on functional anatomy and reconstruction of prehistoric lifeways.

Prerequisite(s): Anthropology 309 or 350.

Antirequisite(s): Credit for Archaeology 555 and 613 will not be allowed.

Archaeology 591 **3 units; (3-0)**

Landscape Archaeology

Human perceptions and uses of the biophysical and cultural environment. The emphasis is on the act of humanizing the environment by naming places, identifying resources, establishing paths, and modifying the natural landscape thereby creating a tradition of land use that can be accessed archaeologically.

Prerequisite(s): Archaeology 451.

Archaeology 593 **3 units; (3-0)**

Household Archaeology

Human perceptions and uses of the built environment, particularly residential architecture. The emphasis is on the structure and symbolism associated with the spatial arrangements of objects, activities, and social interactions.

Prerequisite(s): Archaeology 451.

Archaeology 595 **3 units; (3-0)**

Problems in Palaeopathology and Palaeonutrition

Patterns of disease in prehistoric human populations with consideration to the interaction of health and nutrition. Techniques for determining disease and nutrition from prehistoric remains are covered.

Prerequisite(s): Anthropology 201, Archaeology 555 and either Anthropology 350 or Archaeology 203, and admission to the Archaeology or Anthropology major.

Archaeology 596 **6 units; (3S-0)**

Honours Thesis (BSc)

Students carry out an analytical research project and produce a final written report.

Prerequisite(s): Admission to Archaeology BSc Honours program and consent of the Department.

Archaeology 597 **3 units; (3-0)**

Independent Reading Course

An independent reading course for archaeology Majors. Each student is required to choose reading in consultation with an advisor.

Prerequisite(s): Consent of the Department.

Archaeology 598 **6 units; (3S-0)**

Honours Thesis (BA)

Students carry out a research project and produce a final written report.

Prerequisite(s): Admission to Archaeology BA Honours program and consent of the Department.

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Archaeology 601 **3 units; (3S-0)**

Theoretical Foundations

The philosophy of science, the history of anthropological theory, and a survey of contemporary theoretical approaches in anthropology. Throughout, the relevance to and connections with the subdisciplines of archaeology and biological anthropology will be emphasized.

Prerequisite(s): Consent of the Department.

Archaeology 603 **3 units; (3S-0)**

Seminar on Special Topics

Intensive study of special problems of particular interest to Archaeology Department graduate students. Subject matter for any particular year to be left to the discretion of the Department.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Archaeology 613 **3 units; (3-1T-2)**

Analysis of Human Skeletal Remains

Methods of analyzing human remains from archaeological contexts with emphasis on identification and description. Lecture, lab and weekly seminar directed to Archaeology graduate students who have not had a previous course in human osteology.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Archaeology 613 and either 555 or 603.07 will not be allowed.

Archaeology 615 3 units; (3S-0)

Topics in Archaeological Theory and Method

The history of archaeological theory and contemporary theoretical and methodological approaches used in archaeological research.

Prerequisite(s): Consent of the Department.

Archaeology 617 3 units; (3S-0)

Theory and its Application in Biological Anthropology

Basic issues in the study of human adaptation with a focus on principles of evolutionary biology as they apply to modern studies. Throughout, a bio-cultural approach will be emphasized.

Prerequisite(s): Consent of the Department.

Archaeology 619 3 units; (3-0)

Advanced Topics in Human Osteology

Current developments in interpretation of human skeletal and dental remains. Topics include forensic anthropology, bone biology, and population reconstruction.

Prerequisite(s): Archaeology 555.

Archaeology 621 3 units; (3S-0)

Problems in Ethnoarchaeology

Seminar on selected topics relating to ethnoarchaeology.

Prerequisite(s): Consent of the Department.

Archaeology 625 3 units; (3S-0)

Hunter-Gatherer Adaptations

Intensive study of contemporary and prehistoric hunter-gatherer social and economic adaptations.

Archaeology 627 3 units; (3S-0)

Origins of Agriculture

Intensive study of the origins of agriculture throughout the world.

Archaeology 631 3 units; (3S-0)

The Development of Complex Societies

The rise, development, and collapse of complex societies throughout the world.

Prerequisite(s): Consent of the Department.

Archaeology 633 3 units; (3S-3)

Specialized Analyses of Archaeological Materials

Theory and practice for specialized analyses of the physical and chemical composition of archaeological materials, including microscopic traces of use. Topics will cover procedures used to prepare materials for such specialized analyses and to identify the relevant properties, as well as issues of quantification and interpretation.

Prerequisite(s): Consent of the Department.

Archaeology 635 3 units; (3S-0)

Social Identity

Social identity is a fundamental theoretical and practical concern for archaeologists, physical anthropologists, and paleoanthropologists. Explores how humans use material culture and material practices to interact in a world ordered by social identities. Students will explore how research in their area of interest has addressed social identities.

Prerequisite(s): Consent of the Department.

Archaeology 637 3 units; (3S-0)

Mesoamerican Archaeology and History

Ancient history of Mesoamerica, emphasizing a conjunctive approach based on hieroglyphic, historical and ethnohistorical sources as well as on archaeological evidence.

Prerequisite(s): Consent of the Department.

Archaeology 639 3 units; (3S-0)

Stable Isotope Methods in Archaeology

Methods and applications of stable isotope analysis to archaeological research. Topics to be covered include the use of light stable isotopes to determine past and present diet, the use of stable isotopes to document residence and migration, analysis of stable carbon isotopes in soils, stable isotope ecology for environmental reconstruction and paleoclimate studies.

Prerequisite(s): Consent of the Department.

Archaeology 701 3 units; (3S-0)

Special Topics in World Archaeology

Archaeology of particular geographical areas such as Circumpolar, North America, Mesoamerica, South America, Africa, Oceania, and Europe and Near East.

MAY BE REPEATED FOR CREDIT

Archaeology 703 3 units; (3S-0)

Advanced Seminar in Selected Topics

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Architectural Studies ARST

For more information about these courses see the School of Architecture, Planning and Landscape website: evds.ucalgary.ca/.

Junior Course

Architectural Studies 201 3 units; (2-1T)

Architecture and the Built Environment

An introduction to architecture as an artistic and scientific endeavour as well as an examination of its purpose and intentions, its processes, and its products. Students will develop an understanding of the social, cultural, historical, technological, economic, and natural context influencing the design of buildings and other objects.

Senior Courses

Architectural Studies 421 3 units; (2-1T)

Architecture and Life Cycle Thinking: Climate Change and Beyond

An introduction to strategies for comparing building and product performance in relation to environmental impacts and contributions to climate change. Concepts of circular economy, life cycle analysis, embedded energy, recycling/reuse of building materials are explored through the lenses of resource depletion, carbon and water footprints and waste generation

Prerequisite(s): Architectural Studies 201.

Architectural Studies 423 3 units; (3-0)

Sustainability in the Built Environment

An examination of the built environment and the tools to achieve a stable and balanced and a regenerative ecosystem in a process of responsible consumption, wherein waste is minimized and the built environment interacts with natural environments and cycles. Healthful interior environments, resource efficiency, ecologically

benign materials, renewable energies and social justice issues are examined.

Prerequisite(s): Admission to the Architectural Studies Minor or consent of the Faculty.

Antirequisite(s): Credit for Architectural Studies 423 and Environmental Design 523 will not be allowed.

Architectural Studies 431 3 units; (0-3)

Design Thinking in the Built Environment Studio I

A foundational introduction to design thinking as applied to the built environment of buildings, cities, and landscapes. Students will complete a series of experiential learning exercises that emphasize three-dimensional thinking and problem-solving skills. The course is offered in a studio environment, which along with the coursework, will provide valuable experience to develop a portfolio.

Prerequisite(s): Architectural Studies 201.

Architectural Studies 441 3 units; (0-3)

Design Thinking in the Built Environment Studio II

A capstone project-based course that builds on the skills acquired in Architectural Studies 431. Students will work in small groups to develop, research, execute, and present a small design thinking project based in Calgary. The course is offered in a studio environment.

Prerequisite(s): Architectural Studies 431.

Architectural Studies 444 6 units; (0-8)

Studio II in Architecture

A studio exploring the application of ordering principles of architecture and to the numerous layers that contributes to the quality of inhabitation of place and space through design. Issues explored include the formal, the experiential and the theoretical concerns of architectural design in today's cultural context.

Prerequisite(s): Architectural Studies 451 and 484 and admission to the Architectural Studies Minor.

Corequisite(s): Architectural Studies 453.

Antirequisite(s): Credit for Architectural Studies 444 and any of 431, 441 or Environmental Design Architecture 582 will not be allowed.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Architectural Studies 449 3 units; (3-0)

Building Science and Technology I

Functioning of the building enclosure: demonstration of the behaviour of building elements and their sub-assemblies under differential temperature and pressure stresses; fundamentals of acoustics; nature and use of building materials; response of building materials to climatic cycles radiation, precipitation, heating and cooling.

Prerequisite(s): Admission to the Architectural Studies Minor or consent of the Faculty.

Antirequisite(s): Credit for Architectural Studies 449 and Environmental Design Architecture 511 will not be allowed.

Architectural Studies 451 3 units; (0-8)

Graphics Workshop I

A skill building course with instruction and supervised experience in basic drafting, sketching and rendering; principles of perspective, drawing and presentation conventions. A variety of instruction

may be offered to accommodate the varied level of student development.

Prerequisite(s): Admission to the Architectural Studies Minor.

Corequisite(s): Architectural Studies 484.

Antirequisite(s): Credit for Architectural Studies 451 and Environmental Design Architecture 541 will not be allowed.

Architectural Studies 453 **3 units; (0-8)**

Graphics Workshop II

Instruction and supervised experience in drafting, sketching and rendering; drawing and presentation conventions. Builds on Architectural Studies 451. A variety of instruction may be offered to accommodate the varied level of student development.

Prerequisite(s): Architectural Studies 451 and 484 and admission to the Architectural Studies Minor.

Corequisite(s): Architectural Studies 444.

Antirequisite(s): Credit for Architectural Studies 453 and Environmental Design Architecture 543 will not be allowed.

Architectural Studies 457 **3 units; (3-0)**

History of Architecture and Human Settlements

A survey history of architecture and human settlement from the prehistoric world until the present. The first course addresses the pre-modern traditions of the major world cultures. The second course explores the traditions of the Western world from the beginning of the Italian Renaissance until the present. The courses will examine the changes in world view that have altered the course of architecture through the study of selected works of architecture and urbanism.

457.01. History of Architecture and Human Settlements I-Premodern Traditions of the World

457.02. History of Architecture and Human Settlements II-The Rise of Modernity, 1750 to the Present

Prerequisite(s): Admission to the Architectural Studies Minor or consent of the Faculty.

Antirequisite(s): Credit for Architectural Studies 457 and Environmental Design Architecture 523 will not be allowed.

Architectural Studies 484 **6 units; (0-8)**

Studio I in Architecture

A studio that explores the foundation concepts in architectural design and form making involving a sequence of progress skill building, visual and spatial thinking and problem solving exercises.

Prerequisite(s): Admission to the Architectural Studies Minor.

Corequisite(s): Architectural Studies 451.

Antirequisite(s): Credit for Architectural Studies 484 and any of 431, 441, 485 or Environmental Design Architecture 580 will not be allowed.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Art ART

For more information about these courses see the Department of Art website: <https://art.ucalgary.ca/>.

Junior Courses

Art 231 **3 units; (3-3)**

Art Fundamentals: 2D

Foundation course in two-dimensional art making. Creative exploration of pictorial space,

composition and design will occur via learning fundamentals of perspective, colour, shape, balance and unity. Approaches may include wet and dry media, digital technologies, collage. These will be addressed in the context of research, problem solving, visual fluency and conceptual development.

Art 233 **3 units; (3-3)**

Art Fundamentals: 3D

Foundation course in three-dimensional art making. Creative exploration may include media such as plaster, clay, wood, and found objects. Technical approaches may include mold-making, casting, additive and subtractive processes. Form, mass, volume and materials will be addressed in the context of research, problem solving, visual fluency and conceptual development.

Art 235 **3 units; (3-3)**

Introduction to Photography and Digital Imaging

An introductory course in current photographic methods, including digital photography, digital image processing and the presentation of photographs.

Note: Students must provide their own advanced digital camera. Consult with the department for more information.

Art 241 **3 units; (3-3)**

Drawing I

Introductory course in observational and representational drawing. Creative exploration includes mark-making, hand-eye co-ordination, proportions, perspective, line, texture, figure-ground relationships and pictorial composition. Approaches may include pencil, conté, charcoal, pastel, pen and ink. These will be addressed in the context of research, problem-solving, visual fluency and conceptual development.

Art 243 **3 units; (3-3)**

Drawing II

Developing observational and representational skills through figure drawing and exploration of the contemporary field. Approaches will include a more developed understanding of colour, research, problem solving, visual fluency and conceptual development.

Prerequisite(s): Art 241.

Art 251 **3 units; (3-3)**

Media Arts: Practice and Theory

Technical instruction and creative opportunities in the media arts, in addition to examination of historical, theoretical and critical context.

Art 271 **3 units; (3-3)**

Introduction to Printmaking

Basic concepts and techniques in Fine Art Printmaking.

Senior Courses

Art 301 **3 units; (3-0)**

Studies in Contemporary Canadian Art

Study of recent Canadian art from a range of perspectives in art criticism.

Art 309 **3 units; (3-3)**

(formerly Art 205)

Foundations of Art Education

An introduction to the history, theory and philosophy of art education through participatory learning events.

Art 311 **3 units; (3-0)**

Topics in Art

Topics related to contemporary studio and curatorial practices such as spirituality, exhibitions, digital storytelling, new media, or public art.

MAY BE REPEATED FOR CREDIT

Art 313 **3 units; (3-3)**

Video Art

Focuses on concepts, issues, and techniques of video as an art medium. Students will gain experience and a working knowledge of concept development, video shooting and digital editing, in the context of contemporary art theory and practice.

Prerequisite(s): Art 235.

Note: Students must provide their own digital video camera for the duration of the term.

Art 315 **3 units; (3-3)**

Programming for Artists

An introduction to computer programming techniques used to create interactive art projects.

Prerequisite(s): 3 units in courses labelled Art.

Antirequisite(s): Credit for Art 315 and any of Computer Science 217, 219, 231, 235, Data Science 211 or Engineering 233 will not be allowed.

Art 317 **3 units; (3-3)**

(formerly Art 439)

Electronics for Artists

Theoretical and practical applications of basic electronic principles and techniques involving the use of electronics in contemporary art practices. Will include applied experiences with hardware and visual programming environments.

Prerequisite(s): 3 units in courses labelled Art.

Art 319 **3 units; (3-3)**

Digital Illustration

Introduces students to vector-based illustration techniques, their historical context, and terminology. The course provides a focus on the fundamentals of designing with imagery, and the relationship between verbal and visual communication.

Prerequisite(s): Art 235.

Antirequisite(s): Credit for Art 319 and 253 will not be allowed.

Art 321 **3 units; (3-0)**

Net Art: Theory and Practice

Examination of the work of Net-based artists and investigation of the Internet as a vehicle to extend art and design practice.

Art 323 **3 units; (3-3)**

Digital Sculpture

Introduces students to 3D modelling by means of digital sculpting techniques, their historical context and terminology. Provides a focus on the fundamentals of working and designing in three-dimensional space.

Prerequisite(s): Art 235.

Art 327 **1.5 units; (0-2)**

Art Now I

A series of presentations by visiting artists and scholars that introduces students to professional practices of contemporary visual artists.

Prerequisite(s): 15 units in courses labelled Art.

Art 329 1.5 units; (0-2)

Art Now II

A series of presentations by visiting artists and scholars that introduces students to professional practices of contemporary visual artists.

Prerequisite(s): 15 units in courses labelled Art.

Art 331 3 units; (3-3)

2D Digital Imaging

Electronic visualization involving computer applications in artistic practice.

Prerequisite(s): Art 235.

Art 332 3 units; (3-3)

Topics in Photography

Studio inquiry in photography developing students' foundational, technical and conceptual skills. Exploration of topics in photography such as large format, projection, narrative and fine art printing processes will enable research creation directed toward self-generated practice. Activities will include workshops, studio practice and critique.

Prerequisite(s): Art 336.

Note: Students must provide their own advanced digital camera. Consult with the department for more information.

MAY BE REPEATED FOR CREDIT

Art 334 3 units; (3-3)

(formerly Art 333)

Time-Based Art

Exploration of time and duration as a component of artistic practice, that may include the use of frame-based media and camera-less animation.

Prerequisite(s): Art 235.

Art 336 3 units; (3-3)

Digital Photography

Fundamental technical, aesthetic and conceptual considerations in digital photography, camera use and the use of desktop editing software in support of fine art photography. Introduction to digital printing for photographic artists. A portion of assigned course work will be output as inkjet prints.

Prerequisite(s): Art 235.

Antirequisite(s): Credit for Art 336 and 337 will not be allowed.

Note: Students must provide their own advanced digital camera. Consult with the department for more information.

Art 338 3 units; (3-3)

Film Photography

Further work in photography, using film and silver-based photographic materials including intensive use of the variables of exposure, film development and silver-based printing of photographic materials.

Prerequisite(s): Art 235.

Antirequisite(s): Credit for Art 338 and 335 will not be allowed.

Art 340 3 units, (3-0) or (3-3)

Panorama and 360 Virtual Reality Photography

Students learn how to use software and hardware needed to create panoramas and virtual tours.

Prerequisite(s): Art 235.

Art 341 3 units; (3-3)

Drawing the Figure

Theory and practice of drawing the human figure at a developing level involving an extended range of drawing media.

Prerequisite(s): Art 241.

Art 342 3 units; (3-3)

Art Education Across the Lifespan I

An exploration of the cognitive, emotional, and social development of infants, children and adolescents learning art. Students will engage in experiential learning in formal and informal settings.

Antirequisite(s): Credit for Art 342 and any of 305, 307 or 393 will not be allowed.

Art 343 3 units; (3-3)

Drawing: Construction of Pictorial Space

Extends the range of concepts and practices in drawing to include pictorial space.

Prerequisite(s): Art 241.

Art 344 3 units; (3-3)

Art Education Across the Lifespan II

An exploration of the cognitive, emotional, and social development of adults learning art. Students will engage in experiential learning in formal and informal settings.

Antirequisite(s): Credit for Art 344 and any of 305, 307 and 393 will not be allowed.

Art 345 3 units; (3-3)

Anatomical Drawing I

Perceptual and drawing skills pertaining to human anatomical relationships.

Prerequisite(s): Art 241.

Art 347 3 units; (3-3)

Anatomical Drawing II

Further development of anatomical drawing skills including anatomical structures of the hands and the muscles of facial expression.

Prerequisite(s): Art 345.

Art 349 3 units; (3-3)

Drawing for the Biological Sciences

Basic and more complex principles of drawing from subjects pertaining to the biological sciences; drawing from observation, exploration of foundational skills in a cross-disciplinary context.

Note: Cannot be used a prerequisite for other Art courses

Art 350 3 units; (3-3)

Painting: Materials and Processes

Technical and conceptual exploration of painting, with experimentation in at least two media, including acrylic and/or oil. May include colour theory, painting style, application of materials and different painting supports.

Prerequisite(s): Art 231 or 241.

Art 351 3 units; (3-3)

Painting: Figuration

Exploration of painting proceeding from observation and traditions of figuration. Media will include acrylic and/or oil.

Prerequisite(s): Art 231 or 241.

Art 353 3 units; (3-3)

Painting: Abstraction

Exploration of painting proceeding from traditions of abstraction. Media will include acrylic and/or oil.

Prerequisite(s): Art 231 or 241

Art 361 3 units; (3-0)

Visual Research Methods

Students utilize arts-based research methods to formulate and develop an independent project. Projects normally will be completed using digital photography.

Prerequisite(s): 6 units in courses labelled Art at the 300 level.

Art 363 3 units; (3-0)

Advanced Visual Research Methods

Students pursue individually designed arts-based research projects, examine approaches to editing, sequencing, and presenting projects to an audience. Projects normally will be completed using digital photography.

Prerequisite(s): Art 361.

Art 365 3 units; (3-3)

Topics in Studio Research and Critique I

Studio-based introduction to contemporary and emerging creative practices contextualized through critique. Topics may include: installation art, performance art, slip casting, or hybrid art forms.

MAY BE REPEATED FOR CREDIT

Art 373 3 units; (3-3)

Printmaking: Lithography

Basic concepts and techniques of lithographic printing.

Art 377 3 units; (3-3)

Printmaking: Serigraphy

Basic concepts and techniques of silk-screen printing.

Art 379 3 units; (3-3)

Printmaking: Relief and Intaglio

Basic concepts and techniques in relief and intaglio printmaking.

Art 381 3 units; (3-3)

Sculpture: Materials and Processes

Technical and conceptual exploration of sculpture through materials and processes. This may include a range of methods such as mold-making, casting, assemblage, carving, welding, forging, riveting, time-based media, installation or digital media.

Prerequisite(s): Art 233.

Art 383 3 units; (3-3)

Sculpture: Concepts and Strategies

Conceptual and professional exploration of sculpture introducing students to strategies and concepts to assist in research and problem solving. Approaches may include understanding object-hood, material as content, serial art, art movements impacting sculpture, public art, and sculpture and the market.

Prerequisite(s): Art 233.

Art 397 3 units; (3-0)

Professional Development

Professional development activities, documentation and dissemination associated with working as a professional artist, including intellectual property,

ethics, and the context of different art communities.

Prerequisite(s): 12 units of Art at the 200 level or above.

Art 399 3 units; (3-0)

Art in Theory and Practice I

Theories of art, critical methodologies, and aesthetics in the visual arts across history and cultures.

Art 401 3 units; (3-0)

Studies in Contemporary International Art

Study of recent international art practices from a range of perspectives in art criticism.

Art 405 3 units; (3-3)

Mechatronic Art and Design

Focus on the development and production of physical systems-based artwork that incorporate elements of robotics, motion control, software and hardware design. An introduction to electronic devices for use in artmaking, providing practical experience with sensors, motors, switches, gears, lights, simple circuits and computers to create kinetic and interactive works of art.

Prerequisite(s): Art 235 and 315.

Art 411 3 units; (3-0)

Selected Topics in Art Education

Exploration of topics in art education such as multiculturalism, creativity, developmental issues, or special needs learners.

MAY BE REPEATED FOR CREDIT

Art 421 3 units; (3-3)

Advanced Topics in Digital Arts

Advanced studio inquiry into digital art forms developing students' technical and conceptual skills. Advanced exploration of digital media topics such as 2D graphics, 3D graphics, animation, motion capture, and modelling will enable research creation directed toward self-generated practice.

Prerequisite(s): 15 units in Art at the 300 level including one of Art 313, 331, 319, 323 or 334.

MAY BE REPEATED FOR CREDIT

Art 431 3 units; (3-3)

3D Digital Imaging

Creative research in 3D digital visualization and fabrication involving multimedia software and hardware. May include 3D printing, rapid prototyping, laser cutting, and computer controlled milling.

Prerequisite(s): 15 units in Art at the 300 level, including one of Art 313, 319, 323, 331, 334 or 336.

Art 438 3 units; (3-3)

Advanced Topics in Photography

Advanced studio inquiry into photography developing students' foundational, technical and conceptual skills. Deeper exploration of topics in photography such as long term projects, narrative, projection, printing and alternative processes will enable research creation directed toward self-generated practice. Activities will include workshops, studio practice and critique.

Prerequisite(s): 15 units of Art at the 300 level including Art 332 or 338.

Antirequisite(s): Credit for Art 438 and either 435 or 437 will not be allowed.

MAY BE REPEATED FOR CREDIT

Art 445 3 units; (3-3)

Advanced Topics in Drawing

Advanced studio inquiry into drawing that develops foundational, technical and conceptual skills. Deeper exploration of topics in drawing such as mixed media, street art and socio-political issues will enable research and creation directed toward self-generated practice.

Prerequisite(s): 15 units of Art at the 300 level, including one of Art 341, 343, 345, 347 or 349.

Antirequisite(s): Credit for Art 445 and either 441 or 443 will not be allowed.

MAY BE REPEATED FOR CREDIT

Art 451 3 units; (3-3)

Painting: Expanded Field

Students explore an expanded field of painting through installing and contextualizing their work. This may include pictorial, spatial, performative, and conceptual responses to site. Students may engage in collage/assemblage, shaped canvases, text/image, objects, paint, and unconventional materials.

Prerequisite(s): Art 231 or 241.

Art 455 3 units; (3-3)

Advanced Topics in Painting

Advanced studio inquiry into painting developing students' foundational, technical and conceptual skills. Deeper exploration of painting will enable research creation directed toward self-generated practice. Activities will include workshops, studio practice and critique. Topics offered may include murals, gender and the body, figure and landscape, or materiality.

Prerequisite(s): 15 units in 300 level Art and one of Art 351 or 353.

MAY BE REPEATED FOR CREDIT

Art 465 3 units; (3-3)

Topics in Studio Research and Critique II

A studio-based topics course that provides students with an opportunity for developing their exploration of contemporary and emerging creative research practices, contextualized via critique. Topics may include visiting artist, studio research, figure painting, visual research.

Prerequisite(s): 15 units in Art at the 300 level including Art History 333.

MAY BE REPEATED FOR CREDIT

Art 475 3 units; (3-3)

Advanced Topics in Printmaking

Advanced studio inquiry into printmaking developing students' technical and conceptual skills. The course will explore advanced practices in areas such as lithography, serigraphy, intaglio through thematic approaches such as technology and place.

Prerequisite(s): 15 units of Art at the 300 level, including one of Art 373, 377 or 379.

Antirequisite(s): Credit for Art 475 and either 471 or 473 will not be allowed.

MAY BE REPEATED FOR CREDIT

Art 481 3 units; (3-3)

Sculpture: Mold Making and Casting

An exploration of mold making and casting techniques in the realization of sculptural forms.

Prerequisite(s): Art 233.

Art 485 3 units; (3-3)

Advanced Topics in Sculpture

Advanced studio inquiry into sculpture that develops technical and conceptual skills. Activities will include studio practice and critique enabling research creation directed toward self-initiated practice. Topics may include sculptural exploration of installation, performance, and site specific art.

Prerequisite(s): 15 units in Art at the 300 level including one of Art 381 or 383.

Antirequisite(s): Credit for Art 485 and 483 will not be allowed.

MAY BE REPEATED FOR CREDIT

Art 491 3 units; (2-1)

Community-Based Art Experiences

A seminar and field experience course introducing prospective educators to all facets of planning and implementing positive art experiences in a non-school setting.

Art 499 3 units; (3-0)

Art in Theory and Practice II

Examination and discussion of theoretical issues associated with current practice in art.

Prerequisite(s): Art 399 and admission to the BFA or BFA Honours in Visual Studies.

Art 501 3 units; (3-0)

Advanced Topics in Media Arts

Advanced studio inquiry into media art forms developing students' technical and conceptual skills. Topics may include: sound and interactivity, immersive art, tele-arts and projection mapping that will enable research creation directed toward self-generated practice.

Prerequisite(s): 15 units of Art at the 300 level including one of Art 323, 315, 317 or 321.

Antirequisite(s): Credit for Art 501 and either Fine Arts 507.08 or 507.09 will not be allowed when the topic is Tele-Arts.

MAY BE REPEATED FOR CREDIT

Art 503 3 units; (3-0)

Computer Game Design

The game design process will be explored, including a history of video games, genres, game mechanics, design documents, and a summary of the development process. The focus will be on design, rather than development, and the artistic and creative assets, rather than the software. Students will design a game and will create a playable prototype. The principles will be applicable to other sorts of games, and to media art in general.

Prerequisite(s): Art 251.

Antirequisite(s): Credit for Art 503 and either Fine Arts 507.06 or 507.07 will not be allowed.

Art 509 3 units; (3-0)

Curriculum Building for Art

Developing curriculum and program structures for formal and community art education. Program design includes current theory and practice and a field research component.

Prerequisite(s): Art 231, 233, one of 342 or 344 and 12 units in courses labelled Art at the 300 level or above.

Antirequisite(s): Credit for Art 509 and 515 will not be allowed.

Art 513 3 units; (1T-6)

Directed Study

Independent studio research under the supervision of a faculty member.

Prerequisite(s): Consent of the Department.

Note: May be repeated for credit to a maximum of 9 units.

MAY BE REPEATED FOR CREDIT

Art 560 6 units; (2T-4)

Honours Thesis

Independent studio research and production supported by a research paper for BFA Honours Visual Studies students, culminating in a Thesis Exhibition.

Prerequisite(s): Art 461 and admission to the BFA Honours Visual Studies Program.

Note: Normally completed concurrently with Art 561 and 563.

Art 561 3 units; (3-3)

Advanced Studio II

Directed studio research and production.

Prerequisite(s): Consent of the Department.

Art 563 3 units; (3-3)

Advanced Studio III

Further directed studio research and production.

Prerequisite(s): Art 561.

Art 565 3 units; (3-0)

Studio Research and Critique III

Advanced studio course that develops self-generated approaches to creative research and critique. Encourages engagement with contemporary and emerging practices and leads to critical fluency, contextualized via critique. Situated in an interdisciplinary setting, students can expect to encounter a wide range of themes and approaches to support their practice.

Prerequisite(s): Art 465.

Art 595 3 units; (1T-6)

Studio Research

Independent studio research for honours students.

Prerequisite(s): Admission to Honours in Visual Studies and consent of the Department.

Corequisite(s): Art 561 or 563.

Note: May be repeated for credit to a maximum of 6 units.

MAY BE REPEATED FOR CREDIT

Art 599 3 units; (3-0)

Professional Aspects of Art

Examination and discussion of the issues associated with the professional aspects of surviving as an artist. Presentations by professional artists practicing in the field will form a major component of the course.

Prerequisite(s): 3 units in courses labelled Art at the 400 level and admission to the BFA or BFA Honours in Visual Studies.

Graduate Courses

Art 601 3 units; (0-3T)

History of Art I

Individual study; in consultation with the instructor, the student will select a research topic in art history or art criticism.

Prerequisite(s): Admission to a graduate program in the Department of Art.

Art 603 3 units; (0-3T)

History of Art II

Individual study; in consultation with the instructor, the student will select a research topic in art history or art criticism.

Prerequisite(s): Art 601.

Art 605 3 units; (0-3T)

Critical Study and Research

Individual study and research in the area of studio specialization, critical theory, methodological issues and/or historical topics.

Prerequisite(s): Admission to a graduate program in the Department of Art.

MAY BE REPEATED FOR CREDIT

Art 609 3 units; (3-0)

Art Theory and Criticism

Investigation of contemporary global art theory and criticism.

Prerequisite(s): Consent of the Department of Art.

Art 611 3 units; (3-0)

Research Methods in Art

Introduces students to art making as a process of knowledge production and research creation.

Prerequisite(s): Admission to a graduate program in the Department of Art.

Art 661 6 units; (3/2S-10)

Advanced Studio Practice

Individual study in studio, with seminar-based discussions in research area.

661.01. Advanced Studio Practice

661.02. Thesis Studio Practice

Prerequisite(s): For Art 661.01: Admission to a graduate program in the Department of Art. For Art 661.02, the prerequisite is Art 661.01.

Art 691 3 units; (3-0)

Pedagogy and Professional Practice

Issues in professional practice and post-secondary teaching in visual art. Optional course.

Prerequisite(s): Admission to a graduate program in the Department of Art.

MAY BE REPEATED FOR CREDIT

Art 761 3 units; (2T-10)

Advanced Independent Studio research

Theoretical and applied concepts in studio.

Prerequisite(s): Admission to a graduate program in the Department of Art.

MAY BE REPEATED FOR CREDIT

Art History ARHI

For more information see the Department of Art website: <https://art.ucalgary.ca/>.

Junior Courses

Art History 201 3 units; (3-0)

Introduction to Art History I

An examination of art and architecture before 1400 in relation to significant historical and cultural events.

Antirequisite(s): Credit for Art History 201 and 209 will not be allowed.

Art History 203 3 units; (3-0)

Introduction to Art History II

An examination of art and architecture after 1400 in relation to significant historical and cultural events.

Antirequisite(s): Credit for Art History 203 and 209 will not be allowed.

Art History 211 3 units; (3-0)

Writing and Art History

An introduction to the techniques and strategies of writing about art and cultural objects within the discipline of art history. Students develop and strengthen their writing skills in relation to addressing, evaluating, and assessing art.

Senior Courses

Art History 305 3 units; (3-0)

Canadian Art History

A critical analysis of the forms, objects, and practices that compose the art canon of northern North America. Organized thematically, this course covers the period of history ranging from European contact to the present day.

Antirequisite(s): Credit for Art History 305 and either 301 or 303 will not be allowed.

Art History 311 3 units; (3-0)

Topics in Art History and Visual Studies

Key concepts and theories within the discipline of Art History. Topics may include: Feminist Art Histories; and Art and Social Critique.

MAY BE REPEATED FOR CREDIT

Art History 319 3 units; (3-0)

Introduction to a History of Photography

An introduction to the histories of photography and the photographic image. Examines the development of photography as a technology, art form, and way of envisioning the world.

Antirequisite(s): Credit for Art History 319 and either 419 and 423 will not be allowed.

Art History 321 3 units; (3-0)

Medieval Art and Architecture

An examination of art and architecture c. 400-1400.

Art History 323 3 units; (3-0)

Survey of Far Eastern Art: India and Related Civilizations

An examination of the art and architecture of ancient India and related civilizations, with special emphasis on Buddhist, Hindu and Islamic art.

Art History 325 3 units; (3-0)

Survey of Far Eastern Art: China and Related Civilizations

An examination of the art and architecture of ancient China and related civilizations, with special emphasis on Confucian, Taoist and Buddhist art.

Art History 327 3 units; (3-0)

Renaissance Art

An examination of the arts and architecture of Europe from c. 1300-1600.

Antirequisite(s): Credit for Art History 327 and 329 will not be allowed.

Art History 331 3 units; (3-0)

Discourses of Modern Art and Architecture

A critical exploration of the development of and discussions about different art movements in

relation to Modern Art and the avant-garde, addressing the historical circumstances that enabled the creation of selected art movements, which may include Impressionism, the Arts and Crafts Movement, Cubism, Surrealism, Pop Art, Fluxus, and Situationist.

Antirequisite(s): Credit for Art History 331 and any of 405, 407 or 415 will not be allowed.

Art History 333 3 units; (3-0)

Discourses of Contemporary Art and Architecture

An introduction to the socio-political approaches and critical discourses that have informed art-making in the contemporary period. Examines artworks and their production, circulation, and reception through a variety of positions including gender, race, sexuality, and post-coloniality.

Antirequisite(s): Credit for Art History 333 and 209 will not be allowed.

Art History 340 3 units; (3-0)

Topics in Art and Technology

Examination of the development of art techniques and forms in relation to a variety of technologies. Topics may include the printing press, the history of video games, telematics, interactive art, and structures of surveillance.

Antirequisite(s): Credit for Art History 340 and either Art History 341 or Art 311.01 will not be allowed.

MAY BE REPEATED FOR CREDIT

Art History 343 3 units; (3-0)

A History of Design

An introduction to the history of design including international movements, materials and technologies, production and consumption, and contemporary issues of critical design practice.

Art History 357 3 units; (3-0)

Baroque Art

An examination of the art and architecture of Europe during the seventeenth century.

Art History 359 3 units; (3-0)

Eighteenth- and Nineteenth-Century Art

An examination of the art and architecture in Europe and its colonies during the eighteenth and nineteenth centuries.

Art History 365 3 units; (3-0)

Survey of Far Eastern Art: Japan

An examination of the art and architecture of dynastic Japan, with special emphasis on Shinto and Buddhist traditions.

Art History 367 3 units; (3-0)

Indigenous Art of the Americas

Historical and contemporary studies of indigenous cultural production within the geographic context of the Americas.

Art History 371 3 units; (3-0)

Art and Site

An exploration of the ways in space, place, and context influence the meanings and values of art objects. Topics may include the history of displays, street art, art and the environment, and art in public spaces and sacred sites, and monuments.

Art History 389 3 units; (3-0)

Artist Case Study

Introduction to case study methodology in Art History by way of an in-depth study of the work and life of a particular artist.

Art History 411 3 units; (3-0)

Selected Topics in the History of Art

An in-depth examination of a particular topic related to the study of Art History.

Prerequisite(s): 6 units of Art History courses.

MAY BE REPEATED FOR CREDIT

Art History 425 3 units; (3-0)

Architecture in the Western World Since 1900

A survey of significant examples of modern architecture, defining their stylistic character in light of developments in technology, the history of ideas, and social and historical factors.

Antirequisite(s): Credit for Art History 425 and either Environmental Design Architecture 525 or Environmental Design 683.15 will not be allowed.

Art History 431 3 units; (3-0)

Art and the Body

A critical analysis of the power dynamics inherent to forms of looking and representations of the body in a variety of historical periods and geographical locations. May include gendered representations, the medicalized body, the body in classical art, and displays of marginalized bodies.

Prerequisite(s): 6 units of courses labelled Art History at the 300 level or above.

Art History 471 3 units; (3-0)

Topics in Global Art

An advanced exploration of topics and issues relevant to art-making and exhibitions within global contexts. Topics may include World's Fairs, art biennales, outsider art, and souvenirs.

Prerequisite(s): 6 units in courses labelled Art History at the 300 level or above.

MAY BE REPEATED FOR CREDIT

Art History 501 3 units; (3-0)

Independent Research in Art History

Independent research projects for advanced students in art history.

Prerequisite(s): 18 units in Art History at the 300 level or above and consent of the Department.

Art History 511 3 units; (3-0)

Capstone in the History of Art

A critical investigation of a particular subject related to the advanced study of Art History and Visual Culture.

Prerequisite(s): 18 units in Art History at the 300 level or above and consent of the Department.

MAY BE REPEATED FOR CREDIT

Art History 513 3 units; (0-3)

Directed Studies in Art History

An independent research project conducted under the supervision of a faculty member.

Prerequisite(s): 18 units in Art History at the 300 level or above and consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Art History 613 3 units; (3-0)

Independent Study in Art History

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Art History 615 3 units; (3S-0)

Conference Course in Art History

Focuses on close examinations and discussions of students' research and writing, with an emphasis on communicating informed research creation practices. The course will culminate in a conference presentation.

Prerequisite(s): Consent of the Department.

Art History 617 3 units; (3-0)

Thesis Development

A reading and conference course in the student's research area.

Prerequisite(s): Consent of the Department.

Arts ARTS

For more information about this course, see Faculty of Arts: arts.ucalgary.ca.

Senior Courses

Arts 501 3 units; (3-0)

International Study Topics

Group or individual study topics which involve international experience. Group study topics will vary from year-to-year.

Prerequisite(s): Third-year standing.

Antirequisite(s): Credit for Arts 501 and Social Sciences 501 will not be allowed.

Note: Approval and registration for this course must take place prior to travel. Individual international study topics with a significant research component may also be approved for students traveling abroad. For further information, contact the Arts Students' Centre.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Arts 502 3 units

Academic Field Placement

Authorized academic field placements will vary from year-to-year.

Prerequisite(s): Acceptance to a recognized academic internship or field placement program and approval of the Faculty of Arts.

Antirequisite(s): Credit for Arts 502 and Social Sciences 502 will not be allowed.

Note: May be taken twice for credit. Students should contact the Study Abroad Office for information and advice concerning recognized academic internship opportunities such as the Washington Center Internship Program.

MAY BE REPEATED FOR CREDIT

Arts 503 3 units; (3S-0)

Multidisciplinary Capstone

Participation in a seminar focused on completing and presenting individual research projects that integrate the primary and secondary focus within a student's multidisciplinary degree program.

Prerequisite(s): Admission to the BA Multidisciplinary and completion of 75 units.

Arts 601 3 units; (3S-0)

Theory and Practice of Teaching and Learning

An introduction, exploration, and application of the theories and practices of teaching undergraduate students in the arts, humanities, and social sciences.

Prerequisite(s): Admission to MA, MSc or PhD program in the Faculty of Arts.

Arts and Science Honours Academy ASHA

For more information about these courses, see the Faculty of Art: <https://arts.ucalgary.ca/programs>.

Junior Courses

Arts and Science Honours Academy 220 6 units; (3-0)

Quests and Questions

An introduction to a variety of perspectives on human culture. Students will inquire into such topics as the nature of discovery and creation, tradition and modernity, gender and social structure. These topics will be approached through careful analysis of artistic, literary, religious, philosophical and scientific texts.

Note: Open only to students in the Arts and Science Honours Academy Program. Successful completion of this course in the first year is required for continuation in the program.

Arts and Science Honours Academy 321 3 units; (3-0)

Representation

Far more than a neutral reflection of the world, representation, be it of artistic, social or scientific phenomena, is a complex issue. Issues, inconsistencies and flaws arising from the concept of representation will be studied in a variety of contexts. Topics to be covered include: sensory perception from neurological, psychological and cultural perspectives; mimesis and metaphor in literature and the visual arts; and the use of images, imaging, and interpretative frameworks in the social and natural sciences.

Prerequisite(s): Arts and Science Honours Academy 220 and admission to the Arts and Science Honours Academy.

Arts and Science Honours Academy 421 3 units; (3-0)

Invention

From the slingshot to steam power to intellectual property, from prophets to scientists to novelists; the theory and practice of invention looms large in human history and is of particular importance to the present age. Examines the nature and development of technological, conceptual, and linguistic invention in a variety of contexts.

Prerequisite(s): Arts and Science Honours Academy 321 and admission to the Arts and Science Honours Academy.

Arts and Science Honours Academy 501 3 units; (3-0)

The Nature of Research

A consideration of academic research within the social, historical and political context of its production and use. Questions to be considered include, but are not limited to: the historical development of professions and disciplines; the cultural framework within which research is produced and the cultural uses of research; and the ways in which research

creates objects of knowledge and serves to define and categorize human experience and identity.

Prerequisite(s): Arts and Science Honours Academy 421 and admission to the Arts and Science Honours Academy.

Arts and Science Honours Academy 503 3 units; (3-0)

Capstone Seminar

Students will reflect on their intellectual journey from both disciplinary and interdisciplinary perspectives. Each student will prepare two separate presentations: one on a topic related to their travel experience, the other related to their honours thesis or disciplinary specialty.

Prerequisite(s): Arts and Science Honours Academy 501 and admission to the Arts and Science Honours Academy.

Astronomy ASTR

For more information about these courses contact the Department of Physics and Astronomy phas.ucalgary.ca/.

Note: For listings of related courses, see Astrophysics, Physics, Medical Physics, and Space Physics.

Junior Courses

Astronomy 207 3 units; (3-0)

Introduction to Astronomy I - The Solar System

A comprehensive, descriptive overview of the solar system covering how ideas have changed from ancient times to today. The latest discoveries. The electromagnetic spectrum; telescopes and detectors; laws of planetary motion; planets, asteroids, comets, and the Sun. Formation of the solar system. Extra-solar planets and the possibility of extraterrestrial life. Possible field trip to the Rothney Astrophysical Observatory.

Antirequisite(s): Credit for Astronomy 207 and any of 205, 213 or Astrophysics 213 will not be allowed.

Note: Not recommended for physical science majors.

Astronomy 209 3 units; (3-0)

Introduction to Astronomy II - The Cosmos

A comprehensive, descriptive overview of the universe outside the solar system. The electromagnetic spectrum; stellar spectra; distance determinations. Origin and evolution of stars; white dwarfs, neutron stars and black holes. The interstellar medium. Dark matter. Galaxies and quasars. The Big Bang. The fate of the universe. Possible field trip to the Rothney Astrophysical Observatory.

Antirequisite(s): Credit for Astronomy 209 and any of 205, 213 or Astrophysics 213 will not be allowed.

Note: Not recommended for physical science majors.

Astrophysics ASPH

For more information about these courses contact the Department of Physics and Astronomy phas.ucalgary.ca/.

Note: For listings of related courses, see Astronomy, Physics, Medical Physics, and Space Physics.

Senior Courses

Astrophysics 305 3 units; (3-2T-1) (formerly Astrophysics 213)

Introduction to Astrophysics

Fundamentals of modern astrophysics including observations and physical interpretation physical phenomena in the Universe. Topics include the nature of the Sun and stars, galaxies, and the interstellar medium; distances and motions in the universe; radiation and telescopes; celestial mechanics; stellar evolution. Minor laboratory exercises including one at the Rothney Astrophysical Observatory as circumstances permit.

Prerequisite(s): One of Physics 211, 221, 227 or Engineering 202; and one of Mathematics 249, 265 or 275.

Astrophysics 307 3 units; (3-3) (formerly Astrophysics 507)

Introduction to Observational Astrophysics

Lectures and practical laboratory sessions in observational astronomy. Students will collect, reduce, and interpret astronomical data, develop an understanding of telescopes, instruments, and detectors; reduction and analysis methods; simulations and model fitting; data and error analysis. Observations will be carried out at the Rothney Astrophysical Observatory and/or the main campus.

Prerequisite(s): Astrophysics 213 or 305; one of Physics 211, 221, 227 or Engineering 202; and one of Physics 255, 259 or 323.

Astrophysics 401 3 units; (3-0)

Galactic Astrophysics

The galaxy: space distribution of stars and interstellar material; kinematics and dynamics of stellar systems; rotation and spiral structure; classification and global properties of galaxies; active galaxies.

Prerequisite(s): Physics 325, Mathematics 375; and one of Astrophysics 213 or 305.

Astrophysics 403 3 units; (3-0)

Stellar Structure and Evolution

Observational properties of stars; equations of stellar structure; physics of stellar interiors; structure and evolution of stars; white dwarfs, neutron stars, black holes; observational aspects of stellar atmospheres; radiative transfer in stellar atmospheres; opacity; spectral line formation.

Prerequisite(s): Astrophysics 213 or 305; Physics 325 and Mathematics 375.

Astrophysics 409 3 units; (3-0) (formerly Astrophysics 309)

Planetary Astrophysics

Orbital mechanics. Planetary interiors, surfaces, atmosphere, ionospheres and magnetospheres. Solar magnetism and activity cycles. Comets, asteroids, meteorites. Origin of the solar system. Exoplanets.

Prerequisite(s): Mathematics 375 and Astrophysics 213 or 305.

Astrophysics 503 3 units; (3-0)

The Interstellar Medium

Multiwavelength observations of gas and dust in our Galaxy; distribution and physics of neutral atomic hydrogen and molecules; interstellar chem-

istry; physics of dust grains; HII regions; interstellar shocks; gas dynamics; star formation.

Prerequisite(s): Astrophysics 401, Physics 325, 343 and Mathematics 375.

Note: Concurrent or prior enrolment in Astrophysics 403 is highly recommended.

Astrophysics 509 **3 units; (3-0)**

High Energy Astrophysics and Cosmology

Clusters of galaxies; microwave and X-ray background radiation; dark matter and dark energy; overview of cosmology; general relativistic considerations; large-scale structure and expansion of the universe; nucleosynthesis; gamma ray bursts and cosmic rays.

Prerequisite(s): Astrophysics 401, Physics 325, 343 and Mathematics 375.

Note: Concurrent or prior enrolment in Astrophysics 403 is highly recommended.

Graduate Courses

Astrophysics 607 **3 units; (1-6)**

Advanced Observational Astrophysics

Principles and tools of modern ground-based and space astronomy emphasizing ultraviolet, optical, infrared, and radio radiation. Data acquisition and reduction techniques for astrometry, photometry, spectroscopy, imaging, and interferometry. Use of astronomical data analysis software.

Astrophysics 611 **3 units; (3-0)**

Radio Astronomy

Wave propagation, antennas, interferometry, aperture synthesis, radio receivers, and spectrometers. Applications to continuum and line radiation in stars, interstellar medium and extragalactic objects.

Astrophysics 621 **3 units; (3-0)**

High Energy Astrophysics

Interaction of high energy particles with matter, propagation and origin of cosmic rays; structure of white dwarfs and neutron stars; the physics of jets and the accretion process onto compact objects; supernovae and supernova remnants; active galactic nuclei.

Biochemistry BCEM

For information about these courses contact the Department of Biological Sciences: bio.ucalgary.ca/.

Senior Courses

Biochemistry 341 **3 units; (3-3/2)**

Biochemistry of Life Processes

Emphasis is placed on describing the chemistry of biochemical molecules including proteins, carbohydrates, lipids, and nucleic acids, and how this relates to cell structure and life processes. Basic concepts of metabolism are introduced, focusing on the breakdown of carbohydrates for energy. The laboratory component reinforces learning of the lecture material, while teaching technical skills and the analysis and interpretation of experiments involving biochemical molecules.

Prerequisite(s): Chemistry 351.

Antirequisite(s): Not open to majors in the Department of Biological Sciences or Natural Sciences concentrators in Biological Sciences. Credit for Biochemistry 341 and 393 will not be allowed.

Biochemistry 393 **3 units; (3-3/2)**

Introduction to Biochemistry

Biomolecules and metabolism as a foundation for understanding molecular organization and reactions of life. Relationships between structure and biological function of amino acids, proteins, lipids, nucleic acids and coenzymes. Principles of metabolism are illustrated using key metabolic pathways. Laboratory involves inquiry-based approaches for studying biomolecules and metabolic pathways.

Prerequisite(s): Chemistry 351; and Biology 311 or admission to the BHSC Honours program and Medical Sciences 341.

Antirequisite(s): Credit for Biochemistry 393 and 341 will not be allowed.

Biochemistry 401 **3 units; (3-6)**

Biochemistry Laboratory Techniques I

Recombinant DNA techniques, protein expression and mutagenesis stressing nucleic acid and protein properties relevant to these techniques. Practical experience in the laboratory includes DNA amplification (PCR), gene cloning and expression, nucleic acid-protein bioinformatics and introduction to methods for working with proteins. Emphasis on the scientific process: experimental design, data analysis and dissemination of results.

Prerequisite(s): Biochemistry 393 and one of Chemistry 353 or 355.

Antirequisite(s): Credit for Biochemistry 401 and Cellular, Molecular and Microbial Biology 451 will not be allowed.

Biochemistry 403 **3 units; (3-6)**

Biochemistry Laboratory Techniques II

Chromatography, protein purification, biophysical and enzymatic means of characterizing proteins. Practical experience in the laboratory with protein purification and protein characterization techniques selected to complement the selection from Biochemistry Laboratory Techniques I.

Prerequisite(s): Biochemistry 401 and 471.

Biochemistry 431 **3 units; (3-0)**

Proteins and Proteomics

Protein structure and chemistry: structural motifs, ligand-binding, conformational changes, chemical modification; protein folding; structure prediction by molecular modelling. Identification of proteins in the proteome: 2D gel electrophoresis and chromatography, mass spectrometry; metalloproteins; post-translational modifications; protein-protein interactions.

Prerequisite(s): Biology 331, Biochemistry 393 and one of Chemistry 353 or 355.

Antirequisite(s): Credit for Biochemistry 431 and 531 will not be allowed.

Biochemistry 443 **3 units; (3-2/2T)**

Metabolism

Intermediary carbohydrate, lipid, amino acid and nucleotide metabolism, and the regulation of these metabolic pathways.

Prerequisite(s): One of Chemistry 353 or 355; and Biochemistry 341 or 393.

Biochemistry 471 **3 units; (3-2T)**

Physical Biochemistry

The laws of thermodynamics as they apply to biological systems: the hydrophobic effect, properties of water, electrolyte solutions and ligand binding. Optical spectroscopic methods including UV/

visible absorption, fluorescence, and infrared as applied to biological molecules.

Prerequisite(s): Biochemistry 341 or 393; Chemistry 353 or 355; one of Mathematics 249, 251, 265, 275, 281, or Applied Mathematics 217 and one of Mathematics 253, 267, 277, 283, 211, 213, or Applied Mathematics 219; and Physics 211 or 221, and 223.

Biochemistry 507 **3 units; (0-8) or (3-0)**

Advanced Topics in Biochemistry

Independent research or reading project that may include seminars, lectures, term papers and training in theoretical and/or laboratory methods.

Prerequisite(s): 54 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Biochemistry 528 **6 units; (0-8)**

Independent Studies in Biochemistry

Original and independent thought, practical research and the completion of written and oral reports.

Prerequisite(s): 72 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Biochemistry 530 **6 units; (0-8)**

Honours Research Project in Biochemistry

Research project under the direction of one or more faculty members in the Department of Biological Sciences. Formal written and oral reports must be presented on completion of this course. Open only to Honours Biochemistry students or Honours Biological Sciences students.

Prerequisite(s): 72 units and consent of the Department.

Biochemistry 541 **3 units; (3-0)**
(Chemistry 541)

Concepts in Biochemical Toxicology

An interdisciplinary course focused on the diverse biomolecular mechanisms by which organic (e.g. PCB's) and inorganic pollutants (e.g. Cd, Hg, As) adversely affect cell function examined at multiple levels of organization, from molecules to whole animals organisms. Topics include how natural toxins exert toxicity, how toxins/light generate free radicals within cells, how the speciation of metals in the environment affects their bioavailability/toxicity, and the toxicity mechanisms that lead to homeostatic dysfunction.

Prerequisite(s): Biochemistry 341 or 393; Chemistry 311, 321 and 351.

Biochemistry 543 **3 units; (3-0)**

Enzymology

The structure, mechanisms and biological interactions of enzymes. Binding, catalysis, rates and regulation will be discussed with regard to chemical principles of kinetics and reaction. The principles of enzyme action will be considered in the context of the biological role that enzymes play.

Prerequisite(s): Biochemistry 393 or 443.

Biochemistry 547 **3 units; (3-0)**

Signal Transduction and Regulation of Metabolism

Principles of signal transduction with examples from prokaryotes and eukaryotes. Discussion of protein covalent modifications, inositol lipid signaling, structure and function of protein kinases and protein phosphatases and their role in regulating various aspects of cell function.

Emphasis on metabolic pathways, cell cycle control, checkpoints, DNA damage response and epigenetics.

Prerequisite(s): Biochemistry 393 or 443.

Biochemistry 551 3 units; (3-0)

Structural Biology

Applications of modern methods to structural studies of proteins and nucleic acids by NMR and X-ray crystallography with a comparison of the structural information derived from the two methods. Crystallization of macromolecules. Experimental and theoretical foundations of X-ray and NMR structure determination, and ligand binding. Non-invasive NMR studies of metabolism, and magnetic resonance imaging.

Prerequisite(s): One of Biochemistry 341 or 393; and one of Biochemistry 471 or Chemistry 371.

Biochemistry 553 3 units; (3-0) (formerly Biology 553)

Molecular Biophysics

A comprehensive survey of modern biophysics covering the flow and processing of matter, energy and information in living systems. Equilibrium and non-equilibrium thermodynamics in biology. Molecular motors and facilitated proton transport. An integrative approach connecting atomistic theories to cellular processes.

Prerequisite(s): Biochemistry 341 or 393; and Biochemistry 471 or Chemistry 371.

Biochemistry 555 3 units; (3-0)

Biomembranes

The material examines the structure and function of biological membranes with a strong emphasis on the role of membrane proteins. Topics may include: the physical properties of lipid bilayers, isolation and purification of membrane proteins, preparation of membrane mimetic systems, ion and solute movement across membranes (transport and ion channels), membrane protein folding, assembly and structure, and protein secretion and translocation systems.

Prerequisite(s): Biochemistry 431 and 471 and one of 393 or 443.

Biochemistry 561 3 units; (3-0)

Applied Biochemistry and Biotechnology

An introduction to the language, materials, methods, concepts and commercial applications of biotechnology with emphasis on methodology, proteins as products, and the impact of genome sequencing on biotechnology. Topics will also include microbial, animal, and bioremediation biotechnology, expanding the genetic code, synthetic biology, antibiotic resistance, cancer immunotherapy, stem cells, and gene therapy.

Prerequisite(s): Biochemistry 393.

Biochemistry 575 3 units; (3-1T-0)

Lipids

Structure and function of lipids including phospholipids, sphingolipids, and steroids. Topics include properties of lipids and bilayers, lipid-lipid and lipid-protein interactions, technological applications, biosynthesis and regulation, lipids as second messengers, intracellular trafficking, and lipids in physiology and disease. Literature review and student seminars are significant components of this course.

Prerequisite(s): Biochemistry 393 and one of Biochemistry 401 or 443.

Biochemistry 577 3 units; (3-4)

Biomolecular Simulation

Introduction to simulation and computer modelling methods commonly used in biochemistry and biophysics, with a focus on physical models to understand the behaviour of biomolecules. Topics include simulation methods, dynamics of proteins, DNA, and lipids, calculation of binding constants, protein-drug interactions, properties of ion channels as well as a number of recent literature topics.

Prerequisite(s): One of Biochemistry 341 or 393 and one of Biochemistry 471 or Chemistry 371.

Graduate Courses

Enrolment in any graduate course requires consent of the Department.

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

600-level courses are available with permission to undergraduate students in the final year of their programs.

See also the separate listing of graduate level Chemistry courses.

Biochemistry 641 3 units; (3-0)

Selected Topics in Biochemistry

Selected topics in Biochemistry such as those which appear annually in the serial publication Annual Review of Biochemistry.

MAY BE REPEATED FOR CREDIT

Biochemistry 731 3 units; (3-0)

Current Topics in Biochemistry

A discussion of contemporary experimental and theoretical biochemical methods used for the study of drugs and diagnostics at a biomolecular level. Structural analysis, drug design and computational methods will be introduced, as well as modern 'omics' research approaches and current protein drug targets of the pharmaceutical industry.

Biology BIOL

For more information about these courses see the Department of Biological Sciences: bio.ucalgary.ca/.

Junior Courses

Biology 202 3 units; (3-0)

The Science of Food, Cooking and Eating

Introduction to a scientific understanding of food and cooking using principles from a range of biological sciences, including biochemistry, molecular biology, microbiology, immunology, physiology and ecology. Topics include: building blocks of food, molecular-level understanding of recipes, biochemical reactions of cooking, microbiology of food production, physiology of sensory apparatus, food-related diseases, and industrialized food production.

Antirequisite(s): Credit for Biology 202 and either 241 or 243 will not be allowed. Not open for credit to Honours, Majors or Minors in the Department of Biological Sciences or to Natural Sciences or Environmental Science students with a Concentration in Biological Sciences.

Biology 205 3 units; (3-0)

The Organization and Diversity of Life

A study of biological concepts and mechanisms illustrated by current examples of medical and environmental problems.

Antirequisite(s): Not open for credit to Honours, Majors or Minors in the Department of Biological Sciences or to Natural Sciences program students with a Concentration in Biological Sciences. Credit for Biology 205 and either 241 or 243 will not be allowed.

Biology 241 3 units; (3-3)

Energy Flow in Biological Systems

An introduction to the energetics of life from molecules through ecosystems. Topics include: energy in biological systems; how different organisms obtain, store and use energy; energy budgets of organisms; and energy flow through cells and ecosystems.

Prerequisite(s): Biology 30 and Chemistry 30.

Antirequisite(s): Credit for Biology 241 and 205 will not be allowed.

Biology 243 3 units; (3-3)

DNA, Inheritance and Evolution

An introduction to central concepts in evolution and DNA as a vehicle for inheritance of genetic information. Topics include: the nature of genetic information and inheritance including transcription, translation and replication; natural selection and speciation; origin and history of biodiversity.

Prerequisite(s): Biology 241.

Antirequisite(s): Credit for Biology 243 and 205 will not be allowed.

Biology 297 3 units; (3-0)

Topics in Biology

Lectures and study in biological sciences.

Antirequisite(s): Not open for credit to Honours, Majors or Minors in the Department of Biological Sciences or to Natural Sciences program students with a Concentration in Biological Sciences.

Note: This course is not part of the Field of Biological Sciences.

MAY BE REPEATED FOR CREDIT

Senior Courses

Biology 305 3 units; (3-0)

The Human Organism

An introduction to human biology that analyzes the structure and function of systems in our bodies. Leads to an appreciation of how the human body maintains itself and carries out the functions necessary to sustain any organism. A course for non-majors that will develop their understanding of the anatomy and physiology of their own species in a zoological and evolutionary context.

Prerequisite(s): One of Biology 30 or 205 or 241.

Antirequisite(s): Not open for credit to Honours, Majors and Minors in the Department of Biological Sciences or to Natural Sciences program students with a Concentration in Biological Sciences. Credit for Biology 305 and any of Kinesiology 259, 260, Medical Science 404, Zoology 269, 461 or 463 will not be allowed.

Biology 307 3 units; (3-0)

Ecology and Human Affairs

The major principles of ecology. How the physical environment affects organisms; behavioural ecology and life histories; species interactions; the biology of populations, communities, and ecosystems; biodiversity and conservation. The

non-biologists will gain an understanding of ecological and evolutionary principles that will allow them to better appreciate the natural world, and the increasing environmental impacts of humans.

Prerequisite(s): 24 units.

Antirequisite(s): Not open for credit to Honours, Majors and Minors in the Department of Biological Sciences or to Natural Sciences program students with a Concentration in Biological Sciences, or to students in the Environmental Sciences program.

Biology 309 **3 units; (3-0)**

Plants and People

A review of the structure and function of plants. A survey of the nature of people's basic food plants and an overview of agricultural and forestry practices. Plant improvement by traditional and modern methods, and plant propagation.

Prerequisite(s): Biology 205 or 241.

Antirequisite(s): Credit for Biology 309 and Botany 309 will not be allowed. Not open for credit to Honours, Majors and Minors in the Department of Biological Sciences or to Natural Sciences program students with a Concentration in Biological Sciences.

Biology 311 **3 units; (3-3)**

Principles of Genetics

Topics will include Mendelian inheritance, allelic relationships, genetic linkage, sex linkage, changes in chromosome structure, segregation and recombination, epistasis, molecular genetics, genetics of bacteria and viruses, gene fine structure, gene function, complementation, bioinformatics and regulation of gene expression. Several selected organisms will be used in the laboratories to illustrate pertinent genetic principles.

Prerequisite(s): Biology 241 and 243.

Antirequisite(s): Credit for Biology 311 and Medical Science 341 will not be allowed

Biology 313 **3 units; (3-3)**

Principles of Ecology

The ecological principles, theories and interactions of organisms at individual, population, community and ecosystem levels will be explored. Ecological principles will be applied to examine current issues involving conservation of species, habitats, biodiversity and ecosystem function.

Prerequisite(s): Biology 241 and 243.

Biology 315 **3 units; (3-3)**

Quantitative Biology I

Data collection, presentation and analysis in the biological sciences. Basic design of biological experiments including concepts of control, replication, and interspersed. Analysis of biological data will include tests of statistical hypotheses and estimation techniques.

Prerequisite(s): Biology 241 and 243.

Biology 331 **3 units; (3-1T)**

Introduction to Cellular and Molecular Biology

The principles of cellular structure and function. Molecular organization of membranes, organelles, nucleus and cytoplasmic structures; the integration of cellular functions; assembly of organelles; the regulation of cell proliferation; and the interaction of cells with their neighbours and their environment.

Prerequisite(s): Biology 311.

Antirequisite(s): Credit for Biology 331 and Medical Science 351 will not be allowed.

Biology 371 **3 units; (3-1T)**

Comparative Biology of Plants and Animals

An exploration of how multicellular organisms meet the challenges of living, both as individuals, and in an evolutionary context. Parallels and divergence between plants and animals are illustrated in their responses to the challenges they face, with the water-to-land transition forming a central theme in shaping the form and function of plant and animal life.

Prerequisite(s): Biology 241 and 243.

Biology 375 **3 units; (3-0)**

Insects, Science and Society

Examination of insects as the most diverse and abundant form of animal life on the planet, why they are so successful and how they influence our lives. Topics include how insects are built, what they do, and how they interact with people and have come to be so important economically and culturally, as pests, pollinators, experimental animals, maintaining our environment and forming complex societies. Other topics include evolution of insects, insects in history and culture and how insects can help us address issues such as biological conservation, climate change and animal rights.

Prerequisite(s): 24 units.

Antirequisite(s): Not open for credit to honours, majors or minors in the Department of Biological Sciences or to Environmental Science and Natural Sciences program students with a Concentration in Biological Sciences.

Biology 401 **3 units; (3-1T)**

Evolutionary Biology

An introduction to the micro- and macro-evolutionary processes responsible for the diversity of organisms. Topics include heredity, genetic variation, population structure, genetic drift, natural selection and adaptation, sexual selection, evolution of interactions between species, speciation, phylogeny and biogeography.

Prerequisite(s): Biology 313 and 315.

Biology 435 **3 units; (3-3)**

Biology of Fungi

Morphology, life history patterns and systematics of fungi. Fungal ecology including fungi as parasites, symbionts and decomposers. Basic molecular biology, genetics and physiology.

Prerequisite(s): Biology 313 and 331.

Antirequisite(s): Credit for Biology 435 and 335 will not be allowed.

Biology 451 **3 units; (3-1T)**

Conservation Biology

The application of ecological theory and principles to the conservation and management of natural and modified ecosystems, with emphasis on preservation of biodiversity and sustainable development. Topics include disturbance as an ecological process, ecological and evolutionary responsiveness of natural systems, ecology of resource harvesting, management of endangered habitats and populations, implications of human population growth and global change.

Prerequisite(s): Biology 313.

Biology 453 **3 units; (3-0)**
(formerly Biology 351)

Plants in their Environment

An integration of physiological and ecological aspects of plant adaptation to different environments. Topics include interactions between plants and other organisms (e.g., bacterial and

fungal symbionts, animal pollinators, herbivores) as well as the influence of abiotic stressors on plant growth and distribution. The ecological consequences and possible applications of such interactions are discussed.

Prerequisite(s): Biology 313 and one of Botany 303, Biology 371 or Plant Biology 403.

Biology 501 **3 units; (3-0)**
(Medical Science 501)

Principles and Mechanism of Pharmacology

Basic principles of pharmacology, with specific emphasis on receptor signaling mechanisms. Explores the application of pharmacological principles to the treatment of disease.

Prerequisite(s): Biochemistry 393; one of Zoology 463 or Medical Science 404 and consent of the BHSc program.

Biology 503 **3 units; (3-0)**
(Medical Science 503)

Pharmacology of Organ Systems

Through analysis and discussion of research literature, this course explores topics in pharmacology including the nervous, cardiovascular, renal, respiratory and immune systems, as well as anti-cancer therapies.

Prerequisite(s): Biology 501 (Medical Science 501) and consent of the BHSc program.

Biology 505 **3 units; (3-0)**

Medicinal Plant Biochemistry

Deals with biochemical, molecular, and cellular aspects of plant metabolism, natural product diversity in the plant kingdom, and modern molecular and biochemical methods to understand plant metabolism. The focus is on the metabolic pathways that are either unique to plants, or that exhibit unique features in plants. Several key plant pathways that produce plant-derived medicines will be discussed.

Prerequisite(s): Biology 331 and Biochemistry 393.

Antirequisite(s): Credit for Biology 505 and Botany 503 will not be allowed.

Biology 515 **3 units; (3-0)**
(Medical Science 515)

Cellular Mechanisms of Disease

The cellular and molecular mechanisms underlying basic human disease processes and how these can be influenced by lifestyle and environmental factors. The ways in which this knowledge can be used in the laboratory diagnosis of disease.

Prerequisite(s): Biochemistry 393 and one of Biology 331 or Medical Science 351.

Biology 520 **6 units; (3-3) or (3-2)**

Field Course in Tropical Biology

An examination of biodiversity in a selected region of the tropics, including aspects of ecology of animals and plants, animal behaviour and an introduction to field techniques for observing and censusing selected taxa. Field studies will take place at forest and savannah sites with consideration of community-based conservation efforts.

Prerequisite(s): Consent of the Department.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Biology 530 **6 units; (0-8)**

Honours Research Project in Biological Sciences

Research project under the direction of one or more faculty members in the Department of Biological Sciences. Formal written and oral reports must be presented on completion of this course. Open only to Honours Biological Sciences students.

Prerequisite(s): 72 units and consent of the Department.

Biology 591 **3 units; (1-5) or (1-4)**

Invertebrate Biodiversity

Field course in the natural history and classification of invertebrates as they are encountered in their natural habitat. Course material will include: techniques for collection and identification of major groups of invertebrates; aspects of behaviour and ecology of local species; use of invertebrates as indicators of environmental change; censusing/monitoring invertebrates populations.

Prerequisite(s): One of Zoology 375, 401 or 435.

Graduate Courses

Enrolment in any graduate course requires consent of the Department.

Only when appropriate to a student's program may graduate credit be received for courses numbered 500-599.

600-level courses are available with permission to undergraduate students in the final year of their program.

Biology 601 **3 units; (1S-0)**

Research Seminar

Reports on studies of the literature or of current research. Graduate students normally register in their supervisor's research cluster.

601.01. Biochemistry I

601.02. Biochemistry II

601.03. Integrative Cell Biology I

601.04. Integrative Cell Biology II

601.05. Ecology and Evolutionary Biology I

601.06. Ecology and Evolutionary Biology II

601.11. Microbiology I

601.12. Microbiology II

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Biology 607 **3 units; (3-0) or (0-6)**

Special Problems in Biology

Independent research or reading project that may include seminars, term papers and training in theoretical and/or laboratory methods.

MAY BE REPEATED FOR CREDIT

Biology 609 **3 units; (3-0)**

Advanced Statistical Applications in Biology

Explains and demonstrates the analysis of biological data with general linear models, generalized linear models, maximum-likelihood fitting of non-linear models, and resampling techniques. Content is presented in a workshop format, so that students learn the application of computer analysis coincidentally with statistical concepts.

Prerequisite(s): Ecology 425 or consent of the Department.

Biology 617 **3 units; (3-0)**

Darwin's Origin of Species

An examination of the first edition of Charles Darwin's "On the Origin of Species" and related writings. Students will lead discussions of scientific, philosophical, and other issues raised by the book.

Prerequisite(s): Consent of the Department.

Biology 619 **3 units; (3-0)**

Advanced Evolutionary Biology

The theory of organic evolution. Historical development of evolutionary ideas. Darwin's contribution. The mechanism of natural selection; sexual, kin and group selection. The application of the theory in biogeography, ecology, ethology and other areas of biology.

Biology 703 **3 units; (3-0) or (0-6)**

Recent Advances in Biology

Lectures, seminars and/or laboratories on special advanced topics in biological sciences. Each student should seek consent of a departmental faculty member who will supervise the chosen study.

MAY BE REPEATED FOR CREDIT

Biomedical Engineering BMEN

For more information about these courses, see the Biomedical Engineering program: ucalgary.ca/bme/.

Senior Courses

Biomedical Engineering 301 **3 units; (3-2)**

Introduction to Biomedical Engineering

Fundamentals of biological systems and the application of engineering principles to solving problems in medicine. Topics include pharmaceuticals and drug delivery, instrumentation and devices, physiological and biological measurements, biomechanics, the Scientific Method and the Canadian health-care system. Applications may include cardiovascular, neural and musculo-skeletal systems.

Biomedical Engineering 309 **3 units; (3-3/2)**

Anatomy and Physiology for Engineers

Physiological terminology and anatomical planes of reference; cell biology and physiology; includes structure and function of musculoskeletal, cardiac, nervous, gastrointestinal and respiratory tissues and systems; diseases and disorders of those systems; design constraints for bioengineering products.

Biomedical Engineering 401 **3 units; (3-1T)**

Fundamentals of Biomedical Device Design

An introduction to the development of biomedical devices. Topics may include identifying market needs, idea generation, biologically inspired design, human factors related to design, regulatory issues, intellectual property protection, clinical trials, and commercialization considerations. Case studies may be drawn from cardiovascular, neural and musculoskeletal applications.

Prerequisite(s): Biomedical Engineering 301.

Antirequisite(s): Biomedical Engineering 517 and 619.05.

Biomedical Engineering 500 **9 units; (1-8)**

Biomedical Engineering Research Thesis

A research project in an area of interest, directed by a project advisor/faculty member within the

Schulich School of Engineering, Cumming School of Medicine, Faculty of Kinesiology, or Faculty of Science. Includes a lecture component covering the scientific process, ethics, review of literature, and writing scientific proposals and manuscripts. The course culminates with a written thesis and presentation. Projects may involve experimental, analytic or computer modelling studies.

Prerequisite(s): Fourth- or fifth-year standing in the Engineering program of choice.

Note: Pre-term study is required.

Biomedical Engineering 501 **3 units; (1-2)**

Biomedical Engineering Project

A project in an area of interest, supervised by a project advisor/faculty member within the Schulich School of Engineering, Cumming School of Medicine, Faculty of Kinesiology, or Faculty of Science. Includes a lecture component covering topics including the scientific process, ethics, review of literature, patent searches, market analysis, and technology evaluation. The project involves choosing a particular product, process or theory relevant to biomedical engineering, researching it and justifying its selection. A final report and presentation are required.

Prerequisite(s): Fourth- or fifth-year standing in the Engineering program of choice.

Note: Pre-term study is required.

Biomedical Engineering 509 **3 units; (3-2)**

Introduction to Biomedical Imaging and Applications

Principles of various imaging modalities used in Biomedical engineering applications, including CT, MRI, ultrasound, PET, SPECT. Image processing operations: filtering, enhancement, feature extraction, pattern recognition and image reconstruction. Image registration and integration of different imaging modalities.

Prerequisite(s): Fourth- or fifth-year standing in the Engineering program of choice.

Biomedical Engineering 511 **3 units; (3-2/2)**

Biomaterials and Biocompatibility

Basic chemical and mechanical properties of biological and synthetic materials and their role in biological system health, dysfunction, and repair. Role of microstructure, material properties, and biocompatibility aspects in selection of biomaterials for medical or industrial applications. Incorporation of biomimetic concepts in material design. Topics may include artificial and tissue engineered products, implants, prostheses, biofilms, biosensors, and foreign body response.

Prerequisite(s): Fourth- or fifth-year standing in the Engineering program of choice.

Biomedical Engineering 515 **3 units; (3-0)**

Bioengineering Methods in Systems Biology and Physiology

Concepts from systems theory, differential equations, and stochastic processes applied to physiological and biological systems. Experimental and computational approaches to the study of gene expression and gene networks. Use of quantitative model-based approaches for integrative analysis of physiological and biological functions. Case studies of applications to disease mechanisms and the drug discovery process.

Prerequisite(s): Mathematics 375 or Applied Mathematics 307.

Biomedical Engineering 519 3 units; (3-2)**Special Topics in Biomedical Engineering**

Current topics in Biomedical Engineering.

Prerequisite(s): Consent of the BMES Director or designate.

MAY BE REPEATED FOR CREDIT

Biomedical Engineering 523 3 units; (3-2)**Biomechanics of Movement**

Introduction to musculoskeletal biomechanics, including experimental and analytical approaches to the analysis of movement, experimental instrumentation and devices, and joint dynamics. Review of linear algebra. Introduction to three-dimensional rigid body mechanics. Determination of the joint forces and moments. Analysis of the contribution of external loading, forces generated by muscles and constraints provided by other musculoskeletal structures to predict forces in musculoskeletal joints and tissues. Numerical and modelling approaches, including inverse dynamics and optimization, and determination of segmental inertial properties. Applications in orthopaedic engineering, movement assessment, ergonomics and joint injury and replacements.

Prerequisite(s): Engineering 349 and fourth-year standing in the Schulich School of Engineering.

Antirequisite(s): Credit for Biomedical Engineering 523 and Mechanical Engineering 523 will not be allowed.

Biomedical Engineering 525 3 units; (3-2)**Biomechanics of Tissues**

The structure and functional behaviour of complex tissues which make up the human musculoskeletal system (bone, cartilage, muscles, tendons, ligaments) and cardiovascular systems (heart, blood vessels) will be explained by applying basic principles of mechanics as well as continuum mechanics. Introductory topics include: review of linear and tensor algebra, kinematics of continua, deformation gradient, deformation and strain tensors, Cauchy stress tensor and equilibrium, conservation laws, stress power and measures of stress. Constitutive equations for solids and fluids will be introduced as they apply to the study of biological tissues; anisotropy and inhomogeneity, fibre-reinforced non-linear behaviour.

Prerequisite(s): Engineering 317 and 349.

Antirequisite(s): Credit for Biomedical Engineering 525 and 405 will not be allowed.

Biomedical Engineering 585 3 units; (3-2/2)**Molecular, Cellular and Tissue Engineering**

Concepts, calculations, and methodologies in molecular, cellular and tissue engineering will be discussed and applied to solve problems in the areas of molecular diagnostics, pharmaceuticals, nanomedicine and regenerative medicine. Topics include cell biology and culture, stem cells, bioreactors, biomaterials, drug delivery, fluid dynamics, kinetics, and diffusion.

Prerequisite(s): Fourth- or fifth-year standing in the Engineering program of choice.

Antirequisite(s): Credit for Biomedical Engineering 585 and any of Biomedical Engineering 407, Biomedical Engineering 519.09, and Chemical Engineering 541 will not be allowed.

Graduate Courses**Biomedical Engineering 600** 3 units; (4-0)
(formerly Biomedical Engineering 611/612/613/614)**Biomedical Engineering Foundations**

An introduction to core concepts of Biomedical Engineering including an introduction to biomedical engineering fundamentals. Course allows students to select between a biology focused or an engineering focused fundamental module to complement previous course work (with approval of course instructor).

Biomedical Engineering 602 3 units; (2-0)
(formerly Biomedical Engineering 611/612/613/614)**Biomedical Engineering Core I**

Topics may include an introduction to a) biomedical engineering research, research integrity and ethics, b) career paths and progression in biomedical engineering and c) oral research communication skills.

Antirequisite(s): Credit for Biomedical Engineering 602 and either 605 or 607 will not be allowed.

NOT INCLUDED IN GPA

Biomedical Engineering 604 3 units; (2-0)
(formerly Biomedical Engineering 611/612/613/614)**Biomedical Engineering Core II**

Topics may include an introduction to a) research methodology, including experimental design and b) written research communication skills in biomedical engineering, and c) preparation and review of research proposals. Satisfactory completion of this course within one year of first registration will ensure that the Biomedical Engineering Graduate Program Research Proposal requirements are met.

Antirequisite(s): Credit for Biomedical Engineering 604 and either 605 or 607 will not be allowed.

NOT INCLUDED IN GPA

Biomedical Engineering 605 1.5 units; (1.5S-0)**Research Seminars in Biomedical Engineering**

Reports of studies of the literature or of current research.

NOT INCLUDED IN GPA

Biomedical Engineering 607 1.5 units; (1.5S-0)**Research Seminars in Biomedical Engineering**

Reports of studies of the literature or of current research.

NOT INCLUDED IN GPA

Biomedical Engineering 609 3 units; (3-3/2)**Anatomy and Physiology for Biomedical Engineers**

Advanced instruction on human skeletal structure, types of connective tissues, structure of joints, muscle and organ structure and function, cardiac physiology, blood properties and flow, introduction to autonomous nervous system, and disorders of the musculoskeletal system. Other topics will be covered dependent on the interests of the instructor and students.

Biomedical Engineering 619 3 units; (3-0)**Special Problems in Biomedical Engineering**

Designed to provide graduate students, especially at the PhD level, with the opportunity of pursuing advanced studies in particular areas under the direction of a faculty member.

MAY BE REPEATED FOR CREDIT

Biostatistics BIST

BIST 600

For more information about these courses contact the Department of Mathematics and Statistics math.ualgary.ca/.

Biostatistics 600 1.5 units; (3S-0)**Research Seminar**

A professional skills course, focusing on the development of technical proficiencies that are essential for students to succeed in their future careers as practicing statistician in academia, government, or industry. The emphasis is on delivering professional presentations and using modern statistical research tools. A high level of active student participation is required.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Botany BOTa

Please see Plant Biology PLBI.

Business and Environment BSEN

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ualgary.ca/>.

Senior Courses**Business and Environment 395** 3 units; (3-0)**Business Law for Strategic Decision-Makers**

Business law topics may include: regulatory compliance and environment management, tort and contractual liability, legal issues affecting the strategic management of sole proprietorships, partnerships, corporations and joint ventures, personal liability of corporate directors and officers, intellectual property, advertising and promotion law, consumer protection legislation, legal issues affecting employees and independent contractors, the strategic management of international business, securities law and other current business law issues.

Prerequisite(s): 24 units.

Business and Environment 401 3 units; (3-0)**Business in Canada**

A comparative analysis of Canada's competitive position in the global economy utilizing case studies analyzing strategies employed by Canadian corporations to be successful in world markets.

Prerequisite(s): Entrepreneurship and Innovation 201.

Note: Fourth-year standing is highly recommended. Not available for credit toward the Bachelor of Commerce degree. Preference in enrolment is given to students who have declared a Management and Society Minor.

Business and Environment 449 3 units; (3-0)**Haskayne Wilderness Retreat**

A wilderness intensive retreat combining experiential outdoor activities and personal growth challenges with cross-cultural teachings and ceremonies guided by Indigenous Knowledge Keepers.

Delivers core leadership skills for corporate social responsibility in sustainable development.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Antirequisite(s): Credit for Business and Environment 449 and Management Studies 559.04 will not be allowed.

Note: This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee will be assessed to cover additional costs associated with this course.

Business and Environment 517 3 units; (3-0)

Indigenous Peoples and Sustainable Development

An introduction to indigenous peoples and sustainable development, framed within business ethics relevant to energy and extractive industries. Treaties, government policy and land-use address the duty to consult and accommodate indigenous peoples, emphasizing reconciliation with intercultural competence for indigenous corporate relations and professional capacity building.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Antirequisite(s): Credit for Business and Environment 517 and Management Studies 597.17 will not be allowed.

Business and Environment 533 3 units; (3-0)

Dilemmas and Decisions in Business

Managers must balance ethical, social, legal and economic issues while making complex decisions that affect both internal and external stakeholders. Using legal and business case methods as the primary teaching tools, students will, individually and in groups, gain an understanding of how to balance ethical, social and legal decision-making principles, process complex facts and obtain well-reasoned results in order to make decisions in turbulent times.

Prerequisite(s): 60 units including Business and Environment 395, and either admission to the Haskayne School of Business or enrolment in the Management and Society Minor.

Antirequisite(s): Credit for Business and Environment 533 and Management Studies 559.24 will not be allowed.

Business and Environment 551 3 units; (3-0)

Social Issues, Strategies and Shareholders

An examination of the management of social and environmental issues. A focus on the pressing global issue of climate change and the economic impacts, both threats and opportunities, of greenhouse gas emissions mitigation on energy production and consumption throughout the economy.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Antirequisite(s): Credit for Business and Environment 551 and Management Studies 559.12 will not be allowed.

Business and Environment 555 3 units; (3-0)

Strategies for Sustainable Development

Make better business decisions in light of our society, the environment and the economy. Solve social and environmental problems while generating a shareholder return. Practical frameworks for decision making.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units.

Antirequisite(s): Credit for Business and Environment 555 and 559.04 will not be allowed.

Business and Environment 559 3 units; (3-0)

Selected Topics in Business and Environment

Investigation of selected topics related to business and environment issues.

Prerequisite(s): Admission to the Haskayne School of Business. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search. Third-year standing is highly recommended.

MAY BE REPEATED FOR CREDIT

Business and Environment 561 3 units; (3-0)

Ethical Issues and the Professional Manager

Major ethical principles are evaluated from different perspectives to provide tools for making sound ethical decisions in various business situations and in the face of moral dilemmas.

Prerequisite(s): Admission to the Haskayne School of Business and 30 units.

Business and Environment 595 3 units; (3-0)

Advanced Business Law

Various advanced topics that are of current interest in business law. These topics may probe deeper into several of the topics covered in the introductory business law course or may introduce new legal topics of current interest to business managers.

Prerequisite(s): Admission to the Haskayne School of Business and Business and Environment 395.

Graduate Courses

Business and Environment 672 1.5 units; (3-IT)

Business Communications

Understanding of clear and concise written and verbal communications, development and presentation of a business case, and managing stakeholder expectations through digital and face-to-face techniques.

Prerequisite(s): Admission to the Master of Management Program.

Business and Environment 674 1.5 units; (3-IT)

Business Law

Principal substantive subjects include: the administrative and regulatory process, business contracts, employment and labour, business organizations and negligence.

Prerequisite(s): Admission to the Master of Management Program.

Business and Environment 691 3 units; (3-0)

Fundamentals of Project Management

Application of management principles to the project environment; planning, control, scope, time and cost processes; project organization and human resource issues. Students review a current major capital project and submit and defend a project report.

Antirequisite(s): Credit for Business and Environment 691 and Civil Engineering 691 will not be allowed.

Business and Environment 719 3 units; (3-0)

Project External Issues

Projects will focus on the effects of external factors on business. External factors may include: corporate influences; financial interfaces; sources of funds; lending environment, owner's and lender's risks; government involvement; regulatory

requirements; public interfaces; public information; compensation; project commissioning.

Prerequisite(s): Business and Environment 691.

Business and Environment 749 3 units; (3-0)

Rediscovering Leadership: The Haskayne Wilderness Retreat

One-week intensive wilderness retreat combines experiential outdoor activities and personal growth challenges with cross-cultural First Nations teachings and ceremonies to deliver core leadership skills for social responsibility and sustainable development.

Business and Environment 751 3 units; (3-0)

Strategies for Sustainable Development

The strategic context for making business decisions with respect to sustainable development issues. The role of sustainability in economic development, international trade relations and emerging technologies. Stakeholder perspectives and the effect of environmental and social issues on industrial performance.

Business and Environment 753 3 units; (3-0)

Managing Social and Environmental Issues in the Global Market Place

Canadian companies operating in the international arena find themselves faced with an increasingly complex array of social and environmental risks that threaten their strategic objectives. This course examines this new class of strategic corporate risks through a review of changes in international sustainable development policy initiatives, changes in communications, the emergence of an environmental and social activist sector, and the interaction of these factors resulting in new international business risk challenges. The course uses lectures, cases, simulations and class discussion of theories and concepts.

Business and Environment 761 3 units; (3-0)

Ethics and the Professional Manager

The role of values in business decision making; alternative moral codes and their principles; moral principles as decision tools, and reasoning through moral dilemmas; role of business in society; specific issues in business ethics; application through cases and exercises.

Business and Environment 777 3 units; (3-0)

Global Environment of Business

Economic, political, social and legal factors affecting management decisions. Topics may include Canada in the world economy, business and government relations, business ethics and legal environment for business. Develops knowledge and ability to analyze and deal with complexities of the business environment.

Business and Environment 789 3 units; (3S-0)

Seminar in Business and Environment

Study and discussion of current research literature and contemporary issues on topics related to Business and Environment.

MAY BE REPEATED FOR CREDIT

Business and Environment 793 3 units; (3-0)

Legal Environment of Business

The study of the various areas of business law. Topics may include: contracts, patents and copyrights, product liability, incorporation and other relevant legal issues.

Prerequisite(s): Organizational Behaviour and Human Resources 601, Operations Management 601, Business Technology Management 601, and Accounting 601.

Business and Environment 797 3 units; (3S-0)**Advanced Seminar in Business and Environment**

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Business Technology Management BTMA

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses**Business Technology Management 317 3 units; (3-3T) or (3-1.5T) (formerly Management Information Systems 317)****Introduction to Business Technology Management**

Focus is on digital business technology management and enterprise applications. Foundation areas include: digital business strategy, strategy alignment, enterprise analysis, IT platforms, data management, business analytics, IT governance, IT innovation, organizational impacts, and economic considerations. Technical skills are developed with an examination of managerial and leadership issues.

Prerequisite(s): Admission to the Haskayne School of Business, and either Management Studies 217 and Strategy and Global Management 217, or Business and Environment 291 and Computer Science 203.

Antirequisite(s): Credit for Business Technology Management 317 and 321 will not be allowed.

Business Technology Management 321 3 units; (3-0) (formerly Management Information Systems 321)**Information Technology in Business**

Introduction to the fundamentals of business technology management and how such systems facilitate business transactions and decision-making at all levels of management. Topics examine the development, organization, management, control, and evaluation of information systems. Societal implications of the use of computer and networking technologies in business are also examined.

Prerequisite(s): 30 units.

Antirequisite(s): Credit for Business Technology Management 321 and 317 will not be allowed.

Note: Not available for credit towards the Bachelor of Commerce degree. Preference in enrolment is given to students who have declared a Management and Society Minor.

Business Technology Management 331 3 units; (3-0) (formerly Management Information Systems 331)**Data Management and Business Analytics**

In today's world, businesses, consumers, and societies create massive amounts of data, by design and as a by-product of their activities. Businesses in every industry are harnessing the power of data to support operations, decision-making, planning, and risk management. Students will focus on organizing, storing, and managing the available data using relational database technologies and

generating insights through business analytics techniques.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317.

Business Technology Management 333 3 units; (3-0) (formerly Management Information Systems 333)**Enterprise Analysis**

Focus is on enterprise analysis and high level design of IT-enabled solutions to business problems. Emphasis is placed on problem identification, requirements determination, system development methodologies, modelling the enterprise architecture (business, information, application, and technology), building the IT business case, IT project management, and change management.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317.

Business Technology Management 431 3 units; (3-0)**Gathering, Wrangling, and Analyzing Data in R**

Introduction to software tools, including R, to clean/organize/analyze data, for graphical analyses, reports, and presentations. Topics include working with API's, advanced data scraping tools, dynamic and interactive visualizations, and implementations of statistical methods in data analytics. Skills are applied to typical business data sources and case studies with presentations.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317.

Antirequisite(s): Credit for Business Technology Management 431 and 559.01 will not be allowed.

Business Technology Management 455 3 units; (3-0) (formerly Management Information Systems 455)**Business Technology Management Field Project**

Student teams are assigned to organizations in Calgary and the surrounding area to solve specific information and technology issues. Teams investigate the issues and present proposed solutions to the organization contact. Teams will execute the approved project plan and present a final report both orally and in writing to the organization contact. The project may involve interviewing, library and Internet research, and data collection.

Prerequisite(s): Admission to the Haskayne School of Business, Business Technology Management 317 and one senior Business Technology Management course.

Corequisite(s): One other senior Business Technology Management course.

Business Technology Management 459 3 units; (3-0) (formerly Management Information Systems 459)**Decision Support Application Development using VBA Programming**

Visual Basic for Applications (VBA) is used to create decision support systems and other applications across Microsoft Office Suite applications. Instruction in how to use VBA skills to produce business applications. Focus is on the creation of applications that will allow managers to make meaningful decisions using available data

like financial and other industry data from both internal and external sources.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317.

Business Technology Management 461 3 units; (3-0) (formerly Management Information Systems 461)**IT Platform Management**

Technology background related to telecommunications, data communications and IT platforms. Technologies and management issues associated with network models, networking, security and compliance, platform design and competition. Network planning design, integration, implementation, and operation including inter-organizational issues. Current and future issues in organizational implications of telecommunications and IT platform business technologies.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317.

Business Technology Management 463 3 units; (3-0) (formerly Management Information Systems 463)**Issues in Business Technology Management**

Incorporating the customer point of view, exposure to issues and emerging issues confronting both information systems managers and functional area managers using an integrated learning approach. Emphasis is on the managerial, organizational, and technological issues associated with effective and efficient use of information, technology resources, and IT platforms.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317.

Business Technology Management 465 3 units; (3-0) (formerly Management Information Systems 465)**Enterprise Systems**

Exploration of the technologies and issues underlying enterprise systems, enterprise application integration, workflow systems, and information analytics. Focus on strategic, managerial, and technical implications of the use of such systems in organizations. Examination of the current managerial practices for enterprise system design, implementation, and usage.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317.

Business Technology Management 467 3 units; (3-0) (formerly Management Information Systems 467)**e-Business**

Role, management and use of information technologies to enable a range of organizational and business relationships, models and strategies. Topics include developing an IT strategy; digital marketing; customer relationship management (CRM); supply chain management (SCM); planning, developing, and maintaining websites cloud computing; IT platforms; legal, privacy, and security issues; and information technologies for facilitating the use of data, knowledge, and multimedia.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317.

Business Technology Management 531 3 units; (3-0)

Data Analytics Tools for Business

An examination of tools and methods used in data analysis upon which sound business decisions are made. One or more data analysis packages/programs will be used to analyze different types of business data. Statistical and other analytic methods; data mining, machine learning and various techniques, and their application to business data analytics will be explored.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317.

Antirequisite(s): Credit for Business Technology Management 531 and 559.03 will not be allowed.

Business Technology Management 559 3 units; (3-0) (formerly Management Information Systems 559)

Selected Topics in Business Technology Management

Discussion of current or special interest topics in Business Technology Management from a managerial orientation.

Prerequisite(s): Admission to the Haskayne School of Business and Business Technology Management 317. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Business Technology Management 601 3 units; (3-0) (formerly Management Information Systems 601)

Business Technology Management

The fundamentals of how to use information technology (IT) innovatively to create competitive firms, to manage global interdependencies, and to provide and support quality products and services efficiently and effectively. Topics covered include trends in IT and how they may affect organizations, how organizations and the value chain can be redesigned using IT to encourage and facilitate better performance, how the Internet and electronic commerce impact organizations and markets, how IT-based platforms drive the network economy.

Business Technology Management 672 1.5 units; (3-IT)

IT Management

Builds a basic understanding of IT infrastructure and how infrastructure influences business processes. The managerial issues associated with IT implementation will be discussed.

Prerequisite(s): Admission to the Master of Management program.

Business Technology Management 674 1.5 units; (3-IT)

IT for Value Innovation

Examines organizational IT strategy and business opportunities created by rapidly evolving information technologies.

Prerequisite(s): Admission to the Master of Management program.

Business Technology Management 725 3 units; (3-0) (formerly Management Information Systems 725)

e-Business

The fundamental theories and practices in e-Business. Topics include economic motivations for e-Business, the underlying information technologies and applications that enable e-Business, and e-Business strategies.

Prerequisite(s): Business Technology Management 601.

Business Technology Management 731 3 units; (3-0)

Data Management and Business Analytics

Covers organizing, storing, and managing available data using relational database technologies and generating insights through business analytics techniques.

Prerequisite(s): Business Technology Management 601.

Business Technology Management 735 3 units; (3-0) (formerly Management Information Systems 735)

Enterprise Analysis

Course focus is on enterprise analysis and management of IT-enabled solutions to business problems. Emphasis is placed on problem identification, requirements determination, process analysis, enterprise architecture design and IT auditing using the COBIT framework.

Prerequisite(s): Business Technology Management 601.

Business Technology Management 736 3 units; (3-0)

Data Analytics I

Covers tools and methods used in data analytics to discover, collect, organize, and clean data to make it ready for analysis. Software packages used to clean and organize the data for analysis will be introduced, as well as software to enable users' understanding of the data that is collected.

Prerequisite(s): Business Technology Management 601.

Business Technology Management 737 3 units; (3-0) (formerly Management Information Systems 737)

Data Analytics II

Covers tools and methods used in data analysis. Focus is on analytic and mapping methods, such as data mining, text mining, machine learning, social network analytics and preference mapping, and their application to business data analytics.

Prerequisite(s): Business Technology Management 601.

Business Technology Management 743 3 units; (3-0) (formerly Management Information Systems 743)

IT Platform Strategy

Basic characteristics of industries based on network and information goods. Topics include platform-mediated networks, network effects, versioning, pricing, and compatibility, discussed through analytical models and business cases.

Prerequisite(s): Business Technology Management 601.

Business Technology Management 797 3 units; (3S-0) (formerly Management Information Systems 797)

Advanced Seminar in Business Technology Management

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Business Technology Management 799 3 units; (3S-0) (formerly Management Information Systems 799)

Doctoral Seminars in Business Technology Management

- 799.01. PhD Seminar I in Business Technology Management
- 799.02. PhD Seminar II in Business Technology Management
- 799.03. PhD Seminar III in Business Technology Management
- 799.04. PhD Seminar IV in Business Technology Management

Canadian Studies CNST

For more information about these courses see the Department of History website: hist.ucalgary.ca/.

Junior Course

Canadian Studies 201 3 units; (3-0)

Introduction to Canadian Studies

An interdisciplinary examination of the social, cultural, ethnic, political, economic, national, and regional dimensions of Canada, past, present and future.

Senior Courses

Canadian Studies 333 3 units; (3-0)

A Comparison of Canadian and American Cultures

An interdisciplinary comparison of Canadian and American cultures and cultural assumptions. A variety of issues and contexts will be dealt with from historical and contemporary perspectives.

Canadian Studies 337 3 units; (3-0)

Introduction to Folklore: The Canadian Context

Introduction to the academic study of folklore: basic terminology, folk groups, performance and applications with examples taken from the Canadian and Albertan context. Introduction to traditional genres of folkloric expression and analyses of current folk groups and their folklore.

Canadian Studies 355 3 units; (3-0)

Canadian Cities

Canadian urban life from an interdisciplinary perspective.

Canadian Studies 361 3 units; (3-0)

Gender, Race and Ethnicity in Canada

An interdisciplinary introduction to gender, race and ethnicity in Canada to provide an understanding of race, ethnicity and gender as simultaneous and intersecting systems of relationship and meaning.

Canadian Studies 401 3 units; (3-0)

Topics in Canadian Studies

An examination of selected social, cultural, ethnic, economic, political, regional, or national topics in Canadian Studies.

MAY BE REPEATED FOR CREDIT

Canadian Studies 439 3 units; (3-0)

Approaches to Canadian Heritage

Examines heritage commemoration, preservation and interpretation by involving students in support projects with local communities. Projects involve the exploration of presentation methods; the use of oral, artifactual and other evidence in heritage projects; policy and planning issues, the cultural, social, political, ecological and theoretical dimensions of heritage; and the sharing of heritage with the wider public.

Canadian Studies 451 3 units; (3-0)

The Culture of the Calgary Stampede

A particular phenomenon of Calgary - and western Canadian culture - is the Calgary Stampede. In this interdisciplinary course, students will gain an understanding of the rich and complex history, vision and operation of this major western festival.

Antirequisite(s): Credit for Canadian Studies 451 and 401.05 will not be allowed

Note: Students may be required to attend off-campus events outside of class time (e.g. the Stampede grounds). A supplementary fee may be assessed to cover additional costs associated with this course.

Canadian Studies 501 3 units; (3-0)

Research in Selected Topics

Supervised individual study of a topic in Canadian Studies.

Prerequisite(s): One of: Art 361, Communication and Media Studies 313, History 300, Political Science 399 or Sociology 313 and consent of the Department.

Note: Students should contact the Department of History at least two weeks prior to the first day of classes to arrange an independent study course.

MAY BE REPEATED FOR CREDIT

Canadian Studies 591 3 units; (3S-0)

Senior Seminar in Canadian Studies

Advanced level seminar(s) in Canadian Studies, for examination of particular topics of special interest to senior students.

Prerequisite(s): 72 units, including 6 units from courses labelled Canadian Studies.

Canadian Studies 597 3 units; (3-0)

Honours Directed Reading

Directed readings for Canadian Studies Honours students in their fourth year.

Prerequisite(s): Admission to the Canadian Studies Honours Program and one of: Art 361, Communication and Media Studies 313, History 300, Political Science 399 or Sociology 313.

Corequisite(s): Canadian Studies 598.

Antirequisite(s): Credit for Canadian Studies 597 and Interdisciplinary Studies 590 will not be allowed.

Canadian Studies 598 6 units; (3-0)

Honours Writing Seminar

Will participate in sessions throughout the year that will normally be facilitated by the Honours Advisor.

Prerequisite(s): Admission to the Canadian Studies Honours Program and one of: Art 361, Communication and Media Studies 313, History 300, Political Science 399 or Sociology 313.

Corequisite(s): Canadian Studies 597.

Antirequisite(s): Credit for Canadian Studies 598 and Interdisciplinary Studies 590 will not be allowed.

Cellular, Molecular and Microbial Biology CMMB

For more information about these courses see the Department of Biological Sciences: bio.ucalgary.ca/.

Senior Courses

Cellular, Molecular and Microbial Biology 343
3 units; (3-3)

Microbiology

An introductory study of prokaryotes, viruses and immunology with emphasis on systematics, ecology, physiology, molecular biology and roles in pathogenesis of the major groups of prokaryotes.

Prerequisite(s): Chemistry 351 and one of Biology 311 or Medical Science 341.

Cellular, Molecular and Microbial Biology 403
3 units; (3-1T)

Developmental Biology of Animals

Study of the mechanism of cellular differentiation with emphasis on intra- and intercellular processes.

Prerequisite(s): Biochemistry 393; one of Biology 311 or Medical Science 341; and one of Biology 331 or Medical Science 351.

Cellular, Molecular and Microbial Biology 411
3 units; (3-0)

Molecular Genetics

Molecular biology and gene expression in prokaryotes and eukaryotes. Topics include: DNA topology, genome structure, chromatin structure, DNA replication, DNA repair and recombination, mechanisms of transcription and gene expression, post-transcriptional RNA processing, translation.

Prerequisite(s): One of Biology 311 or Medical Science 341; one of Biology 331 or Medical Science 351; and one of Biochemistry 341 or Biochemistry 393.

Cellular, Molecular and Microbial Biology 413
3 units; (3-0)

Human Genetics

The principles of genetics as applied to human and medical genetics. Mendelian and multifactorial inheritance of normal and abnormal traits, pedigree analysis, segregation, linkage and gene mapping. Cytogenetics and developmental genetics. Population genetics including inbreeding and evolution in humans. Genetic predisposition to disease.

Prerequisite(s): Biology 311 or Medical Science 341.

Cellular, Molecular and Microbial Biology 421
3 units; (3-2T)

Virology

Comprehensive overview of virus structure and replication; molecular events involved in virus infection and replication including genetics, biochemistry and molecular biology of bacterial, plant and animal viruses. Areas of persistent viruses, viral immunology, cancer and AIDS will be covered.

Prerequisite(s): Biochemistry 393 and Cellular, Molecular and Microbial Biology 343; and one of Biology 311 or Medical Science 341; and one of Biology 331 or Medical Science 351.

Cellular, Molecular and Microbial Biology 431
3 units; (3-0)

Bacterial Pathogens

An introduction to microbes that cause infections (in humans, other animals and plants.) Topics include: the relationship between pathogen and host, ability of pathogens to colonize, reproduce and cause disease, the role of antibiotics and vaccines in treatment and prevention of infection, antibiotic resistance in bacteria, environmental control of virulence factor production.

Prerequisite(s): Cellular, Molecular and Microbial Biology 343.

Cellular, Molecular and Microbial Biology 443
3 units; (3-3)

Microbial Physiology

The focus is structure and function of prokaryotic cells. Topics include cell envelope structure, cell division, transport and secretion, signal transduction, differentiation and development, bacterial growth and energetics, and the diversity of metabolic pathways in Bacteria and Archaea. The laboratory introduces analytical techniques commonly used in bacterial physiology, and some useful biochemical assays.

Prerequisite(s): Biochemistry 393 and Cellular, Molecular and Microbial Biology 343.

Cellular, Molecular and Microbial Biology 451
3 units; (3-5)

Molecular Analysis of Biological Systems

A laboratory course emphasizing techniques in molecular biology that can be applied to the analysis of problems in cellular, molecular and microbial biology.

Prerequisite(s): Cellular, Molecular and Microbial Biology 411 and admission to the Cellular, Molecular and Microbial Biology major or to the Biological Sciences Honours program.

Antirequisite(s): Credit for Cellular, Molecular and Microbial Biology 451 and either Biochemistry 401 or 541 will not be allowed.

Cellular, Molecular and Microbial Biology 461
3 units; (3-0)

(formerly Biology 461)

Functional Genomics and Molecular Networks

Introduction to high-throughput methods for global functional and network analysis of genes and proteins. Topics include microarrays, chromatin immunoprecipitation, synthetic genetic array analysis, next-generation sequencing and network topology.

Prerequisite(s): Biology 331.

Cellular, Molecular and Microbial Biology 505
3 units; (3-0)

Advanced Developmental Biology

In-depth analyses of the current literature in developmental biology. Emphasis will be on the

co-ordinated regulation of gene expression during development.

Prerequisite(s): Cellular, Molecular and Microbial Biology 403.

Cellular, Molecular and Microbial Biology 507
3 units; (0-8) or (3-0)

Advanced Topics in Cellular, Molecular and Microbial Biology

Independent Research or reading project that may include seminars, lectures, term papers and training in theoretical and/or laboratory methods.

Prerequisite(s): 54 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Cellular, Molecular and Microbial Biology 511
3 units; (3-0)

Molecular Biology and Genetics

The concepts of molecular biology as they apply to genetics. Application of current methodology to the understanding of the genetics of prokaryotes, lower and higher eukaryotes (for example: fungi, yeasts, trypanosomes, plants and animals). Genomic organization and function of subcellular organelles such as mitochondria and chloroplasts will also be considered in detail. The mechanism(s) of regulation of gene expression will be discussed in relation to nuclear as well as organelle genomes.

Prerequisite(s): Cellular, Molecular and Microbial Biology 411.

Cellular, Molecular and Microbial Biology 519
3 units; (3-0)

Advanced Cell Biology

In-depth analysis of current literature in cell biology. Topics include subcellular organization and dynamics, cell signalling and differentiation, protein and RNA trafficking, and other aspects of eukaryotic cell biology.

Prerequisite(s): Biology 311 and 331 and one of Biochemistry 401 or 443.

Cellular, Molecular and Microbial Biology 523
3 units; (3-0)

DNA Genomes and RNA Function

An examination of information storage and gene expression in prokaryotes and eukaryotes. Biochemical mechanisms of gene expression and regulation in bacteria. Genome sequencing projects and a survey of genome structure and content across domains of life. Topics in eukaryotic gene expression. The diverse roles played by RNA, from information molecules to structural scaffolds to ribozymes.

Prerequisite(s): Cellular, Molecular and Microbial Biology 411.

Cellular, Molecular and Microbial Biology 527
3 units; (3-3)

Immunology

Comprehensive overview of the immune system and how immune responses are generated and regulated in the context of infectious diseases. Topics include both fundamental cellular and molecular immunology. Dysregulated responses, such as autoimmunity, immunodeficiencies, transplants, and allergies will also be covered.

Prerequisite(s): Biology 311 and 331 and Cellular, Molecular and Microbial Biology 343 and one of Biochemistry 401 or 443.

Cellular, Molecular and Microbial Biology 528
6 units; (0-8)

Independent Studies in Cellular, Molecular and Microbial Biology

Original and independent thought, practical research and the completion of written and oral reports.

Prerequisite(s): 72 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Cellular, Molecular and Microbial Biology 530
6 units; (0-8)

Honours Research Project in Cellular, Molecular and Microbial Biology

Research project under the direction of one or more faculty members in the Department of Biological Sciences. Formal written and oral reports must be presented on completion of this course. Open only to Honours Cellular, Molecular and Microbial Biology students or Honours Biological Sciences students.

Prerequisite(s): Cellular, Molecular and Microbial Biology 451 and completion of at least 72 units and consent of the Department.

Cellular, Molecular and Microbial Biology 531
3 units; (3-0)

Topics in Cellular Interactions

An exploration of selected topics concerning cell-cell interactions and the interactions of cells with their environment during development, differentiation and disease (cancer). Multidisciplinary approaches will be presented, using discussions of seminal research and critical analysis of current literature. Potential topics include cell junctions, cell signaling, cytoskeletal organization, stroma, extracellular matrix remodelling and stem cells and cancer stem cells.

Prerequisite(s): Biology 331 and one of Biochemistry 401 or 443 or 431.

Cellular, Molecular and Microbial Biology 543
3 units; (3-0)

Environmental Microbiology

Focuses on understanding the interactions of micro-organisms with their environment. Roles of micro-organisms in nutrient cycling, biological control, and biodegradation will be discussed. The use of molecular approaches to identify and characterize microbial communities, and to understand the precise nature of microbial interactions with abiotic and biotic environments will be emphasized. Special topics will include plant-microbe and animal-microbe symbiosis, extreme environments and biotechnological applications of environmental microbiology.

Prerequisite(s): Cellular, Molecular and Microbial Biology 343.

Cellular, Molecular and Microbial Biology 545
3 units; (3-0)

Petroleum Microbiology

Microorganisms can contribute to a more sustainable energy future. Their impact and roles in the fossil fuel industry will be reviewed. Topics will include oilfield souring, biocorrosion, biodegradation, enhanced recovery, upgrading, and bioremediation of contaminated sites.

Prerequisite(s): Cellular, Molecular and Microbial Biology 343.

Cellular, Molecular and Microbial Biology 549
3 units; (3-0)

Microbial Genetics

The genetics and genomics of prokaryotes. Topics will include recombination, mechanisms of genetic exchange, analysis of genes and genomes, and genome evolution. Selected current topics in bacterial genetics will also be covered.

Prerequisite(s): Cellular, Molecular and Microbial Biology 411.

Cellular, Molecular and Microbial Biology 561
3 units; (3-0)

(Medical Science 561)

Cancer Biology

Advances in methodology and in theoretical concepts have permitted continuing breakthroughs in our understanding of the organismal, cellular and molecular biology of cancer cells, and in the development of novel strategies for cancer prevention, diagnosis and treatment. These advances will be presented in a comprehensive overview of cancer including issues of demographics and incidence, causation and detection, origins and progression and therapeutic approaches. Emphasis will be placed on the cell and molecular biology of cancer and on the interaction of the cancer cell with the host organism.

Prerequisite(s): Biology 331 or Medical Science 351, and one of Cellular, Molecular and Microbial Biology 411, Biochemistry 401 or 443.

Cellular, Molecular and Microbial Biology 563
3 units; (3-0)

Microbial Diversity

An overview of microbial diversity, the evolutionary mechanisms that give rise to it, and the methods used to study it. Topics may include: microbial systematics; characterizing the last universal common ancestor of life; estimating global microbial diversity; "unculturable" microbes and molecular DNA-based methods used to study them in nature; modern cultivation techniques; comparative genomics of microbial species; environmental metagenomics; microbial biogeography and speciation and gene flow in microbial communities.

Prerequisite(s): Cellular, Molecular and Microbial Biology 343.

Cellular, Molecular and Microbial Biology 565
3 units; (3-0)

(Medical Science 565)

Advanced Topics in Microbial Pathogenesis and the Microbiome

Provides a fuller understanding of bacterial diseases using a systems approach and illustrating key paradigms via the consideration of specific pathogens. Topics include: strategies for bacteria surviving host immune responses, bacterial invasion strategies, opportunistic infections, disease Pathogenesis, and antibiotic resistance, challenges of dealing with emerging infections. Lectures, small group interactive sessions, specified readings.

Prerequisite(s): Cellular, Molecular and Microbial Biology 431.

Cellular, Molecular and Microbial Biology 567
3 units; (3-0)

(Medical Science 567)

Advanced Topics in Immunology

New and emerging themes in immunology, with an emphasis on disease processes such as inflammation in the gut, kidney and lung. Topics include: innate immunity, the inflammasome, sterile inflammation, process and mechanism of immune cell recruitment in different tissues, T cell biology,

B cell biology, regulatory immune cells, mucosal immunity, airways responses to virus, mechanisms of food allergies, inflammatory bowel disease. Lectures, small group interactive sessions, specified readings.

Prerequisite(s): Cellular, Molecular and Microbial Biology 527 or Medical Science 321.

Graduate Course

Cellular, Molecular and Microbial Biology 637
3 units; (3-0)

Advanced Topics in Molecular Microbiology

Techniques and discussion of recent literature in molecular microbiology. Topics covered will vary from year-to-year, but could include bioinformatics, genomics, mutagenesis, advanced microscopy techniques, proteomics, vectors and cloning techniques, gene expression, and over-expression of proteins, as they relate to the study of prokaryotic systems. Course content will be tailored to the interests of the graduate students enrolled in the class in a given year.

Central and East European Studies CEST

For more information see the School of Languages, Linguistics, Literatures and Cultures website: slllc.ucalgary.ca/.

Senior Course

Central and East European Studies 313
3 units; (3-0)

An Introduction to Cultural Traditions

A survey of Russian and Eastern European cultural history from the settlement of the Slavic peoples to the early twentieth century. Included will be such topics as the ethnic, linguistic, and cultural composition of the region; art and architecture of medieval Russia; the Enlightenment; national revival movements; literature, music and painting; modernism; the cultural efflorescence of the early Soviet period.

Antirequisite(s): Credit for Central and East European Studies 313 and History 493.19 will not be allowed.

Note: Normally taught as part of the Term Abroad Program. A supplementary fee will be assessed to cover additional costs associated with this course.

Chemical Engineering ENCH

For more information about these courses, see the Department of Chemical and Petroleum Engineering: <https://schulich.ucalgary.ca/chemical-petroleum>.

Senior Courses

Chemical Engineering 315 3 units; (3-2)

Chemical Engineering Process Calculation

Material and energy balances of physical and chemical systems for steady state and transient conditions. Introduction to analysis and synthesis of chemical processes.

Corequisite(s): Engineering 311.

Chemical Engineering 317 3 units; (3-1T)

Materials Science for Chemical Engineers

Classes of inorganic and polymeric materials and their applications, crystal structure determination, phase diagrams and phase transformation, defects and material properties, materials processing

methods, characterization tools for materials engineers, nanotechnology.

Prerequisite(s): Engineering 202 and Mathematics 275 or Applied Mathematics 217.

Corequisite(s): Chemistry 357.

Chemical Engineering 331 3 units; (3-1T-3/2)

Process Fluid Dynamics

Fluid Properties; Newtonian and non-Newtonian fluids. Fluid statics. Bernoulli equation; derivation and applications. Control volume and system representation. Differential analysis of Flows. The Navier-Stokes equation; applications. Dimensional analysis. Flow in conduits; laminar and turbulent flows; single-pipe and multiple-pipe systems. Forces on immersed bodies; fluidization. Metering.

Prerequisite(s): Engineering 201 and 202; and Mathematics 375 or Applied Mathematics 307.

Chemical Engineering 401 3 units; (3-1)

Partial Differential Equations in Transport Processes

Partial differential equations in different co-ordinate systems. Approximate and exact methods of solving equations. Similarity transform, Separation of variables. Laplace transform. Fourier series and Sturm-Liouville systems. Analysis and solution of steady state and transient diffusion problems including Fourier, Darcy and Fick's law analogies. Application to energy transfer in solids and pressure propagation in reservoirs.

Prerequisite(s): Chemical Engineering 331 and Mathematics 375 or Applied Mathematics 307.

Corequisite(s): Chemical Engineering 403.

Chemical Engineering 403 3 units; (3-1T-4/2)

Heat Transfer

A study of concepts involved in heat transfer. Applications of continuity and energy equations. Boundary layer theory. Conduction, convection and radiation heat transfer. Boiling and condensation. Evaporation. Heat exchanger calculations.

Prerequisite(s): Mathematics 375 or Applied Mathematics 307 and Chemical Engineering 331.

Chemical Engineering 405 3 units; (3-1T-2)

Separation Processes I

Diffusion and convective mass transfer. Staged and continuous contacting. Solid-liquid and liquid-liquid extraction, distillation, absorption and stripping.

Prerequisite(s): Chemical Engineering 403 and 427.

Chemical Engineering 407 3 units; (3-2T)

Numerical Methods in Chemical and Oil & Gas Engineering

The theory and use of numerical computational procedures to solve chemical and oil and gas engineering problems. Methods for solution of nonlinear equations, solution of simultaneous linear equations, regression, curve fitting, solution of the algebraic eigenvalue problem, interpolation, differentiation, integration, solution of ordinary differential equations and partial differential equations are included.

Prerequisite(s): Engineering 233 and Mathematics 375 or Applied Mathematics 307.

Antirequisite(s): Credit for Chemical Engineering 407 and Engineering 407 will not be allowed.

Chemical Engineering 421 3 units; (3-1T-2)

Chemical Engineering Kinetics

Kinetics of homogeneous reactions and the interpretation of kinetic data; design of single and multiple reactors for simple, simultaneous and consecutive reactions; influence of temperature, pressure and flow on reactions and reactor design; introduction to heterogeneous reaction systems and catalyzed fluid reactions.

Prerequisite(s): Chemical Engineering 403 and 407.

Corequisite(s): Chemical Engineering 405.

Chemical Engineering 423 3 units; (3-1)

Chemical Engineering Process Development

Design of chemical processing units and plants; cost estimates and chemical process economics; optimization techniques; introduction to linear programming. Safety and environmental considerations in process design.

Prerequisite(s): Chemical Engineering 315.

Antirequisite(s): Credit for Chemical Engineering 423 and Petroleum Engineering 423 will not be allowed.

Chemical Engineering 427 3 units; (3-1T-1)

Chemical Engineering Thermodynamics

Review of first and second law principles; application to the properties of fluids and solutions; vapour liquid equilibria; the third law; applications to chemical equilibrium and chemical reactions.

Prerequisite(s): Engineering 311 and Chemical Engineering 315.

Chemical Engineering 429 3 units; (3-2T-3/2)

Process Dynamics and Control

Mathematical models describing transient response characteristics of basic process elements; use of a dynamic process simulator; block flow diagram of a feedback control loop; process control hardware; basic control modes; tuning feedback controls; cascade control; feedforward control; common control loops; distillation column control; design of multiple single loop controllers; plant wide modelling and control.

Prerequisite(s): Chemical Engineering 315 and Mathematics 375.

Corequisite(s): Chemical Engineering 405.

Antirequisite(s): Credit for Chemical Engineering 429 and 529 will not be allowed.

Chemical Engineering 501 3 units; (3-1T-1)

Transport Phenomena

Simplification, scaling and dimensional reasoning. Error estimation. Heat, mass and momentum transfer analyses. Convective-Diffusive transport in open and porous media. Systems and process modelling. Analytical solutions by the lumped, integral and differential techniques.

Prerequisite(s): Chemical Engineering 401.

Chemical Engineering 503 3 units; (3-1T)

Crude Oil Upgrading and Refining

Upgrading objectives; analysis and composition of non-distillable material and its relationship to upgrading; upgrading processes; refinery products and specifications. Conventional, heavy oil and bitumen upgrading technology.

Prerequisite(s): Third-year standing, or higher, in Chemical Engineering or Oil and Gas Engineering.

Chemical Engineering 505 3 units; (3-1T-1)**Separation Processes II**

Concepts in mass transfer including molecular diffusion, mass transfer rates, and mass transfer coefficients. Application of these and other fundamental concepts in chemical engineering to develop process design specifications for various unit operations which may include: crystallization, humidification and cooling, drying, adsorption, and membrane processes.

Prerequisite(s): Chemical Engineering 405.

Chemical Engineering 511 3 units; (3-4)**Chemical Process Design I**

Team design project applying principles of process engineering and project management; Gantt charts; critical path method; process simulation, degrees of freedom analysis; considerations in process selection; plant location; block flow diagrams; process flow diagrams; short cut process equipment design/sizing procedures; preliminary equipment cost estimating techniques.

Prerequisite(s): Chemical Engineering 405, 421, 423, 429 and admission to the Chemical Engineering program.

Antirequisite(s): Credit for Chemical Engineering 511 and Petroleum Engineering 511 will not be allowed.

Note: Chemical Engineering 511 and 531 are a required two-course sequence that shall be completed in the same academic year. Concurrent enrolment in Chemical Engineering 511 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Chemical Engineering 519 3 units; (3-1T)**Special Topics**

Current advanced topics in Chemical Engineering.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Chemical Engineering 530 3 units; (3-1T)**Electrochemical Engineering**

Electrochemical kinetics and thermodynamics. Mass transport in electrochemical cells. Design and modelling of electrochemical cells. Application of electrochemistry to fuel cells, batteries, and water treatment.

Prerequisite(s): Chemical Engineering 421 and 427.

Antirequisite(s): Credit for Chemical Engineering 530 and any of 519.13, 519.14 or 651 will not be allowed.

Chemical Engineering 531 3 units; (2-6)**Chemical Process Design II**

Team design project continuing from Chemical Engineering 511. Detailed design of large commercial plants involving the preparation of a process and instrumentation diagram; emphasis on computer design procedures; specification sheets for chemical processing equipment such as separators, pumps, compressors, columns and process piping. Other topics include operational considerations in design, plant safety; relief system design; waste treatment and pollution control processes; plant and equipment plot plans; control and computer simulation.

Prerequisite(s): Chemical Engineering 511.

Note: Chemical Engineering 511 and 531 are a required two-course sequence that shall be completed in the same academic year. Concurrent enrolment in Chemical Engineering 511 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Chemical Engineering 535 3 units; (3-2/2)**Principles of Biochemical Engineering**

Introduction to biochemistry, enzyme kinetics and cell growth and metabolism. Aspects of mass transfer, heat transfer and fluid flow related to the design of biological process equipment. Fermentations, sterilization and extraction techniques. Treatment of effluents. Introduction to bio-reactor design and scale-up. Introduction to process instrumentation and control.

Prerequisite(s): Chemistry 357.

Chemical Engineering 537 3 units; (3-1T)**Computational Thermodynamics**

Amalgamation of thermodynamic models and computational techniques with application to industrially important thermodynamic problems such as multi-component flash calculations, reacting systems, phase stability and gas hydrates.

Prerequisite(s): Chemical Engineering 427.

Chemical Engineering 539 3 units; (3-1T)**Polymer Engineering**

Introduction to polymer science and technology. Molecular structure, processing, rheology, thermal, physical and mechanical properties. Synthetic polymers used in biomedical, manufacturing and other advanced technological applications.

Prerequisite(s): Chemical Engineering 403.

Corequisite(s): Prerequisite or Corequisite: Chemistry 357.

Chemical Engineering 551 3 units; (2-4/2)**Chemical Engineering Laboratory**

Experiments which demonstrate the operation of chemical process equipment involving heat and/or mass transfer, or kinetics. Lectures will cover experimental design and applied statistics.

Prerequisite(s): Chemical Engineering 405.

Corequisite(s): Chemical Engineering 505 or Biomedical Engineering 500 or 501.

Antirequisite(s): Credit for Chemical Engineering 551 and Petroleum Engineering 551 will not be allowed.

Graduate Courses**Chemical Engineering 607** 3 units; (3-0)**Natural Gas Processing Principles**

Physical and chemical properties of natural gases; vapour-liquid equilibrium data and computations; flow of gas and gas-liquid mixtures; separation of gaseous mixtures; heat transfer in gas processing; production of natural gas and its associated liquids.

Note: This course does not count towards the degree requirements of MSc and PhD students.

Chemical Engineering 609 3 units; (3-0)**Natural Gas Processing Technology**

Design and operational criteria in transporting and processing of natural gas; refrigeration and compression; cryogenics; hydrocarbon dew point control; LPG recovery; sulphur recovery; mechanical flow diagrams; process simulation.

Prerequisite(s): Chemical Engineering 607 or an undergraduate degree in Chemical Engineering.

Chemical Engineering 613 3 units; (3-0)**Advanced Topics in Mass Transfer**

Advanced concepts in mass transfer in multiphase systems. Mass transfer with simultaneous chemical reaction and heat transfer.

Chemical Engineering 615 3 units; (3-1.5)**Model Predictive Control**

Review of process dynamics and control fundamentals (step response curves, PID control structures and PID controller tuning). Identification of finite impulse response models from plant data. Model Predictive Control (MPC) algorithms (e.g. Dynamic Matrix Control). Applications of Linear Programming to determine optimal MPC setpoints respecting unit constraints. Computer simulation using the MATLAB MPC toolbox. Introduction to univariate controller performance assessment techniques.

Chemical Engineering 617 3 units; (3-1.5)**Modelling and Identification Advanced Control**

First-principles dynamic models of complex chemical processes. Comparison of dynamic simulation models generated using MATLAB/Simulink with those embedded in commercial process simulators. Consideration of operability in plant design. Introduction to time series analysis and closed-loop identification. Causality versus correlation. Multivariate regression methods for soft sensor design.

Chemical Engineering 619 3 units; (3-0)**Special Problems**

Advanced studies on specialized topics in chemical, petroleum, biochemical and environmental engineering.

MAY BE REPEATED FOR CREDIT

Chemical Engineering 620 6 units; (0-4)**Graduate Project**

Individual project in the student's area of specialization under the guidance of a faculty member. A written proposal, one or more written progress reports, and a final written report are required. An oral presentation is required upon completion of the course. Open only to students in the MEng (course-based) program.

Prerequisite(s): Consent of the Department Head or Associate Head Graduate Studies.

Antirequisite(s): Credit for Chemical Engineering 620 and 699 will not be allowed.

Chemical Engineering 621 3 units; (3-0)**Reservoir Simulation**

Enhanced recovery modelling (generalized black-oil models, compositional and miscible), well treatment, grid orientation. New developments in gridding, thermal models, naturally fractured reservoirs, modelling of induced fractures (hydraulic and waterflood), reservoir geomechanics, and practical aspects of conducting simulation studies.

Prerequisite(s): Petroleum Engineering 429 or 523.

Chemical Engineering 623 3 units; (3-0)**Chemical Reactor Design**

Advanced study of design and operation of chemical reactors for both homogeneous and heterogeneous systems, batch, continuous flow stirred tank, tubular and multibed adiabatic reactors. Cold shot cooling in reactors. Optimal temperature gradients and yields. Catalyst effectiveness factors and optimal control with decaying catalysts. Analysis of sulphur plant reactor design including cost optimization.

Prerequisite(s): Chemical Engineering 421.

Chemical Engineering 625 3 units; (3-0)**Advanced Topics in Heat Transfer**

Diffusive and convective transport of heat. Analytical and approximate solutions to steady

state and transient conduction and convection problems. Superposition techniques. Forced convection of heat in laminar and turbulent regimes.

Chemical Engineering 627 **3 units; (3-1.5)**

Chemical Process Simulation

Object oriented programming applied to the design of a steady state chemical process simulator via the sequential modular approach and by the equation-based approach. Material and energy balances for systems of process units.

Chemical Engineering 629 **3 units; (3-0)**

Secondary and Tertiary Recovery

Displacement processes for improved recovery of hydrocarbons. Waterflooding, gas flooding, solvent flooding and chemical flooding. Performance prediction techniques. Comparative economics.

Prerequisite(s): Petroleum Engineering 525.

Chemical Engineering 630 **3 units; (3-1T)**

Electrochemical Engineering

Electrochemical kinetics and thermodynamics. Mass transport in electrochemical cells. Design and modelling of electrochemical cells. Application of electrochemistry to fuel cells, batteries, and water treatment.

Antirequisite(s): Credit for Chemical Engineering 630 and any of 519.13, 519.14 or 651 will not be allowed.

Chemical Engineering 631 **3 units; (3-0)**

Advanced Topics in Fluid Mechanics

Constitutive equations for viscous flow and methods of solution. Laminar, transition and turbulent flows. Hydrodynamic stability. Vortices. Boundary layers.

Chemical Engineering 633 **3 units; (3-0)**

Chemical Thermodynamics

Advanced application of thermodynamic principles. Calculation of thermodynamic properties; ideal and non-ideal solution theory; calculation of phase equilibria; properties of reacting mixtures.

Prerequisite(s): Chemical Engineering 427.

Chemical Engineering 639 **3 units; (3-0)**

Applied Numerical Methods in Engineering

Numerical solution of systems of linear and non-linear algebraic equations, eigenvalue problems. Numerical solution of systems of ordinary and partial differential equations. Initial value and boundary value problems. Finite difference and finite element methods. Numerical stability.

Note: Knowledge of a programming language and undergraduate-level numerical methods is necessary.

Chemical Engineering 643 **3 units; (3-0)**
(Environmental Engineering 641)

Air Pollution Control Engineering

Introduction to air quality and air pollution. Energy and air pollution. Fossil fuel combustion and related air pollution. Industrial air pollution control. Control of particulate matter. Control of VOCs, SO_x, and NO_x. Adsorption, absorption and biofiltration of air pollutants. GHG emission control. Recent advances on related topics.

Antirequisite(s): Credit for Chemical Engineering 643 and Environmental Engineering 641 will not be allowed.

Chemical Engineering 645 **3 units; (3-0)**
(Environmental Engineering 661)

Industrial and Produced Wastewater Treatment

Sources and characterization of industrial wastewater. Treatment objectives and regulations. Unit and process design. Physical/chemical treatment including sedimentation, coagulation, filtration, absorption, adsorption, ion exchange, membrane processes and pH adjustment.

Note: Credit for Chemical Engineering 645 and Environmental Engineering 661 will not be allowed.

Chemical Engineering 647 **3 units; (3-0)**

Thermal Recovery Methods

Oil sands and heavy oil resources. Fluid and rock properties. Heat transfer processes in porous media. Comparative analysis of viscous oil recovery methods: steam flooding, cyclic steam stimulation, in-situ combustion and steam-assisted-gravity-drainage. Surface equipment and operation. Laboratory and field performance evaluation of thermal recovery methods. Process economics.

Prerequisite(s): Petroleum Engineering 429, 523 or 621.

Chemical Engineering 649 **3 units; (3-0)**

Naturally Fractured Reservoirs

Classification and characterization of naturally fractured reservoirs. Drilling and completion methods. Production characteristics. Tight gas reservoirs. Reserve estimation. Emphasis is placed on the relationship between geology, log interpretation, well testing, and primary-secondary recovery of hydrocarbons from naturally fractured reservoirs.

Chemical Engineering 653 **3 units; (3-0)**

Horizontal Wells for Petroleum Production

Drilling and completion methods for horizontal wells; mathematical analysis of steady state flow to horizontal wells and well combinations; pseudo steady state and constant well bore pressure models; theoretical comparisons of predicted performance and coning behaviour of horizontal and vertical well patterns; performance in fractured reservoirs; potential for horizontal wells in heavy oil and bitumen production; basic conceptual ideas of steam-assisted gravity drainage.

Prerequisite(s): Petroleum Engineering 429 or Petroleum Engineering 523.

Chemical Engineering 657 **3 units; (3-0)**

Advanced Reservoir Engineering

Formulation and solution of reservoir-engineering problems including combination of variables, Laplace transform, approximate Integral methods, and solution methods of moving boundary problems. Examples from thermal processes (e.g. hot waterflooding, SAGD), different recovery mechanisms (e.g. imbibition, expansion drive, solution-gas drive), well testing problems and naturally fractured reservoirs.

Prerequisite(s): Petroleum Engineering 429 or Petroleum Engineering 523.

Note: Prior knowledge of reservoir engineering and analytical solution methods of differential equations is necessary.

Chemical Engineering 659 **3 units; (3-0)**

Advanced Cell and Tissue Engineering

Current challenges in tissue engineering. Focus on specific tissues. Course topics include a brief biology review, cell fate processes, stem cells, tissue microenvironments and mass transfer, biomateri-

als, bioreactors, and clinical delivery of tissue engineered constructs.

Prerequisite(s): Consent of the Department.

Note: Credit for Chemical Engineering 659 and Biomedical Engineering 619.06 will not be allowed.

Chemical Engineering 661 **3 units; (3-0)**

Geostatistics for Reservoir Characterization

Statistical/probability concepts, exploratory data analysis, spatial structural analysis, estimation theory (Kriging), integration of auxiliary information and conditional stochastic simulation. Special emphasis on reservoir characterization and the particular problems encountered in that area. The geostatistical methodology for reservoir characterization will be demonstrated on a fluvial reservoir example.

Prerequisite(s): Petroleum Engineering 429 or Petroleum Engineering 523.

Note: Open to graduate Chemical Engineering, Civil Engineering and Geophysics students, and Geology graduate students with sound quantitative skills. Prior exposure to statistical/probability theory is required.

Chemical Engineering 665 **3 units; (3-0)**
(Environmental Engineering 665)

Wastewater Issues for the Oil and Gas Industry

Produced water characteristics, regulations governing produced water management, management options. Technologies used for produced water treatment, novel/emerging technologies. Process design approaches and comparative evaluation of various technologies. Case Studies.

Note: Credit for Chemical Engineering 665 and Environmental Engineering 665 will not be allowed.

Chemical Engineering 677 **3 units; (3-0)**

Advanced Oil and Gas Engineering

Problems related to production of conventional oil, heavy oil and natural gas; analysis of the interactions of oil, water and gas, effects of fluid properties, rock structure and capillary, gravity and viscous forces acting on the reservoir system; application to the design of improved oil and gas recovery methods. New processes in oil and gas recovery.

Prerequisite(s): Petroleum Engineering 429 or Petroleum Engineering 523.

Chemical Engineering 687 **3 units; (3-0)**
(formerly Chemical Engineering 619.87)

Petroleum Economics

Economic principles and risk management practices in the petroleum industry. Project selection; investment ranking; budgeting; and portfolio development. Decision making under uncertainty and risk.

Antirequisite(s): Credit for Chemical Engineering 687 and Petroleum Engineering 626 will not be allowed.

Chemical Engineering 689 **3 units; (3-0)**

Drilling Advances, Modelling and Simulation

Application of drilling optimization simulator tools to optimize rate of penetration and minimize cost. Drilling hydraulics simulation, directional drill string torque and drag calculations, drilling fluid selection and analysis and real time drilling rate analysis.

Antirequisite(s): Credit for Chemical Engineering 689 and either Chemical Engineering 619.91 or Petroleum Engineering 627 will not be allowed.

Chemical Engineering 698 **6 units; (3-0)**
(Geology 698)

Reservoir Characterization for Field Development

A team-based, integrated reservoir description experience working with geophysical, geological, petrophysical, and engineering data to produce a field development plan.

Prerequisite(s): Chemical Engineering 621, Geology 697 and Organizational Behaviour and Human Resources 789 and admission to the Master of Engineering with Reservoir Characterization Specialization.

Antirequisite(s): Credit for Chemical Engineering 698 and either 619.95 and 619.96 will not be allowed.

Chemical Engineering 699 **3 units; (0-4)**

Special Project

Project study conducted under the guidance of a faculty member and intended to expose the student to the tools, techniques and basic aspects of research. A written comprehensive report and one or more written progress reports are required.

Prerequisite(s): Consent of the Department Head or Associate Head Graduate Studies.

Antirequisite(s): Credit for Chemical Engineering 699 and 620 will not be allowed.

MAY BE REPEATED FOR CREDIT

Chemical Engineering 701 **3 units; (3-0)**
(Environmental Engineering 621)

Experimental Design and Error Analysis

Statistical analysis and design of engineering experiments. Random variables and sampling distributions; estimation and hypothesis testing; concepts of central tendency, variability, confidence level; correlation, regression and variation analysis; robust estimation; experiments of evaluation; experiments of comparison; factorial experiments (analysis of variance); experimental designs (involving randomization, replication, blocking and analysis of covariance).

Antirequisite(s): Credit for more than one of Chemical Engineering 701, Environmental Engineering 621, Chemical Engineering 619.45 and 619.82 will not be allowed.

Note: Intended for MSc/PhD students. MEng students may be able to register with Instructor's Permission.

Chemical Engineering 703 **3 units; (3-0)**

Advanced Mathematical Methods in Engineering

Review of theory of linear algebra. Review of ordinary differential equations: linear, non-linear; series solutions; special exact solutions; applications. Partial differential equations: geometric interpretation; characteristic curves; separation of variables; the Sturm-Liouville problem and Fourier series; eigenfunction expansion; Fourier, Laplace and Hankel transforms; self-similarity; Green's function; applications.

Antirequisite(s): Credit for Chemical Engineering 703 and 619.83 will not be allowed.

Note: Intended for MSc/PhD students. MEng students may be able to register with Instructor's Permission.

Chemistry CHEM

For more information about these courses see the Department of Chemistry: ucalgary.ca/chem/.

Students interested in taking Chemistry courses are urged to read the advice in the Faculty

of Science Program section of this Calendar. Students taking Chemistry courses which have a laboratory component are required to provide evidence that they have successfully completed the Chemical Laboratory Safety Course for Undergraduates prior to the first laboratory class. Students who have not completed this course at some time during their undergraduate program will not be allowed into the laboratory until they do so. Information about this course is available from the Chemistry Undergraduate Office (SA 229), email address: chem.undergrad@ucalgary.ca, or at chem/undergraduate/current_students/academics.

Junior Courses

Chemistry 201 **3 units; (3-.75T-3/2)**

General Chemistry: Structure and Bonding

An introduction to university chemistry from theoretical and practical perspectives, that focuses on an exploration of the fundamental links between electronic structure, chemical bonding, molecular structure and the interactions of molecules using inorganic and organic examples.

Prerequisite(s): Chemistry 30 (or Continuing Education - Chemistry 2) and one of Mathematics 30-1 or Mathematics 2 (offered by Continuing Education).

Antirequisite(s): Credit for Chemistry 201 and any of 209, 211 or 301 will not be allowed.

Chemistry 203 **3 units; (3-.75T-3/2)**

General Chemistry: Change and Equilibrium

An introduction to university chemistry from theoretical and practical perspectives that focuses on an exploration of the fundamental links between kinetics, equilibria and thermodynamics and explores acidity/basicity and redox behaviour using inorganic and organic examples.

Prerequisite(s): Chemistry 30 (or Continuing Education - Chemistry 2) and one of Mathematics 30-1 or Mathematics 2 (offered by Continuing Education).

Antirequisite(s): Credit for Chemistry 203 and any of 209, 213 or 301 will not be allowed.

Chemistry 209 **3 units; (3-1T-3/2)**

General Chemistry for Engineers

Basic chemical concepts. Atomic and molecular structure. Chemical bonding. Chemical kinetics and equilibria. Acid-base and solubility equilibria. Oxidation-reduction phenomena and electrochemistry. The chemistry of water. The chemistry of energy sources. Basic environmental issues.

Prerequisite(s): Chemistry 30 (or Continuing Education - Chemistry 2) and one of Mathematics 30-1 or Mathematics 2 (offered by Continuing Education).

Antirequisite(s): Credit for Chemistry 209 and any of 201, 203, 211, 213 and 301 will not be allowed.

Chemistry 211 **3 units; (3-3)**

Foundations of Chemistry: Structure and Bonding

Same core topics as Chemistry 201 but taught with a greater emphasis on critical thinking, scientific observation and problem solving and the application of chemistry to topics such as drug design and environmental issues.

Prerequisite(s): A grade of 80 per cent or higher in Chemistry 30 (or a grade of "B+" or higher in Continuing Education - Chemistry 2) and one of Mathematics 30-1 or Mathematics 2 (offered by Continuing Education).

Antirequisite(s): Credit for Chemistry 211 and any of 201, 209 or 301 will not be allowed.

Chemistry 213 **3 units; (3-3)**

Foundations of Chemistry: Change and Equilibrium

Same core topics as Chemistry 203 but taught with a greater emphasis on critical thinking, scientific observation and problem solving and the application of chemistry to topics such as materials, explosives and medicine.

Prerequisite(s): Chemistry 201 or 211.

Antirequisite(s): Credit for Chemistry 213 and any of 203, 209 or 301 will not be allowed.

Senior Courses

Note: In all senior courses in Chemistry with a laboratory component, a charge will be levied for excessive breakage of glassware or equipment.

Chemistry 301 **3 units; (3-0)**

The Chemical World

The focus is on developing a general awareness and appreciation of the chemistry all around us; where chemical principles are surveyed in a variety of current and everyday contexts.

Antirequisite(s): Credit for Chemistry 301 and any of 201, 203, 209, 211 or 213 will not be allowed.

Registration in this course is not permitted for Honours, Majors or Minors in Chemistry programs or Environmental Science (Chemistry Concentration) or Natural Sciences (Chemistry Concentration).

Note: This course is not in the field of Chemistry. May not be used for credit by Honours, Majors or Minors in Chemistry programs or Environmental Science (Chemistry Concentration) or Natural Sciences (Chemistry Concentration).

Chemistry 311 **3 units; (3-4)**

Analytical Chemistry: Quantitative Analysis

Lectures: Principles and practice of precision measurement in chemistry. Statistical treatment of data. Acid-base and oxidation-reduction equilibria. Complexometric analysis. Laboratory: Quantitative analysis of organic and inorganic materials.

Prerequisite(s): Chemistry 201 or 211; and 203 or 213; and one of Mathematics 249, 265 or 275.

Chemistry 315 **3 units; (3-4)**

Analytical Chemistry: Introductory Instrumental Analysis

Lectures: Principles and practice of instrumental measurements for the quantitative determination of substances. Spectroscopic analysis. Analytical separations: liquid-liquid extraction, solid phase extraction, chromatography. Electrochemical methods: potentiometry, voltammetry, coulometry. Automated methods of analysis. Laboratory: Quantitative analysis of organic and inorganic materials using simple instrumental techniques.

Prerequisite(s): Chemistry 311.

Chemistry 321 **3 units; (3-0)**

Environmental Chemistry

A survey course of major aspects of environmental chemistry including the natural chemical cycles in the biosphere, geosphere, hydrosphere and atmosphere and the consequences of anthropogenic disturbances to these cycles. Topics discussed will include: Aquatic Chemistry and water pollution. Atmospheric Chemistry and its alteration. Soil Chemistry and the fate of pollutants. Hazardous waste. Toxicological Chemistry.

Prerequisite(s): One of Chemistry 203, 209 or 213.

Chemistry 351 3 units; (3-1T-3)**Organic Chemistry I**

An introduction to Organic Chemistry from a mechanistic perspective. Structure, bonding, and function, e.g. physical properties and reactivity. Stereochemistry; kinetics and thermodynamics. Spectroscopy (nuclear magnetic resonance, infrared, ultra-violet/visible, and mass spectrometric techniques). Substitution and elimination reactions of saturated functional groups - the chemistry of alkanes, alkyl halides, alcohols and their derivatives. Laboratory: Practical techniques.

Prerequisite(s): Chemistry 201 or 211; and 203 or 213.

Antirequisite(s): Credit for Chemistry 351 and 357 will not be allowed.

Chemistry 353 3 units; (3-1T-3)**Organic Chemistry II**

The concept and implications of aromaticity. The reactions of unsaturated functional groups via substitution, elimination and addition mechanisms - the chemistry of alkenes, alkynes, aromatics, aldehydes, ketones and carboxylic acids and their derivatives. Laboratory: Characteristic functional group reactivity, synthesis, and qualitative organic analysis.

Prerequisite(s): Chemistry 351.

Antirequisite(s): Credit for Chemistry 353 and either 355 or 357 will not be allowed.

Chemistry 355 3 units; (3-1T-3)**Organic Chemistry II (for Chemists)**

Mechanisms and synthetic applications of the reactions of alkenes, alkynes, aromatics, carbonyl compounds, carboxylic acids and derivatives, and conjugated systems such as 1, 3-dienes and enones. The concept of aromaticity and its effect on chemical behaviour. Laboratory: Emphasis on organic synthesis and the methods of qualitative organic analysis.

Prerequisite(s): Chemistry 201 or 211; and 203 or 213; and 351 and admission to the Chemistry major, Applied Chemistry major or Chemical Physics major.

Antirequisite(s): Credit for Chemistry 355 and either 353 or 357 will not be allowed.

Chemistry 357 3 units; (3-1T)**Industrial Organic Chemistry for Engineers**

The hybridization of the carbon atom and covalent bonding. Typical reactions of alkanes, alkenes, alkynes and industrial applications. Substitution; halogenation, nitration and oxidation of aromatic hydrocarbons; polymerization and industrial applications. Functional groups and their reactions; oxidation, reduction, addition and elimination reactions, and industrial applications.

Prerequisite(s): Chemistry 209, or 201 or 211; and 203 or 213.

Antirequisite(s): Credit for Chemistry 357 and any of 351, 353 or 355 will not be allowed.

Chemistry 371 3 units; (3-1T-3)**Physical Chemistry: Thermodynamics Chemistry**

Lectures: A study of the states of matter. The basic laws of thermodynamics and their applications. Development of the concept of chemical potential. Changes of state and phase diagrams of pure substances and mixtures. Equilibrium electro-chemistry. Laboratory: Experimental measure-

ments, interpretations, and calculations relating to the topics discussed in lectures.

Prerequisite(s): Chemistry 201 or 211; and 203 or 213; Physics 223 or admission to a Major program offered by the Department of Physics and Astronomy and 6 units of Physics; and Mathematics 267 or 277.

Antirequisite(s): Credit for Chemistry 371 and any of Physics 347, 349, or 447 will not be allowed.

Chemistry 373 3 units; (3-1T-3)**Physical Chemistry: Quantum Chemistry**

Lectures: Elementary quantum mechanical treatment of the energy levels of atoms and molecules. Atomic spectra. Symmetry elements, operations, and point groups. Laboratory: Experimental measurements, interpretations, and calculations relating to the topics discussed in lectures.

Prerequisite(s): Chemistry 201 or 211; and 203 or 213; Physics 223 or 355; Mathematics 267 or 277.

Chemistry 379 3 units; (3-1T)**Materials Chemistry for Engineers**

An introduction to materials chemistry with industrial applications. Theories of chemical bonding and the relationship between chemical structure and observable properties. Chemical and physical properties of mixtures and interfaces. Structure and applications of polymers and soft materials.

Prerequisite(s): Chemistry 209, or 201 or 211; and 203 or 213.

Chemistry 402 3 units; (0-9)**Introduction to Research in Chemistry**

A chemistry-based research project under the supervision of an academic staff member.

402.01 - Introduction to Research in Chemistry I

402.02 - Introduction to Research in Chemistry II

Prerequisite(s): Chemistry 201 or 211; and 203 or 213; and consent of the Department.

Chemistry 409 3 units; (3-0)**Applied Chemistry and Chemical Pathways for Engineers**

Analysis of industrial chemical processes based on reaction pathways to infer system performance including co-product formation and the role of catalysts. Examples from oil, gas, coal and petrochemical processing.

Prerequisite(s): Chemistry 209 and 357.

Chemistry 417 3 units; (3-0)**Modern Chromatographic Analysis**

Fundamental concepts and methods of chromatographic separation science: Partition theory, sample preparation, chromatographic theory, gas and liquid chromatography, principles of detection. Emerging concepts such as micro-fluidic separation platforms, column technology and novel mobile phases.

Prerequisite(s): Chemistry 311 and 315.

Chemistry 423 3 units; (3-0)**Green Chemistry: Principles and Techniques**

Green Chemistry focuses on the science and techniques that chemists and chemical and process engineers use to generate less waste, and to develop products and processes that are more atom- and energy-efficient, environmentally sensitive, and cost-effective. A look at the principles behind green chemistry, some techniques and processes

used in achieving atom- and energy-efficiency, and waste reduction.

Prerequisite(s): Chemistry 333 or 433; and one of 353 or 355; or Chemistry 357 and 409.

Chemistry 425 3 units; (3-0)**Industrial Chemistry**

Electrochemical processes and the applications of some of their products. Unit operations and reactor types in the chemical industry. Petroleum refining including heavy oil and bitumen. Industrial organic synthesis including monomers for subsequent polymerization. Design of specialized polymers.

Prerequisite(s): Chemistry 353 or 355.

Chemistry 431 3 units; (3-3)
(formerly Chemistry 331)**Inorganic Chemistry: Main Group Elements**

Lectures: The structure of many-electron atoms. Bonding, stereochemistry and symmetry in inorganic compounds. Solid-state science and aspects of inorganic solution chemistry. The chemistry of the main group elements. Laboratory: Applications of chemical principles to inorganic synthetic and qualitative analytical problems.

Prerequisite(s): Chemistry 201 or 211; and 203 or 213; and 351.

Chemistry 433 3 units; (3-3)
(formerly Chemistry 333)**Inorganic Chemistry: Transition Metals**

Lectures: Bonding models for metals and for transition metal compounds. Interpretation of redox and thermodynamic properties based on ligand field theory. Coordination and organometallic compounds of the transition metals. Metal complexes as catalysts in industry and biology. Laboratory: Synthesis, analysis, and physical investigations of transition metal compounds which illustrate their important properties.

Prerequisite(s): Chemistry 201 or 211, and 203 or 213, and 331 or 431.

Chemistry 453 3 units; (3-4)**Advanced Organic Chemistry**

Introduction to molecular orbital (MO) theory. Pericyclic reactions, the Woodward-Hoffmann rules. Photochemistry. Elucidation of reaction mechanism, and reactive intermediates. Laboratory: Multi-step synthesis and computer modelling of organic reactions.

Prerequisite(s): Chemistry 351 and one of Chemistry 353 or 355.

Chemistry 471 3 units; (3-1T-3)**Physical Chemistry: Kinetics and Spectroscopy**

Vibrational, electronic and magnetic resonance spectra. Reaction kinetics and transport properties in the gas phase and in solution. Catalysis. Laboratory: Experimental measurements, interpretations, and calculations relating to the topics discussed in lectures.

Prerequisite(s): Chemistry 371 and 373.

Chemistry 502 6 units; (0-9)**Research in Chemistry**

Comprehensive research project under the direction of a staff member. A research report must be

presented on completion of the course, and attendance at a weekly research seminar is expected.

Prerequisite(s): Consent of the Department.

Note: It is recommended that students have completed the third year of their program in Chemistry, Applied Chemistry or Chemical Physics.

MAY BE REPEATED FOR CREDIT

Chemistry 515 **3 units; (3-4)**

Advanced Instrumental Analysis

Lectures: Fundamental aspects of modern instrumental methods. Spectroscopic methods: UV-visible and atomic absorption spectroscopy, flame and plasma emission methods. Chromatographic methods; liquid and gas chromatography. Mass spectrometry. Laboratory: Analysis of inorganic and organic samples using spectroscopic, electrochemical, and chromatographic instrumental methods.

Prerequisite(s): Chemistry 311 and 315.

Chemistry 521 **3 units; (3-0)**

Introduction to Atmospheric Chemistry

An introduction to Tropospheric and Stratospheric Chemistry. The detailed chemistry of the stratosphere and troposphere. Gas-phase chemical kinetics. Photochemistry and atmospheric radiation. Aerosols. Anthropogenic pollution and air quality. Climate forcing. Introduction to modelling and atmospheric transport.

Prerequisite(s): Chemistry 315 and 373.

Chemistry 531 **3 units; (3-1T)**

Advanced Inorganic Chemistry: Transition Metals

Co-ordination and organometallic chemistry of the transition elements, incorporating the lanthanoids and actinoids. Fundamental and applied aspects, including characterization techniques, reaction mechanisms, catalysis and bioinorganic chemistry.

Prerequisite(s): Chemistry 331 or 431; and 333 or 433; and one of 353 or 355.

Chemistry 533 **3 units; (3-1T)**

Advanced Inorganic Chemistry: Main Group Elements

Chemistry of the s- and p-block elements. Interpretation of nuclear magnetic resonance, electron paramagnetic resonance, vibrational and mass spectra. Fundamental concepts and industrial uses of inorganic heterocycles and polymers, electron-deficient and organometallic compounds. Solid-state chemistry.

Prerequisite(s): Chemistry 331 or 431; and 333 or 433; and one of 353 or 355.

Chemistry 535 **3 units; (1-8)**

Advanced Inorganic Laboratory

Advanced laboratory techniques for the synthesis and characterization of main group compounds, organometallics and solid-state materials using modern spectroscopic and structural methods. Includes a short project.

Prerequisite(s): Chemistry 331, 333 and 453 and admission to the Chemistry major, Applied Chemistry major or Chemical Physics major.

Chemistry 541 (Biochemistry 541) **3 units; (3-0)**

Concepts in Biochemical Toxicology

An interdisciplinary course focused on the diverse biomolecular mechanisms by which organic (e.g. PCB's) and inorganic pollutants (e.g. Cd, Hg, As) adversely affect cell function examined at

multiple levels of organization, from molecules to whole organisms. Topics include how natural toxins exert toxicity, how toxins/light generate free radicals within cells, how the speciation of metals in the environment affects their bioavailability/toxicity, and the toxicity mechanisms that lead to homeostatic dysfunction.

Prerequisite(s): Chemistry 311, 321, 351; and one of Biochemistry 341 or 393.

Antirequisite(s): Credit for Chemistry 541 and either Chemistry 641 or Biochemistry 541 will not be allowed.

Chemistry 551 **3 units; (3-1T)**

Organic Synthesis

Concepts and strategies of synthesizing molecules with emphasis on carbon-carbon bond-forming reactions, protecting groups, chemo-, regio- and stereoselectivity.

Prerequisite(s): Chemistry 453.

Chemistry 553 **3 units; (3-1T)**

Bio-organic Chemistry

Organic chemistry applied to the understanding of biomolecules: Selected topics from carbohydrate, peptide/protein, lipid and nucleoside chemistry, enzyme inhibition and drug design.

Prerequisite(s): Chemistry 453.

Chemistry 555 **3 units; (1-8)**

Advanced Organic Laboratory

Advanced laboratory techniques: Methods of purification and identification of products, purification of reagents, experimental design, working with air/moisture sensitive reagents. Includes a short research project.

Prerequisite(s): Chemistry 453 and admission to the Chemistry major, Applied Chemistry major or Chemical Physics major.

Chemistry 559 **3 units; (3-1T)**

Organic Spectroscopy

The instrumentation, theory and practical aspects of spectroscopy (e.g. UV/vis, MS, IR, 1H and 13C NMR including 2D-techniques). The emphasis will be on the application for structural elucidation through a problem solving approach.

Prerequisite(s): Chemistry 351 and one of 353 or 355.

Chemistry 571 **3 units; (3-0)**

Physical Chemistry of Interfaces

The chemical and electrical nature, as well as basic thermodynamics, of interfaces. Surface films and aqueous interfaces, including micelles and bilayers. Interfaces involving solids such as metals and semiconductors. Absorption phenomena and surface catalysis. Survey of experimental approaches for interfacial studies.

Prerequisite(s): Chemistry 371 and 373.

Chemistry 573 **3 units; (3-0)**

Nature of the Condensed Phase in Chemistry

Theoretical models of liquids and solids. Dielectric continuum, polarizabilities and magnetism. Ionic crystal, insulators, conductors, semiconductors and super conductors. Some aspects of scattering techniques for structure determination.

Prerequisite(s): Chemistry 371 and 373.

Chemistry 575 **3 units; (3-1T-3)**

Advanced Electronic Structure Theory

A discussion of the theories of modern electronic structure illustrated by applications to molecular

structure and bonding, electronic spectroscopy, as well as chemical reactivity and dynamics.

Prerequisite(s): Chemistry 371 and 373.

Chemistry 579 **3 units; (3-0)**

Surface and Colloid Chemistry for Engineers

Introduces the fundamental and applied aspects of interfacial phenomena including capillarity, surface and interfacial tension, films, wetting and contact angles, adsorption, micellization, solubilization and emulsification. Examples drawn from colloids, foams, aerosols and macromolecules.

Prerequisite(s): Chemistry 209; and 357 or 379; and Chemical Engineering 427.

Chemistry 599 **3 units; (3-0) or (3-3)**

Selected Topics in Chemistry

Selected topics are offered based on the interests of Chemistry faculty and students.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Chemistry 601 **3 units; (2S-0)**

Research Seminar

Reports on studies of the literature or of current research. Required of all graduate students in Chemistry.

NOT INCLUDED IN GPA

Chemistry 603 **3 units; (2S-0)**

Research Seminar

Continuation of Chemistry 601.

NOT INCLUDED IN GPA

Chemistry 613 **3 units; (3-0)**

Electrochemical Fundamentals and Methodologies

Origin, significance, and thermodynamics of interfacial potential differences; structure of the double layer; basic principles of electron transfer at interfaces, Butler-Volmer equation; mass transport control of electro-chemical reactions; controlled potential methods as applied to electrode surface reactions and homogeneous reactions coupled to electron-transfer processes.

Chemistry 615 **3 units; (3-0)**

Analytical Separations

Theory and practice of resolving mixtures into separate components for analysis. Basic theory; liquid-liquid extraction; high performance liquid chromatography; gas-liquid, open bed, ion exchange and exclusion chromatography; electrophoresis.

Chemistry 617 **3 units; (3-0)**

Advanced Analytical Chemistry

Consideration of principles and equilibria pertaining to aqueous and nonaqueous neutralization, redox, complexation, precipitation and potentiometric methods employed in analyses. Statistical considerations of analytical data and analysis.

Chemistry 619 **3 units; (3-0)**

Selected Topics in Analytical Chemistry

Topics of current interest such as: properties of synthetic polymer membranes, advanced instrumental methods, developments in chemical sensors, speciation studies, environmental analytical chemistry.

MAY BE REPEATED FOR CREDIT

Chemistry 621 3 units; (3-0)**Organometallic Chemistry**

A detailed discussion of structure, bonding and preparative methods in organometallic chemistry including the industrial and synthetic applications of organometallic compounds.

Chemistry 623 3 units; (3-0)**Chemistry of the Main Group Elements**

The chemistry of electron-deficient, electron-precise, and electron-rich rings, inorganic polymers, and organometallic compounds of the main group elements; applications of spectroscopic techniques; industrial uses. Seminars on recent research developments.

Chemistry 627 3 units; (3-0)**Theoretical Inorganic Chemistry**

Aspects of theoretical inorganic and organometallic chemistry including: quantitative and qualitative molecular orbital theory; the bonding and structure of molecules, clusters, and extended arrays; the fragments of organometallic species; orbital correlation diagrams in inorganic reactions; spectroscopic methods and their interpretation.

Chemistry 629 3 units; (3-0)**Selected Topics in Inorganic Chemistry**

Courses are offered to cover topics of current interest, such as bioinorganic chemistry, inorganic solution phenomena, and the inorganic chemistry of the solid state.

MAY BE REPEATED FOR CREDIT

Chemistry 641 3 units; (3-0)**Concepts in Biochemical Toxicology**

An interdisciplinary course focused on the diverse biomolecular mechanisms by which organic (e.g. PCB's) and inorganic pollutants (e.g. Cd, Hg, As) adversely affect cell function examined at multiple levels of organization, from molecules to whole organisms. Topics include how natural toxins exert toxicity, how toxins/light generate free radicals within cells, how the speciation of metals in the environment affects their bioavailability/toxicity, and the toxicity mechanisms that lead to homeostatic dysfunction.

Antirequisite(s): Credit for Chemistry 641 and either Chemistry 541 or Biochemistry 541 will not be allowed.

Chemistry 651 3 units; (3-0)**Advanced Organic Stereochemistry**

Stereochemical principles in organic chemistry, including: geometry, bonding, symmetry, molecular isomerism, conformational analysis, asymmetric and stereocontrolled reactions.

Chemistry 653 3 units; (3-0)**Advanced Organic Spectroscopy**

Advanced spectroscopic techniques for the determination of complex organic structures. Emphasis will be on NMR methods, practical aspects of acquiring spectra, advanced interpretation and reporting spectral data.

Chemistry 655 3 units; (3-0)**Advanced Organic Synthesis**

A review of modern synthetic reactions and methods in the field of organic chemistry with emphasis on the recent literature.

Chemistry 657 3 units; (3-0)**Theoretical Organic Chemistry**

Theoretical principles of organic chemistry including stereochemistry, molecular orbital calculations, pericyclic processes (Woodward-Hoffmann rules), and PMO theory.

Chemistry 659 3 units; (3-0)**Selected Topics in Organic Chemistry**

Courses are offered in major branches of organic chemistry, including: carbohydrate chemistry, steroids and terpenoids, semiochemistry, heterocyclic chemistry, biosynthesis of secondary metabolites, as well as other topics of current interest.

MAY BE REPEATED FOR CREDIT

Chemistry 669 3 units; (3-0)**Selected Topics in Applied Chemistry**

Courses are offered in such topics as electrochemistry, industrial catalysis, chemistry of energy sources, colloid and surface chemistry and polymer chemistry.

MAY BE REPEATED FOR CREDIT

Chemistry 681 3 units; (3-0)**Crystallography**

A general introduction to X-ray analysis of single crystals. Topics include: Geometry of the crystalline state; diffraction of X-rays; Fourier synthesis; methods of structure solution; accuracy and precision of derived parameters.

Chemistry 689 3 units; (3-0)**Selected Topics in Physical Chemistry**

Courses are offered in such topics as dielectric properties, kinetics, molecular vibrations, fluorescence spectroscopy, X-ray diffraction.

MAY BE REPEATED FOR CREDIT

Chemistry 701 3 units**Independent Study**

Independent study not directly related to the student's thesis project normally under the direction of any chemistry faculty member. A course information sheet must be provided and a student report must be submitted on completion of the course.

Note: Multiple 701 courses can be offered in any one term. However, students may take this course for credit not more than twice.

MAY BE REPEATED FOR CREDIT

Chinese CHIN

For more information see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

Language Placement information see 4.59 Placement in Language Courses.

Junior Courses**Chinese 205** 3 units; (4-1)**Beginners' Chinese I**

Basic concepts of the Chinese National Language. Reading and writing of characters, essentials of grammar, basic vocabulary, and oral drills on normal speech patterns.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: Not open to students with credit in Chinese 30 or 35. See 4.59 Placement in Language Courses.

Chinese 207 3 units; (4-1)**Beginners' Chinese II**

Continuation of Chinese 205.

Prerequisite(s): Chinese 205.

Chinese 229 3 units; (2-2)**Intensive Beginners' Chinese**

Intensive development of conversational skills and the pronunciation of the Chinese National Language. Enhanced training in vocabulary acquisition, grammar and writing. For students with a background in a Chinese dialect.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Antirequisite(s): Credit for Chinese 229 and either 205 or 207 will not be allowed.

Chinese 279 3 units; (1-2)**Reading and Writing Chinese**

Introduction to the Chinese language for students who have a background in Mandarin and other Chinese dialects, but limited reading and writing ability. Students will learn to read and write characters, and acquire the essentials of basic vocabulary and grammar.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Antirequisite(s): Credit for Chinese 279 and either 205 or 207 will not be allowed.

Senior Courses**Chinese 301** 3 units; (3-1)**Continuing Chinese I**

Further acquisition of Chinese characters, and the development of conversational skills through reading and discussion of selected Chinese texts. Structural analysis of normal speech patterns. Preparation of written assignments. A continuation of Chinese 207.

Prerequisite(s): Chinese 207.

Antirequisite(s): Credit for Chinese 229 and 301 will not be allowed.

Chinese 303 3 units; (3-1)**Continuing Chinese II**

Continuation of Chinese 301.

Prerequisite(s): Chinese 301.

Antirequisite(s): Credit for Chinese 303 and 229 will not be allowed.

Chinese 309 3 units; (3-2)**Chinese Culture in an Immersion Setting**

An introduction to contemporary Chinese culture and functional Chinese language.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: Offered during Spring/Summer Intersession in the People's Republic of China. A supplementary fee will be assessed to cover additional costs associated with this course.

Chinese 311 3 units; (3-1)**Chinese Language in an Immersion Setting I**

A course in Chinese stressing the oral skills in an immersion environment.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Corequisite(s): Chinese 309.

Note: Offered during Spring/Summer Intersession in the People's Republic of China. A supplementary fee will be assessed to cover additional costs associated with this course.

Chinese 313 **3 units; (3-1)**

Chinese Language in an Immersion Setting II

A continuation of Chinese 311.

Prerequisite(s): Chinese 311.

Note: Offered during Spring/Summer Intersession in the People's Republic of China. A supplementary fee will be assessed to cover additional costs associated with this course.

Chinese 317 **3 units; (3-0)**

Topics in Chinese Civilization

Distinctive features of Chinese civilization within the Asian context.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

Chinese 331 **3 units; (3-0)**

Intermediate Chinese I

An intermediate course giving equal emphasis to receptive and productive language skills.

Prerequisite(s): Chinese 303.

Antirequisite(s): Credit for Chinese 331 and 229 will not be allowed.

Chinese 333 **3 units; (3-0)**

Intermediate Chinese II

A continuation of Chinese 331.

Prerequisite(s): Chinese 331.

Antirequisite(s): Credit for Chinese 333 and 229 will not be allowed.

Chinese 341 **3 units; (3-0)**

Introduction to Chinese Literature

Introduction to Chinese literature through the reading and discussion of selected literary works.

Prerequisite(s): Chinese 303.

Chinese 353 **3 units; (3-0)**

Introduction to Chinese Language and Linguistics

An overview of Chinese linguistics. Provides an introduction to linguistic concepts and topics to enhance understanding of the structure of the Chinese language.

Prerequisite(s): Chinese 207.

Note: Taught in English. Consent will be given to all students who are native speakers of Chinese, native speakers, and students whose Chinese proficiency is equivalent to the level of Chinese 207.

Chinese 355 **3 units; (3-0)**

Topics in Chinese Literature in Translation

Introduces the literary tradition of China by means of reading the English translations of representative works. Examines the historical and cultural background, as well as literary forms and aesthetics.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

Chinese 357 **3 units; (3-0)**

Topics in Chinese Film

Chinese film from the perspectives of film theory and political and cultural history. The course may concentrate on a specific director, a period, or a genre in Chinese film.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

Chinese 363 **3 units; (3-0)**

Chinese Language in the Cultural Context

Study of the use and function of the Chinese language in its cultural context.

Prerequisite(s): Chinese 207 or consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: Consent will be given to all students who are native speakers of Chinese and students whose Chinese proficiency is equivalent to the level of Chinese 207.

Chinese 371 **3 units; (3-0)**

Classical Chinese I

An introduction to the grammar and vocabulary of the classical Chinese language. Readings of short texts selected from famous classical works.

Prerequisite(s): Chinese 303.

Chinese 373 **3 units; (3-0)**

Classical Chinese II

Further study of grammar and vocabulary of classical Chinese language. Readings of short texts selected from famous classical works.

Prerequisite(s): Chinese 371.

Chinese 401 **3 units; (3-0)**

Advanced Chinese Conversation

Development of Chinese oral communication skills through contemporary film, television programs and/or other audio materials with textbooks.

Prerequisite(s): Chinese 333.

Antirequisite(s): Credit for Chinese 401 and 421 will not be allowed.

Chinese 403 **3 units; (3-0)**

Advanced Readings and Writing in Modern Chinese

Development of Chinese reading and writing skills through newspapers, magazines, social commentary and/or literary works.

Prerequisite(s): Chinese 333.

Antirequisite(s): Credit for Chinese 403 and 421 will not be allowed.

Chinese 431 **3 units; (3-0)**

Selected Topics in Chinese Literature

Selected readings from various literary topics, such as contemporary Chinese literature, the Chinese diaspora experience, readings of specific authors.

Prerequisite(s): Chinese 403 or 421.

MAY BE REPEATED FOR CREDIT

Chinese 461 (Japanese 461) **3 units; (3-0)**

Japanese-Chinese Cultural Relations

Discussion of cultural relations and influences between Japan and China. Topics may include cultural identities and cross-influences, literary and artistic traditions, writing systems.

Prerequisite(s): Chinese 303 or higher (excluding Chinese 317 and Chinese 355).

Note: Knowledge of Japanese would be beneficial.

Chinese 561 **3 units; (3S-0)**

Research Seminar

Engages senior students as members of a collaborative research team. Independent research, discussion, group presentations.

Prerequisite(s): One of Chinese 403, 421 or 431.

MAY BE REPEATED FOR CREDIT

Civil Engineering ENCI

For more information about these courses, see the Department of Civil Engineering: schulich.ucalgary.ca/civil.

Senior Courses

Civil Engineering 317 **3 units; (3-1.5T-3/2)**

Mechanics of Solids

Axial-force, shear-force and bending-moment diagrams; stress and strain; stress-strain relations; elastic and plastic behaviour; elastic constants; simple statically indeterminate (one-degree) problems; review of moment of inertia, product of inertia and principal axes of inertia; elastic torsion of circular shafts; elastic and plastic bending about principal axes of beams with symmetrical cross-section; composite beams; shear stresses due to bending; Mohr's circle for stress; thin-walled pressure vessels; deflection of beams by integration; Euler buckling.

Prerequisite(s): Engineering 202 and Mathematics 275 or Applied Mathematics 217.

Antirequisite(s): Credit for Civil Engineering 317 and Engineering 317 will not be allowed.

Civil Engineering 337 **3 units; (2-3)**

Tools for Civil Engineering Design

A course utilizing computer tools to solve practical Civil Engineering problems. The course concentrates upon the use of spreadsheets, but also involves interaction with databases, computer graphics and computer programming for analysis, design and reporting. Problems will normally be derived from several core Civil Engineering sub-disciplines.

Prerequisite(s): Engineering 233.

Civil Engineering 402 **3 units; (3-2T)**

Hydraulics

Quantitative and qualitative investigation of pipe flow and free-surface fluid flow. Application of fundamental laws of mechanics to fluid flow, including conservation of mass, momentum, and energy. Use of theoretical and numerical analysis methods. Review of basic concepts of fluid motion; pressurized pipe network flow; open channel flow; uniform and non-uniform flow.

Prerequisite(s): Mechanical Engineering 341.

Civil Engineering 413 **3 units; (3-5/2)**

Introduction to Civil Engineering Materials

Engineering properties, materials science and applications of Civil Engineering materials: strength, elasticity, fatigue, creep, shrinkage, durability, thermal deformation; introduction to fracture mechanics; microstructure and fundamental principles underlying performance; mass transport processes, corrosion and phase transformations causing deterioration. Practical examples from difference materials sectors: steel, aggregates, cement, Portland cement concrete, masonry, asphalt concrete, natural and synthetic polymers.

Prerequisite(s): Engineering 201 and one of Engineering 317 or Civil Engineering 317.

Civil Engineering 423 **3 units; (3-1T-2)**

Geotechnical Engineering I

Identification and classification of soils; soil compaction; seepage; effective stress concept; stresses in a soil mass; settlement; one dimensional consolidation; shear stress and strength; introduction to slope stability; selected laboratory and design exercises with computer applications.

Prerequisite(s): Geology 471.

Civil Engineering 451 **3 units; (3-2T-1)****Structural Engineering I**

Review of analysis of statically determinate and indeterminate structures. Structural building materials; principles of structural analysis and design process; loads on structures; structural systems; idealized models; load paths for gravity lateral loads; structural safety; philosophy of limit states design. Design principles for main structural members in steel, plain and reinforced concrete/masonry, and timber.

Prerequisite(s): Civil Engineering 461.

Corequisite(s): Civil Engineering 413.

Civil Engineering 461 **3 units; (3-1.5T)****Mechanics of Solids and Structures**

Analysis of statically determinate structures: reactions, member forces in trusses, bending moment, shearing force and axial force diagrams for frames; introduction to indeterminate structures; effects of moving loads, influence lines, Muller-Breslau principle; determination of displacements using moment area theorems, energy theorems and virtual work; Maxwell's theorem; normal stresses in non-symmetric sections; principal axes, shear centre; plastic torsion of circular shafts, torsion of non-circular sections; principal stresses, failure theories; elastic buckling of columns.

Prerequisite(s): Engineering 317 or Civil Engineering 317.

Civil Engineering 471 **3 units; (3-2)****Project Management I**

Introduces techniques that provide rational solutions to a range of project management decision-making problems encountered in engineering projects. Students are expected to gain a detailed understanding of some of the techniques, tools and processes available and their application in planning and managing engineering and construction projects. The course covers project management fundamentals including project planning and scheduling techniques, cash flow forecasting, performance evaluations and decision analysis. Introduction to operations research.

Civil Engineering 473 **3 units; (3-2T)****Transportation Engineering I**

Goals and objectives of urban and regional transportation planning; introduction to transportation modes; transportation demand models; fundamentals of traffic flow theory; shockwave theory; car following models; highway capacity and level of service; traffic signal warrants; traffic signal design.

Prerequisite(s): Engineering 319.

Civil Engineering 481 **3 units; (3-1/2T-2/2)****Environmental Engineering I**

Analyze and develop civil engineering solutions, at a conceptual level, to human health and environmental problems associated with human activities; fundamental aspects of air, water and land pollution; water quality assessment and control; environmental aspects of non-renewable energy development; introduction to sustainability concepts in construction and transportation; solid waste management technologies; introduction to land pollution prevention and control.

Prerequisite(s): Chemistry 209 and Mechanical Engineering 341.

Civil Engineering 502 **3 units; (3-1T)****Civil Engineering Aspects of Sustainable Communities**

Definition of sustainability; global urbanization; emissions from transportation systems; economics of urban development from a civil infrastructure point of view, water/wastewater, land use/transportation; public transportation; travel demand management for sustainability; construction industry - energy use and emissions.

Prerequisite(s): Civil Engineering 473 and 481.

Civil Engineering 504 **3 units; (3-1T)****Uncertainty Concepts in Civil Engineering**

Fundamentals of uncertainty, risk, reliability and decision making in Civil Engineering applications. Probability as a measure of uncertainty based on frequency data, least presumptive methods and use of odds; Bayes' Theorem; known probability distributions and how they apply to civil engineering problems. Advanced topics including applications of extreme value distributions, joint probability distributions and stochastic optimization. Risk as a function of both probability and disutility. Risk analysis through Bayesian Decision Theory.

Prerequisite(s): Engineering 319.

Civil Engineering 508 **3 units; (3-1)****Environmental Aspects of Energy**

Environmental assessment and management in the energy sector. Ecological footprint introduction. Site investigation, field techniques and program implementation; remedial planning and design; cost and time analysis; physical, chemical and biological remediation techniques; biomass and waste to energy; energy use and emissions in transportation systems; energy efficiencies and emissions in building construction; assess problems with energy use from an environmental setting; develop and apply engineered solutions; ecological and environmental footprints of energy industries.

Prerequisite(s): Civil Engineering 481.

Civil Engineering 513 **3 units; (3-2T)****Structural Concrete Design**

Structural systems for buildings. Flexural design in reinforced concrete. Design of continuous beams and one-way slabs using moment coefficients. Shear design. Bond and development. Serviceability. Two-way slab and flat plate systems: direct design method, punching shear. Biaxially loaded and long columns. Walls: laterally loaded walls, bearing walls, shear walls. Footings: wall footings, isolated footings. Pre-stressed concrete: introduction, elastic analysis, deflections, flexural and shear strength. Use of computer programs where applicable.

Prerequisite(s): Civil Engineering 451.

Corequisite(s): Civil Engineering 551.

Civil Engineering 523 **3 units; (3-1T-2/2)****Geotechnical Engineering II**

Sub-surface investigations; soil shear strength, critical states and laboratory tests; shallow and deep foundations in sands and clays; bearing capacity and settlement of structures; lateral earth pressures and retaining structures; seepage analysis; slope stability analysis, selected laboratory design exercises, solution to slope stability and other problems using computer programs.

Prerequisite(s): Civil Engineering 423.

Civil Engineering 551 **3 units; (3-2T)****Structural Engineering II**

Review of analysis of statically determinate structures. Static and kinematic indeterminacy. Principle of superposition. The force/flexibility and displacement/stiffness methods for the analysis of statically indeterminate structures. Calculation of displacements. Inelastic buckling of columns. Use of computers for the analysis of plane frames and grids. Plastic analysis of continuous beams, frames and plates. Yield line theory.

Prerequisite(s): Civil Engineering 451.

Civil Engineering 557 **3 units; (3-2T)****Structural Steel Design**

Principles of limit states design of steel structures. Floor systems; resistance to horizontal forces. Properties of steel. Tension members. Eccentrically-loaded bolted and welded connections; connection details. Axially-loaded compression members. Laterally unsupported beams. Members subjected to bending and axial forces; beam-column effect. Composite beams. Plate girders. Design of a simple steel structure and use of available computer software to assist in analysis and design of steel structures.

Prerequisite(s): Civil Engineering 451 and 551.

Civil Engineering 565 **3 units; (3-1T)****Project Management II**

Introduces fundamentals of engineering and construction management techniques, tools and processes. The course covers understanding of design and contract documents, estimating and cost control; project organizations, design of temporary facilities including formwork and safety related matters, construction processes, dispute resolution, social, economic and environmental impacts, regulatory requirements, project completion and commissioning.

Prerequisite(s): Civil Engineering 471.

Civil Engineering 570 **6 units; (0-4)****Group Design Project**

Team design project applying engineering and project management principles to civil engineering design problems. Consideration of technical, resource allocation and business aspects of project. Development of project scope, design, specifications, scheduling and documentation. Elements of practical team management and leadership. Specific guidance provided by academic and industry advisors.

Prerequisite(s): Civil Engineering 402, 413, 423, 451, 461, 471, 473, and 481.

Note: Departmental consent will only be granted in exceptional cases if students are missing no more than one of the courses listed above. Concurrent enrolment in Civil Engineering 570 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Civil Engineering 571 **3 units; (3-1T)****Introduction to Road Safety**

Theory and evidence in accident analysis and prevention. Topics include Haddon's matrix, crash data analysis, traffic enforcement, road safety advertising, fleet safety, road safety audits, vehicle safety and program evaluation.

Prerequisite(s): Civil Engineering 473 and Engineering 319.

Civil Engineering 575 **3 units; (3-1T)****Transportation Engineering II**

An introduction to the fundamentals of how various transportation systems are designed and operated.

Topics to be covered include: public transit design and operation, highway engineering and design, airport design, traffic system design and operations, before and after studies and Intelligent Transportation Systems.

Prerequisite(s): Civil Engineering 473 and Engineering 319.

Civil Engineering 581 **3 units; (3-1)**

Environmental Engineering II

Water and wastewater quantities and quality, water distribution and wastewater collection systems, hydraulic considerations, design of sanitary sewers, storm drainage systems, physical, chemical, and biological processes for water and wastewater treatment; aeration, coagulation, flocculation, sedimentation, single and multi-media filtration, disinfection, activated sludge system and trickling filter, adsorption, reverse osmosis, membrane filtration, advanced oxidation, sludge processing and disposal, industrial water and wastewater treatment, water conservation, reuse and recycling.

Prerequisite(s): Civil Engineering 481 and Mechanical Engineering 341.

Civil Engineering 595 **3 units; (3-1)**

Special Topics

Current topics in Civil Engineering.

Prerequisite(s): Consent of the Department Head.

MAY BE REPEATED FOR CREDIT

Civil Engineering 597 **3 units; (0-5)**

Civil Engineering Project I

Individual work on an assigned Civil Engineering topic under the supervision of a faculty member. The project will normally involve a literature review, theoretical and laboratory or field work. Submission of a mid-term progress report defended orally and a final report.

Prerequisite(s): Consent of the Department.

Graduate Courses

Registration in all courses requires the approval of the Department of Civil Engineering. For a more complete listing of Environmental Engineering graduate courses look under Environmental Engineering.

Civil Engineering 611 **3 units; (3-1)**

Bituminous Materials

Origin of bituminous materials. Production, composition, and internal structure. Natural and petroleum-refined bituminous materials. Characteristics of bituminous materials and their measurement. Basic material and rheological tests. Application of bituminous materials in asphalt paving technologies. Hot mixes and asphalt emulsions. Paving mix design, properties and testing. Main failure modes of asphalt pavements. Industrial asphalts. Environmental impacts of asphalt technologies.

Civil Engineering 615 **3 units; (3-0)**

Rheology of Engineering Materials

Elements of tensor calculus. Constitutive equations. Linear and non-linear viscoelasticity. Dielectric properties of materials. Rheometry. Temperature and molecular mass dependencies of material functions. Relations between material functions. Microstructure and rheology of materials.

Civil Engineering 617 **3 units; (3-0)**

Fracture of Civil Engineering Materials

Cohesive strength; plasticity. Fracture mechanics in relation to structural steel, stress intensity, fracture toughness, energy release rate, LEFM, COD, J-Integral, R-Curve, fatigue. Compressive fracture of concrete, masonry and rocks; cracking patterns, fracture theories, damage models, test methods and effects.

Civil Engineering 619 **3 units; (3-0)**

Special Problems

Designed to provide graduate students, especially at the PhD level, with the opportunity of pursuing advanced studies in particular areas under the direction of a faculty member. Students would be required to consider problems of an advanced nature.

MAY BE REPEATED FOR CREDIT

Civil Engineering 621 **3 units; (3-0)**

Computer Analysis of Structures

Review of the displacement method of structural analysis, energy theorems, and transformation of force and displacement matrices. Computer analysis of framed structures: banded stiffness matrices, assemblage of stiffness matrices, displacement and support conditions and calculation of reactions, solution of banded equations. Structural symmetry, anti-symmetry and cyclic symmetry. Analysis of large structures by substructuring. Analysis of shear wall structures. Introduction to the finite element method: displacement functions, stiffness matrix formulation, consistent load vectors, isoparametric elements. Non-linear analysis: effect of axial forces combined with large displacements, geometric stiffness matrix, Newton-Raphson techniques, examples of geometric non-linearity, non-linear buckling, cable networks including membrane elements, analysis of structures made of non-linear materials. Structuring and composition of available structural analysis computer programs, and their applications.

Civil Engineering 623 **3 units; (3-0)**

Behaviour and Design of Reinforced Concrete Members

Behaviour and strength of reinforced concrete members; materials; safety; design of members subjected to flexure, compression, compression and flexure including biaxial bending, shear, torsion; bond and anchorage; slender columns; deep beams; serviceability; rotation capacity; relation between results of research and current design codes.

Civil Engineering 627 **3 units; (3-0)**

Serviceability of Concrete Structures: Advanced Topics

Material properties affecting serviceability: creep and shrinkage of concrete and relaxation of prestressed steel. Displacement method of analysis of strains and stresses due to temperature, creep and shrinkage; composite sections; cracked sections. Time-dependent internal forces; effects of loading, prestressing and construction in stages. Displacements of cracked members; crack spacing; stabilized cracks; force-induced and displacement-induced cracking. Deflections of beams, frames, slabs and floor systems. Non-linear effects of cracking on internal forces. Effects of temperature. Fatigue of cracked prestressed members. Corrosion; effects of cracking. Serviceability considerations of miscellaneous structures, e.g., bridges, water-retaining structures and pavements.

Civil Engineering 629 **3 units; (3-0)**

Computational Modelling of Concrete Structures

Discussion of linear finite element analysis; non-linear analysis and iterative techniques; constitutive relations and failure theories; modelling of reinforcement and prestressing; cracking models and post-cracking behaviour; tension stiffening and strain softening; models for shear transfer; time-dependent effects of creep, shrinkage and temperature; behaviour under cyclic loading and dynamic effects; numerical examples and computer applications on analysis of beams, frames, slabs, shear panels and walls, thin shells, axisymmetric solids and three dimensional structures.

Civil Engineering 633 **3 units; (3-0)**

Fibre Reinforced Polymers for Construction and Repair of Structures

Properties and behaviour of various types of Fibre-Reinforced Polymers (FRP) materials. Limit States Design, procedures and design philosophy of structures reinforced or strengthened with FRP. Flexural and shear design. FRP systems for flexural and shear strengthening of structures. Axial strengthening of columns. Concrete prestressed with FRP. Durability and fire resistance, blast mitigation and repair using FRP. Case studies and field applications.

Civil Engineering 635 **3 units; (3-0)**

Behaviour and Design of Prestressed Concrete Bridges and Other Structures

Forces due to prestressing in statically indeterminate structures such as continuous beams, frames, slabs, using load balancing method, force method and prestressing influence coefficients. Limit analysis of continuous prestressed concrete structures. Design of prestressed flat slabs. Initial and time-dependent deflections. Effect of creep and shrinkage in statically indeterminate structures; effect of differential settlement; creep behaviour of structures made continuous by cast-in situ concrete. Discussion of various types of prestressed concrete bridges; selection of cross-section, pier arrangement, abutments, approach slab, bearings. Loads. Design of skew and curved bridges. Cable layout in skew and curved bridges. Methods of bridge construction. Aesthetic considerations in bridge design.

Civil Engineering 637 **3 units; (3-0)**

Behaviour and Design of Prestressed Concrete Members

Flexural analysis and design of prestressed and partially prestressed concrete members based on stresses, deflections and strength. Design of members subjected to shear, torsion, compression or tension. Fire resistance. Composite members. Bond and anchorage zones. Prestressing losses and time-dependent deformations. Discussion of current design standards.

Civil Engineering 639 **3 units; (3-0)**

Structural Dynamics

Numerical analysis of simple systems; rigorous analysis of one-degree systems; lumped mass multi-degree systems and structures with distributed mass and load; approximate analysis and design methods; earthquakes, blast-resistant design, beams subjected to moving loads; calculation of results by analog and digital computer.

Civil Engineering 641 3 units; (3-0)**Seismic Analysis and Design**

Introduction to seismology, ground movements, typical accelograms. Response spectra for linear and non-linear responses, role of damping and inelastic behaviour. Equivalent lateral load for design, code requirements. Structural design concepts to mitigate seismic effects. Design of steel structures for earthquake motions. Design of concrete frames and walls for earthquake motions.

Prerequisite(s): Civil Engineering 639.

Civil Engineering 643 3 units; (3-0)**Structural Masonry Design**

Component materials and their properties, masonry properties, quality control, plain and reinforced masonry, beams, walls, slender walls, columns, load-moment interaction curves, concentrated load bearing, shear load distribution, shear walls, code provisions, building envelope, detailing, differential movement, geometric walls, prestressed masonry, arches.

Civil Engineering 645 3 units; (3-0)**Risk Analysis**

The objective of this course in engineering risk analysis and risk assessment is to familiarize students with the principles and techniques of quantitative risk analysis. Key focus points are the treatment of uncertainties, the attitude of conservatism, risk perception, the careful use of quantitative risk measures, and a discussion of the dangers tasks facing risk-based decision makers. Includes: Hazards, risk, risk analysis, risk assessment; risk measures; probability, uncertainty modelling, stochastic variables; using and misusing data, reliability, tails; risk assessment frameworks, models in health and environmental risk analysis, models in engineering risk analysis; risk perception, risk comparison; and practical case studies.

Civil Engineering 647 3 units; (3-0)**Structural Reliability Analysis**

Concepts of risk and reliability, uncertainties, and engineering decision making. Techniques for reliability-based assessment of structural components and systems. Time-dependent structural reliability analysis including load, load effect, and resistance modelling. Code calibration using structural reliability. Reliability assessment of existing structures. Applications focus on design and optimization of uncertain systems such as structures, soils, and infrastructure systems.

Civil Engineering 653 3 units; (3-0)**Theory and Applications of the Finite Element Method**

Conceptual framework of the finite element method with emphasis on applications to structural analysis: shape functions, continuity at nodes, numerical integration, matrix assembly. Scope of the method, use of basic equations of elasticity, displacement (stiffness) method of analysis. Sources of error and poor performance; mesh sensitivity; element types, their selection and behaviour. Applications in structural analysis, heat conduction and other non-structural problems; use of available finite element programs.

Civil Engineering 655 3 units; (3-0)**Numerical Methods for Modelling Geomaterials**

Methods of theoretical analysis for solving partial differential equations associated with Geotechnical and Structural Engineering. Variational Principles, Principle of Virtual Work and Galerkin Method. Theory of finite element and focus on its computer implementation for analysis of engineering

problems. Typical applications include two- and three-dimensional stress analysis, seepage flow, and coupled fluid flow-solid deformation problems. Advanced topics: numerical strategies for solving material and geometric non-linearities (plasticity and large deformations), poro-elasticity and plasticity, strain localization, and presentation of other numerical techniques such as finite difference, boundary element, discrete element methods.

Civil Engineering 657 3 units; (3-0)**Airport Planning and Engineering**

Planning of airport systems; planning and design of the airfield; airside capacity and delay; air traffic control; planning and design of the passenger terminal; analysis of airport operations.

Civil Engineering 659 3 units; (3-0)**Sustainable Infrastructure**

Sustainability and durability issues of structural materials; properties and uses of non-renewable and recycled materials; energy efficient design and green material selection; life cycle cost analysis. Constructability. Aesthetics. Infrastructure management, inventory, assessment/monitoring, performance and remaining service life. Preservation of existing infrastructure; repair and rehabilitation, strengthening and retrofitting to extend service life of structures. Structural composites; properties and applications to improve performance and sustainability of infrastructure.

Civil Engineering 665 3 units; (3-0)**Fundamentals of Soil Behaviour**

Principle of effective stress in saturated soil, unsaturated soil and clay. Engineering properties of soils. Shear strength and deformation characteristics of soils in static, cyclic, drained and/or undrained loading. Laboratory testing of soils. One-dimensional consolidation, poro-elastic deformation, swelling mechanism, time-dependent deformation and soil contamination in soils.

Civil Engineering 667 3 units; (3-0)**Applied Rock Engineering**

Engineering properties of intact rock and rock mass. Rock classification. Slope and underground excavation; groundwater flow in fractured rock; poro-elastic deformation analysis; hydraulic fracturing.

Civil Engineering 669 3 units; (3S-3)**Permafrost Engineering**

Development, characteristics and significance of permafrost, including the thermal and hydrological processes and resulting periglacial geomorphology and geotechnical implications. Contemporary topics in science and engineering of seasonally and perennially frozen ground.

Antirequisite(s): Credit for Civil Engineering 669 and Geography 689 will not be allowed.

Civil Engineering 671 3 units; (3-0)**Advanced Foundation Engineering**

Application of geotechnical engineering in the design and analysis of foundations. Includes shallow foundations, deep foundations, earth retaining structures, embankments. Use of bearing capacity theory to calculate ultimate loads. Use of typical elasticity solutions to evaluate settlement. Introduction to Limit State Design. Introduction to the use of geosynthetics to improve soil behaviour in foundation design. Design problems and computer applications in geotechnical foundation engineering.

Civil Engineering 673 3 units; (3-0)**Constitutive Laws for Geomaterials**

Definition of a continuous medium. Description of deformable continuous media; concepts of stress, strain and their invariants. Constitutive equations geomaterials as a generic for soil, rock and concrete materials in civil engineering. Review of elasticity theory. Introduction to yielding, plastic flow and failure phenomena in geomaterials. Limit analysis with applications to both geotechnical and structural engineering. Stress-strain behaviour for both cohesive and granular materials. Constitutive models based on critical state theory will be presented. Other topics such as strain localization and fracture phenomena may be included as appropriate.

Civil Engineering 689 3 units; (3-0)**Advanced Project Management Practices and Principles**

Advanced practices, tools and concepts in managing complex volatile or large projects. SMART project management based on best practices in diverse industries forms the basis of this course.

Prerequisite(s): Civil Engineering 691 and 697.

Civil Engineering 691 3 units; (3-0)**Fundamentals of Project Management**

Application of management principles to the project environment; planning, control, scope, time and cost processes; project organization and human resource issues. Students review aspects of a current major capital project and submit and defend a project report.

Prerequisite(s): Consent of the Program Director.

Antirequisite(s): Credit for Civil Engineering 691 and Business and Environment 691 will not be allowed.

Civil Engineering 693 3 units; (3-0)**Project Engineering Management**

Role of the engineering manager in the project management team. The engineering firm, its organization and function; project development, engineering project control; design control; scope and estimate control; engineering interfaces with procurement and construction; engineering responsibility in project commissioning start-up and operations.

Civil Engineering 695 3 units; (3-0)**Project Construction Management**

Role of the construction manager in the project management team; project options for the management of construction; managing the contractor's business; labour relations; claims; contractor(s) responsibility in project commissioning start-up and operations.

Civil Engineering 697 3 units; (3-0)**Project Planning and Control**

Strategic and tactical planning; planning for scope, quality, time and cost; selection and implementation of project management information system; economic and risk analysis; planning for construction labour relations.

Civil Engineering 699 3 units; (3-0)**Law for Project Managers**

Legal issues related to the effective management of projects. Introduction to the legal system and processes; environmental law; intellectual property non-disclosure; professional liability; contract law; strategic alliances; employment law; the builder's lien act. Cases are reviewed and students are

expected to complete a number of assignments requiring research into case law.

Note: This course may not be taken for credit towards the JD or LLM degrees.

Civil Engineering 707 **3 units; (3-0)**

Theory of Transport Demand Modelling

Modelling for transport planning; data in transport modelling; trip generation modelling; trip distribution modelling; modal split modelling; direct demand models; traffic assignment; equilibrium in transport modelling; discrete-choice models; specification and estimation of logit models; aggregation issues; simplified transport demand models; model updating and transferability.

Prerequisite(s): Consent of the Department.

Civil Engineering 709 **3 units; (2-4)**

Practice of Transport Demand Modelling

Sample enumeration modelling; practical aspects of logit model estimation and calibration; disaggregate choice behaviour data; practical four-step transport demand modelling using conventional software packages; application of computer-based network assignment models.

Prerequisite(s): Civil Engineering 707.

Civil Engineering 711 **3 units; (3-0)**

Advanced Analysis and Modelling of Public Transit Systems

Role of public transport in a city; concepts of public and private benefits; economies of scale; main modes of urban public transport systems: rail, bus, van and other vehicles; advanced mathematical modelling of mode of operation, route alignment, access, station and stop location, transfer protocols, time table, vehicle and fleet size, reliability; concepts of utility and value of time; detailed functional design and optimization of a bus route, rail line; bus, rail and metro networks.

Prerequisite(s): An undergraduate degree in engineering or instructor approval.

Civil Engineering 715 **3 units; (3-0)**

Transport Economics

Economic characteristics of transport; movement and location; transport demand; direct costs of transport; the value of travel time; external costs of transport; shadow prices; pricing of transport services; containment of external costs of transport; private and public sector investment analysis in transport; transport and economic development; transport policy.

Prerequisite(s): Consent of the Department.

Civil Engineering 717 **3 units; (3-0)**
(formerly Civil Engineering 703)

Dynamic Traffic Flow and Network Modelling

Fundamental traffic flow characteristics; moving bottlenecks and standing queues; macroscopic traffic flow models, shockwave theory and queuing theory; Traffic instabilities such as capacity drop, wide moving jams and hysteresis loops; Higher order traffic models; Microscopic models (i.e. car-following models); Static assignment including the concepts of user equilibrium and system optimum, shortest path and Braece paradox; Formulation of traffic assignment as a mathematic programming and solution algorithm; Basic concepts of dynamic traffic assignment including dynamic network loading and route choice; advanced traffic management with particular emphasis on advanced traffic management and control and discussion of microscopic simulation models.

Prerequisite(s): Consent of the Department.

Civil Engineering 741 **3 units; (3-0)**
(Environmental Engineering 663)

Biological Processes for Wastewater Treatment

Specialized biological wastewater treatment processes for removal of impurities not effectively removed by conventional secondary wastewater treatment systems, such as nutrients (e.g. nitrogen and phosphorus), residual organics, residual solids, bacteria and viruses. Wetlands. Activated sludge modelling. Biological nutrient removal. Sludge management. Disinfection.

Antirequisite(s): Credit for Civil Engineering 741 and Environmental Engineering 663 will not be allowed.

Civil Engineering 745 **3 units; (3-0)**
(Environmental Engineering 655)

Hazardous Waste and Contaminated Sites Management

Integrated waste management. Functional and fundamental properties of hazardous waste. Toxicological properties of contaminants. Contaminant release mechanisms. Fate and transport of contaminants in the environment. Contaminated site assessment principles. Quantitative human health risk assessment (QHRA) as applied to contaminated sites. Hazard identification, exposure pathway analysis, risk characterization. Risk management and site remediation. Methods of hazardous waste treatment and contaminated site remediation. Secure land disposal of hazardous waste and contaminated soils and sludges.

Antirequisite(s): Credit for Civil Engineering 745 and Environmental Engineering 655 will not be allowed.

Civil Engineering 747 **3 units; (3-0)**
(Environmental Engineering 653)

Contaminated Soil Remediation

Overview of soil remediation engineering. Contaminant partitioning in air, water and gas phases. Phases of site assessments, Physical and chemical treatment processes, soil vapour extraction, air sparging, soil washing, soil flushing, thermal desorption and incineration, solidification and stabilization, vitrification, biological treatment processes, bioremediation kinetics, ex situ and in situ techniques. Liquid phase bioremediation as it pertains to soil remediation.

Antirequisite(s): Credit for Civil Engineering 747 and Environmental Engineering 653 will not be allowed.

Civil Engineering 749 **3 units; (3-0)**

Environmental Aspects of Waste Disposal Systems

Soil-chemical interactions and implications in waste disposal system design; landfill design principles; leachate production, leachate migration in the unsaturated/saturated zones; analytical and numerical solution of flow and transport equations; applications and case studies of groundwater contamination; design and construction of barrier systems; bioreactor landfills; landfill closure issues; greenhouse gas control systems.

Antirequisite(s): Credit for Civil Engineering 749 and Environmental Engineering 651 will not be allowed.

Civil Engineering 751 **3 units; (3-0)**

Snow Avalanche Hazard Mitigation

Avalanche motion and protection including avalanche terrain, frictional flow, impact pressures, avalanche risk for fixed structures, elements of structural defence, and run-out estimation based on statistical models, dynamic models, air photo interpretation, field studies of vegetation and historical records.

Civil Engineering 753 **3 units; (3-0)**

Snow Avalanche Formation and Release

Snowpack properties and processes including meteorological and ground effects on the snowpack, energy balance at the snow surface, snowpack stratigraphy, metamorphism of snow grains, bonding, as well as spatial and temporal variability of the snowpack. Avalanche initiation including deformation and failure of weak layers, models of slab failure and fracture propagation. Concepts of snow stability, avalanche forecasting and avalanche risk for recreationists.

Communication and Culture CMCL

For more information about these courses see the Department of Communication, Media and Film website: commfilm.ucalgary.ca/.

Junior Courses

Communication and Culture 201 **3 units; (2-1T)**

Culture Foundations

A critical and inter-disciplinary examination, via classic texts, of the Greco-Roman and Judeo-Christian Heritage of Western Civilization (e.g., Homer, Sophocles, Plato, Augustine). Focus on major ideas, principles and their implications within the time frame of the Ancient and Medieval periods (i.e., 3000 B.C.E.–400 C.E.) and in comparison with non-Western traditions.

Antirequisite(s): Credit for Communication and Culture 201 and 301 will not be allowed.

Communication and Culture 203 **3 units; (2-1T)**

Roads to Modernity

A critical and inter-disciplinary examination, via classic texts (e.g., Chaucer, Machiavelli, Montaigne, Dante), of how the Greco-Roman and Judeo-Christian traditions were transformed into the Modern West. Focus on the major ideas, principles and their implications within the timeframe from the sixth to the sixteenth century and in comparison to non-Western traditions.

Prerequisite(s): Communication and Culture 201 or 301.

Antirequisite(s): Credit for Communication and Culture 203 and 303 will not be allowed.

Senior Courses

Communication and Culture 305 **3 units; (2-1)**

Modernity

A critical and inter-disciplinary examination, via classic texts (e.g., Bacon, Hobbes, Locke, Marx, Woolf, Freud, Sartre), of the meaning of Modernity in Western and non-Western contexts. Focus on the major ideas, principles and their implications from the seventeenth to the twentieth century.

Antirequisite(s): Credit for Communication and Culture 305 and 501 will not be allowed.

Communication and Culture 307 **3 units; (2-1)**

Contours of Contemporary Culture

A critical and inter-disciplinary examination, via classic texts (e.g., Bettelheim, Wiesel, Arendt, Ellul, Marcuse, DeBeauvoir, hooks, Foucault, Camus, and Maslow), of how modernity has been transformed within the framework of an evolving global culture. Focus on the major ideas, principles and their implications within the time frame of the twentieth century to the present.

Antirequisite(s): Credit for Communication and Culture 307 and 503 will not be allowed.

Communication and Culture 507 3 units; (3S-0)**Collaborative Learning and Peer Mentoring**

Study of learning theories and learning processes with practical experience through helping learners in a University of Calgary undergraduate course under the supervision of that course's instructor. Activities may include facilitating discussion in classrooms or online, discussing topics for term papers, organizing and assisting study groups, or coaching peers in their oral presentation or writing skills.

Prerequisite(s): 48 units and consent of the Department of Communication, Media and Film.

Antirequisite(s): Credit for Communication and Culture 507 and Science 511 will not be allowed.

Note: Prospective students must submit an application to the Department of Communication, Media and Film.

Communication and Culture 509 3 units; (3S-0)**Research in Peer Mentoring and Higher Learning**

Students continue to support peers in their learning processes using a facilitative, collaborative approach. As part of their mentoring hours, students will assist new peer mentors to grow into their roles. Students will conduct a textual and field research project related to their peer mentoring roles.

Prerequisite(s): Communication and Culture 507, or General Studies 507 and consent of the Department of Communication, Media and Film.

Note: Prospective students must submit an application to the Department of Communication, Media and Film.

Graduate Courses

Courses offered by the Graduate Program in the Department of Communication, Media and Film Studies in the Faculty of Arts are now listed in the Communication and Media (COMS) section of the calendar.

Communication and Media Studies COMS

For more information about these courses see the Department of Communication, Media and Film website: commfilm.ucalgary.ca/.

Note: Communication and Media Studies (COMS) courses were formerly named Communications Studies (COMS). For prerequisite purposes, all Communication and Media Studies (COMS) courses are equivalent to the former Communications Studies (COMS) courses with the same number.

Junior Courses**Communication and Media Studies 201 3 units; (2-1)****Introduction to Communication and Media Studies**

A general mapping of the field, with an emphasis on its breadth in the areas of media studies, communication of science and technology and rhetorical communication. General examination of how Communications Studies emerged during the twentieth century and how the field relates to issues of social and cultural change.

Antirequisite(s): Credit for Communication and Media Studies 201 and Communications Studies 201 will not be allowed.

Communication and Media Studies 203 3 units; (2-1)**New Media**

An introduction to the social, political and cultural aspects of new media. Examines the social factors that influence the use of new media, as well as the effects of new media on different spheres of social life. Topics may include the historical development of new media; participatory cultures; copyright and Internet law; creative industries; and surveillance and governance in new media.

Antirequisite(s): Credit for Communication and Media Studies 203 and either Science, Technology, and Society 341 or Communications Studies 203 will not be allowed.

Senior Courses**Communication and Media Studies 313 3 units; (3-0)****Communication Research Methods**

A critical introduction to communication research methods. Students will explore, practice and critique selected quantitative and qualitative research methods and perspectives on the processes of knowledge production.

Prerequisite(s): Communication and Media Studies 201 or Communications Studies 201 or admission to Bachelor of Film Studies.

Antirequisite(s): Credit for Communication and Media Studies 313 and any of Communications Studies 313, Communication and Culture 313, General Studies 313, Development Studies 407, Northern Planning and Development Studies 407 or Women's Studies 313 will not be allowed.

Note: Students are recommended to take Communication and Media Studies 313 in their second year.

Communication and Media Studies 363 3 units; (3-0)**Professional and Technical Communication**

An introduction to professional and technical communication in diverse media. Examines the rhetorical dimensions of workplace settings as well as the process of planning, composing and delivering professional and technical communication for various audiences.

Prerequisite(s): 24 units.

Antirequisite(s): Credit for Communication and Media Studies 363 and Communications Studies 363 or Engineering 213 will not be allowed.

Note: Preference in enrolment is given to Majors and Minors in the Department of Communications, Media and Film Studies, majors in Geography, students enrolled in the Bachelor of Arts in Communication and Culture, the Haskayne School of Business and the Schulich School of Engineering. Most sections of this course will be offered online.

Communication and Media Studies 367 3 units; (3-0)**Visual Communication and Culture**

Critical study of images in society. Topics may include formal image analysis; theories of the image; the politics and ethics of visual representation; portraiture and identity; advertising images; spectacle and modern media; war and propaganda imagery; circulation and the networked image; iconoclasm and censorship.

Prerequisite(s): Communication and Media Studies 201.

Antirequisite(s): Credit for Communication and Media Studies 367 and Communications Studies 367 will not be allowed.

Communication and Media Studies 369 3 units; (3-0)**Rhetorical Communication**

An introduction to the basic principles of rhetorical theory, criticism and practice. Examines rhetorical perspectives on elements of communication such as argumentation, persuasion, audience, situation, genre and ethics. Students will apply rhetorical theory to the criticism of samples of public communication and will practice their rhetorical skills through in-class activities and assigned writing and oral presentations.

Prerequisite(s): Prerequisite or Corequisite: Communication and Media Studies 201 or Communications Studies 201.

Antirequisite(s): Credit for Communication and Media Studies 369 and either Communications Studies 361 or 369 will not be allowed.

Note: Preference in enrolment is given to Majors and Minors in Communication and Media Studies and the Bachelor of Communication and Media Studies.

Communication and Media Studies 371 3 units; (2-1)**Critical Media Studies**

Emphasizes major critical approaches and theoretical foundations of media studies research. Explores the contexts in which these theories arose, identifies their major strengths and weaknesses and analyzes how critical theory engages the social world. Areas covered include the Frankfurt School, structuralism and semiotics, cultural studies, post-structuralism and feminist media studies.

Prerequisite(s): Communication and Media Studies 201 or Communications Studies 201.

Antirequisite(s): Credit for Communication and Media Studies 371 and Communications Studies 371 will not be allowed.

Communication and Media Studies 381 3 units; (2-1)**Communications History**

A general survey of how various communication systems and practices developed through history and of the social contexts within which they emerged, transformed and adapted through time. Examines major technological developments in the history of human communication and uses theory to understand their origins and impacts on social organization and everyday life.

Corequisite(s): Prerequisite or Corequisite: Communication and Media Studies 201 or Communications Studies 201.

Antirequisite(s): Credit for Communication and Media Studies 381 and either Communications Studies 380 or 381 will not be allowed.

Communication and Media Studies 383 3 units; (3-0)**Introduction to Public Relations**

Public relations theory and practice, with a particular emphasis on Canadian examples. Focus on links between public relations and new media, ethical standards of practice, and critical perspectives on public relations as well as on the development of practical skills.

Antirequisite(s): Credit for Communication and Media Studies 383 and either Communications Studies 383 or 483 will not be allowed.

Communication and Media Studies 393 3 units; (3-0)**Critical Perspectives on Health and Science**

Examines the construction and communication of health and science as socio-cultural phenomena

and interrogates the ways in which health and science issues are communicated, defined, represented and framed, particularly within contemporary media.

Prerequisite(s): Communication and Media Studies 201 or Communications Studies 201.

Antirequisite(s): Credit for Communication and Media Studies 393 and either Communications Studies 393 or Science, Technology and Society 421 will not be allowed.

Communication and Media Studies 401 **3 units; (3-0)**

Special Topics in Communication and Media Studies

Critical study of contemporary topics or issues related to communications media, technology, culture, or discourse. Past topics have included gaming, the music industry, feminism, video activism, propaganda, fan cultures, and women in sport.

MAY BE REPEATED FOR CREDIT

Communication and Media Studies 413 **3 units; (3-0)**

Advanced Research Methods

An in-depth study of selected methods for social and cultural research. Students will design and carry out empirical research applying these methods.

Prerequisite(s): Communication and Media Studies 313 or Communications Studies 313.

Antirequisite(s): Credit for Communication and Media Studies 413 and Communications Studies 413 will not be allowed.

Note: This course is strongly recommended for students who intend to apply to Honours or graduate programs or to seek employment in research-intensive industries.

Communication and Media Studies 435 **3 units; (3-0)**

Communication and Canadian Society

Explores aspects of Canadian communication, including historical development, theoretical approaches, challenges posed by advances in technology, and policy questions such as media ownership, Canadian content requirements and the relationship between media and democracy.

Prerequisite(s): Communication and Media Studies 201 or Communications Studies 201.

Antirequisite(s): Credit for Communication and Media Studies 435 and either Communications Studies 335 or 435 will not be allowed.

Communication and Media Studies 463 **3 units; (3-0)**

Rhetorical Communication in Online Environments

Rhetorical theory, criticism, production and editing of professional communication in online environments (organizational websites and blogs, professional uses of social media, project management applications, collaborative writing applications, corporate and community discussion forums and intranets). Experiential learning through team projects that critique and develop an organization's online content.

Prerequisite(s): One of Communication and Media Studies 363, 383, 369, Communications Studies 363, 383, or 369.

Antirequisite(s): Credit for Communication and Media Studies 463 and Communications Studies 463 will not be allowed.

Communication and Media Studies 469 **3 units; (3-0)**

Rhetorical History and Criticism

A study of rhetorical thought and action from selected periods, cultures and authors from the classical period to the modern age, with an emphasis on the interaction between rhetoric and philosophical, social and political change. Theories will be applied to the criticism of historical and contemporary public communication.

Prerequisite(s): Communication and Media Studies 369 or Communications Studies 369.

Antirequisite(s): Credit for Communication and Media Studies 469 and either Communications Studies 461 or 469 will not be allowed.

Communication and Media Studies 473 **3 units; (3-0)**

Popular Culture

Introduces critical tools for deconstructing and evaluating the social significance of popular cultural texts, including music, television, film, advertising, memes and viral content. Particular focus on audience reception as a key method for understanding fan practices and subcultures

Prerequisite(s): Communication and Media Studies 371 or Communications Studies 371.

Communication and Media Studies 475 **3 units; (3-0)**

Media and Cultural Industries

Considers the role and nature of media and cultural industries, offering students understanding of their role in the production and circulation of popular culture and information. Industries typically examined are television, radio, newspapers and other print media, film, sound recording, book publishing and advertising.

Prerequisite(s): Communication and Media Studies 371 or Communications Studies 371.

Antirequisite(s): Credit for Communication and Media Studies 475 and Communications Studies 475 will not be allowed.

Communication and Media Studies 477 **3 units; (3-0)**

Food Culture and Communication

A theoretical and experiential introduction to food cultures as processes and products of communication. Examines how food is constructed and represented through text, film, television, art and tourism. Political and economic constructions of food culture, security and sustainability will also be explored.

Antirequisite(s): Credit for Communication and Media Studies 477 and either Communications Studies 401.03 or 477 will not be allowed.

Note: This course may involve off-campus field trips during class time. A supplementary fee will be assessed to cover additional costs associated with this course. Alternatively, the course may be packaged along with others as part of a Study Abroad opportunity requiring an application and pre-term study and preparation. Contact the instructors or the University of Calgary Study Abroad program for more information.

Communication and Media Studies 479 **3 units; (3-0)**

Feminist Media Studies

Introduces critical perspectives and practices of feminist media studies and interrogates how gendered, racialized and sexualized subjectivities are produced, circulated and consumed through

media cultures and texts. A key focus will be relationships between power, media and identity.

Prerequisite(s): Communication and Media Studies 371.

Antirequisite(s): Credit for Communication and Media Studies 479 and 401.36 will not be allowed.

Communication and Media Studies 481 **3 units; (3-0)**

Advanced Studies in New Media and Society

Examines the nature, origins and social implications of new media with a focus on the Internet. Evolving forms of interpersonal, group and public communication based on the Internet will be assessed in terms of the role they play in identity formation, cultural integration, learning, political participation, commerce and work.

Prerequisite(s): Communication and Media Studies 203 and 371.

Antirequisite(s): Credit for Communication and Media Studies 481 and Communications Studies 481 will not be allowed.

Communication and Media Studies 485 **3 units; (3-0)**

Environmental Media and Communication

Examines the mutual entanglements of media, communication and the environment, with a particular focus on media representations of the environment and environmental risks. May also examine environmental issues related to communications technologies and global communications infrastructures.

Antirequisite(s): Credit for Communication and Media Studies 485 and 401.46 will not be allowed.

Communication and Media Studies 491 **3 units; (3-0)**

Introduction to Acoustic Communications and Acoustic Ecology

Concepts, techniques and applications of the fields of Acoustic Communications (the ways in which speech and music convey meaning) and Acoustic Ecology (the effects of sound in natural and human environments). These interdisciplinary areas weave together communication theory, cognitive psychology, sociology, musicology, physical sciences, health sciences and aesthetics.

Antirequisite(s): Credit for Communication and Media Studies 491 and either Communications Studies 391 or Communication and Media Studies 401.12 will not be allowed.

Note: There is no scheduled tutorial or lab, but some field work (off campus) and research out of class time is required.

Communication and Media Studies 501 **3 units; (3-0)**

Research in Selected Topics

Supervised individual study of a special topic.

Prerequisite(s): Consent of the Department.

Note: Students who wish to propose a topic must secure a supervisor and have the topic approved by the Department at least two weeks prior to the first day of classes.

MAY BE REPEATED FOR CREDIT

Communication and Media Studies 502 **3 units; (3-0)**

Political Economy of Communication

Examines power relations between public, government and commercial forces in communication. Looks at how media dynamics have shifted his-

torically and how current policies, structures and institutions impact our daily media interactions.

Prerequisite(s): Communication and Media Studies 371 or 435.

Antirequisite(s): Credit for Communication and Media Studies 502 and 503.04 will not be allowed.

Communication and Media Studies 503 3 units; (3-0)

Advanced Special Topics in Communication and Media Studies

Advanced study of contemporary topics or issues related to communications media, technology, culture or discourse.

Prerequisite(s): One of Communication and Media Studies 371 and 381 and admission to a major or minor program in Communication and Media Studies.

MAY BE REPEATED FOR CREDIT

Communication and Media Studies 507 3 units; (0-4)

Experiential Learning in Communications and Media

Supervised individual study through guided experiential learning. Opportunity provided to combine interests in communications research and theory with experiential learning opportunities in an organization or university unit. Involves a communication-related placement or project that engages students in critical reflection on community experience in the context of their formal education.

Prerequisite(s): Communication and Media Studies 201 or Communications Studies 201; and one additional course labelled Communication and Media Studies or Science, Technology and Society 341, 421 and admission to a majors or minor program in the Department of Communication, Media and Film and consent of the Department.

Antirequisite(s): Credit for Communication and Media 507 and either Communications Studies 407 or 507 will not be allowed.

Note: Students should contact the Department of Communication, Media and Film at least two weeks prior to the first day of classes to arrange an independent study course.

Communication and Media Studies 581 3 units; (1-2)

Senior Project in BCMS/BFS

An advanced research and experiential project incorporating academic research and media production. The project will be produced in a medium appropriate to the student's specialization: print, radio, television, video, film or digital media.

Prerequisite(s): Admission to the Bachelor of Communication and Media Studies program or Bachelor of Film Studies program. One of Communication and Media Studies 369, 371, 381 or one of Communications Studies 369, 371, 381 or one of Film 321, 323, 331 or 333; and first year of an applicable diploma program from SAIT or an approved equivalent.

Antirequisite(s): Credit for Communication and Media Studies 581 and Communication and Media Studies 580 or Communications Studies 580 will not be allowed.

Note: Students must present their diploma transcript to the Department of Communication, Media and Film for consent to register in this course. An unofficial transcript will suffice.

Communication and Media Studies 591 3 units; (3S-0)

Senior Seminar in Communication and Media

Explores the variety of ways in which communication builds social and cultural values with reference to a special topic. Completion of a major project that will integrate understanding of communication theory, history and methodology.

Prerequisite(s): 78 units, including Communication and Media Studies 313, 369, 371, 381, or Communications Studies 313, 369, 371, 381 and admission to the BA in Communication and Media Studies.

Antirequisite(s): Credit for Communication and Media Studies 591 and Communications Studies 591 will not be allowed.

Communication and Media Studies 595 3 units; (2S-0)

Honours Seminar

Individual research and seminar activities (e.g., critiques, presentations, and peer reviews of drafts) to produce a proposal and a paper to be used as the basis for the Honours Thesis.

Prerequisite(s): Communication and Media Studies 313 or Communications Studies 313 and admission to the Honours Program.

Antirequisite(s): Credit for Communication and Media Studies 595 and Communication and Media Studies 590 or Communications Studies 590 will not be allowed.

Communication and Media Studies 597 3 units; (0-1)

Honours Thesis

Supervised individual research and preparation of an honours thesis. Incorporating material from the Communication and Media Studies 595 paper to complete the honours thesis.

Prerequisite(s): Communication and Media Studies 595 and admission to the Honours Program.

Antirequisite(s): Credit for Communication and Media Studies 597 and Communication and Media Studies 590 or Communications Studies 590 will not be allowed.

Graduate Courses

For more information, see the Department of Communication, Media and Film: commfilm.ucalgary.ca/graduate.

Notes:

- Communication and Media Studies (COMS) courses were formerly named Communications Studies (COMS). All are COMS courses and considered equivalent for prerequisite purposes.
- Not all courses will be offered each year. Registration is open to graduate students admitted into the program. All other students require consent of the Department's Graduate Program Director.

Communication and Media Studies 601 3 units; (3S-0) (formerly Communication and Culture 601)

Interdisciplinary Approaches to Communication and Media Studies

An overview of theories, problematics and approaches in communication and media.

Antirequisite(s): Credit for Communication and Media Studies 601 and either Communications Studies 601 or Culture and Society 601 will not be allowed.

Communication and Media Studies 603 3 units; (3S-0) (formerly Communication and Culture 603)

Critical Media Studies

Theories and perspectives in the study of media production, industries, genres, and reception.

Antirequisite(s): Credit for Communication and Media Studies 603 and Communications Studies 603 will not be allowed.

Communication and Media Studies 613 3 units; (3S-0) (formerly Communication and Culture 613)

Communication and Cultural Theory

An examination of the major perspectives in communication and cultural theory through a historical analysis of classic works and an overview of contemporary approaches and applications.

Antirequisite(s): Credit for Communication and Media Studies 613 and either Communications Studies 613 or Culture and Society 613 will not be allowed.

Communication and Media Studies 615 3 units; (3S-0) (formerly Communication and Culture 615)

Research Methods

A survey of research methods appropriate to the study of communication and media.

Antirequisite(s): Credit for Communication and Media Studies 615 and Communications Studies 615 will not be allowed.

Communication and Media Studies 617 3 units; (3S-0) (formerly Communication and Culture 617)

Representation and Identity

An investigation of various issues related to representation and identity, including but not limited to race, ethnicity, gender and sexuality.

Antirequisite(s): Credit for Communication and Media Studies 617 and Culture and Society 603 will not be allowed.

Communication and Media Studies 619 3 units; (3S-0) (formerly Communication and Culture 619)

Communications and Cultural Industries

An analysis of the governmental and social contexts which inform the current development of telecommunications, communications, cultural industries and new media in Canada.

Antirequisite(s): Credit for Communication and Media Studies 619 and Communications Studies 619 will not be allowed.

Communication and Media Studies 623 3 units; (3S-0) (formerly Communication and Culture 623)

Social Contexts of Science and Technology

Theoretical perspectives for understanding central debates in the study of science and technology in their social, political, cultural, and communication contexts.

Communication and Media Studies 631 3 units; (3S-0) (formerly Communication and Culture 621)

Social and Media Activism

A critical overview of how digital media are being taken up by social justice movements and the im-

plications of these new media practices in relation to politics and activism.

Antirequisite(s): Credit for Communication and Media Studies 631 and Culture and Society 607 will not be allowed.

Communication and Media Studies 641 3 units; (3S-0)
(formerly Communication and Culture 641)

International Communication

An examination of cultural/communication issues and practices in international contexts. Examines the role of media systems in processes of culture, development, and identity formation.

Antirequisite(s): Credit for Communication and Media Studies 641 and Communications Studies 641 will not be allowed.

Communication and Media Studies 643 3 units; (3S-3)

Methods in Film Studies

An examination of key approaches to studying film, including its aesthetic, historical, and theoretical dimensions.

Communication and Media Studies 645 3 units; (3S-0)

Media and Democracy

An examination of the role played by media in democratic systems past and present. Draws from classic and contemporary democratic theory to explore the changing positions of traditional and new media, focusing on the interrelationships of media, political institutions and citizenship.

Communication and Media Studies 647 3 units; (3S-0)

Communication and Health

Critically exploring the concept of health through the lens of communication, examines cultural and media representations of health, along with questions of health and identity, health promotion and advocacy, health risk and regulation, and social movements.

Communication and Media Studies 711 3 units; (3S-0)
(formerly Communication and Culture 711)

Directed Studies

A research project under the direction of a faculty member.

Antirequisite(s): Credit for Communication and Media Studies 711 and Communications Studies 711 will not be allowed.

MAY BE REPEATED FOR CREDIT

Communication and Media Studies 713 3 units; (3S-0)
(formerly Communication and Culture 713)

PhD Theory Seminar

A seminar that enables PhD students to focus their research interests and to explore theories relevant to their areas of specialization.

Prerequisite(s): Admission to the Communication and Media Studies PhD program.

Antirequisite(s): Credit for Communication and Media Studies 713 and Communications Studies 713 will not be allowed.

Communication and Media Studies 717 3 units; (3S-0)
(formerly Communication and Culture 717)

Selected Topics in Communication, Media and Film

A variety of communication, media and film topics based on faculty expertise.

MAY BE REPEATED FOR CREDIT

Community Health Sciences MDCH

For more information about these courses, see the Cumming School of Medicine: <https://cumming.ucalgary.ca/>.

Community Health Sciences 600 3 units; (3-0)

Introduction to Community Health Sciences

An introduction to the Department as well as a general orientation to the education and research programs in Community Health.

Prerequisite(s): Admission to the Community Health Sciences or Public Health and Preventative Medicine program or consent of the program. Not available to Open Studies students.

Antirequisite(s): Credit for Community Health Sciences 600 and Medical Science 644 will not be allowed.

NOT INCLUDED IN GPA

Community Health Sciences 602 3 units; (1-0)

Practicum in Public Health and Preventative Medicine

Clinical or field-based practicum for the Master of Community Medicine Program of the Community Health Sciences graduate program.

Prerequisite(s): Admission to the Master of Community Medicine specialization or the Public Health and Preventative Medicine program.

Antirequisite(s): Credit for Community Health Sciences 602 and Medical Science 649.01 will not be allowed.

NOT INCLUDED IN GPA

Community Health Sciences 603 3 units; (1-0)

Practicum in Health Care Epidemiology

Clinical or field-based practicum for the Health Care Epidemiology specialization of the Community Health Sciences graduate program.

Prerequisite(s): Admission to the Community Health Sciences graduate program's Health Care Epidemiology specialization.

Antirequisite(s): Credit for Community Health Sciences 603 and Medical Science 649.02 will not be allowed.

NOT INCLUDED IN GPA

Community Health Sciences 604 3 units; (1-0)

Practicum in Community Health Sciences

Clinical or field-based practicum for students in any specialization of the Community Health Sciences graduate program.

Prerequisite(s): Admission to the Community Health Sciences graduate program.

Antirequisite(s): Credit for Community Health Sciences 604 and Medical Science 649.03 will not be allowed.

NOT INCLUDED IN GPA

Community Health Sciences 605 3 units; (3-1T)
(Veterinary Medicine 605)

Introduction to Biostatistical Methods

Analysis and design of research related to biological sciences. Emphasis is placed upon formulating good research questions, evaluating the appropriateness of different statistical methods for analyzing results, and performing and interpreting such statistical analyses. Statistical analyses will be carried out using modern statistical software.

Prerequisite(s): Consent of the Cumming School of Medicine.

Community Health Sciences 610 3 units; (3-2T)
(Veterinary Medicine 610)

Biostatistics I: Essentials of Biostatistics

Introduces the fundamental concepts of summarizing data and statistical inference, including graphical displays, hypothesis testing, p-values, and confidence intervals. Specific topics include comparisons of means and proportions, non-parametric tests, correlation and regression, confounding, sample size determination, and power calculations. Additional topics include a brief introduction to analysis of variance and covariance, logistic regression, and analysis of time-to-event data. Students gain hands-on experience analyzing data using STATA statistical software. Although this course uses STATA exclusively, much of the technical knowledge and some of the computing techniques are applicable to any statistical package.

Prerequisite(s): Admission to the Community Health Sciences graduate program or Public Health and Preventative Medicine program or consent of the program. Not available to Open Studies students.

Antirequisite(s): Credit for Community Health Sciences 610 and Medical Science 643.01 will not be allowed.

Community Health Sciences 611 3 units; (3-2T)
(Veterinary Medicine 611)

Biostatistics II: Models for Health Outcomes

Extends the fundamental concepts to modelling health outcomes using modern regression analysis techniques. Logistic and linear regressions, and their extensions, are covered in detail. The rationale, formulation, and statistical assumptions underlying each regression technique are discussed. Methods for selecting and assessing models are included. Additional topics include a brief introduction to models used in the analysis of repeated measures, longitudinal studies, and time-to-event data. STATA statistical software is used to analyze data. Required course for Biostatistics and Epidemiology specializations.

Prerequisite(s): Community Health Sciences 610 or Medical Science 643.01 and admission to the Community Health Sciences graduate program. Not available to Open Studies students.

Antirequisite(s): Credit for Community Health Sciences 611 and Medical Science 643.02 will not be allowed.

Community Health Sciences 612 3 units; (3-2T)

Biostatistics III: Models for Repeated Measures Studies and Time-to-Events Studies

Discusses techniques for analyzing data collected at more than one point in time (repeated measures) and time-to-event (survival) data. Topics include generalized linear models (GLM), generalized additive models (GAM), Poisson regression, generalized estimating equations (GEE), and proportional

hazards regression with time-varying covariates. STATA statistical software is used to analyze data.

Prerequisite(s): Admission to the Community Health Sciences graduate program and Community Health Sciences 611 or Medical Science 643.02 or consent of the program. Not available to Open Studies students.

Antirequisite(s): Credit for Community Health Sciences and Medical Science 643.03 will not be allowed.

Community Health Sciences 626 3 units; (3-0)

Meta-Analysis/Systematic Review in Medical Education

To become familiar with the theory, research, and application of meta-analysis/systematic review as it applies to the compilation of studies in education and health care with a focus on the discipline of medicine education. In particular, an emphasis will be placed on the principles of using statistical methods and techniques related to synthesizing studies in the measurement of a pre-determined and appropriate topic of interest to the participant.

Prerequisite(s): Admission to the Medical Education specialization of the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 626 and Medical Science 738 will not be allowed.

Community Health Sciences 627 3 units; (3-0)

Medical Education Assessment and Measurement

Approaches to assessment and measurement within the context of competency-based medical education.

Prerequisite(s): Admission to the Medical Education Specialization of the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 627 and Medical Science 739 will not be allowed.

Community Health Sciences 628 3 units; (3-0)

Teaching, Learning, and Curriculum Design

Overview of context in which medicine is taught and learned, the theory related to learning and change, the key elements of curriculum design and evaluation, and examine traditional and innovative methods used to enhance student and practitioner knowledge, skills and attitudes.

Prerequisite(s): Admission to the Medical Education Specialization of the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 628 and any of Community Health Sciences 623, 624 and 625 will not be allowed.

Community Health Sciences 629 3 units; (3-0)

Foundations of Practice and Science in Medical Education

Foundational academic concepts in the science of medical education including an overview of the philosophy of science, history of medical education and medical education scholarship along with fundamental concepts in medical education scholarship such as ethics and professionalism, critical appraisal and academic leadership.

Prerequisite(s): Admission to the Medical Education Specialization of the Community Health Sciences graduate program or consent of the program.

Community Health Sciences 630 3 units; (3-1) (formerly Community Health Sciences 621)

Designing Medical Education Research

Why and how of research in medical education including core components of research, ethical issues, project management, the research proposal, reviewing the literature, data collection and analysis, reports and dissemination.

Prerequisite(s): Admission to the Medical Education Specialization of the Community Health Sciences graduate program or consent of the program.

Community Health Sciences 631 3 units; (3-0)

Implementation of Medical Education Research

Technical aspects of conducting a study including writing questions, selecting methods that are aligned with the research questions and approaches to analyzing quantitative and qualitative data.

Prerequisite(s): Admission to the Medical Education Specialization of the Community Health Sciences graduate program or consent of the program.

Community Health Sciences 640 3 units; (3-2T) (Veterinary Medicine 640)

Fundamentals of Epidemiology

Principles and methods of descriptive and analytic epidemiology. Emphasizes the underlying concepts and approaches of epidemiological research and critical appraisal of epidemiologic studies including: observational study designs and their vulnerabilities to bias, measures of frequency and association, basic methods for addressing sampling variability, confounding, and effect modification. Concepts related to causal judgment in epidemiology are also introduced.

Prerequisite(s): Admission to the Community Health Sciences graduate program or Public Health and Preventative Medicine program or consent of the program. Not available to Open Studies students.

Corequisite(s): Community Health Sciences 610.

Antirequisite(s): Credit for Community Health Sciences 640 and Medical Science 647.01 will not be allowed.

Community Health Sciences 641 3 units; (3-0)

Introduction to Clinical Trials

An introduction to methodological issues in the design and conduct of randomized controlled trials. Topics include ethics, blinding, randomization, sample size determination, sequential designs, data monitoring, and the logistical and organizational aspects of single centre and multi-centre trials.

Prerequisite(s): Admission to the Community Health Sciences graduate program and Community Health Sciences 610 and 640 or Medical Science 643.01 and 647.01 or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 641 and Medical Science 659.04 will not be allowed.

Community Health Sciences 642 3 units; (3-0)

Psychiatric Epidemiology

An overview of the context, principles and methods of psychiatric epidemiology. Basic concepts of bias and random error will be applied specifically to problems encountered in conducting psychiatric epidemiological studies. An additional objective is for students to gain a basic understanding of psychiatric terminology and nosology, including

a basic understanding of the clinical features of major diagnostic categories.

Prerequisite(s): Community Health Sciences 610 and 640 and admission to the Community Health Sciences graduate program or consent of the program. Not available to Open Studies students.

Community Health Sciences 643 3 units; (3-0)

Research in Health Care Epidemiology and Infection Control

Emphasizes the research aspects of health care epidemiology and the application of basic epidemiologic and biostatistical techniques in the health care environment. The course uses an interdisciplinary approach and fosters the integration of knowledge and skills from the bench to the bedside and back.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 643 and Medical Science 647.07 will not be allowed.

Community Health Sciences 644 3 units; (3-0)

Surveillance I: Data Handling for Infection Control

Focuses on the skills needed for data handling related to Infection Control in various settings. The primary aims are: (1) to develop the skills to properly manage data using various tools and technology; (2) to use basic statistical tools to analyze data used in Infection control; (3) to properly interpret and draw appropriate conclusions from data used in infection control.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 644 and Medical Science 647.10 will not be allowed.

Note: This is an online course.

Community Health Sciences 645 3 units; (3-0)

Surveillance II: Principles of Surveillance

Focuses on the practice of surveillance for Infection Prevention and Control in various settings. The primary aims are: (1) to be able to base surveillance on an appropriate rationale; (2) to understand and use various methods of surveillance; (3) to make recommendations and follow up on the results of surveillance; (4) to be able to evaluate a surveillance program and incorporate into quality improvement.

Prerequisite(s): Community Health Sciences 644 or Medical Science 647.10 and admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 645 and Medical Science 647.11 will not be allowed.

Note: This is an online course.

Community Health Sciences 646 3 units; (3-0)

Introduction to Public Health Surveillance

Surveillance is a public health function. Topics included in this online course include definition and overview of public health surveillance, indicators, frameworks and principles for the planning and evaluation of surveillance systems; analysis and interpretation of surveillance data; communication

of public health information; and legal and ethical issues relevant to surveillance systems.

Prerequisite(s): Community Health Sciences 610 and 640 or Medical Science 643.01 and 647.01 and admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 646 and Medical Science 647.12 will not be allowed.

Community Health Sciences 647 3 units; (3-0)

Clinical Epidemiology

Designed for students who have some familiarity and experience in epidemiology, biostatistics and who have a background in clinical health care or related field. It focuses on the application of epidemiologic methods to clinical health issues.

Prerequisite(s): Community Health Sciences 610 and 640 or Medical Science 643.01 and 647.01 and admission to the Community Health Sciences graduate program with a clinical background or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 647 and Medical Science 647.15 will not be allowed.

Community Health Sciences 648 6 units; (3-1.5)

Online Basic Infection Control

Focuses on providing novice Infection Control Professionals (ICPs) with the basic knowledge, tools and strategies needed to do Infection control in a board range of health care environments from health care institutions to the community. The purpose of this entry to practice course is (1) to identify and describe the scope of infection prevention and control problems and issues for novice ICPs and (2) to examine and integrate their current expertise with the basic knowledge, tools and strategies needed to examine problems and develop practical solutions in Infection Control.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 648 and Medical Science 660 will not be allowed.

Note: This is an online course.

Community Health Sciences 649 3 units; (3-0) (Medical Science 613.01)

Epidemiology of Infectious Diseases

Focuses on the principles of epidemiology that are of particular relevance to infectious diseases. The course emphasizes the research aspects of infectious diseases epidemiology and how the basic techniques of epidemiology and biostatistics are applied in the communicable diseases.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Community Health Sciences 660 3 units; (3-0)

Foundations of Health Services Research

An introduction to the fundamental concepts of health services research including topics related to health systems and methods in health services research, as well as evaluation of health systems performance, with emphasis on knowledge translation and health policy creation and analysis.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 660 and Medical Science 645.18 will not be allowed.

Community Health Sciences 661 3 units; (3-0) (Economics 679)

Health Economics I

Application of basic concepts from economics to examination of health and health care policy issues, such as why we have the kind of health-care system we have, various aspects of health care reform, promotion of health, and evaluation of interventions.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 661 and Medical Science 679 will not be allowed.

Community Health Sciences 662 3 units; (3-0)

Economic Evaluation

Designed for students interested in being able to critically interpret economic evaluation studies of health or health care interventions and beyond. The aim of the course is to introduce students to the concepts and methods of economic evaluation, provide an introduction to how it may serve as a useful tool in health and health care decision-making, and to enable students to critically appraise the economic evaluation literature.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 662 and Medical Science 659.08 will not be allowed.

Community Health Sciences 663 3 units; (3-2)

Decision Analysis in Health Economic

Students will be introduced to the concepts of decision analysis and how it may serve as a useful tool in health care economics evaluation. Through attention to a clinical question or health care policy issue, students will develop the skills necessary to perform an economic evaluation to address it.

Prerequisite(s): Community Health Sciences 662 or Medical Science 659.08 and admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 663 and Medical Science 659.06 will not be allowed.

Community Health Sciences 664 3 units; (3-0)

Administrative Data Analysis Methodology

Administrative data have been used widely for decision making and research. Analysis of the data requires knowledge of the data features and unique analytical skills since the data are not collected for research purposes. This course is designed to provide these skills. Through analyzing available administrative data, students will write manuscripts suitable for publications at peer-reviewed journals.

Prerequisite(s): Minimum grade of "B+" in Community Health Sciences 610 and 640 or Medical Science 643.01 and 647.01 and consent of the program.

Antirequisite(s): Credit for Community Health Sciences 664 and Medical Science 659.07 will not be allowed.

Note: Consent of the program must be obtained by September 30.

Community Health Sciences 665 3 units; (3-0)

Leadership in Health Care Organizations

A foundation for developing management and leadership skills in health care organizations.

The curriculum includes: fundamentals of leadership; formal and informal components of organizations; strategic, operational, financial and project planning; managing change and conflict; human resources; and evaluating organizational performance. A variety of learning opportunities are incorporated including: reading materials, student seminars, self-assessment tools, case studies, team assignments, guest speakers and class discussion.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 665 and Medical Science 645.10 will not be allowed.

Community Health Sciences 666 3 units; (3-0)

Health Policy

An advanced level course focused on developing and deepening participants' understanding of critical policy issues affecting health and health services. The course will primarily review health policy in the context of Canadian populations and systems. However, a more global comparative frame of reference will be used to test, challenge and contrast both the historical and current underpinnings of health policy in Canadian jurisdictions.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 666 and Medical Science 645.15 will not be allowed.

Community Health Sciences 667 3 units; (3-0)

Introduction to the Legal and Ethical Framework of Health Care in Canada

An introduction to two integrated aspects of health care in Canada: the legal dimensions and the ethical dimensions. No formal background or training in law or ethics is presupposed. Successful students will gain grounding in the ethico-legal complexity of health care and health research in Canada.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 667 and Medical Science 645.17 will not be allowed.

Community Health Sciences 680 3 units; (3S-0)

Foundations of Population/Public Health

Students will learn, discuss, and interrogate foundational content in population health and public health. Foundational content includes history, structure, functions, concepts, theories, and debates. The course is structured with the first half focusing on public health and the second half focusing on population health.

Prerequisite(s): Admission to the Community Health Sciences graduate program or Public Health and Preventative Medicine program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 680 and Medical Science 651.04 will not be allowed.

Community Health Sciences 681 3 units; (3-2T)**Health Research Methods**

Introduction to health research, including research design, measurement, data collection, proposal and grant writing.

Prerequisite(s): Community Health Sciences 610 or Medical Science 643.01 and admission to in the Community Health Sciences graduate program or consent of the program. Not available to Open Studies students.

Antirequisite(s): Credit for Community Health Sciences 681 and Medical Science 659.02 will not be allowed.

Community Health Sciences 683 3 units; (3-0)**Introduction to Qualitative Health Research for the Health Sciences**

A focus on understanding and appraising published examples of qualitative research on health topics as well as analyzing qualitative findings in health research. The importance of both methods and theories for ensuring rigor will be emphasized. Examples of relevance to people's experiences of health, illness and health care as well as the social and structural determinants of health will be considered.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 683 and Medical Science 659.05 will not be allowed.

Community Health Sciences 687 3 units; (3-0)**Environmental Health**

Examination of the interaction between natural and man-made environments in human health/illness.

Prerequisite(s): Admission to the Community Health Sciences graduate program or the Public Health and Preventative Medicine program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 687 and Medical Science 651.06 will not be allowed.

Community Health Sciences 689 3 units; (3-0)**Global Health and Development**

An examination of health, the determinants of health, and approaches to health policy and programming in the context of less developed country populations. The course provides an overview of the history and evolution of primary health care and the role of health in development and examines current trends and issues related to global development. Cross-cutting themes include: international perspectives and trends in health sector reform, globalization, policy programming and financing, public participation in decision making, governance, health human resources, gender, human rights, partnerships and information-education-communication among others.

Prerequisite(s): Admission to the Community Health Sciences graduate program or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 689 and Medical Science 651.08 will not be allowed.

Community Health Sciences 700 3 units; (3-0)**Community Health Directed Study**

Independent study in special topics at an advanced level in Community Health Sciences.

Prerequisite(s): Consent of the program.

MAY BE REPEATED FOR CREDIT

Community Health Sciences 710 3 units; (3-0)**Advanced Topics in Biostatistics**

Advanced topics and methods used in biostatistics.

Prerequisite(s): Consent of the program.

Antirequisite(s): Credit for Community Health Sciences 710 and Medical Science 712.01 will not be allowed.

Community Health Sciences 720 3 units; (2-3)**Pro Doctoral Seminar**

Pertinent topics discussed to prepare students for thesis preparation.

Community Health Sciences 730 6 units; (3S-0)**Doctoral Medical Education Research Seminar**

An exploration of medical education research as an emerging field with multiple overlapping discourses, methods, philosophies, and ideologies.

Prerequisite(s): Admission to the Medical Education Specialization in the PhD program in Community Health Sciences.

Community Health Sciences 740 3 units; (3-2T) (Veterinary Medicine 740)**Advanced Epidemiology**

An expansion on the understanding of causality and threats to validity in epidemiologic research. The focus will be on the assessment and control of bias, including selection, information and confounding. The concept of effect modification (interaction) will be appraised. Stratified analysis will be considered as a tool for the assessment and control of confounding and effect modification and will be applied to a variety of study designs including case-control, and cohort studies.

Prerequisite(s): Community Health Sciences 640 or Medical Science 647.01 and registration in the Community Health Sciences graduate program. Consent of the program is required for all other students.

Antirequisite(s): Credit for Community Health Sciences 740 and Medical Science 709 will not be allowed.

Community Health Sciences 741 3 units; (3-0)**Systematic Reviews and Meta-Analysis**

An exposure to all steps involved in the conduct of a systematic review and meta-analysis.

Prerequisite(s): Community Health Sciences 610 or Medical Science 643.01 and Community Health Sciences 640 or Medical Science 647.01 and admission to the Community Health Sciences graduate program, or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 741 and Medical Science 711 will not be allowed.

Community Health Sciences 742 3 units; (3-0)**Advanced Topics in Epidemiology**

Advanced topics and methods used in Epidemiology.

Prerequisite(s): Community Health Sciences 640 or Medical Science 647.01 and consent of the program.

Antirequisite(s): Credit for Community Health Sciences 742 and Medical Science 712.02 will not be allowed.

Community Health Sciences 760 3 units; (3-0)**Advanced Topics in Health Services Research**

Advanced topics and methods used in health services research.

Prerequisite(s): Community Health Sciences 660 or Medical Science 645.18 and consent of the program.

Antirequisite(s): Credit for Community Health Sciences 760 and Medical Science 712.03 will not be allowed.

Community Health Sciences 761 3 units; (3-0)**Advanced Methods in Health Research**

Advanced health research designs and measurement techniques.

Prerequisite(s): Community Health Sciences 681 or Medical Science 659.02 and admission to the Community Health Sciences graduate program, or consent of the program.

Antirequisite(s): Credit for Community Health Sciences 761 and Medical Science 705 will not be allowed.

Community Health Sciences 780 3 units; (3-0)**Advanced Topics in Population/Public Health**

Advanced topics and methods used in population/public health.

Prerequisite(s): Community Health Sciences 680 or Medical Science 651.04 and consent of the program.

Antirequisite(s): Credit for Community Health Sciences 780 and Medical Science 712.04 will not be allowed.

Community Rehabilitation CORE

For more information about these courses, contact the Community Health Sciences office: communityhealthsciences/.

Junior Courses**Community Rehabilitation 205 3 units; (2-1T-2)****Introduction to Disability Studies**

The social, political, economic, ethics/bioethical, technological and advocacy issues impacting persons with disabilities and their families. Supports professional development tutorials in community practicum.

Community Rehabilitation 207 3 units; (2-1T-5)**An Introduction to Community Rehabilitation Practice and Professional Conduct**

Practical application of the basic principles of assessment, planning and intervention with individuals/groups. Supports professional development tutorials in community practica.

Prerequisite(s): Community Rehabilitation 205 or consent of the Program.

Community Rehabilitation 209 3 units; (3-0)**Disability in Theory and Everyday Life**

An overview of theories employed in community rehabilitation and disability studies.

Senior Courses**Community Rehabilitation 321 3 units; (2-1)****Communication Skills in Rehabilitation**

A skills-based introduction to understanding and developing basic communication skills that facilitate helpful dialogue in interpersonal, counselling,

guidance and community rehabilitation related contexts.

Community Rehabilitation 435 3 units; (3-0)

Social Research in Disability, Health and Rehabilitation Disablement

An overview of research methods in community rehabilitation and disability studies. An introduction to the major design, analyses and knowledge transfer strategies in the field.

Prerequisite(s): 24 units including at least one of Community Rehabilitation 205 or 209 or admission to BCR or BCR-C.

Antirequisite(s): Credit for Community Rehabilitation 435 and 425 will not be allowed.

Community Rehabilitation 471 3 units; (3-0)

Community Rehabilitation Practice for Families and Their Children

Families with children with disabilities in the context of the family relationships, support networks, schools and communities.

Prerequisite(s): 24 units, including at least one of Community Rehabilitation 205 or 209 or admission to BCR or BCR-C.

Community Rehabilitation 473 3 units; (3-0)

Social Justice and the Labour Force

Exploring the role of work for youth and adult with disabilities.

Prerequisite(s): 24 units including at least one of Community Rehabilitation 205 and 207 or admission to BCR or BCR-C.

Community Rehabilitation 475 3 units; (3-0)

Community Rehabilitation Practice and the Aging Process

Theoretical and practical issues as they relate to rehabilitation and community services for seniors with disabilities.

Prerequisite(s): 24 units including at least one of Community Rehabilitation 205 and 207, or admission to BCR or BCR-C.

Community Rehabilitation 485 3 units; (2T/2-10)

An Introduction to Community Rehabilitation Practice and Professional Conduct

Practical application of the basic principles of assessment, planning and intervention with individuals/groups. Professional development tutorials support 130 hours in community practicum. Students taking both Community Rehabilitation 485 and 487 will choose a different human service realm for each practicum.

Prerequisite(s): 27 units.

Note: Prior completion of Community Rehabilitation 205 and 207 is strongly recommended.

Community Rehabilitation 487 3 units; (2T/2-10)

Practicum in Rehabilitation Practice

Practical application of the basic principles of assessment, planning and intervention with individuals/groups. Supports professional development tutorials in community practicum.

Prerequisite(s): Community Rehabilitation 207.

Community Rehabilitation 536 3 units; (3-0)

Adapting Curriculum in Schools K-12

A variety of practical strategies for developing meaningful curriculum modifications and instructional methods for students with disabilities. The strategies are premised on using collaborative

team approaches to planning and implementing instructional programs for students. Involving families as a meaningful part of the learning team will also be emphasized.

Prerequisite(s): Admission to the BCR or BCR-C program.

Community Rehabilitation 537 3 units; (3-0)

Inclusion and Challenging Behaviours

An examination and expansion of belief systems surrounding challenging behaviour. Participants will be offered opportunities to learn about successful strategies for supporting difficult students within a classroom as well as other settings.

Prerequisite(s): Admission to the BCR or BCR-C program.

Community Rehabilitation 538 3 units; (3-0)

Ethics of Inclusion

Ethics of caring and inclusion and implications for educational reform. Topics include the ethics of inclusive teaching practices in regular classrooms, educational systems change and leadership.

Prerequisite(s): Admission to the BCR or BCR-C program.

Community Rehabilitation 541 3 units; (3-0)

International Disability Research and Policy

Disability research and policy including human rights policy and law whereby the student learns to understand local, national and global perspectives.

Prerequisite(s): 54 units.

Community Rehabilitation 543 3 units; (3-0)

Integrating the Arts

Principles, theories and applications of creative art techniques with varied populations. Of particular interest to rehabilitation practitioners working with persons who present behavioural challenges.

Prerequisite(s): 48 units and admission to the BCR or BCR-C program.

Antirequisite(s): Credit for Community Rehabilitation 543 and 591.02 will not be allowed.

Community Rehabilitation 547 3 units; (3-0)

Health Research, Emerging Technologies and Marginalized Groups

Provides an in-depth global outlook on new, envisioned and emerging sciences and technologies and their global impact on (a) disabled people and disability studies; (b) the concept and field of rehabilitation and identity of rehabilitation professionals; (c) the concept of health professionals. Also provides an understanding of how disability studies scholars and rehabilitation and health policy, systems and care delivery scholars and professionals can enrich the new, envisioned and emerging science and technology and governance of science and technology discourse.

Prerequisite(s): 48 units.

Antirequisite(s): Credit for Community Rehabilitation 547 and 591.28 will not be allowed.

Community Rehabilitation 549 3 units; (3-0)

Understanding Children with Autism

Introduces students to Autism Spectrum Disorders (ASD). Discussions of the biological bases for the disorders as well as historical perspectives will be covered. Current research will be investigated from a variety of perspectives and philosophies. This course will provide students with in-depth knowledge of techniques used to treat children with autism, both empirically validated and those currently in vogue. An overview of characteristics,

assessment strategies, issues, and approaches related to children with autism will be provided.

Prerequisite(s): 48 units.

Antirequisite(s): Credit for Community Rehabilitation 549 and 591.30 will not be allowed.

Community Rehabilitation 553 3 units; (3-0)

Health Foundations: Disability Across the Lifespan

Explores the concepts of community rehabilitation in the context of anatomy and physiology of disabling conditions and human development across the lifespan. Self-directed learning is based on case studies, exploring current literature, and online interactive group work and forum discussions.

Prerequisite(s): 24 units.

Antirequisite(s): Credit for Community Rehabilitation 553 and either 557 or 591.34 will not be allowed.

Community Rehabilitation 559 3 units; (3-0)

Fetal Alcohol Syndrome and Community Rehabilitation

A disability studies approach to Fetal Alcohol Spectrum Disorder and how this approach can facilitate an understanding of individuals with FASD in view of the principles of community inclusion and social justice as these apply to family support, schooling, intervention, prevention and life-long supports.

Prerequisite(s): 24 units.

Antirequisite(s): Credit for Community Rehabilitation 559 and 591.42 will not be allowed.

Community Rehabilitation 569 3 units; (3-0)

Recovery Models: Mental Health and Disability

Clinical and interprofessional skills for those working in recovery and consumer driven programs in Community Mental Health and Disability.

Prerequisite(s): 48 units.

Community Rehabilitation 573 3 units; (3-0)

Disability and the Law

Foundations of Canadian legal principles and practices as they affect community rehabilitation.

Prerequisite(s): 54 units.

Community Rehabilitation 583 3 units; (3-1)

Community Development in Community Rehabilitation

A study of management, practice and leadership issues for professionals working in community development and interdisciplinary teams, as well as in private, non-profit and public community-based organizations and businesses. Partnerships and community action are examined as components of rehabilitation practice.

Prerequisite(s): 48 units.

Community Rehabilitation 591 3 units; (2-1)

Advanced Study Topics in Community Rehabilitation

Advanced study topics in community rehabilitation.

Prerequisite(s): 54 units.

MAY BE REPEATED FOR CREDIT

Community Rehabilitation 594 3 units; (2T/2-10)

Practicum I

Senior level program and management skills in partner agencies, associations and systems. Spe-

cifics to be negotiated with the student. Content on professional ethics will also be covered.

Prerequisite(s): 54 units and enrolment in BCR, Minor in Community Rehabilitation and Disability Studies, Minor in Adapted and Therapeutic Physical Activity or Concentration in Community Rehabilitation and Disability Studies for Health and Society Majors in the Bachelor of Health Sciences program.

Antirequisite(s): Credit for Community Rehabilitation 594 and 589.01 will not be allowed.

Note: Course needs to be taken in combination with Community Rehabilitation 595 in the same academic year.

Community Rehabilitation 595 3 units; (2T/2-10)

Practicum II

Senior level program and management skills in partner agencies, associations and systems. Specifics to be negotiated with the student. Content on professional ethics will also be covered.

Prerequisite(s): Community Rehabilitation 594.

Antirequisite(s): Credit for Community Rehabilitation 595 and 589.02 will not be allowed.

Note: Course needs to be taken in combination with Community Rehabilitation 594 in the same academic year.

Community Rehabilitation 597 3 units; (2T/2-10)

Practicum I in Community Rehabilitation for Distance Learners

Students will complete a project in the area of program or service development (e.g. needs analysis, developing funding proposals, program evaluation). In the seminars, students will be supported in the completion of agency-based program development. Content on professional ethics will also be covered.

Prerequisite(s): Admission to the BCR-C distance program.

Antirequisite(s): Credit for Community Rehabilitation 597 and 589.06 will not be allowed.

Note: Course is normally taken in combination with Community Rehabilitation 598 in the same academic year.

Community Rehabilitation 598 3 units; (2T/2-10)

Practicum II in Community Rehabilitation for Distance Learners

Students will complete a project in the area of program or service development (e.g. needs analysis, developing funding proposals, program evaluation). In the seminars, students will be supported in the completion of agency-based program development. Content on professional ethics will also be covered.

Prerequisite(s): Community Rehabilitation 596 or 597 and admission to the BCR-C distance program.

Note: Course is normally taken in combination with Community Rehabilitation 597 in the same academic year.

Graduate Courses

For more information about these courses, contact Graduate Science Education cumming.ucalgary.ca/gse.

Community Rehabilitation 624 6 units; (3-1S-3)

Specialization Theory and Practice: A Collaborative Inquiry Capstone

Students refine a topic of inquiry, prepare background working papers, invite reactions from stakeholders/experts and report on their experience to stakeholder audience, fellow students and faculty. This is not a research course but an opportunity for students to own their knowledge and find ways to share their experience and education with others in a collaborative manner.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Rehabilitation 630 3 units; (3-1S)

Foundations and Futures of Disability and Community Studies

History, current issues, and futures of intervention, activism, and academic study related to disability. This will include the systems and changing roles of those traditionally served, professionals, the teams they generate and society.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 630 and 603.15 will not be allowed.

Community Rehabilitation 631 3 units; (3-1S)

Politics of Inclusion and Exclusion of Disability and Community Studies

Current topics relevant to inclusion and exclusion will be reviewed. An examination of research in disability provides an opportunity for the student to learn, understand, and compare legislation, policy, and ethical frameworks that inform action. Frameworks of choice, respect, consultation, collaboration, and co-operation will be examined.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 631 and 603.12 will not be allowed.

Community Rehabilitation 632 3 units; (3-0)

Leadership and Innovation

The changing personal, organizational, and societal, leadership role and its importance for innovation in the field of disability and community studies.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 632 and 603.13 will not be allowed.

Community Rehabilitation 633 3 units; (3-1S)

Social Construction: Health Capacity and Disability

A constructivist exploration of language, political structures, and sense of self to deepen the understanding of health capacity and disability.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 633 and 603.18 will not be allowed.

Community Rehabilitation 634 3 units; (3-1S)

Appraisal of Social and Health Quantitative Research Methods

Provides students with experience in critically appraising a range of quantitative research methods and familiarize them with a variety of bio-statistical approaches. A variety of frameworks will be used to critically appraise literature from students' chosen field of study and examine and discuss the implications for evidence-based practice.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 634 and 603.16 will not be allowed.

Note: Pre-session requirements include reading of pre-session materials and participation in orientation session prior to online course delivery.

Community Rehabilitation 641 3 units; (3-0)

Special Topics in International Disability Research and Policy

Selected topics in disability research and policy provide an opportunity for the student to learn, understand, and compare the policies in two or more countries.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Rehabilitation 650 3 units; (3-0)

Adapting Curriculum and Instruction from K-12

A variety of practical strategies for developing meaningful curriculum and instructional methods for students with severe disabilities. The strategies are premised on using the content of typical community collaborative team approaches to planning and implementing programs for students. Involving parents as part of the Learning Team will be emphasized.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 650 and 691.04 will not be allowed.

Community Rehabilitation 651 3 units; (3-0)

Challenging Behaviours in the Classroom: Inclusive Education

Examines and builds upon the participant's belief systems about challenging behaviour. Participants will be offered opportunities to learn about successful strategies for supporting difficult students within a classroom setting.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 651 and 691.32 will not be allowed.

Community Rehabilitation 652 3 units; (3-0)

Collaboration, Ethics, Management: Inclusive Education

Each year a topic is negotiated with the education sector in partnership with provincial advocacy organizations.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 652 and 691.33 will not be allowed.

Community Rehabilitation 653 3 units; (3-1S)

Advanced Seminar: Assessment and Intervention for Families with Children with Special Needs

Exploration of cognitive, social/emotional, motor, language/communication development and assessment of children with disabilities in the context of their families and communities.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 653 and 603.02 will not be allowed.

Community Rehabilitation 654 3 units; (3-0)

Health Research, Emerging Technologies and Marginalized Groups

Provides an in depth view of the impact of new emerging technologies and the governance of science and technology and health research on social policy, disability studies, disability research and the lives of disabled people and other marginalized groups.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 654 and 691.42 will not be allowed.

Note: This is an online course.

Community Rehabilitation 655 3 units; (3-0)

Bioethics and People with Disabilities

Provides an in depth view of the impact of bioethics on social policy, disability studies, disability research and the lives of disabled people.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 655 and 691.44 will not be allowed.

Note: This is an online course.

Community Rehabilitation 656 3 units; (3-0)

Career Development and Disabilities

Exploration of career development issues such as occupational change, and integration back into the workforce because of disability experienced in adult life.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Antirequisite(s): Credit for Community Rehabilitation 656 and 603.03 will not be allowed.

Community Rehabilitation 676 6 units; (3-1S-3)

Consultation in Human Services and Systems

Qualitative and quantitative evaluation research informs the design and implementation of a collaborative evaluation of a rehabilitation program, policy or system.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Rehabilitation 730 3 units; (3S-0)

Doctoral Pro-Seminar in Disability, Community and Rehabilitation

This advanced professional seminar focuses on a critical examination of theoretical, methodological, and professional issues relevant to research in the domains of community rehabilitation and disability studies. The course is intended for PhD students preparing their dissertation research proposals as a final preparation for their Candidacy Exam.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other graduate students.

NOT INCLUDED IN GPA

Comparative Literature COLT

For more information contact the Arts Students' Centre.

Senior Course

Comparative Literature 399 3 units; (3-0)

Studies in Comparative Literature
MAY BE REPEATED FOR CREDIT

Computational Media Design CMDA

For more information about these courses, see the Computational Media Design program: ucalgary.ca/cmda.

Graduate Courses

Computational Media Design 601 3 units; (3-0)

Special Topics in Computational Media Design
A study of topics related to computational media design.

MAY BE REPEATED FOR CREDIT

Computational Media Design 603 3 units; (0-9)

Research Project in Computational Media Design

An independent research project in computational media design under the guidance of a faculty member.

MAY BE REPEATED FOR CREDIT

Computer Engineering ENCM

For more information about these courses, see the Department of Electrical and Computer Engineering: <https://schulich.ucalgary.ca/electrical-computer>.

Senior Courses

Computer Engineering 335 3 units; (3-1T-1.5)

Programming Fundamentals for Electrical Engineers

Key features of the C programming language. Pointers, memory models and memory management. Manipulation of text files and binary files. Introduction to recursion. Introduction to object-based programming using a modern object-oriented language.

Prerequisite(s): Engineering 233.

Antirequisite(s): Credit for Computer Engineering 335 and 339 will not be allowed.

Computer Engineering 369 3 units; (3-1T-1.5)

Computer Organization

Organization of a simple stored-program computer: CPU, busses and memory. Instruction sets, machine code, and assembly language. Conventions for assembly language generated by compilers. Floating-point number representation. Hardware organization. Address translation and virtual memory. Input/output devices, computer interfacing, interrupt handling and multi-tasking systems.

Prerequisite(s): Electrical Engineering 353 and Computer Engineering 335 or 339 or Software Engineering for Engineers 337.

Computer Engineering 467 3 units; (3-1T-3/2)

Digital Electronic Circuits

MOS transistor fundamentals (D.C. characteristics, large signal model, transient behaviour). Transistor level implementation of standard MOS logic gates. Other MOS logic blocks. MOS memory (static and dynamic). Interfacing various logic families. Introduction to integrated circuit design.

Prerequisite(s): Electrical Engineering 343 and 361.

Computer Engineering 501 3 units; (3-1T-1)

Principles of Computer Architecture

Impacts of integrated circuit technology on processor and memory system design and performance. Tradeoffs in instruction set design. Caches. Virtual memory. Enhancement of instruction throughput with instruction-level, data-level, and thread-level parallelism. Introduction to multicore microarchitecture and programming.

Prerequisite(s): Computer Engineering 369 and 511.

Computer Engineering 507 3 units; (3-1T)

Computer Aided Design of Integrated Circuits

Development of Computer-Aided Design (CAD) tools for digital circuits, algorithmic definition and design; partitioning, clustering, placement routing and timing techniques for digital circuits; applications in other areas of engineering.

Prerequisite(s): Electrical Engineering 353.

Antirequisite(s): Credit for Computer Engineering 507 and Electrical Engineering 519.38 will not be allowed.

Computer Engineering 509 3 units; (3-2)

Fundamentals of Biometric Systems Design

Biometric systems, sensors and devices, Integration of Biometric-based hardware and software, Biometric applications.

Prerequisite(s): Electrical Engineering 327 or consent of the Department.

Antirequisite(s): Credit for Computer Engineering 509 and 519.36 will not be allowed.

Computer Engineering 511 3 units; (3-1T-3/2)**Embedded System Interfacing**

Review of computer architecture; microcontrollers and their instruction sets; interfacing using common input/output devices, debugging and other software engineering practices, strategies for interrupt handling and exception handling; Interfacing using high level and assembly languages; software and hardware optimizations to achieve real time operations; real time operating systems; Embedded real-time applications.

Prerequisite(s): Computer Engineering 369.

Computer Engineering 515 3 units; (3-1T-3/2)**Digital Signal Processors**

Review of microprocessor fundamentals. Comparison of basic system architectures for RISC, CISC and DSP processors, recent architectural innovations. Processor characteristics needed to match the requirements for typical DSP applications. Hardware and software optimization techniques including multiple busses, register windows, super-scalar and other highly parallel instruction sets, critical timing paths, optimizing compilers and multi-processor operation. Fundamental comparison of custom and current commercial single chip DSP processor architectures. Elements of Hardware-Software co-design and development processes. Practical applications and laboratories.

Prerequisite(s): Computer Engineering 369.

Computer Engineering 517 3 units; (3-1T)**Computer Arithmetic and Computational Complexity**

Analyzing the complexity of computer arithmetic algorithms, fundamental issues concerning computational complexity problems with applications to engineering problems, including signal and image processing, cryptography and data mining.

Prerequisite(s): Computer Engineering 335 or 339 or Software Engineering for Software Engineers 337.

Antirequisite(s): Credit for Computer Engineering 517 and 519.34 will not be allowed.

Computer Engineering 519 3 units; (3-2)**Special Topics in Computer Engineering**

Current topics in computer engineering.

Prerequisite(s): Consent of the Department.

Note: Consult Department for announcement of topics.

MAY BE REPEATED FOR CREDIT

Computer Science CPSC

For more information about these courses, contact the Department of Computer Science: ucalgary.ca/cpsc/.

Notes:

- Computer Science students should also see courses listed under Software Engineering.
- Computer Science 217, 231, 235 and Data Science 211 are each introductions to computer science that include a substantial introduction to programming and that are available for credit for Computer Science majors. Students interested in these courses should consult the department and program information for the Department of Computer Science when choosing which course to take.
- In several cases, credit is not allowed for Computer Science courses and various courses offered by the Faculty of Engineering. Students

who have successfully completed Engineering courses should contact the Department of Computer Science for additional information.

Junior Courses**Computer Science 203 3 units; (4-0)****Introduction to Problem Solving using Application Software**

Introduction to computer fundamentals; contemporary topics, such as security and privacy, and the Internet and World Wide Web. Problem solving, analysis and design using application software such as spreadsheets.

Antirequisite(s): Not open to Computer Science majors.

Note: Basic familiarity with personal computers and commonly used software, including word processors, electronic mail and web browsers, will be assumed.

Computer Science 217 3 units; (3-2T)**Introduction to Computer Science for Multidisciplinary Studies I**

Introduction to problem solving, analysis and design of small-scale computational systems and implementation using a procedural programming language. For students wishing to combine studies in computer science with studies in other disciplines.

Antirequisite(s): Credit for Computer Science 217 and any of 215, 231, 235, Data Science 211, Computer Engineering 339 or Engineering 233 will not be allowed.

Note: See the statements at the beginning of the Computer Science entry.

Computer Science 219 3 units; (4-2T)**Introduction to Computer Science for Multidisciplinary Studies II**

Continuation of Introduction to Computer Science for Multidisciplinary Studies I. Emphasis on object oriented analysis and design of small-scale computational systems and implementation using an object oriented language. Issues of design, modularization and programming style will be emphasized.

Prerequisite(s): Computer Science 217 or Data Science 211.

Antirequisite(s): Credit for Computer Science 219 and any of 233, 235, Electrical Engineering 497 or Computer Engineering 493 will not be allowed.

Computer Science 231 3 units; (3-2T)**Introduction to Computer Science for Computer Science Majors I**

Introduction to problem solving, the analysis and design of small-scale computational systems, and implementation using a procedural programming language. For computer science majors.

Antirequisite(s): Credit for Computer Science 231 and any of 215, 217, 235 or Data Science 211 or Computer Engineering 339 or Engineering 233 will not be allowed.

Note: See the statements at the beginning of the Computer Science entry.

Computer Science 233 3 units; (3-2T)**Introduction to Computer Science for Computer Science Majors II**

Continuation of Introduction to Computer Science for Computer Science Majors I. Emphasis on object-oriented analysis and design of small-scale computational systems and implementation using an object oriented language. Issues of design,

modularization, and programming style will be emphasized.

Prerequisite(s): Computer Science 231.

Antirequisite(s): Credit for Computer Science 233 and any of 219, 235, Electrical Engineering 497 or Computer Engineering 493 will not be allowed.

Computer Science 235 3 units; (3-2T-2)**Advanced Introduction to Computer Science**

An accelerated introduction to problem solving, the analysis and design of small-scale computational systems and implementation using both procedural and object oriented programming languages. Issues of design, modularization, and programming style will be emphasized.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Computer Science 235 and any of 215, 217, 219, 231, 233, Computer Engineering 339, 493 or Data Science 211 will not be allowed.

Note: See the statements at the beginning of the Computer Science entry.

Senior Courses**Computer Science 313 3 units; (3-2T)****Introduction to Computability**

An introduction to abstract models of sequential computation, including finite automata, regular expressions, context-free grammars, and Turing machines. Formal languages, including regular, context-free, and recursive languages, methods for classifying languages according to these types, and relationships among these classes.

Prerequisite(s): Mathematics 271 or 273; Philosophy 279 or 377; and one of Computer Science 219, 233 or 235.

Note: One of Computer Science 319 or 331 is strongly recommended as preparation for this course.

Computer Science 319 3 units; (3-2T)**Data Structures, Algorithms, and Their Applications**

Fundamental data structures, including arrays, lists, stacks, queues, trees, hash tables, and graphs. Algorithms for searching and sorting. Applications of these data structures and algorithms. For students wishing to combine studies in computer science with studies in other disciplines.

Prerequisite(s): One of Computer Science 219, 233, 235, Computer Engineering 335, 339 or Software Engineering for Engineers 337.

Antirequisite(s): Credit for Computer Science 319 and 331 will not be allowed. Computer Science majors are not permitted to register in this course.

Computer Science 329 3 units; (3-2T)**Explorations in Information Security and Privacy**

A broad survey of topics in information security and privacy, with the purpose of cultivating an appropriate mindset for approaching security and privacy issues. Topics will be motivated by recreational puzzles. Legal and ethical considerations will be introduced as necessary.

Prerequisite(s): One of Computer Science 217, 231, 235, Data Science 211 or Engineering 233.

Note: One of Mathematics 211, 213, 249, 251, 265, 271, 273, 275, 281 or Applied Mathematics 217 is recommended as preparation for this course.

Computer Science 331 **3 units; (3-2T)**

Data Structures, Algorithms, and Their Analysis

Fundamental data structures, including arrays, lists, stacks, queues, trees, hash tables, and graphs. Algorithms for searching and sorting. Introduction to the correctness and analysis of algorithms. For computer science majors and those interested in algorithm design and analysis, information security, and other mathematically-intensive areas.

Prerequisite(s): Mathematics 271 or 273; and one of Computer Science 219, 233, 235 or Computer Engineering 339.

Antirequisite(s): Credit for Computer Science 331 and 319 will not be allowed.

Computer Science 335 **3 units; (3-2T)**

Intermediate Information Structures

A continuation of Computer Science 319 or 331. Collision resolution in hash tables, search algorithms, advanced tree structures, strings. Advanced algorithmic tools for the storing and manipulation of information.

Prerequisite(s): Computer Science 319 or 331.

Computer Science 355 **3 units; (3-2T)**

Computing Machinery I

An introduction to computing machinery establishing the connection between programs expressed in a compiled language, an assembly language, and machine code, and how such code is executed. Includes the detailed study of a modern CPU architecture, its assembly language and internal data representation, and the relationship between high-level program constructs and machine operations.

Prerequisite(s): One of Computer Science 219, 233 or 235.

Antirequisite(s): Credit for Computer Science 355 and 265 or Computer Engineering 369 will not be allowed.

Computer Science 359 **3 units; (3-2T)**

Computing Machinery II

An introduction to hardware and microprocessor design, including the connection between gate-level digital logic circuits and sequential machines that can execute an algorithm and perform input and output.

Prerequisite(s): Computer Science 355 and Philosophy 279 or 377.

Antirequisite(s): Credit for Computer Science 359 and any of 325, 455 or Computer Engineering 415 will not be allowed.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Computer Science 399 **3 units; (3-0)**

Special Topics in Computer Science

Exploration of various areas in Computer Science. Topics will vary from year-to-year. It will be offered as required to provide the opportunity for students to engage in additional areas in Computer Science. Before registration, consult the Department of Computer Science for topics offered.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Computer Science 405 **3 units; (3-1.25T)**
 (formerly Computer Science 499.01)

Software Entrepreneurship

Development of business models, building software prototypes and creation of pitch presentations to create a software-based business.

Prerequisite(s): Software Engineering 300.

Note: Taught in collaboration with the Haskayne School of Business.

Computer Science 409 **3 units; (3-0)**

History of Computation

The history of computation from the earliest times to the modern era.

Prerequisite(s): Computer Science 355.

Computer Science 411 **3 units; (3-2T)**

Compiler Construction

Introduction to compilers, interpreters, and the tools for parsing and translation. Lexical analysis, context free grammars and software tools for their recognition. Attribute grammars and their applications in translation and compiling.

Prerequisite(s): Computer Science 319 or 331.

Note: Computer Science 313 is strongly recommended as preparation for this course.

Computer Science 413 **3 units; (3-2T)**

Design and Analysis of Algorithms I

Techniques for the analysis of algorithms, including counting, summation, recurrences, and asymptotic relations; techniques for the design of efficient algorithms, including greedy methods, divide and conquer, and dynamic programming; examples of their application; an introduction to tractable and intractable problems.

Prerequisite(s): Computer Science 313, 331; Mathematics 211 or 213; and one of Mathematics 249, 265 or 275.

Note: Students who have credit for Computer Science 319 instead of Computer Science 331 should contact the department for instructions on how to enrol in this course.

Computer Science 418 **3 units; (3-2T)**

Introduction to Cryptography

The basics of cryptography, with emphasis on attaining well-defined and practical notations of security. Symmetric and public key cryptosystems; one-way and trapdoor functions; mechanisms for data integrity; digital signatures; key management; applications to the design of cryptographic systems. In addition to written homework, assessment will involve application programming; additional mathematical theory and proof-oriented exercises will be available for extra credit.

Prerequisite(s): Computer Science 331 and one of Mathematics 271, 273, 315 or Pure Mathematics 315.

Antirequisite(s): Credit for Computer Science 418 and any of Computer Science 429, 557, Mathematics 318, Pure Mathematics 329 or 418 will not be allowed.

Note: Students who have credit for Computer Science 319 instead of Computer Science 331 should contact the department for instructions on how to enrol in this course.

Computer Science 433 **3 units; (3-2T)**

Artificial Intelligence

An examination of the objectives, key techniques and achievements of work on artificial intelligence in Computer Science.

Prerequisite(s): Computer Science 313 and Philosophy 279 or 377.

Note: Prior or concurrent completion of Computer Science 349 or 449 is strongly recommended as preparation for this course.

Computer Science 441 **3 units; (3-2T)**

Computer Networks

Principles and practice in modern telecommunications, computer communications and networks. Layered communication protocols and current physical, data link, network and Internet protocol layers. Circuit switching, packet switching, and an introduction to broadband multimedia networking.

Prerequisite(s): Computer Science 319 or 331; and one of Computer Science 325, 359 or Computer Engineering 369.

Antirequisite(s): Credit for Computer Science 441 and Electrical Engineering 573 will not be allowed.

Computer Science 449 **3 units; (3-2T)**
 (formerly Computer Science 349)

Programming Paradigms

Examination of the basic principles of the major programming language paradigms. Focus on declarative paradigms such as functional and logic programming. Data types, control expressions, loops, types of references, lazy evaluation, different interpretation principles, information hiding.

Prerequisite(s): Computer Science 319 or 331; and Philosophy 279 or 377.

Note: The prerequisite of Philosophy 279 or 377 is waived for Engineering students in the Software Engineering program.

Computer Science 453 **3 units; (3-2T)**

Introduction to Computer Graphics

Introduction to computer graphics. Principles of raster image generation. Example of a graphics API. Graphics primitives. Co-ordinate systems, affine transformations and viewing of graphical objects. Introduction to rendering including shading models and ray tracing. Introduction to modelling including polygon meshes, subdivision, and parametric curves and surfaces.

Prerequisite(s): Computer Science 319 or 331; and Mathematics 211 or 213; and one of Mathematics 253, 267, 277, 283 or Applied Mathematics 219.

Computer Science 457 **3 units; (3-2T)**

Principles of Operating Systems

An introduction to operating systems principles. Performance measurement; concurrent programs; the management of information, memory and processor resources.

Prerequisite(s): Computer Science 319 or 331; and one of Computer Science 325, 359 or Computer Engineering 369.

Note: Prior or concurrent completion of Computer Engineering 511 is strongly recommended for students in Computer Engineering or Software Engineering programs.

Computer Science 461 **3 units; (3-2T)**

Information Structures

File architecture and manipulation techniques for various file types. Physical characteristics of current mass storage devices. Advanced data

structures and algorithms for implementing various sequential and hierarchical file structures. File organization and design for various applications, file systems and other storage management techniques including website design.

Prerequisite(s): Computer Science 355 and one of 319 or 331.

Computer Science 471 **3 units; (3-2T)**

Data Base Management Systems

Conceptual, internal and external data bases. Relational data base systems and SQL. The normal forms, data base design, and the entity-relationship approach.

Prerequisite(s): Computer Science 319 or 331.

Antirequisite(s): Credit for Computer Science 471 and Business Technology Management 331 will not be allowed.

Computer Science 481 **3 units; (3-2T)**

Human-Computer Interaction I

Fundamental theory and practice of the design, implementation, and evaluation of human-computer interfaces. Topics include: principles of design; methods for evaluating interfaces with or without user involvement; techniques for prototyping and implementing graphical user interfaces.

Prerequisite(s): One of Software Engineering 300, 301 or Data Science 311.

Computer Science 491 **3 units; (3-2T)**

Techniques for Numerical Computation

Elementary techniques for the numerical solution of mathematical problems on a computer, including methods for solving linear and non-linear equations, numerical integration, and interpolation.

Prerequisite(s): Computer Science 319 or 331; and Mathematics 211 or 213; and one of Mathematics 249, 251, 265, 275, 281 or Applied Mathematics 217.

Antirequisite(s): Credit for Computer Science 491 and any of Applied Mathematics 491, 493 or Engineering 407 will not be allowed.

Computer Science 499 **3 units; (3-0)**

Special Topics in Computer Science

Exploration of various areas in Computer Science. Topics will vary from year-to-year. It will be offered as required to provide the opportunity for students to engage in additional areas in Computer Science. Before registration, consult the Department of Computer Science for topics offered.

Prerequisite(s): Consent of the Department.

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Computer Science 501 **3 units; (3-2T)**

Advanced Programming Techniques

Theory and application of advanced programming methods and tools. Recent issues as well as those of an enduring nature will be discussed.

Prerequisite(s): Computer Science 349 or 449.

Computer Science 502 **6 units; (1-5)**

Research Project

A substantial research project under the guidance of a faculty member. A report must be written and presented on completion of the course.

502.01. Research Project in Computer Science

502.02. Research Project in Theoretical Computer Science

502.03. Research Project in Computer Graphics

502.04. Research Project in Information Security

502.05. Research Project in Scientific Computation

502.06. Research Project in Software Engineering

502.07. Research Project in Human Computer Interaction

502.08. Research Project in Networks and Distributed Computing

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Computer Science 502 and any of 503, Software Engineering for Engineers 599 or 591 will not be allowed.

Note: Students intending to complete a research project in a specific area of computer science should register in the version of Computer Science 502 corresponding to that area, if such a course is available. Other students should register in Computer Science 502.01. Permission to register in Computer Science 502 is generally given only to students with a minimum GPA of 3.30 over the last 90 units. When demand exceeds capacity, registration in Computer Science 502 is limited to students in Honours programs in Computer Science.

Computer Science 503 **3 units; (1-5)**

Project

A research project conducted under the guidance of a faculty member. A report must be presented on completion of the course.

503.01. Project in Computer Science

503.02. Project in Theoretical Computer Science

503.03. Project in Computer Graphics

503.04. Project in Information Security

503.05. Project in Scientific Computation

503.06. Project in Software Engineering

503.07. Project in Human Computer Interaction

503.08. Project in Networks and Distributed Computing

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Computer Science 503 and either 502 or Software Engineering for Engineers 599 will not be allowed.

Note: Students intending to complete a project in a specific area of computer science should register in the version of Computer Science 503 corresponding to that area, if such a course is available. Other students should register in Computer Science 503.01.

Computer Science 511 **3 units; (3-0)**

Introduction to Complexity Theory

Time and space complexity; the classes P, LOGSPACE, PSPACE and their nondeterministic counterparts; containments and separations between complexity classes; intractability and the theory of NP-completeness; complexity theories for probabilistic algorithms and for parallel algorithms.

Prerequisite(s): Computer Science 413.

Antirequisite(s): Credit for Computer Science 511 and 611 will not be allowed.

Computer Science 513 **3 units; (3-0)**

Computability

Computable functions; decidable and undecidable problems; Church's thesis and recursive functions.

Prerequisite(s): Computer Science 313.

Note: Computer Science 413 is strongly recommended as preparation for this course.

Computer Science 517 **3 units; (3-0)**

Design and Analysis of Algorithms II

Advanced techniques for the design and analysis of deterministic and probabilistic algorithms; techniques for deriving lower bounds on the complexity of problems.

Prerequisite(s): Computer Science 413.

Computer Science 518 **3 units; (3-0)**

Introduction to Computer Algebra

Fundamental problems, classical and modern algorithms, and algorithm design and analysis techniques of use in computer algebra. Integer and polynomial arithmetic. Additional problems in computer algebra, possibly including problems in computational linear algebra, factorization, and concerning systems of polynomial equations will be considered as time permits.

Prerequisite(s): Computer Science 413 and one of Mathematics 211 or 213.

Antirequisite(s): Credit for Computer Science 518 and Computer Science 667 will not be allowed.

Note: Computer Science 491 and Pure Mathematics 315 or Mathematics 315 are recommended as preparation for this course.

Computer Science 519 **3 units; (3-0)**

Introduction to Quantum Computation

Introduction to quantum computing. Quantum algorithms, quantum search, quantum fourier transforms, quantum error correcting codes, quantum cryptography, nonlocality and quantum communication complexity, and quantum computational complexity.

Prerequisite(s): Computer Science 413 and one of Mathematics 311 or 313.

Antirequisite(s): Credit for Computer Science 519 and Computer Science 619 will not be allowed.

Computer Science 521 **3 units; (3-2T)**

Foundations of Functional Programming

Theoretical foundations of functional programming: the lambda-calculus, beta-reduction, confluence, and reduction strategies. Programming syntax: solving recursive equations with the Y-combinator, let and letrec, types, datatypes, and patterns. Programming in a functional language: recursion patterns, useful combinators, maps, and folds, for datatypes. Example applications: recursive descent parsing, unification, combinatorial algorithms, theorem proving.

Prerequisite(s): Computer Science 313 and one of Computer Science 349 or 449.

Computer Science 522 **3 units; (3-2T)**

Introduction to Randomized Algorithms

Techniques for the design and analysis of randomized algorithms; discrete probability theory; randomized data structures; lower bound techniques; randomized complexity classes; advanced algorithmic applications from various areas.

Prerequisite(s): Computer Science 413.

Antirequisite(s): Credit for Computer Science 522 and Computer Science 622 will not be allowed.

Note: Mathematics 321 or Statistics 321 is recommended as preparation for this course.

Computer Science 525 **3 units; (3-0)**

Principles of Computer Security

Security policies and protection mechanisms for a computing system, including such topics as design principles of protection systems, authentication and authorization, reference monitors, security architecture of popular platforms, formal modelling of protection systems, discretionary access control, safety analysis, information flow control, integrity, role-based access control. Legal and ethical considerations will be introduced.

Prerequisite(s): Computer Science 457 and one of Mathematics 271 or 273.

Antirequisite(s): Credit for Computer Science 525 and either 529 or 625 will not be allowed.

Note: Computer Science 329 is recommended as preparation for this course.

Computer Science 526 **3 units; (3-2T)**

Network Systems Security

Attacks on networked systems, tools and techniques for detection and protection against attacks including firewalls and intrusion detection and protection systems, authentication and identification in distributed systems, cryptographic protocols for IP networks, security protocols for emerging networks and technologies, privacy enhancing communication. Legal and ethical issues will be introduced.

Prerequisite(s): Computer Science 441.

Antirequisite(s): Credit for Computer Science 526 and either 529 or 626 will not be allowed.

Note: Computer Science 329 and one of Pure Mathematics 329, Computer Science 418, Mathematics 318 or Pure Mathematics 418 are recommended as preparation for this course.

Computer Science 527 **3 units; (3-0)**

Computer Viruses and Malware

Study of computer viruses, worms, Trojan horses, and other forms of malicious software. Countermeasures to malicious software. Legal and ethical issues, and some general computer and network security issues.

Prerequisite(s): Computer Science 313 and 457 and consent of the Department.

Antirequisite(s): Credit for Computer Science 527 and 627 will not be allowed.

Computer Science 528 **3 units; (3-0)**

Spam and Spyware

Spam and other unsolicited bulk electronic communication, and spyware. Legal and ethical issues. Countermeasures and related security problems.

Prerequisite(s): Computer Science 313 and 457 and consent of the Department.

Antirequisite(s): Credit for Computer Science 528 and 628 will not be allowed.

Computer Science 530 **3 units; (3-2T)**

Information Theory and Security

Information theoretic concepts such as entropy and mutual information and their applications to defining and evaluating information security sys-

tems including encryption, authentication, secret sharing and secure message transmission.

Prerequisite(s): One of Computer Science 219, 233 or 235, one of Mathematics 271, 273, 315 or Pure Mathematics 315, and one of Statistics 205 or 211 or 213 or 321 or Mathematics 321.

Antirequisite(s): Credit for Computer Science 530 and 630 will not be allowed.

Note: Computer Science 329 is recommended as preparation for this course.

Computer Science 531 **3 units; (3-0)**

Systems Modelling and Simulation

An introduction to the modelling and simulation of stochastic systems; programming language issues; model and tool design; input data modelling; simulation experiments; and the interpretation of simulation results.

Prerequisite(s): Computer Science 457 and one of Mathematics 321 or Statistics 205 or 211 or 213 or 321.

Note: Mathematics 321 is recommended over Statistics 205 or 211 or 213 as preparation for this course. Computer Science 441 is also recommended as preparation for this course.

Computer Science 535 **3 units; (3-0)**

Introduction to Image Analysis and Computer Vision

Standard methods used in the analysis of digital images. Image acquisition and display: visual perception; digital representation. Sampling and enhancement. Feature extraction and classification methods. Object recognition.

Prerequisite(s): One of Mathematics 311, 313, 331, 353, 376, Applied Mathematics 307, 311, Pure Mathematics 331.

Antirequisite(s): Credit for Computer Science 535 and 635 will not be allowed.

Computer Science 550 **6 units; (2-3)**

Systems Administration

Topics and practices in systems administration and management. Required and optional administration duties and responsibilities. Moral and ethical conundrums, and legal responsibilities, in systems operation. Configuration and installation of operating systems and network and systems services.

Prerequisite(s): Computer Science 457 and consent of the Department.

Computer Science 559 **3 units; (3-0)**

Introduction to Distributed Systems

Designing and implementing distributed systems that overcome challenges due to concurrent computation, failure of components in the system and heterogeneity of processors and communication channels.

Prerequisite(s): Computer Science 441 and 457.

Computer Science 561 **3 units; (3-2T)**

Introduction to Distributed Algorithms

Basic problems in distributed systems such as symmetry breaking, consensus, resource allocation, and synchronization. The impact of system characteristics, such as models of communication, timing and failure, and of solution requirements, such as correctness and complexity criteria and algorithmic constraints, on the computability and complexity of these problems. Techniques for

solving problems under different models will be emphasized.

Prerequisite(s): Computer Science 413.

Antirequisite(s): Credit for Computer Science 561 and 661 will not be allowed.

Computer Science 565 **3 units; (3-0)**

Emergent Computing

An insight into a new mindset for programming as an emergent and evolutionary process of "breeding," rather than constructing. Programs can evolve to perform specific tasks in a bottom-up fashion rather than being manually coded. Topics will include: decentralized agent-based programming, massive parallelism and interaction, evolution, swarm intelligence.

Prerequisite(s): Computer Science 433.

Computer Science 567 **3 units; (3-1T)**

Foundations of Multi-Agent Systems

Modelling of agents and properties of multi-agent systems. Communication issues, including interaction and co-ordination concepts, forming and maintaining organizations, and competitive agent environments. Example systems; the implementation of a multi-agent system will be performed as the assignment.

Prerequisite(s): Computer Science 457 and 433.

Antirequisite(s): Credit for Computer Science 567 and 609 or Software Engineering 697 will not be allowed.

Computer Science 568 **3 units; (3-0)**

Agent Communications

An examination of communication paradigms in multi-agent systems. A number of paradigms will be covered including simple protocols, BDI (Believe, Desire, Intension), and social commitments.

Prerequisite(s): Computer Science 433 and consent of the Department.

Antirequisite(s): Credit for Computer Science 568 and 662 will not be allowed.

Computer Science 571 **3 units; (3-0)**

Design and Implementation of Database Systems

Implementation and design of modern database systems including query modification/optimization, recovery, concurrency, integrity, and distribution.

Prerequisite(s): Computer Science 471.

Antirequisite(s): Credit for Computer Science 571 and 671 will not be allowed.

Computer Science 572 **3 units; (3-0)**
(formerly Computer Science 599.77)

Fundamentals of Social Network Analysis and Data Mining

Introduction to data mining with emphasis on frequent pattern mining, clustering and classification, data collection, network construction, basic graph theory concepts and network analysis metrics, and case studies.

Prerequisite(s): Computer Science 571.

Antirequisite(s): Credit for Computer Science 572 and 672 will not be allowed.

Computer Science 575 **3 units; (3-0)**
(formerly Computer Science 599.72)

iProgramming for Creative Minds

Design, develop and market apps. This course has a focus on developing, implementing and evaluat-

ing ideas in teams and gaining entrepreneurial skills for software development and marketing.

Prerequisite(s): Software Engineering 300.

Computer Science 577 3 units; (3-0)
(formerly Computer Science 599.97)

Biometric Technologies

Principles of biometric system design, technology and performance evaluation. Verification, identification and synthesis in biometrics. Traditional and emerging techniques for fingerprint matching, face recognition, iris modelling, signature authentication, and biometric pattern recognition. Multi-modal biometrics and information fusion. Privacy and ethics considerations in deployment of biometric systems.

Prerequisite(s): Computer Science 453.

Computer Science 581 3 units; (3-2)

Human-Computer Interaction II

Intermediate and advanced topics and applications in human-computer interaction, to further one's skills for designing highly interactive human-computer interfaces.

Prerequisite(s): Computer Science 481 and consent of the Department.

Computer Science 583 3 units; (3-2T)

Introduction to Information Visualization

Principles of information representation, presentation and interaction. Development of mappings from data to visual structures and exploration, navigation, cues, distortion and emphasis techniques.

Prerequisite(s): Computer Science 319 or 331 or Data Science 311.

Note: Prior or concurrent completion of Computer Science 453 or 481 is strongly recommended.

Computer Science 584 3 units; (3-2T)

Human-Robot Interaction

Introduction to the design, implementation and evaluation of human-robot interfaces. Topics include the evaluation of human-robot interaction (HRI), theoretical, philosophical and ethical issues, exploration of applications and tasks, prototyping HRI tools, and practical implementation and evaluation methods.

Prerequisite(s): Computer Science 481.

Computer Science 585 3 units; (3-2)

Games Programming

Standard techniques for the implementation of computer games. Standard multimedia programming environments and high performance multimedia. Special purpose rendering engines. Interactive control and feedback; modelling.

Prerequisite(s): Computer Science 453 and consent of the Department.

Computer Science 587 3 units; (3-2T)

Fundamentals of Computer Animation

Principles of traditional animation, key framing, parametric and track animation, free form deformation, inverse kinematics, dynamics, spring mass systems, particle systems, numerical integration, Lagrangian constraints, space time constraints, collisions, human animation, behavioural animation, metamorphosis, implicit animation techniques, animating liquids, gases and cloth, motion capture.

Prerequisite(s): Computer Science 453.

Antirequisite(s): Credit for Computer Science 587 and 687 will not be allowed.

Computer Science 589 3 units; (3-0)

Modelling for Computer Graphics

Parametric Modelling. B-splines and NURBS. Subdivision schemes. Surface subdivision. Multiresolution. Wavelets. Implicit modelling. Blends. Polygonization. Blobtree. Precise contact modelling. Solid modelling. CSG. Procedural modelling. Special topics, e.g. Differential geometry. Graph-based modelling. Topology.

Prerequisite(s): Computer Science 453.

Antirequisite(s): Credit for Computer Science 589 and 689 will not be allowed.

Computer Science 591 3 units; (3-0)

Rendering

Physical foundations of illuminations techniques. Colour. Radiometry and photometry. Reflection models. The rendering equation. Ray tracing. Monte Carlo techniques. Sampling and antialiasing. Texturing. Radiosity. Photon tracing. Volume rendering. Image-based rendering. Real-time shading.

Prerequisite(s): Computer Science 453.

Antirequisite(s): Credit for Computer Science 591 and 691 will not be allowed.

Computer Science 594 6 units; (1-5)

Software Engineering Project

A software engineering project conducted under the guidance of a faculty member.

Prerequisite(s): Consent of the Department.

Note: Includes a research, writing and presentation component.

Computer Science 598 6 units; (3-0)

Special Topics in Computer Science

New areas in Computer Science. It will be offered only as required. Before registration consult the Department of Computer Science for topics offered.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Computer Science 599 3 units; (3-0) or (3-2)

Special Topics in Computer Science

Exploration of various areas in Computer Science. Topics will vary from year-to-year. It will be offered as required to provide the opportunity for students to engage in additional areas in Computer Science. Before registration, consult the Department of Computer Science for topics offered.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Note: Registration in all courses requires the approval of the Department of Computer Science. Computer Science students should also see courses listed under Software Engineering.

Computer Science 601 3 units; (3-0)

Special Topics in Computer Science

A study of problems of particular interest to graduate students in Computer Science.

MAY BE REPEATED FOR CREDIT

Computer Science 605 3 units; (3-0)
(Medical Science 605)

Information Storage and Processing in Biological Systems

Examination of complex biological systems; concepts and fundamentals of biological solutions to information storage and processing; modelling

and computer simulation of biological systems; information storage in biological molecules; genetic networks; hierarchical organization of biological information processing in signal transduction, development, evolution, and ecology; biological control systems.

Computer Science 607 3 units; (3-0)

Biological Computation

Examination and modelling of biological networks; focus on the latest developments in biological computing and their theoretical backgrounds, such as: DNA computing; genomic algorithms; artificial chemistries; complex adaptive systems, chaos and fractals; immune system computing; gene regulatory networks; swarm intelligence systems.

Computer Science 609 3 units; (3-0)

Foundations of Multi-Agent Systems

Modelling of agents and properties of multi-agent systems. Communication issues, including interaction and co-ordination concepts, forming and maintaining organizations, and competitive agent environments. Example systems; the implementation of a multi-agent system will be performed as the assignment.

Antirequisite(s): Credit for Computer Science 609 and either Computer Science 567 or Software Engineering 697 will not be allowed for programs offered by the Department of Computer Science.

Computer Science 610 3 units; (3-0)

Compiler Code Generation and Optimization

Compiler code generation and optimization techniques, including register allocation, instruction selection, dataflow analysis, and code optimization techniques using intermediate representations. Implementation of special language features and tools for automated code generation.

Computer Science 611 3 units; (3-0)

Complexity Theory

Deterministic and non-deterministic time and space complexity; complexity classes and hierarchies; NP-complete problems and intractable problems; axiomatic complexity theory.

Antirequisite(s): Credit for Computer Science 611 and Computer Science 511 will not be allowed.

Computer Science 615 3 units; (3-0)

Computational Techniques for Graphics and Visualization

Various case studies from the fields of graphics and visualization. Topics in numerical linear algebra, numerical optimization, and discrete differential geometry.

Antirequisite(s): Credit for Computer Science 615 and 601.13 will not be allowed.

Computer Science 617 3 units; (3-0)

Category Theory for Computer Science

Introduction to category theory with applications in computer science. Functors, natural transformations, adjoints and monads, initial and final algebras. Introduction to 2-categories and fibrations.

Computer Science 619 3 units; (3-0)

Quantum Computation

Introduction to quantum computing. Quantum algorithms, quantum search, quantum fourier transforms, quantum error correcting codes, quantum cryptography, nonlocality and quantum

communication complexity, and quantum computational complexity.

Antirequisite(s): Credit for Computer Science 619 and 519 will not be allowed.

Computer Science 622 **3 units; (3-0)**

Randomized Algorithms

Design and analysis of randomized algorithms; discrete probability theory; randomized data structures; lower bound techniques; randomized complexity classes; advanced algorithmic applications from various areas.

Antirequisite(s): Credit for Computer Science 622 and 522 will not be allowed.

Computer Science 625 **3 units; (3-0)**

Principles of Computer Security

Security policies and protection mechanisms for a computing system, including such topics as design principles of protection systems, authentication and authorization, reference monitors, security architecture of popular platforms, formal modelling of protection systems, discretionary access control, safety analysis, information flow control, integrity, role-based access control. Legal and ethical considerations will be introduced as necessary.

Antirequisite(s): Credit for Computer Science 625 and 525 will not be allowed.

Computer Science 626 **3 units; (3-0)**

Network Systems Security

Attacks on networked systems, tools and techniques for detection and protection against attacks including firewalls and intrusion detection and protection systems, authentication and identification in distributed systems, cryptographic protocols for IP networks, security protocols for emerging networks and technologies, privacy enhancing communication. Legal and ethical issues will be introduced as necessary.

Antirequisite(s): Credit for Computer Science 626 and 526 will not be allowed.

Computer Science 627 **3 units; (3-0)**

Computer Viruses and Malware

Study of computer viruses, worms, Trojan horses, and other forms of malicious software. Countermeasures to malicious software. Legal and ethical issues, and some general computer and network security issues.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Computer Science 627 and 527 will not be allowed.

Computer Science 628 **3 units; (3-0)**

Spam and Spyware

Spam and other unsolicited bulk electronic communication, and spyware. Legal and ethical issues. Countermeasures, and related security problems.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Computer Science 628 and 528 will not be allowed.

Computer Science 629 **3 units; (3-0)**
(Pure Mathematics 629)

Elliptic Curves and Cryptography

An introduction to elliptic curves over the rationals and finite fields. The focus is on both theoretical and computational aspects; subjects covered will include the study of endomorphism rings, Weil pairing, torsion points, group structure, and effective implementation of point addition. Applications to cryptography will be discussed,

including elliptic curve-based Diffie-Helman key exchange, El Gamal encryption, and digital signatures, as well as the associated computational problems on which their security is based.

Computer Science 630 **3 units; (3-2T)**

Information Theory and Security

Information theoretic concepts such as entropy and mutual information, and their applications to defining and evaluating information security systems including encryption, authentication, secret sharing and secure message transmission.

Antirequisite(s): Credit for Computer Science 630 and 530 will not be allowed.

Computer Science 635 **3 units; (3-0)**

Image Analysis and Computer Vision

Standard methods used in the analysis of digital images. Image acquisition and display: visual perception; digital representation. Sampling and enhancement. Feature extraction and classification methods. Object recognition.

Antirequisite(s): Credit for Computer Science 635 and 535 will not be allowed.

Computer Science 641 **3 units; (3-0)**

Performance Issues in High Speed Networks

An overview of current research in high speed networks. Topics covered will include the current Internet, the future Internet, wireless networks, optical networks, Asynchronous Transfer Mode (ATM), TCP/IP, network traffic measurement, web server performance, and mobile computing. Emphasis will be placed on network performance issues for next-generation Internet protocols and applications.

Computer Science 643 **3 units; (3-0)**

Modern Wireless Networks

An introduction to the fundamentals and applications of wireless networks.

Computer Science 653 **3 units; (3-0)**

Computational Geometry

Geometric searching, hull proximity and intersection data structures and algorithms and their complexity.

Computer Science 657 **3 units; (3-0)**

Modelling And Visualization of Plants

Modelling, simulation and visualization of plants for computer graphics and biological purposes. Modelling of plants as an example of interdisciplinary research including computer science, biology, mathematics and physics. L-systems as a formal basis for model construction. Modelling languages. Information flow in plants. Symmetry, self-similarity and allometry of plants. Descriptive models of plant architecture. Models integrating plant structure and function. Simulation of plant development. Case studies: competition for space, phyllotaxis, tropisms, and biomechanical considerations. Reaction-diffusion models of morphogenesis. Genotype-to-phenotype mapping. Modelling of plant ecosystems. Rendering and visualization of the models. A survey of applications and research directions.

Computer Science 661 **3 units; (3-0)**

Algorithms for Distributed Computation

Fundamental algorithmic problems in distributed computation; impact of communication, timing,

failures and other characteristics on computability and complexity of solutions.

Antirequisite(s): Credit for Computer Science 661 and 561 will not be allowed.

Computer Science 662 **3 units; (3-0)**

Agent Communications

An examination of communication paradigms in multi-agent systems. A number of paradigms will be covered including simple protocols, BDI (Believe, Desire, Intension), and social commitments.

Antirequisite(s): Credit for Computer Science 662 and 568 will not be allowed.

Computer Science 667 **3 units; (3-0)**

Computer Algebra

Fundamental problems, classical and modern algorithms, and algorithm design and analysis techniques of use in computer algebra. Integer and polynomial arithmetic. Additional problems in computer algebra, possibly including problems in computational linear algebra, factorization, and concerning systems of polynomial equations will be considered as time permits.

Antirequisite(s): Credit for Computer Science 667 and 518 will not be allowed.

Computer Science 669 **3 units; (3-0)**
(Pure Mathematics 669)

Cryptography

An overview of the basic techniques in modern cryptography, with emphasis on fit-for-application primitives and protocols. Topics will include symmetric and public-key cryptosystems; digital signatures; elliptic curve cryptography; key management; attack models and well-defined notions of security.

Computer Science 671 **3 units; (3-0)**

Database Management Systems

Foundations of database applications and database systems, plus some advanced topics in data management systems will be introduced.

Antirequisite(s): Credit for Computer Science 671 and 571 will not be allowed.

Computer Science 672 **3 units; (3-0)**
(formerly Computer Science 601.77)

Fundamentals of Social Network Analysis and Data Mining

Introduction to data mining with emphasis on frequent pattern mining, clustering and classification, data collection, network construction, basic graph theory concepts and network analysis metrics, and case studies.

Antirequisite(s): Credit for Computer Science 672 and either 572 or 599.77 will not be allowed.

Computer Science 673 **3 units; (3-0)**

Distributed Database Systems

Introduction to distributed database systems. Topics covered include: architecture, data design, query processing, transaction management, multidatabases, object-oriented databases and advanced system issues.

Computer Science 675 **3 units; (3-0)**

Datawarehouse Systems

Design, development and deployment of datawarehouses. Schemas, models, data organization, OLAP, tuning, data mining and architectural models may be discussed.

Computer Science 681 **3 units; (3-0)**

Research Methods in Human-Computer Interaction

Application of the theory and methodology of human-machine studies to real systems; theory and practice.

Computer Science 683 **3 units; (3-0)**

Information Visualization: Theory and Practice

The theory and development of interactive visual representations of abstract data for the purpose of amplifying cognition. Topics covered can include representational issues, perceptual issues, visual literacy, spatial abstraction, and interaction issues.

Computer Science 687 **3 units; (3-2T)**

Computer Animation

Principles of traditional animation, key framing, parametric and track animation, free form deformation, inverse kinematics, dynamics, spring mass systems, particle systems, numerical integration, Lagrangian constraints, space time constraints, collisions, human animation, behavioural animation, metamorphosis, implicit animation techniques, animating liquids, gases and cloth, motion capture.

Antirequisite(s): Credit for Computer Science 687 and 587 will not be allowed.

Computer Science 689 **3 units; (3-0)**

Modelling for Computer Graphics

Parametric Modelling. B-splines and NURBS. Subdivision schemes. Surface subdivision. Multiresolution. Wavelets. Implicit modelling. Blends. Polygonization. Blobtree. Precise contact modelling. Solid modelling. CSG. Procedural modelling. Special topics, e.g. Differential geometry. Graph-based modelling. Topology.

Antirequisite(s): Credit for Computer Science 689 and 589 will not be allowed.

Computer Science 691 **3 units; (3-0)**

Rendering

Physical foundations of illuminations techniques. Colour. Radiometry and photometry. Reflection models. The rendering equation. Ray tracing. Monte Carlo techniques. Sampling and antialiasing. Texturing. Radiosity. Photon tracing. Volume rendering. Image-based rendering. Real-time shading.

Antirequisite(s): Credit for Computer Science 691 and 591 will not be allowed.

Computer Science 695 **3 units; (3-0)**

Data Management in Geographical Information Systems

Examination of advanced geometric algorithms for representation, analysis and visualization of Geographical Information Systems. Data structures such as progressive mesh, ROAM, multidimensional Delauney triangulation, quadtree and space partitioning. Algorithmic techniques such as incremental, divide and conquer, sweep-plane, and dimension reduction. Algorithms for surface simplification, culling, quality measurement and reduction.

Computer Science 696 **3 units; (3-0)**

Information Security Seminar

Topics in information security, such as security management, emerging threats, research frontiers using case studies and best practices.

Antirequisite(s): Credit for Computer Science 696 and 699 will not be allowed.

Computer Science 697 **3 units; (3-0)**

Biometric Security

Principles of biometric system design, technology and performance evaluation. Verification, identification and synthesis in biometrics. Traditional and emerging techniques for fingerprint matching, face recognition, iris modelling, signature authentication, and biometric pattern recognition. Multi-modal biometrics and biometric security.

Computer Science 698 **6 units; (3-0)**

Information Security Project

An information security project conducted under the guidance of a faculty member. A report must be written and presented on completion of the course.

Computer Science 699 **3 units; (3-0)**

Research Methodology in Computer Science

An introduction to and survey of research areas and methods in Computer Science. Professional skills in computer science research such as reviewing, critical evaluation, and the preparation of research proposals.

Antirequisite(s): Credit for Computer Science 699 and 696 will not be allowed.

NOT INCLUDED IN GPA

Computer Science 701 **3 units; (3-0)**

Research Topics in Computer Science

In-depth course on a focused current research topic in Computer Science. Involves a significant research component and requires substantial background knowledge.

MAY BE REPEATED FOR CREDIT

Computer Science 767 **3 units; (3-0)**

Advanced Topics in Multiagent Systems

An in-depth study of a selected subfield of multiagent systems including state-of-the-art research. This is a project-driven course.

Prerequisite(s): Computer Science 567 or 609.

Computer Science 771 **3 units; (3-0)**

Current Trends in Database Technology

Advanced topics chosen from Bioinformatics, Data mining, Mobile Databases, Spatial Databases and Web Databases. There is a large project component.

Computer Science 781 **3 units; (3-0)**

Advanced Topics in Human-Computer Interaction

The topics covered will change year-by-year depending on current advances in human computer interaction.

Prerequisite(s): Computer Science 481.

Computer Science 785 **3 units; (3-0)**

Implicit Modelling

A detailed look at modelling using implicit and iso-surface techniques taking an in-depth review of the literature. Algebraic methods will be followed by skeletal models, field function design, modelling techniques, rendering and texture mapping. Polygonisation algorithms, ray tracing implicits, techniques for animation, metamorphosis, precise contact modelling, deformation and warping. Algorithms and data structures and implementation details will be presented. Students will be expected to make a new contribution in their project and term paper.

Computer Science 789 **3 units; (3-0)**

Advanced Geometric Modelling

Current research topics including spline modelling, Subdivision Surfaces, multiresolution, wavelets, analysis of the subdivision surfaces and reverse subdivision.

Co-operative Education COOP

Senior Courses

Co-operative Education 501 **15 units; (4 months)**

Co-operative Placement in Actuarial Science

501.01. Co-operative Placement in Actuarial Science I

501.02. Co-operative Placement in Actuarial Science II

501.03. Co-operative Placement in Actuarial Science III

501.04. Co-operative Placement in Actuarial Science IV

501.05. Co-operative Placement in Actuarial Science V

NOT INCLUDED IN GPA

Co-operative Education 503 **15 units; (4 months)**

Co-operative Placement in Applied Chemistry

503.01. Co-operative Placement in Applied Chemistry I

503.02. Co-operative Placement in Applied Chemistry II

503.03. Co-operative Placement in Applied Chemistry III

503.04. Co-operative Placement in Applied Chemistry IV

503.05. Co-operative Placement in Applied Chemistry V

NOT INCLUDED IN GPA

Co-operative Education 511 **15 units; (4 months)**

Co-operative Placement in Arts

511.01 Co-operative Placement in Arts I

511.02 Co-operative Placement in Arts II

511.03 Co-operative Placement in Arts III

511.04 Co-operative Placement in Arts IV

NOT INCLUDED IN GPA

Co-operative Education 523 **15 units; (4 months)**

Co-operative Placement in Business

523.01. Co-operative Placement in Business I

523.02. Co-operative Placement in Business II

523.03. Co-operative Placement in Business III

523.04. Co-operative Placement in Business IV

NOT INCLUDED IN GPA

Co-operative Education 543 **15 units; (4 months)**

Co-operative Placement in Ecology

543.01. Co-operative Placement in Ecology I

543.02. Co-operative Placement in Ecology II

543.03. Co-operative Placement in Ecology III

543.04. Co-operative Placement in Ecology IV

543.05. Co-operative Placement in Ecology V

NOT INCLUDED IN GPA

Dance DNCE

For more information about these courses, see the Division of Dance website: <https://arts.ucalgary.ca/schools/creative-performing-arts/dance>.

An audition and consent of Dance is necessary before students register in certain courses.

Junior Courses

Dance 201 3 units; (2S-2)

Introductory Contemporary Dance I

Introductory study of the techniques of contemporary dance.

Note: Not open to Dance Majors. A supplementary fee will be assessed to cover additional costs associated with this course.

NOT INCLUDED IN GPA

Dance 205 3 units; (2S-2)

Introductory Contemporary Dance II

Further introductory study of the techniques of contemporary dance.

Prerequisite(s): Dance 201.

Note: Not open to Dance majors. A supplementary fee will be assessed to cover additional costs associated with this course.

NOT INCLUDED IN GPA

Dance 207 3 units; (2S-2)

Elementary Contemporary Dance I

Elementary study of the techniques of contemporary dance.

Prerequisite(s): Dance 205 and audition or admission to the Dance major.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 209 3 units; (2S-2)

Elementary Contemporary Dance II

Further elementary study of the techniques of contemporary dance.

Prerequisite(s): Dance 207. Audition required if Dance 207 was not completed in the previous term.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 211 3 units; (2S-2)

Introductory Jazz Dance

Introductory study of the techniques of jazz dance.

NOT INCLUDED IN GPA

Dance 213 3 units; (2S-2)

Introductory Jazz Dance II

Further introductory study of the techniques of jazz dance.

Prerequisite(s): Dance 211.

Note: Dance 213 and 223 will be offered in alternating years.

NOT INCLUDED IN GPA

Dance 215 3 units; (2S-2)

Hip Hop I

Introductory study of the techniques of hip hop.

Antirequisite(s): Credit for Dance 215 and either 315 or 343.01 will not be allowed.

NOT INCLUDED IN GPA

Dance 217 3 units; (2S-2)

Hip Hop II

Intermediate study of the techniques of hip hop.

Prerequisite(s): Dance 215.

Antirequisite(s): Credit for Dance 217 and either 317 or 343.05 will not be allowed.

NOT INCLUDED IN GPA

Dance 221 3 units; (2S-2)

Introductory Ballet I

Introductory study of the techniques of ballet.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

NOT INCLUDED IN GPA

Dance 223 3 units; (2S-2)

Introductory Ballet II

Further introductory study of the techniques of ballet.

Prerequisite(s): Dance 221.

Note: Dance 213 and 223 will be offered in alternating years.

NOT INCLUDED IN GPA

Dance 235 3 units; (2S-2)

Safe Dance Practice and Complementary Training

Training principles and components of physical fitness in safe dance practice as they apply to training optimization and injury prevention in dance.

Prerequisite(s): Dance 207 and admission to the Dance program.

Dance 243 3 units; (2S-2)

Dance in Popular Culture

Survey of social dance forms from World War I to present.

Dance 247 3 units; (2S-2)

Introduction to Creative Process

A creation-based course in basic movement analysis and creative process focusing on the identification and development of personal movement preferences.

Prerequisite(s): Admission to the Dance major.

Dance 267 3 units; (3-0)

Dance Aesthetics, Criticism and Analysis

Introduction to the practice of dance writing through an aesthetic-comparative, critical and analytic lens.

Prerequisite(s): Admission to the Dance major.

Dance 295 3 units; (1-3)

Dance Performance Practicum I

Practical experience in dance performance.

Prerequisite(s): Consent of the Division Chair, Dance.

NOT INCLUDED IN GPA

Senior Courses

Dance 303 3 units; (2S-4)

Principles of Technique

Reinforcement of the basic principles of contemporary dance in preparation for more advanced study.

Prerequisite(s): Dance 209 and audition.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 305 3 units; (2S-4)

Elementary Contemporary Dance III

This completes the elementary sequence in the techniques of contemporary dance.

Prerequisite(s): Dance 209 and audition.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 307 3 units; (2S-4)

Intermediate Contemporary Dance I

Intermediate study of the techniques of contemporary dance.

Prerequisite(s): Dance 305. Audition required if Dance 305 was not completed in the previous term.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 309 3 units; (3S-0)

Special Topics in Dance Theory I

Introductory study of topics in dance theory, including Canadian Dance History, Dance Aesthetics and Criticism, and Dance Ethnography.

Prerequisite(s): Consent of the Division Chair, Dance.

MAY BE REPEATED FOR CREDIT

Dance 311 3 units; (2S-4)

Elementary Jazz Dance I

Elementary study of the techniques of jazz dance.

Prerequisite(s): Dance 211 and audition.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 313 3 units; (2S-4)

Elementary Jazz Dance II

Further elementary study of the techniques of jazz dance.

Prerequisite(s): Dance 311. Audition required if Dance 311 was not completed in the previous term.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 321 3 units; (2S-4)

Elementary Ballet I

Elementary study of the techniques of ballet.

Prerequisite(s): Dance 221 and audition.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 323 3 units; (2S-4)

Elementary Ballet II

Further elementary study of the techniques of ballet.

Prerequisite(s): Dance 321. Audition required if Dance 321 was not completed in the previous term.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 331 3 units; (2S-2)

Creative Process I: Improvisation

A practical study of movement improvisation as a critical component of creative process with emphasis on improvisation as a performance practice and as a tool for creation.

Prerequisite(s): Dance 209 and 247.

Dance 333 3 units; (2S-2)

Creative Process II: Solo Forms

A practical application of contemporary models of dance-making with a focus on articulating individualized movement language in the solo form.

Prerequisite(s): Dance 331.

Dance 341 3 units; (3-0)

Early Dance History

Historical survey of dance: origins through the nineteenth century.

Antirequisite(s): Credit for Dance 341 and 241 will not be allowed.

Dance 343 3 units; (2S-2)

Special Topics in Dance Practices I

Possible topics include Contact Improvisation, African Dance, Mixed Ability Dance, Site Specific Dance.

Prerequisite(s): One junior level dance course and consent of the Division Chair, Dance.

MAY BE REPEATED FOR CREDIT

Dance 345 3 units; (3-0)

Twentieth-Century Dance History

Historical survey of western theatre dance.

Dance 347 3 units; (3-0)

Modern and Contemporary Dance History

In depth study of western modern and contemporary dance theatre practices with particular focus on twentieth century to present.

Prerequisite(s): Dance 267.

Dance 359 3 units; (3-2)

Dance Anatomy

Functional anatomy of the skeletal and muscular systems as they apply to training optimization and injury prevention in dance.

Prerequisite(s): Dance 209 and 235.

Antirequisite(s): Credit for Dance 359 and 309.05 will not be allowed.

Dance 363 3 units; (2S-2)

Dance Science

The scientific study of dance and the practical application of scientific principles to dance practice.

Prerequisite(s): Dance 235; and Kinesiology 259 or Dance 359; and two of Dance 205, 207, 209, 211, 221.

Antirequisite(s): Credit for Dance 363 and 463 will not be allowed.

Dance 365 3 units; (2S-2)

Pilates Conditioning

Study of the Pilates method of conditioning utilizing the Pilates Reformer apparatus.

Prerequisite(s): Dance 235.

Dance 375 3 units; (2S-2)

Complementary Dance Training Practices I

Study of complementary training practices for improving dance performance.

Prerequisite(s): Dance 235 and consent of the Division Chair, Dance.

Dance 391 3 units; (2-1)

Dance and the Camera

An introduction to making dances for the camera incorporating composing dance for the frame, basic camera skills, story board organization, and basic editing skills, as well as viewing and analysis of dances on film and video.

Prerequisite(s): Dance 333.

Dance 395 3 units; (1S-5)

Dance Performance Practicum II

Further practical experience in dance performance.

Prerequisite(s): Consent of the Division Chair, Dance.

NOT INCLUDED IN GPA

Dance 397 3 units; (1S-5)

Dance Performance Practicum III

Intermediate practical experience in dance performance.

Prerequisite(s): Consent of the Division Chair, Dance.

Corequisite(s): Prerequisite or Corequisite: Dance 395.

NOT INCLUDED IN GPA

Dance 405 3 units; (2S-4)

Intermediate Contemporary Dance II

Further intermediate study of the techniques of contemporary dance.

Prerequisite(s): Dance 307 and audition.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 407 3 units; (2S-4)

Intermediate Contemporary Dance III

This completes the sequence of intermediate study of the techniques of contemporary dance.

Prerequisite(s): Dance 405. Audition required if Dance 405 was not completed in the previous term.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 411 3 units; (2S-4)

Intermediate Jazz Dance I

Intermediate study of the techniques of jazz dance.

Prerequisite(s): Dance 313 and audition.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 413 3 units; (2S-4)

Intermediate Jazz Dance II

Further intermediate study of the techniques of jazz dance.

Prerequisite(s): Dance 411. Audition required if Dance 411 was not completed in the previous term.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 421 3 units; (2S-4)

Intermediate Ballet I

Intermediate study of the techniques of ballet.

Prerequisite(s): Dance 323 and audition.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 423 3 units; (2S-4)

Intermediate Ballet II

Further intermediate study of the techniques of ballet.

Prerequisite(s): Dance 421. Audition required if Dance 421 was not completed in the previous term.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 427 3 units; (2S-2)

Cross-Cultural Currents: Embodying Global Dance

Experiential survey of dance practices from around the world.

Note: This course will be offered in alternating years. A supplementary fee will be assessed to cover additional costs associated with this course.

Dance 431 3 units; (2S-2)

Creative Process III: Choreography

Continuing focus on developing choreographic structures that support clear artistic statements, with an emphasis on the duet form.

Prerequisite(s): Dance 333 and consent of the Division Chair, Dance.

Antirequisite(s): Credit for Dance 431 and 430 will not be allowed.

Dance 433 3 units; (2S-2)

Creative Process IV: Choreography

Further study in creating choreographic structures with an emphasis on group forms.

Prerequisite(s): Dance 431 and consent of the Division Chair, Dance.

Antirequisite(s): Credit for Dance 433 and 430 will not be allowed.

Dance 435 3 units; (2S-2)

Creative Process V: Research Creation

Continued study of dance composition introducing concepts of practice-as-research for choreographic creation and analysis. A focus on how to develop new methodologies that integrate theory and practice with a goal toward both written and choreographic outputs.

Prerequisite(s): Dance 405, 433 and consent of the Division Chair, Dance.

Dance 437 3 units; (3-0)

Dance Dramaturgy

Strategies of creation and composition are examined through theory and practice, with a focus on the invitation they extend to the audience, and in the context of the dance dramaturgy's facilitating role.

Prerequisite(s): Dance 333.

Dance 447 3 units; (2-2)

Dance Pedagogy: Community Populations

An overview of the approaches to dance pedagogy for teaching varied community populations, including adults, seniors, mixed ability and pre-school children etc.

Prerequisite(s): Dance 235, 307 and 333.

Note: This course will be offered in alternating years.

Dance 449 **3 units; (2-2)**

Dance Pedagogy: Children and Youth

An overview of the approaches to dance pedagogy for teaching children and youth in public schools and studio contexts.

Prerequisite(s): Dance 235, 307 and 333.

Note: This course will be offered in alternating years.

Dance 465 **3 units; (3-0)**

Dance Psychology

An examination of the affective relationships between dance and the cognitive capacities: perception; memory; and learning.

Prerequisite(s): 9 units in Dance and/or Psychology.

Dance 475 **3 units; (2-2)**

Complementary Dance Training Practices II

Focus on select methods of complementary training practices for improving dance performance.

Prerequisite(s): Dance 375.

MAY BE REPEATED FOR CREDIT

Dance 481 **3 units; (3-0)**

Cross-Cultural Currents: Theorising Dancing Bodies

Critical dance theory and global dance forms.

Prerequisite(s): Dance 267 and 347.

Note: This course will be offered in alternating years.

Dance 491 **3 units; (3-0)**

Design and Production for Dance

An overview of the essential skills required to light, present and produce dance performance.

Prerequisite(s): 60 units.

Dance 493 **3 units; (1-3)**

Dance Teaching Practicum

Practical experience teaching dance in school and recreational settings.

Prerequisite(s): Dance 447 and 449 and consent of the Division Chair, Dance.

Antirequisite(s): Credit for Dance 493 and either Dance Education 491 or 493 will not be allowed.

Note: Students are required to obtain a current Police Information Check.

Dance 495 **3 units; (1S-5)**

Dance Performance Practicum IV

Advanced practical experience in dance performance.

Prerequisite(s): Consent of the Division Chair, Dance.

Corequisite(s): Prerequisite or Corequisite: Dance 397.

NOT INCLUDED IN GPA

Dance 503 **3 units; (3-0)**

Special Topics in Dance Theory II

Advanced study of topics in dance theory, including Dance and the Camera, Research Methods, and Cultural Approaches to Dance Studies.

Prerequisite(s): Consent of the Division Chair, Dance.

MAY BE REPEATED FOR CREDIT

Dance 505 **3 units; (2S-4)**

Advanced Contemporary Dance I

Advanced study of the techniques of contemporary dance.

Prerequisite(s): Dance 407 and audition.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

Dance 507 **3 units; (2S-4)**

Advanced Contemporary Dance II

Further advanced study of the techniques of contemporary dance.

Prerequisite(s): Dance 505. Audition required if Dance 505 was not completed in the previous term.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

Dance 531 **3 units; (1S-6)**

Senior Project

Senior choreographic and/or performance project.

Prerequisite(s): Dance 435 and admission to the BFA Dance program.

Dance 571 **3 units; (1S-6)**

Directed Studies

Prerequisite(s): Consent of the Division Chair, Dance.

MAY BE REPEATED FOR CREDIT

Dance 574 **6 units; (0-7)**

Travel Study

An international perspective on dance training, performance and culture.

Prerequisite(s): Consent of the Division Chair, Dance.

MAY BE REPEATED FOR CREDIT

Dance 581 **3 units; (2S-2)**

Special Topics in Dance Practices II

Possible topics include site specific dance, collaborative creation.

Prerequisite(s): Consent of the Division Chair, Dance.

MAY BE REPEATED FOR CREDIT

Dance 591 **3 units; (80 hours)**

Professional Development

Professional development opportunity with a local professional dance organization.

Prerequisite(s): Dance 407 or 413, 78 units and consent of the Division Chair, Dance.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Graduate Course

Dance 681 **3 units; (2S-2)**

Special Topics in Dance

Prerequisite(s): Consent of the Division Chair, Dance.

MAY BE REPEATED FOR CREDIT

Dance Education DCED

For more information about this course see: ucalgary.ca/knes_info/courses.

Senior Course

Dance Education 325 **3 units; (1-3)**

Dance in Schools

Content, planning, and teaching methodology in school dance.

Prerequisite(s): Admission to the Leadership in Pedagogy and Coaching Major.

Data Science DATA

For more information about these courses, contact the Department of Mathematics and Statistics math.ucalgary.ca/.

Junior Courses

Data Science 201 **3 units; (2-3)**
(formerly Science 201)

Thinking with Data

An introduction to tools and techniques for managing, visualizing, and making sense of data. Includes an introduction to data cleaning, basic statistics, exploratory visualization, sensemaking, and data presentation.

Data Science 211 **3 units; (2-3)**

Programming with Data

A hands-on introduction to basic coding skills, including core programming concepts and the fundamentals of reading, writing, and executing code – with a focus on data manipulation. Emphasizes important tools and practices for programming with data, including development environments, source control, and debugging.

Antirequisite(s): Credit for Data Science 211 and any one of Computer Science 215, 217, 231, 235, Computer Engineering 339 or Engineering 233 will not be allowed.

Senior Courses

Data Science 305 **3 units; (3-2)**

Computational Statistical Modelling

Random variables and their probability models. The Central Limit Theorem and parameter estimation. Statistical modelling of univariate and multivariate data with applications to discrete and continuous data. Data transformations. Introduction to simulation-based inference including randomization and permutation tests.

Prerequisite(s): Data Science 201; one of Data Science 211, Computer Science 217, 231 or 235; and one of Statistics 205, 217, 327, Biology 315, Economics 395, Political Science 399, Psychology 300, Sociology 311, Engineering 319 or Linguistics 560.

Antirequisite(s): Credit for Data Science 305 and any one of Statistics 323, Psychology 301 or Sociology 315 will not be allowed.

Data Science 311 **3 units; (2-3)**

Data Processing and Storage

An introduction to fundamental data structures, including lists, stacks, trees, hash tables, and graphs, and their application for data processing, analysis, and storage. Covers the fundamental

design and use of relational databases, with an emphasis on SQL.

Prerequisite(s): Data Science 201; and one of Data Science 211, Computer Science 217, 231, 235 or Engineering 233.

Antirequisite(s): Credit for Data Science 311 and either Computer Science 319 or 331 will not be allowed.

Data Science 501 **3 units; (1.5-5)**

Data Science Capstone

A substantial research project in the field of Data Science. The project will consist of all of the elements in the data cycle: collection, cleaning, exploratory analysis, statistical and computational analysis and presentation.

Prerequisite(s): One of Data Science 311 or Computer Science 471; and one of Data Science 305, Statistics 323, Biology 315, Sociology 315, Economics 395, Linguistics 560, Psychology 301 or 312.

Graduate Courses

Data Science 601 **3 units; (3-0)**

Working with Data and Visualization

An introduction to fundamental data science concepts including basic data organization, data collection, and data cleaning. Includes a review of basic programming concepts in Python, as well as an introduction to the fundamentals of data visualization and critical thinking with data. Also provides an introduction to data ethics, security, and privacy.

Prerequisite(s): Admission to the Graduate Certificate in Fundamental Data Science and Analytics, or the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 602 **3 units; (3-0)**

Statistical Data Analysis

An introduction to the foundations of statistical inference including the application of probability models to data, as well as an introduction to simulation-based and classical statistical inference, and the creation of statistical models with R.

Prerequisite(s): Admission to the Graduate Certificate in Fundamental Data Science and Analytics, or the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 603 **3 units; (3-0)**

Statistical Modelling with Data

An introduction to the creation of complex statistical models, including exposure to multivariate model selection, prediction, the statistical design of experiments and analysis of data in R.

Prerequisite(s): Data Science 602 and admission to the Graduate Certificate in Fundamental Data Science and Analytics or the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 604 **3 units; (3-0)**

Big Data Management

An introduction to data storage and manipulation at both desktop and cloud scales. Introduces core database concepts and provides a practical introduction to both SQL and NoSQL systems. Also introduces parallel and distributed computing concepts including distributed storage and large scale parallel data processing using MapReduce. Design and implementation of new data visualizations to aid analysis, with emphasis on the practical

and ethical implications of design and analysis decisions.

Prerequisite(s): Data Science 601 and admission to the Graduate Certificate in Fundamental Data Science and Analytics or the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 605 **3 units; (3-0)**

Actionable Visualization and Analytics

Introduces deeper tools, skills, and techniques for collecting, manipulating, visualizing, analyzing, and presenting a number of different common types of data. With a data life-cycle perspective, looks into data elicitation and preparation as well as the actual usage of data in a decision-making context. Introduces techniques for visualizing and supporting the interactive analysis and decision making on large complex datasets. Focus on critical thinking and good analysis practices to avoid cognitive biases when designing, thinking, analyzing, and making decisions based on data.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 606 **3 units; (3-0)**

Statistical Methods in Data Science

Design of surveys and data collection, bias and efficiency of surveys. Sampling weights and variance estimation. Multi-way contingency tables and introduction to generalized linear models with emphasis on applications.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 607 **3 units; (3-0)**

Statistical and Machine Learning

Advancement of the linear statistical model including introduction to data transformation methods, classification, model assessment and selection. Exposure to both supervised learning and unsupervised learning.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 608 **3 units; (3-0)**

Developing Big Data Applications

Provides advanced coverage of tools and techniques for big data management and for processing, mining, and building applications that leverage large datasets. Addresses database and distributed storage design for both SQL and NoSQL systems, and focuses on the application of distributed computing tools to perform data integration, apply machine learning, and build applications that leverage big data. Students will also examine the security and ethical implications of large-scale data collection and analysis.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 611 **3 units; (3-0)**

Predictive Analytics

Overview of the basic concepts and techniques in predictive analytics as well as their applications for solving real-life business problems in marketing, finance, and other areas. Techniques covered in this course include: decision trees, classification rules, association rules, clustering, support vector

machines, instance-based learning. Examples and cases are discussed to gain hands-on experience.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 612 **3 units; (3-0)**

Decision Analytics

Introduces fundamental concepts and modeling approaches to solve problems that are faced by decision makers in today's fast-paced and data-rich business environment. Different decision alternatives are analyzed and evaluated with the use of computer models. Topics include the most commonly used applied optimization, simulation and decision analysis techniques. Extensive use will be made of appropriate computer software for problem solving, principally with spreadsheets.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 613 **3 units; (3-0)**

Introductory Data Analytics

Introduction to new tools for data analytics that can be used to discover, collect, organize, and clean the data to make it ready for analysis. Emphasis is placed on software tools used to interact with data sources and provision of user skills to create business applications that encompass a variety of business data sources; such as customers, suppliers, markets, competitors, and regulators. Software packages used to clean and organize the data for analysis will be introduced, as well as software to enable users' understanding of the data that is collected.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics.

Data Science 614 **3 units; (3-0)**

Advanced Data Analytics

Examination of tools and methods used in data analysis, including basic and advanced analytic tools, as well as machine learning techniques. One or more data analysis packages/programs are used to analyze different types of business data. Statistical and other analytic methods, such as data mining, machine learning and various techniques, and their application to business data analytics are explored.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics.

Data Science 621 **3 units; (3-0)**

Advanced Statistical Modelling

An introduction to the fundamental statistical methods used in health data science including interpretation and communicating the results of these methods. Explores modelling using an epidemiological paradigm such as the assessment for modification and confounding. Introduces fundamental health research methods including study design and the evidence hierarchy.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 622 **3 units; (3-0)**

Machine Learning for Health Data Science

An introduction to the application of machine learning methods to problems in health data. The concepts of precision medicine and precision

public health are introduced and the role of data science in these endeavors is explored. Using real examples from health data., various contemporary machine learning techniques are taught.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 623 **3 units; (3-0)**

Big Data in Health

Many of the major health data assets that exist in Alberta and Canada will be explored through hands-on experience with several datasets. Issues relating to access, confidentiality, privacy and data stewardship will be examined. Methodological challenges related to data linkage will be discussed. Students will work with large health databases including health administrative data, electronic medical record data and various other databases.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Data Science 624 **3 units; (3-0)**

Advanced Exploration and Visualization in Health

Explores the synthesis and summary of large volumes of information into interpretable and compelling results. Software packages useful for visualization of data are examined, including software for geographic information systems, augmented reality, and infographics. Data Science software commonly used in health industry is examined. Fundamental design principles are introduced to guide the approach to data presentation, communication, and interpretation.

Prerequisite(s): Data Science 601, 602, 603, 604 and admission to the Graduate Diploma in Data Science and Analytics, or the Master of Data Science and Analytics.

Development Studies DEST

For more information about these courses, see the Department of Anthropology and Archaeology website: <https://antharky.ucalgary.ca/>.

Junior Course

Development Studies 201 **3 units; (3-0)**

Introduction to Development Studies

An interdisciplinary course focusing on development in both a northern and international context. Explores factors that shape development processes; introduces concepts and issues such as poverty; colonialism and self-determination; human ecology and sustainable development; and appropriate technology. Examines the origins, purposes, and performance of contemporary national and international institutions and their effect on people in different geographical and socio-economic contexts.

Senior Courses

Development Studies 301 **3 units; (3-0)**

Topics in Development Studies

Examination of selected issues in Development Studies.

Prerequisite(s): Development Studies 201.

MAY BE REPEATED FOR CREDIT

Development Studies 302 **3 units; (3-0)**

Community Development

Examines the processes whereby communities take action to solve common problems in both urban and rural settings.

Prerequisite(s): Development Studies 201.

Development Studies 375 **3 units; (3-0)**

Gender and Development

Examines development from the critical perspective of the key role played by gender in development. Case studies from Canadian and international contexts will provide illustrative material for analyzing the issues that emanate from the gendered nature of development processes and practices.

Prerequisite(s): Development Studies 201 or Women's Studies 201.

Development Studies 393 **3 units; (3-0)**

Theories and Applications of Development

A study of development theories and applications through northern and international case studies. Examines practical manifestations of those theories and approaches in development planning, implementation, and praxis including Modernization theory; dependency theory; basic needs approach; neo-liberalism; the staple thesis; globalization; women in development; gender and development.

Prerequisite(s): Development Studies 201.

Development Studies 400 **6 units; (72 hours)**

Field School

A field course for the on-site interdisciplinary study of a country or region with regard to issues of development from variety of perspectives, e.g., cultural, economic, environmental, geographical, historical and political perspectives.

Prerequisite(s): Consent of the Department.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Development Studies 401 **3 units; (3-0)**

Advanced Topics in Development Studies

An examination of selected topics in Development Studies at an advanced level.

Prerequisite(s): Development Studies 393.

MAY BE REPEATED FOR CREDIT

Development Studies 403 **3 units; (3-0)**

Sustainability and Human Ecology in the Circumpolar Arctic

The history of northern development and resource management in Canada with emphasis on specific case studies involving sustainability and human ecology in the Circumpolar Arctic. The role of traditional environmental knowledge and its significance to northern development will be examined. Participatory research methodologies may be introduced.

Prerequisite(s): Development Studies 393 or Indigenous Studies 317.

Antirequisite(s): Credit for Development Studies 403 and either Northern Planning and Development 401 and 405 will not be allowed.

Development Studies 405 **3 units; (3-0)**

Environment and Development

Critical engagement with sustainability through study of the intersections between environment and development, such as planning and development, management, and implementation, the political economy of environment, and

political ecology. Topics may include political and economic systems, resource depletion, industrial agriculture, biodiversity, gender, hazards, traditional knowledge, and resistance.

Prerequisite(s): Development Studies 393 or Anthropology 313 or Indigenous Studies 317.

Development Studies 485 **3 units; (3S-0)**

International and Intercultural Communication

Examines cross-cultural communication at the personal, organizational, societal, and international levels. Discusses the concept of "Globalization" and its implications for communication among different cultures; analyses various theoretical perspectives underlying intercultural communication; explores issues of power, identity and influence; examines intercultural encounters in the context of specific diversified settings; and helps students develop intercultural communication competence.

Prerequisite(s): Development Studies 393.

Development Studies 501 **3 units; (0-3T)**

Directed Research

Supervised individual study of a special topic.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Development Studies 591 **3 units; (3S-0)**

Critical Perspectives on Development Practice and Research

An interdisciplinary consideration of selected issues and methodologies in development, providing the critical perspective and skills needed to conceptualize, design, implement and effectively manage community development projects and programs.

Prerequisite(s): Development Studies 302, 393 and consent of the Department.

Development Studies 593 **3 units; (3S-0)**

Honours Seminar in Development Studies

Current theoretical and methodological issues will be explored in a discussion-based seminar format, with the aim of development of a research project.

Prerequisite(s): Development Studies 393 and admission to the Development Studies Honours Program.

Drama DRAM

For more information about these courses see the Division of Drama website: <https://arts.ucalgary.ca/schools/creative-performing-arts/drama>.

Junior Courses

Drama 203 **3 units; (3-0)**

Creativity

From the economy to the environment and from politics to entertainment, creativity is an endlessly renewable resource that offers benefits for all citizens and may well be the most important human element for our future. Students from all disciplines can investigate the practices and processes of creativity and explore the ways in which it can help enrich their lives.

Antirequisite(s): Credit for Drama 203 and Fine Arts 203 will not be allowed.

Note: Attendance at selected arts events is mandatory. Students are responsible for the purchase of tickets. Affordability and accessibility will influence the selection of events. Drama majors and minors may not count this course towards their field requirements.

Drama 205 3 units; (3-0)**Story**

An exploration of the elements of story present in the arts and beyond. Story is an exciting, creative, dynamic and universal form of human expression with the potential to engage and inspire students from across departments and disciplines.

Antirequisite(s): Credit for Drama 205 and Fine Arts 205 will not be allowed.

Note: Attendance at selected arts events is mandatory. Students are responsible for the purchase of tickets. Drama majors and minors may not count this course towards their field requirements.

Drama 209 3 units; (3S-2)**Introduction to Acting I**

An introduction to creative resources and practices for the actor.

Antirequisite(s): Credit for Drama 209 and 200 will not be allowed.

Drama 210 3 units; (3S-2)**Introduction to Acting II**

An introduction to the actor's interpretation and performance of texts for the theatre.

Prerequisite(s): Drama 209.

Antirequisite(s): Credit for Drama 210 and 200 will not be allowed.

Drama 223 3 units; (3-0)**Introduction to Theatre Production**

An introduction to organizational principles of theatre production and technical theatre skills.

Antirequisite(s): Credit for Drama 223 and 222 will not be allowed.

Note: Participation on the production crews of Drama productions outside of scheduled class time is required.

Drama 225 3 units; (2-2)**Introduction to Scenography**

An introduction to performance design and the disciplines within it: scenery, props, lighting, costumes and sound. Includes a study of the history of theatre design and space. Topics regarding contemporary notions of scenography will be explored, for example performance art, ritual, etc.

Antirequisite(s): Credit for Drama 225 and 222 will not be allowed.

Note: Attendance at two live theatre performances will be required. Additional costs may be incurred. This course is required for all Drama majors, but is open to all undergraduate students for registration.

Drama 242 3 units; (3-0)**Introduction to the Study of Drama**

An introduction to the study of drama, theatre and performance.

Antirequisite(s): Credit for Drama 242 and 240 will not be allowed.

Drama 243 3 units; (3-0)**Introduction to the Practice of Drama**

Continued study and practice of drama, theatre and performance.

Prerequisite(s): Drama 242.

Antirequisite(s): Credit for Drama 243 and 240 will not be allowed.

Senior Courses**Drama 301** 3 units; (2S-4)**Intermediate Acting I**

Further development of fundamental acting techniques and creative processes essential to the actor's craft. Introduction of voice and movement components for the actor.

Prerequisite(s): Drama 200 or 210, audition and consent of Division Chair, Drama.

Antirequisite(s): Credit for Drama 301 and 300 will not be allowed.

Drama 302 3 units; (2S-4)**Intermediate Acting II**

Extension and deepening of techniques and approaches introduced in Drama 301. Introduction of voice and movement components for the actor.

Prerequisite(s): Drama 301.

Antirequisite(s): Credit for Drama 302 and 300 will not be allowed.

Drama 313 3 units; (2S-2)**Scenography I**

Basic scenography including set, props, lighting and costume design theory, process and technique for a variety of theatre forms and performance styles.

Corequisite(s): Prerequisite or Corequisite: Drama 319.

Antirequisite(s): Credit for Drama 313 and either 415 or 417 will not be allowed.

Drama 317 3 units; (2S-2)**Introduction to Stage Sound**

Basic principles of sound for the theatre: recording, reinforcement and reproduction techniques and methods used in creating a production design.

Prerequisite(s): Drama 223 and 225.

Note: This course meets for two hours per week during the Fall and Winter Terms.

Drama 319 3 units; (2S-2)**Graphics and Model Building for Theatre**

An introduction to graphic and model building techniques for the theatre designer.

Prerequisite(s): Drama 223 and 225.

Drama 320 3 units; (2S-2)**Introduction to Lighting Design**

Basic principles of lighting for live performance including conceptualization of the lighting approach, techniques in communication and skills in execution of a performance.

Corequisite(s): Prerequisite or Corequisite: Drama 319.

Antirequisite(s): Credit for Drama 320 and 315 will not be allowed.

Drama 321 3 units; (2S-2)**Stage Management**

Principles of stage management; a stage management project related to one of the presentations in Drama's season of plays.

Prerequisite(s): Drama 223 and 225.

Note: This course meets for two hours per week during both the Fall and Winter Terms.

Drama 345 3 units; (3-0)**History of the Theatre: Origins to the Mid-Eighteenth Century**

Theatre as an art and society phenomenon in selected cultures, emphasizing the development of Western traditions.

Antirequisite(s): Credit for Drama 345 and 342 will not be allowed.

Drama 346 3 units; (4S-0)**Seminar in Drama I**

Critical examination of plays performed in Drama's season; staging requirements for contemporary productions and other works by the same authors and their contemporaries may also be studied.

Prerequisite(s): Drama 243.

Antirequisite(s): Credit for Drama 346 and 340 will not be allowed.

Drama 347 3 units; (3-0)**History of the Theatre: The Late Eighteenth Century to the Present**

Theatre as an art and social phenomenon in selected cultures, emphasizing the development of Western traditions from the late eighteenth century to the present.

Antirequisite(s): Credit for Drama 347 and 344 will not be allowed.

Drama 348 3 units; (4S-0)**Seminar in Drama II**

Further development of skills and competencies, and critical and interpretive skills.

Prerequisite(s): Drama 346.

Antirequisite(s): Credit for Drama 348 and 340 will not be allowed.

Drama 355 3 units; (3S-0)**Introduction to Canadian Theatre and Drama**

A study of Canadian theatre and performance using both formal and theoretical approaches.

Drama 360 6 units; (2S-2)**Performance Creation I**

Explorations in personal/group creative process; facilitation of performance forms that may include sound and movement exploration, storytelling, ritual, mask, puppetry, and the collaborative creation of original performance. Theory and history of performance creation is integrated with practical experience.

Antirequisite(s): Credit for Drama 360 and 366 will not be allowed.

Drama 365 3 units; (2S-2)**Theatre for Young Audiences I**

Study of the history and production of Theatre for Young Audiences (TYA), as well as the creation of original performances. Exploration of performances techniques specific to TYA content, forms and venues.

Prerequisite(s): Drama 209 and 210 or Drama 200.

Antirequisite(s): Credit for Drama 365 and 362 will not be allowed.

Drama 367 3 units; (2S-2)**Theatre for Young Audiences II**

Advanced exploration of performances techniques specific to Theatre for Young Audiences (TYA)

content, forms and venues. There is a performance component that includes tours in the community.

Prerequisite(s): Drama 365.

Antirequisite(s): Credit for Drama 367 and 362 will not be allowed.

Drama 371 **3 units; (2S-2)**

Introduction to Playwriting

Directed exercises in writing for the theatre; workshop sessions for developing and reworking material.

Prerequisite(s): Drama 200 or 210; 223, 225; and 240 or 243.

Drama 381 **3 units; (2-2) or (1.5-1.5)**

Topics in Scenography

Special topics in the study of scenography and techniques for the scenographer.

381.01. History of Costume

381.02. History of Interiors

381.03. History of Scenography

381.04. Costume Techniques

381.05. Scenic Art

381.06. Digital Media for the Theatre

381.07. Make-Up for the Stage

Note: A supplementary fee will be assessed for Drama 381.05 and 381.07 to cover additional costs associated with this course.

Drama 391 **3 units; (0-6)**

Performance Practicum I

Practical experience in theatrical production.

Prerequisite(s): Drama 200 or 210; 223, 225; and 240 or 243 and consent of the Division Chair, Drama.

Note: Students must submit an application and identify a supervisor before being considered for this course.

Drama 393 **3 units; (0-6)**

Performance Practicum II

Further practical experience in theatrical production.

Prerequisite(s): Drama 391 and consent of the Division Chair, Drama.

Note: Students must submit an application and identify a supervisor before being considered for this course.

Drama 400 **6 units; (3S-6)**

Advanced Acting I

Advanced practice of creative, technical and interpretive aspects of acting with emphasis on the integration of physical, vocal and textual components.

Prerequisite(s): Drama 300 or 302, audition and consent of the Division Chair, Drama.

Drama 411 **3 units; (2-2)**

Introduction to Directing

Fundamental approaches and skills in directing covered through theory and practice.

Prerequisite(s): Drama 223, one of 200 or 210 and one of 340 or 346.

Antirequisite(s): Credit for Drama 411 and 410 will not be allowed.

Drama 413 **3 units; (2-2)**

Directing I

Extended practices in directing.

Prerequisite(s): Drama 411.

Antirequisite(s): Credit for Drama 413 and 410 will not be allowed.

Drama 419 **3 units; (2-2)**

Scenography II

Set design and scenography for a variety of contemporary theatre forms and genres. Topics will include set, costume, lighting and projection for live performance.

Prerequisite(s): Drama 313 or consent of the Division Chair, Drama.

Drama 423 **3 units; (2-2)**

Scenography III

Continuation of Drama 419 with a heightened emphasis on individual creation process.

Prerequisite(s): Drama 419.

Drama 440 **6 units; (4S-0)**

Seminar in Drama III

Critical study of plays in Drama's season of plays suited to students in their third and fourth years; critical analysis and historical interpretation is integrated with a careful consideration of requirements for staging; plays generically or historically related may also be studied.

Prerequisite(s): Drama 340 or 346; and 348.

Drama 455 **3 units; (3-0)**

Advanced Topics in Canadian Theatre and Drama

Advanced studies in Canadian Drama. Areas of study may include historical and/or performance movements, critical schools, and the development of theatre companies and professional associations in Canada.

Prerequisite(s): Drama 355.

Antirequisite(s): Credit for Drama 455 and 357 will not be allowed.

MAY BE REPEATED FOR CREDIT

Drama 460 **6 units; (2S-2)**

Performance Creation II

Advanced exploration of personal/group creative process; facilitation of a variety of improvisation and interactive theatre forms; solo/group performance creation. Theories and history of performance creation are integrated with practical experience.

Prerequisite(s): Drama 360.

Drama 471 **3 units; (2S-2)**

Playwriting

Intermediate studies in writing for the theatre leading to the development of a one-act or full-length piece; workshop sessions for developing and rehearsing material.

Prerequisite(s): Drama 371 and consent of the Division Chair, Drama.

Drama 481 **3 units; (2-2) or (1.5-1.5)**

Advanced Topics in Scenography

Possible topics include, but are not limited to: Scenic Art and Digital Techniques, Advanced Make-up and Prosthetics, Textile Manipulation, Projected Media for Live Performance, Advanced Scenic Painting, Advanced Lighting Design, Wear-

able Electronics and the Stage, Design for Devised Theatre, Professional Practice.

Prerequisite(s): Drama 313.

MAY BE REPEATED FOR CREDIT

Drama 483 **3 units; (3S-0) or (3-0)**

Advanced Topics in Theatre Studies

Advanced study in various topics related to theatre studies. Possible topics include, but are not limited to: sexuality as portrayed in the theatre, modernism in theatre studies, contemporary theories of performance.

Prerequisite(s): Drama 346.

MAY BE REPEATED FOR CREDIT

Drama 491 **3 units; (0-6)**

Performance Practicum III

Further practical experience in theatrical production.

Prerequisite(s): Drama 393 and consent of the Division Chair, Drama.

Note: Students must submit an application and identify a supervisor before being considered for this course.

Drama 493 **3 units; (0-6)**

Performance Practicum IV

Further practical experience in theatrical production.

Prerequisite(s): Drama 491 and consent of the Division Chair, Drama.

Note: Students must submit an application and identify a supervisor before being considered for this course.

Drama 500 **6 units; (3S-6)**

Advanced Acting II

Advanced research and performance of roles in a variety of formats and styles with full integration of physical, vocal and textual components, including preparation for professional practice. Performance for live audiences will be required.

Prerequisite(s): Drama 400 and consent of the Division Chair, Drama.

Drama 511 **3 units; (2S-3)**

Directing II

Advanced directorial processes from ideas through presentation and documentation.

Prerequisite(s): Drama 410 or 411 and 413 and consent of the Division Chair, Drama.

Antirequisite(s): Credit for Drama 511 and 510 will not be allowed.

Drama 513 **3 units; (2S-3)**

Directing, Design and Dramaturgy

Advanced collaboration on respectively design-, director-, and dramaturgy-led processes of inquiry and creation.

Prerequisite(s): Drama 511 or 419 or both 346 and 573, successful application and consent of the Division Chair, Drama.

Antirequisite(s): Credit for Drama 513 and 510 will not be allowed.

Drama 517 3 units; (2S-2)

Scenography IV

Advanced set, props, lighting, and costume design theory, process and technique for a variety of theatre forms and performance styles.

Prerequisite(s): Consent of the Division Chair, Drama.

Note: This course will provide students with an opportunity to practice scenography in connection to a live performance in the Drama season.

Drama 540 6 units; (4S-0)

Seminar in Drama IV

Critical study at an advanced level of the dramatic metaphor as presented in Drama's season of plays; intensive focus on the historical period and theatrical genre of one or two of the season's plays especially.

Prerequisite(s): Drama 440.

Drama 560 6 units; (2S-2)

Performance Creation III

Independent research, creation and facilitation of original solo or group performances.

Prerequisite(s): Drama 460.

Drama 564 6 units; (2S-2)

Drama Education

Research into the nature and function of drama education across a variety of age levels and learning environments. Practical experience in structuring learning activities, developing classroom controls and facilitating creative process and performance may be included.

Prerequisite(s): Drama 360 or 362 or both 365 and 367; and admission to the Drama or Drama Education program.

Note: This course is open to other students with permission of the Division Chair.

Drama 571 3 units; (2-0)

Directed Studies I

Independent research under the direction of a faculty member.

Prerequisite(s): Consent of the Division Chair, Drama.

MAY BE REPEATED FOR CREDIT

Drama 572 6 units; (2-0)

Directed Studies II

Independent research under the direction of a faculty member.

Prerequisite(s): Consent of the Division Chair, Drama.

MAY BE REPEATED FOR CREDIT

Drama 573 3 units, (3S-0)

Dramaturgy

Theory and core principles of dramaturgy.

Prerequisite(s): Consent of the Division Chair, Drama.

Antirequisite(s): Credit for Drama 573 and either Drama 571.23 or 571.30 will not be allowed.

Graduate Courses

Drama 605 3 units; (4S-0)

Methods in Theatre Research

Methods in research in the four areas of specialization in the MFA Theatre program.

Note: Required of all students enrolled in the MFA Theatre program.

Drama 607 3 units; (2S-2)

Director, Designer, and Mise-en-scene

Advanced collaborative methods and techniques for directors, designers and dramaturges, leading to the creation of a mise-en-scene for selected plays of varying styles and genres.

Drama 610 6 units; (2S-3)

Selected Problems in Directing

Drama 623 3 units; (2S-2)

Seminar in Scene Design

MAY BE REPEATED FOR CREDIT

Drama 625 3 units; (2S-2)

Seminar in Costume Design

MAY BE REPEATED FOR CREDIT

Drama 627 3 units; (2S-2)

Seminar in Lighting Design

MAY BE REPEATED FOR CREDIT

Drama 629 3 units; (2S-2)

Seminar in Technical Direction

MAY BE REPEATED FOR CREDIT

Drama 647 3 units; (3S-0)

Studies in Modern Drama I

Studies in the literature, history, theory and criticism of drama, theatre and performance from the late nineteenth century to the mid-twentieth century.

Drama 649 3 units; (3S-0)

Studies in Modern Drama II

Studies in the literature, history, theory and criticism of drama, theatre and performance from the mid-twentieth century to the present.

Drama 651 3 units; (2S-0)

Directed Studies

MAY BE REPEATED FOR CREDIT

Drama 660 6 units; (2S-3)

Seminar and Practicum in Performance Creation

Drama 671 3 units; (3S-0)

Selected Problems in Playwriting I

Drama 673 3 units; (3S-0)

Selected Problems in Playwriting II

Earth Science EASC

For more information about these courses, see the Department of Geography website: <https://geog.ucalgary.ca/>.

Senior Courses

Earth Science 301 3 units; (3-0)

Human-Environment Interactions

Exploration of the interactions between humans and environment at different time scales and in different regions. Geographically distinct regions are selected to highlight how humans have adapted to climate change and hazardous natural events. Past adaptations will be examined in the modern context.

Prerequisite(s): Consent of the Department.

Note: May be offered as part of a group study program or field school. This course may occur

in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee may be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

Earth Science 401 3 units; (3-2)

Methods in Earth Science

An introduction to field and laboratory methods used in earth surface processes research. Field excursions may involve travel and will provide the basis for laboratory exercises.

Prerequisite(s): Consent of the Department.

Note: May be offered as part of a group study program or field school. This course may occur in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee may be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

Earth Science 501 3 units; (3-2)

Research Project in Earth Science

An original research project that focuses on earth surface processes and may target local, regional, or global issues. Participants will be exposed to oral and written communication, field sampling techniques and strategies, laboratory techniques, strategies and limitations, and relevant statistical analysis and graphic communication.

Prerequisite(s): Consent of the Department.

Note: May be part of a group study program or a field school. This course may occur in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee may be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

East Asian Language Studies EALS

For more information about this course, see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

Senior Course

East Asian Language Studies 501 3 units; (3S-0)

Advanced Research in East Asian Languages Studies

A research-oriented seminar that will allow students to synthesize their training in East Asian languages and cultures and bring it to bear on a particular subject in Chinese and/or Japanese, or on the relation between East Asian languages and their respective cultures. Students will meet with the instructor individually and regularly in order to discuss their respective research projects.

Prerequisite(s): Admission to the BA in East Asian Language Studies and consent of the School of Languages, Linguistics, Literatures and Cultures.

East Asian Studies EAST

For more information about these courses, see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

East Asian Studies 201 **3 units; (3-0)**

Understanding Contemporary East Asia

An introductory exploration of the cultures of China, Japan, and Korea that outlines their shared characteristics as well as highlighting their differences. Subjects covered include physical environment, history, philosophy, social and political order, economy, and arts.

Antirequisite(s): Credit for East Asian Studies 201 and 317 will not be allowed.

Senior Course

East Asian Studies 531 **3 units; (3-0)**

Issues and Methods in East Asian Studies

Contemporary social, philosophical, economic, political and/or international issues within East Asia and methodologies for analysis of the basis for interactions among East Asian countries will be presented in-depth.

Prerequisite(s): East Asian Studies 201 and one of Chinese 317 or Japanese 317.

Antirequisite(s): Credit for East Asian Studies 531 and East Asia 500 will not be allowed.

Ecology ECOL

For more information about these courses see the Department of Biological Sciences: bio.ucalgary.ca/.

Senior Courses

Ecology 413 **3 units; (140 hours)**

Field Course in Ecology

An examination of ecological principles and techniques through field exercises, including studies of terrestrial and aquatic populations, communities and ecosystems. The course is held at the Kananaskis Centre for Environmental Research in the two weeks immediately prior to the commencement of the Fall Term.

Prerequisite(s): Biology 313 and 315.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Ecology 417 **3 units; (3-3)**

Aquatic Communities and Ecosystems

Community composition and dynamics at the various trophic levels of aquatic ecosystems. Temporal and spatial changes in community composition, physical and chemical conditions, and their effects on the ecosystem. There will be a full week-end field trip, normally during the first or second week of the term.

Prerequisite(s): Biology 313 and one of Biology 315 or Environmental Science 401.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Ecology 419 **3 units; (3-3)**

Terrestrial Communities and Ecosystems

Processes and patterns in above- and below-ground terrestrial communities. Ecosystem level processes in fluxes of carbon and nutrients. Methods for assessing biomass, productivity and biochemical pathways.

Prerequisite(s): Biology 313 and one of Biology 315 or Environmental Science 401.

Ecology 425 **3 units; (3-3)**

Quantitative Biology II

Quantitative analysis as applicable to ecological research. Methodologies and models will be

presented and analyzed. Particular emphasis will be placed on experimental design, regression analysis, and the study of spatial dispersion.

Prerequisite(s): Biology 313 and 315.

Ecology 429 **3 units; (3-3)**

Ecology of Individuals

Ecological and evolutionary perspectives on physiology and behaviour. This course focuses on the influences on resource acquisition, maintenance, growth, and reproduction and their implications for survival and fertility.

Prerequisite(s): Biology 313 and 315.

Note: There is a week-end field trip scheduled after the start of classes.

Ecology 439 **3 units; (3-3)**

Ecology of Populations

A conceptual and practical treatment of population ecology including: population growth, demography, life histories, population dynamics, competition, predation and mutualism.

Prerequisite(s): Ecology 425.

Ecology 501 **3 units; (0-3)**

Ecological and Evolutionary Applications

A class project course in which students apply their understanding of ecological and evolutionary concepts and their analytical skills to investigate selected problems in detail. Project topics vary from year-to-year and will include fundamental and applied problems. Formal written and oral reports will be presented as a necessary component of the course.

Prerequisite(s): Ecology 425, 429 and one of 417 or 419; and 75 units.

Ecology 507 **3 units; (0-8) or (3-0)**

Special Problems in Ecology

Independent research or reading project that may include seminars, lectures, term papers and training in theoretical and/or laboratory methods.

Prerequisite(s): 54 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Ecology 527 **3 units; (3-1T)**

Ecology of Fishes

The ecology of fishes with an emphasis on freshwater systems. Fish will be used as models for examining ecological principles and theory at various levels of organization including physiological, behavioural, population and community ecology. Topics covered include: morphology, systematics, foraging, bioenergetics, life history strategies, population dynamics and the role of fish in aquatic food webs.

Prerequisite(s): Biology 313 and one of Ecology 417 or Zoology 403 or 477.02.

Ecology 528 **6 units; (0-8)**

Independent Studies in Ecology

Original and independent thought, practical research and the completion of written and oral reports.

Prerequisite(s): 72 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Ecology 529 **3 units; (3-0)**

Molecular Ecology and Evolution

Molecular Ecology utilizes population genetics, phylogenetics, and genomics to address questions in ecology, evolution, behaviour and

conservation. Topics will include principal and emerging molecular techniques for characterizing and analyzing genetic variation to test quantitative predictions from ecological and evolutionary theory.

Prerequisite(s): Biology 311 and 313.

Ecology 530 **6 units; (0-8)**

Honours Research Project in Ecology

Research project under the direction of one or more faculty members in the Department of Biological Sciences. Formal written and oral reports must be presented on completion of this course. Open only to Honours Ecology students or Honours Biological Sciences students.

Prerequisite(s): 72 units and consent of the Department.

Graduate Courses

Enrolment in any graduate course requires consent of the Department.

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599. 600-level courses are available with permission to undergraduate students in the final year of their programs.

Ecology 603 **3 units; (3-0)**

Advanced Behavioural Ecology

Current problems and recent research in areas of particular significance. Topics will vary from year-to-year.

MAY BE REPEATED FOR CREDIT

Economics ECON

For more information about these courses, see the Department of Economics: <https://econ.ucalgary.ca/>.

Junior Courses

Economics 201 **3 units; (3-1T)**

Principles of Microeconomics

Principles of consumption, production, exchange: market and firm equilibrium under different competitive conditions. These principles are applied to various contemporary problems in the Canadian economy, such as the changing structure of agriculture, foreign ownership and control, and pollution.

Economics 203 **3 units; (3-1T)**

Principles of Macroeconomics

National income determination, the monetary and banking system, and elementary fiscal and monetary policies. Contemporary problems of unemployment, inflation, economic growth, business cycles and the international economy.

Corequisite(s): Prerequisite or Corequisite: Economics 201.

Economics 209 (Engineering 209) **3 units; (3-1T)**

Engineering Economics

The basic tools and methodology of engineering economic studies. Topics include investment decisions, theory of replacement, economies of scale, externalities, social decision making and

government regulation. Examples are drawn from engineering projects.

Prerequisite(s): Registration in the Faculty of Engineering with second-year standing or higher. If not registered in the Schulich School of Engineering, consent of the Department of Economics. If required for APEGA, consent of the Schulich Undergraduate Studies Office.

Senior Courses

Economics 301 3 units; (3-1T)

Intermediate Economic Theory - Microeconomics I

Demand, production and costs in a market economy. Pricing in perfectly and imperfectly competitive markets.

Prerequisite(s): Mathematics 30-1 or equivalent; Economics 201 and 203.

Economics 303 3 units; (3-1T)

Intermediate Economic Theory - Macroeconomics I

Introduction to the analysis of macroeconomic issues including the causes of recessions and unemployment, the determination of exchange rates, and the effects of government policies.

Prerequisite(s): Mathematics 30-1 or equivalent; Economics 201 and 203.

Economics 311 3 units; (3-0)

Computer Applications in Economics

Use of spreadsheets for economics applications, including project evaluation with financial-economic functions, oil and gas prospect evaluation, investment portfolio management with database functions, database retrieval, and various topics in micro- and macro-economics.

Prerequisite(s): Economics 201 and 203.

Economics 321 3 units; (3-0)

The Global Trading System

Introduction to the theory of international trade; provides a basis for examining Canadian trade policy, and regional and world trade institutions such as the WTO and NAFTA. Topics include: tariffs, non-tariff barriers and enhancements, countervail and anti-dumping action, multinational enterprises and international joint ventures.

Prerequisite(s): Economics 201 and 203.

Economics 323 3 units; (3-0)

Natural Gas Markets

Operation of the natural gas industry in North America. Economics of exploration, development, production, marketing and transportation of natural gas. Impact of government regulations and deregulation.

Prerequisite(s): Economics 201 and 203.

Economics 325 3 units; (3-0)

The North American Oil Industry

An introduction to the crude oil industry in North America, focusing on exploration, development, and production. Topics include Canadian and US oil policies, environmental policy, industry taxation, and royalty regimes.

Prerequisite(s): Economics 201 and 203.

Economics 327 3 units; (3-0)

Petroleum Economics

A non-technical introduction to the economics of petroleum production, crude oil markets, and refin-

ing economics. A focus on global crude oil and refined product markets.

Prerequisite(s): Economics 201 and 203.

Economics 329 3 units; (3-0)

Electricity Markets

Economic analysis of the deregulated electric power industry including the pricing of power, energy and capacity, power supply and demand, market structure, market architecture, and the design and testing of market rules.

Prerequisite(s): Economics 201 and 203.

Economics 337 3 units; (3-0)

Development Economics

An introduction to developing economies: the meaning, significance and purpose of economic development, major theories of economic development, economic problems of developing countries.

Prerequisite(s): Economics 201 and 203.

Economics 339 3 units; (3-0)

Canadian Economic History

The growth and development of the Canadian economy in relation to the endowment of natural resources, changing market conditions and technology, and Canadian public policy.

Prerequisite(s): Economics 201 and 203.

Economics 341 3 units; (3-0)

Money and Banking

Operation of financial markets and institutions: the principles of money creation, interest rate determination, and central banking.

Prerequisite(s): Economics 201 and 203.

Economics 345 3 units; (3-0)

Economic Analysis of Law

An introduction to the relationship between law and economics. Economic theory will be used to analyze property and tort law.

Prerequisite(s): Economics 201.

Economics 349 3 units; (3-0)

The Economics of Social Problems

Contribution that economic analysis can make to the understanding of selected current social issues such as poverty, aging, crime, drug abuse and discrimination.

Prerequisite(s): Economics 201 and 203.

Economics 353 3 units; (3-0)

Chinese Economy

Survey of the economic institutions and processes shaping the Chinese economy, including but not limited to fiscal and monetary policy, financial institutions and financial sector reforms, the restructuring of state-owned enterprises, and the provision of social welfare.

Prerequisite(s): Economics 201 and 203.

Antirequisite(s): Credit for Economics 353 and Economics 399.02 will not be allowed.

Economics 355 3 units; (3-0)

Canadian Public Finance

Examination of the institutions behind and economic rationale for Canadian government policy relating to public expenditures and taxation. Topics include the history and present structure of government spending and taxation, tax expenditures,

the budgetary process, inter-jurisdictional issues, and program design.

Prerequisite(s): Economics 201 and 203.

Economics 357 3 units; (3-1T)

Intermediate Economic Theory - Microeconomics II

Extensions of microeconomic topics such as factor markets, general equilibrium, and welfare economics.

Prerequisite(s): Economics 301 and one of Mathematics 249, 251, 265 or 281.

Antirequisite(s): Credit for Economics 357 and either 309 or 529 will not be allowed.

Economics 359 3 units; (3-1T)

Intermediate Economic Theory - Macroeconomics II

Extensions of macroeconomic topics such as theories of aggregate consumption and investment, interest rate theory, the demand for money, expectations in macro models and growth theory.

Prerequisite(s): Economics 303 and one of Mathematics 249, 251, 265 or 281.

Antirequisite(s): Credit for Economics 359 and either 313 or 531 will not be allowed.

Economics 365 3 units; (3-0)

Regional Economics

The nature of economic regions. Choosing regions for development, regional income estimation and social accounting, inter-regional flow analysis, location theory, theory of regional growth and planning.

Prerequisite(s): Economics 201 and 203.

Economics 371 3 units; (3-0)

Economic Analysis of Transportation

Modal choice by passengers, location choice by firms, capital investment choice. Cost, demand, and market structure related to the determination of transportation rates. Cost/Benefit analysis of transportation projects. Analysis will be related to contemporary aspects of ocean shipping, air, rail, trucking, pipelines and urban transportation.

Prerequisite(s): Economics 201 and 203.

Economics 373 3 units; (3-0)

Game Theory and Strategic Thinking for the Social Sciences

An introduction to the principles of game theory utilizing a non-mathematical and intuitive approach. The principles of strategic thinking are illustrated by application and examples in economics and other social sciences. The objective is to develop the ability of students to reason strategically and to understand how game theory can be used to explain social interaction.

Prerequisite(s): Economics 201 and 203.

Economics 377 3 units; (3-0)

Economics and the Environment

An introduction to the analysis of environmental problems from an economic perspective. Issues such as air and water quality, biodiversity and endangered species will be addressed from local as well as global views.

Prerequisite(s): Economics 201 and 203.

Economics 379 3 units; (3-0)

The Economics of Health

Theories and evidence regarding demand for health and health care, consumer and physician behaviour, asymmetric information in health care

markets, and economic evaluation of health care programs.

Prerequisite(s): Economics 201 and 203.

Economics 387 **3 units; (3-0)**

Introduction to Mathematical Economics I

Essential mathematical background for studying Economics: basic techniques of linear algebra and calculus, including unconstrained and constrained optimization, and their applications to resource allocation problems.

Prerequisite(s): Economics 201 and 203; Mathematics 211; and one of Mathematics 249, 251, 253, 265 or 281.

Corequisite(s): Prerequisites or Corequisites: Economics 301 and 303.

Antirequisite(s): Credit for Economics 387 and either 304 or 521 will not be allowed.

Economics 389 **3 units; (3-0)**

Introduction to Mathematical Economics II

Further essential mathematical background for studying Economics, including exponential and logarithmic functions, eigenvalues and eigenvectors, quadratic forms, integration, and basic methods of dynamic analysis, and their applications to resource allocation problems.

Prerequisite(s): Economics 387.

Antirequisite(s): Credit for Economics 389 and 304 will not be allowed.

Economics 395 **3 units; (3-1)**

Use of Statistics in Economics

Lectures: The use of statistical principles in economics. Topics include: the gathering of economic data; basic data manipulation and hypothesis testing; and the statistical estimation of economic relationships. The two-variable linear regression model is introduced. Laboratory: Quantitative analysis using standard statistical software.

Prerequisite(s): Economics 201 and 203 and Statistics 205, 211 or 213.

Antirequisite(s): Credit for Economics 395 and 315 will not be allowed.

Economics 399 **3 units; (3-0)**

Selected Topics in Economics I

A decadalized course in which topics will vary from year-to-year. Consult the timetable or the Department for the topics available in a given year.

Prerequisite(s): Economics 201 and 203.

MAY BE REPEATED FOR CREDIT

Economics 401 **3 units; (3-0)**

Public Sector Economics: Expenditures

Theory of government spending. Topics include the nature of public goods and externalities, the pricing of public services, causes of growth of public expenditures, expenditure incidence, social insurance, social decision procedures, and political and bureaucratic influences.

Prerequisite(s): Economics 303 and 357.

Economics 403 **3 units; (3-0)**

Public Sector Economics: Taxation

Theory of taxation. Topics include the rationale for and the incentive effects of taxation, efficiency and equity aspects of taxation, partial and general equilibrium tax incidence, open economy effects, choice of governing instruments, and tax reform.

Prerequisite(s): Economics 303 and 357.

Economics 405 **3 units; (3-0)**

Political Economy of Public Policy

Introduction to the economic foundations of political economy and economic models of public sector policy formation. Potential topics are the role of institutions in policy design, theories of bureaucracy, political business cycles, the formation and behaviour of interest groups, and the strategic use of government debt.

Prerequisite(s): Economics 303 and 357.

Economics 423 **3 units; (3-0)**

International Macroeconomics

Foreign exchange markets, and international macroeconomic connections with trade in assets as well as goods and services. Topics include: alternative exchange rate regimes; monetary and fiscal policy responses to problems of unemployment and inflation; balance of payments adjustment mechanisms; international debt; and Euro-dollar markets.

Prerequisite(s): Economics 359.

Economics 425 **3 units; (3-0)**

International Trade

The general equilibrium treatment of the gains from trade, comparative advantage and trade patterns provides a basis for examining topics such as: trade policy under imperfect competition, trade policy and the environment, trade policy and economic growth, and preferential trading arrangements.

Prerequisite(s): Economics 357.

Note: Completion of Economics 321 is recommended but not necessary.

Economics 427 **3 units; (3-0)**

Energy Economics and Policy

Microeconomic analysis of the allocation of energy resources with a focus on policy issues including the environment, OPEC, national security, price and entry regulation, market design, and the potential for new energy sources.

Prerequisite(s): Economics 357 and 395.

Economics 431 **3 units; (3-0)**

Labour Economics

Economic analysis of migration, labour force participation, education, fertility, human resources policy, and the measurement and treatment of unemployment.

Prerequisite(s): Economics 301 and 303.

Economics 453 **3 units; (3-0)**

Cost-Benefit Analysis

Theoretical basis for social cost-benefit analysis, appraisal techniques for investment projects and public policies, and selected applications.

Prerequisite(s): Economics 357.

Economics 465 **3 units; (3-0)**

Industrial Development of Alberta

Structure, growth and development of the provincial economy; evaluation of industrial projects and policy alternatives.

Prerequisite(s): Economics 301 and 303.

Economics 471 **3 units; (3-0)**

Industrial Organization

Behaviour of firms in imperfectly competitive markets. Topics include the theory of strategic competition; dynamic price competition and tacit collusion; product differentiation, product selection, and preemption; entry deterrence and

capacity competition; information, reputation, and predation; the economics of research and development; international trade and imperfectly competitive markets.

Prerequisite(s): Economics 357.

Economics 473 **3 units; (3-1)**
(formerly Economics 499.40)

Water Resource Economics and Policy

Selected economic issues in water resource use in Canada and other countries, including policies toward, and management of, water allocation, water quality, and the value of water for ecosystem services.

Prerequisite(s): Economics 301.

Economics 475 **3 units; (3-0)**

Economics of Natural Resources

Application of economic theory to the problems of natural resource pricing, allocation and conservation. Rent theory, location theory, intertemporal maximization. Natural resource policy formulation. Contemporary Canadian resource problems.

Prerequisite(s): Economics 357.

Economics 477 **3 units; (3-0)**

Regulatory Economics

An introduction to economic regulation, its rationale, form and effects with a focus on the economic theory of regulation and on the practice, structure, and evolution of Canadian regulatory institutions.

Prerequisite(s): Economics 471.

Economics 479 **3 units; (3-1)**

Experimental Economics

Introduces students to the use of and insights gained from experiments in economic research. As part of the course, students will be participating in a variety of in-class experiments.

Prerequisite(s): Economics 357 and 395.

Economics 481 **3 units; (3-0)**

Behavioural Economics

Major factors underlying economic behaviour including: various views of the role of rationality in economic analysis and in the economic decision making of individuals and institutions; determinants of individual preferences and decision making procedures; the experimental analysis of economic behaviour; inter-relationships between the operation of the economic system and feelings of subjective well-being.

Prerequisite(s): Economics 357.

Economics 483 **3 units; (3-0)**

History of Economic Thought

Traces the evolution of economic ideas from the earliest times up to and including the contributions of the classical economists and Marx. Emphasis will be on understanding these contributions both in terms of their historical context and their relationship to present-day theories and controversies.

Prerequisite(s): Economics 301 and 303.

Economics 485 **3 units; (3-0)**
(formerly Economics 599.10)

Economics of the Welfare State

The focus is on ideas and economic analysis relevant to understanding the economics of the

welfare state, where issues of income redistribution and social insurance are central.

Prerequisite(s): Economics 357 and 395.

Antirequisite(s): Credit for Economics 485 and 599.10 will not be allowed.

Economics 487 3 units; (3-0)
(formerly Economics 499.77)

Environmental Economics

Applies microeconomic theory to the examination of market failures as the source of environmental problems, and to designing and evaluating environmental policies to correct them.

Prerequisite(s): Economics 357 and 395.

Economics 489 3 units; (3-0)
(formerly Economics 499.63)

Economics of the Movie Business

Applies microeconomic theory to the motion-picture industry, focusing on how information and extreme uncertainty shape the structure of economic transactions. The historical and institutional illustrations are set in the context of Hollywood.

Prerequisite(s): Economics 357 and 395.

Economics 491 3 units; (3-0)

Managerial and Decision Economics

Systematic economic analysis in managerial decision-making. Application of practical ideas to business decisions, integrating global business issues and practices with conceptually rigorous economic analysis.

Prerequisite(s): Economics 357 and 395.

Antirequisite(s): Credit for Economics 491 and Economics 499.80 will not be allowed.

Economics 493 3 units; (3-0)

Empirical Energy Economics

Students will study and learn how to apply methods of data analysis that are particularly useful in the context of energy economics.

Prerequisite(s): Economics 357, 395 and 427.

Economics 495 3 units; (3-0)

Econometrics I

Introduction to the techniques used in quantifying economic relationships. Econometric principles of estimation and hypothesis testing will be applied to the various economic models. The use of a standard econometric software package is emphasized.

Prerequisite(s): Economics 301 and 303 and 395; and Mathematics 249 or 251 or 265 or 281.

Antirequisite(s): Credit for Economics 495 and 419 will not be allowed.

Economics 497 3 units; (3-0)

Econometrics II

A more in-depth theoretical and empirical treatment of econometrics. Topics include: time series analysis, limited dependent variable estimation and simultaneous equation estimation.

Prerequisite(s): Economics 357, 359, 495 and Mathematics 211.

Economics 499 3 units; (3-0)

Selected Topics in Economics II

A decadalized course in which topics will vary from year-to-year. Consult the timetable or the Department for the topics available in a given year.

Prerequisite(s): One of Economics 301, 303, 357 or 359.

MAY BE REPEATED FOR CREDIT

Economics 527 3 units; (3-0)

World Oil Economics

Analysis of the world oil industry in the post-war period.

Prerequisite(s): Economics 301 and 303.

Economics 537 3 units; (3-0)

Economic Growth

This is an advanced course in Macroeconomics which explores why some countries are rich and others are poor.

Prerequisite(s): Economics 359.

Corequisite(s): Prerequisite or Corequisite: Economics 357.

Economics 541 3 units; (3-0)

Monetary Theory

A survey of recent work in monetary theory with primary emphasis on financial issues.

Prerequisite(s): Economics 303 and 341.

Corequisite(s): Prerequisite or Corequisite: Economics 395.

Economics 557 3 units; (3-0)

Topics in Economic Theory I

Topics in microeconomic theory such as welfare economics and general equilibrium theory.

Prerequisite(s): Economics 357 and 389.

Economics 559 3 units; (3-0)

Topics in Economic Theory II

Topics in macroeconomic theory such as consumption and growth.

Prerequisite(s): Economics 359 and 389 and 395.

Economics 571 3 units; (3-0)

Competition Policy

The law and economics of competition policy. An examination of the economics, jurisprudence and history of competition policy towards mergers, price fixing, vertical restraints, and monopolization, primarily in Canada and the United States.

Prerequisite(s): Economics 471.

Economics 599 3 units; (3-0)

Selected Topics in Economics III

A decadalized course in which topics will vary from year-to-year. Consult the timetable or the Department for the topics available in a given year.

Prerequisite(s): Economics 357 and 359.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Economics 605 3 units; (3-0)

Computational Optimization and Economic Applications

Explores the theory and numerical implementation of mathematical programming, covering basic classes of optimization problems — linear programming, non-linear programming and complementarity problems — as ways to operationalize models of individual choice

and decentralized equilibrium behaviour from economics. Applications will vary.

Economics 609 3 units; (3-0)

Political Economy

Provides a selective overview of modern political economy. Gives an introduction to the basic theoretical models, empirical methodologies, and substantive findings in political economy. Covers theoretical and empirical research and the links between the two. Also treats a number of selected topics on the research frontier.

Economics 611 3 units; (3-0)

Special Topics in Economics

Topics will vary from year-to-year. Consult the timetable or the Department for the topics available in a given year.

MAY BE REPEATED FOR CREDIT

Economics 615 3 units; (3-0)

Econometrics

Provides a foundation of econometric theory relevant for empirical work in economics. Covers classical estimation and inference procedures, including linear regression, linear instrumental variables, differences-in-differences, and linear panel data techniques. Also covers the problem of causality and identification in empirical economics.

Prerequisite(s): Admission to the Master of Arts Economics program or permission of the Department.

Economics 619 3 units; (3-0)

Empirical International Trade

Examines issues from the economic literature on international trade. Focuses on quantitative and empirical analysis. Specific topics include the factor content of trade, firm level and multinational behaviour, empirical testing of political economy determinants of protection, and assessing the environmental impact of trade agreements.

Economics 621 3 units; (3-0)

International Trade

Focuses on the microeconomic aspects of international economics with emphasis on general equilibrium models commonly employed in international economics. Specific topics covered include theories of international specialization and exchange, trade policy and economic welfare, international factor movement, trade and growth, under both perfect competition and imperfect competition, and selected problems of trade policy in the international trading system.

Economics 627 3 units; (3-0)

Energy Economics

Applies the tools of microeconomics, institutional economics, and econometrics to energy markets and policies. Focuses on empirical studies of the energy business including markets for natural gas, crude oil, gasoline, electricity and coal.

Economics 633 3 units; (3-0)

Labour Economics

Emphasizes empirical implementation of theoretical models through the use of data and econometrics. Topics include labor supply theory, search theory, wage determination theories, and numerical methods for the estimation of dynamic models.

Economics 635 **3 units; (3-0)**

Regulatory Economics

An in-depth study of regulatory economics, defined as price and entry regulation. Price and entry regulation occurs when the state restricts who can provide services and approves the terms of service. A considerable part of the course will address regulatory restructuring in network industries, with case studies on electricity reform, local telecommunications, and pipelines.

Economics 641 **3 units; (3-0)**

Financial Economics

A review of the main themes of financial economics and an introduction of a number of frontier ideas that have marked the recent evolution of the discipline. The main focus is on asset pricing and the application of financial econometrics to modelling and prediction of financial data.

Economics 649 **3 units; (3-0)**

Empirical Public Economics

Focuses on empirical research on the economics of the public sector, including material on taxation, public expenditures and social insurance. Gives a broad overview of this growing field and prepares for research in public economics.

Antirequisite(s): Credit for Economics 649 and 611.48 will not be allowed.

Economics 651 **3 units; (3-0)**

Redistribution and Social Insurance

A focus on the economics of public expenditure programs designed to redistribute income or to provide social insurance against risks faced by households.

Economics 653 **3 units; (3-0)**

Public Revenue Analysis

A focus on the revenue side of public finance, primarily in the form of taxation. The equity and efficiency aspects of different taxes are considered, as is optimal tax design. Possible topics include the taxation of labour and capital, the impact taxation on savings and risk taking, and environmental and resource taxation.

Economics 655 **3 units; (3-0)**

Cost/Benefit Analysis

Theoretical and applied aspects of the use of cost-benefit techniques and applied welfare analysis in the evaluation of investment projects and public policies.

Economics 657 **3 units; (3-0)**

Microeconomic Theory

Introduction to advanced microeconomic theory. Topics include consumer theory, theory of the firm, general equilibrium, uncertainty, game theory, and informational economics.

Prerequisite(s): Admission to the Master of Arts Economics program.

Note: Students in other departments can take this course with permission of the Department of Economics.

Economics 659 **3 units; (3-0)**

Macroeconomic Theory

Introduction to the analysis of macroeconomics at an advanced level. Provides an overview of theories addressing the major questions of macroeconomic phenomena. Some coverage of applied

topics, such as economic growth and government policy.

Prerequisite(s): Admission to the Master of Arts Economics program.

Note: Students in other departments can take this course with permission of the Department of Economics.

Economics 661 **3 units; (3-0)**

Behavioural Economics

Survey of research incorporating psychological evidence into economics. Topics include fairness, altruism, prospect theory, self-control, biases in probabilistic judgment, mental accounting, and the relationship between markets, incentives, and attention and various cognitive processes.

Economics 667 **3 units; (3-0)**

Industrial Organization

A focus on market power: its acquisition, maintenance, and exercise. Both theory and application, with an emphasis on how industrial organization does, and should, inform competition policy and antitrust law, will be examined.

Economics 669 **3 units; (3-0)**

Empirical Industrial Organization

Firm behaviour in oligopolistic markets, as well as consumer and firm behaviour in environments with asymmetric information. Strong emphasis on combining economic models with econometric techniques to answer economic questions. Models of demand and supply, discrete static and dynamic games, production function estimation, single agent dynamic models and matching models.

Antirequisite(s): Credit for Economics 669 and 611.71 will not be allowed.

Economics 675 **3 units; (3-0)**

Natural Resource Economics

Examines economic models of the structure and nature of natural resource industries and their interaction with the rest of the economy. Includes non-renewable and renewable resources and applies methods from capital theory, growth theory, public economics, and industrial organization to the study of natural resources.

Economics 677 **3 units; (3-0)**

Environmental Economics

Environmental economics describes the ways in which people interact with their natural environment and the policies that best achieve society's goals in this context. Topics vary from year-to-year and may include benefit-cost analysis, non-market valuation, choice of policy instruments, environmental taxation, trade growth and the environment, global warming and international environmental treaties.

Economics 679 **3 units; (3-0)**
(Community Health Sciences 661)

Health Economics

An overview of topics in health economics. An introduction to economic principles and techniques used in analyzing and planning health policy, in particular the delivery of health services, and for understanding the health behaviour of individuals.

Economics 691 **1.5 units; (3-0)**

Research Methods I

Survey of research methods in economics. For course-based MA students.

Economics 693 **1.5 units; (3-0)**

Research Methods II

Survey of research methods in economics. For course-based MA students.

Economics 695 **3 units; (3-0)**

Research Methods III

Master's research project. Identify an interesting and feasible research question, carry out an extensive literature review of the problem area, develop an economic/econometric model to address the problem, identify and collect appropriate data for empirical research.

Prerequisite(s): Admission into the Master of Arts Economics (course-based) program.

Antirequisite(s): Credit for Economics 695 and 611.55 will not be allowed.

Economics 697 **3 units; (3-0)**

Research Methods IV

Master's research project. Continuing from Research Methods III, the economic/econometric model is fully developed with specific attention to identification issues and testable hypotheses. Appropriate econometric analyses, validation and testing are carried out, leading to a research paper reporting the problem, the model and the results.

Prerequisite(s): Admission into the Master of Arts Economics (course-based) program.

Antirequisite(s): Credit for Economics 697 and 611.57 will not be allowed.

Economics 705 **3 units; (3-0)**

Advanced Econometrics I

Devoted to rigorous treatment of asymptotic theory as it applies to econometric practice. Provides a detailed treatment of the theory and practice of classical estimation procedures, including linear regression and instrumental variables, Maximum Likelihood, the Generalized Method of Moments, as well as an extension to simulation-based methods. The theory of hypothesis testing is also covered.

Prerequisite(s): Admission to the PhD program in Economics.

Economics 707 **3 units; (3-0)**

Advanced Microeconomic Theory I

Introduction to advanced microeconomic theory. Topics include consumer theory, theory of the firm, and general equilibrium.

Economics 709 **3 units; (3-0)**

Advanced Macroeconomic Theory I

Introduction to the basic structure of the dynamic general equilibrium framework that forms the backbone of most modern macroeconomics research. Selected topics include growth, business cycles, and monetary and labor economics.

Economics 711 **3 units; (3-0)**

Independent Study

MAY BE REPEATED FOR CREDIT

Economics 715 **3 units; (3-0)**

Advanced Econometrics II

Focuses on the problem of causality and identification of treatment effects in empirical work in Economics. Topics include but are not limited to randomized trials, causality, instrumental variables, difference in differences, regression discontinuity designs. Students are introduced to empirical applications of these different approaches.

Prerequisite(s): Economics 705.

Economics 717 3 units; (3-0)**Advanced Topics in Econometrics**

Studies cutting edge econometric tools used to evaluate the impacts of policies, extrapolate their effects to new environments, and predict the effects of policies that have never been tried. Methods from both the structural and treatment effect paradigms of policy evaluation will be considered.

Prerequisite(s): Economics 705.

Economics 723 3 units; (3S-0)**Trade, Growth and the Environment I**

Covers relevant theoretical work on the environmental consequences of trade liberalization and economic growth, and the relationship between resource use and globalization, focusing on newly published research. Participants are expected to present and discuss research. The specific choice of topics will be made based on research interests of the class.

Antirequisite(s): Credit for Economics 723 and 611.10 will not be allowed.

Economics 725 3 units; (3S-0)**Trade, Growth and the Environment II**

Covers relevant empirical work on the environmental consequences of trade liberalization and economic growth, and the relationship between resource use and globalization, focusing on newly published research. Participants are expected to present and discuss research. The specific choice of topics will be made based on research interests of the class.

Economics 757 3 units; (3-0)**Advanced Microeconomic Theory II**

Building on Economics 707, a comprehensive treatment of game theory, the economics of uncertainty and information, and the theory of incentives will be introduced. Other topics may be included as time and interest allow.

Prerequisite(s): Economics 707.

Economics 759 3 units; (3-0)**Advanced Macroeconomic Theory II**

Building on Economics 709, a survey of the ideas, controversies, and techniques that constitute modern macroeconomics. The principal issues it covers lie at the heart monetary and fiscal policy and of such important social problems as business cycles and unemployment. The empirical study of key issues raised in theoretical and political debates is also emphasized.

Prerequisite(s): Economics 709.

Economics 791 1.5 units; (1.5-0)**PhD Research Workshop**

Survey of research methods in economics.

Prerequisite(s): Admission to the PhD program in Economics.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Economics 793 1.5 units; (3-0)**PhD Research Workshop II**

Survey of research methods in economics.

Prerequisite(s): Economics 791 and admission to the PhD program in Economics.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Education EDUC

For more information about these courses, see the Werklund School of Education website: <https://werklund.ucalgary.ca/upe/program-information>

Additional graduate education courses are offered under the course headings Educational Psychology (EDPS) and Educational Research (EDER).

Junior Courses**Education 101** 3 units; (3S-0)**English Academic Success**

Students will relate their own life story and experiences to the wider human condition by reading a variety of literary texts and through writing in a variety of literary forms. Assignments will present opportunities for students to develop a critical understanding of literature in a personal context.

Prerequisite(s): Admission to Bridging to Community-Based BEd stream in the Bachelor of Education (Community-based) program.

Note: Completion of this course meets the University of Calgary's ELA 30-1 admission requirement.

NOT INCLUDED IN GPA

Education 201 3 units; (3-0)**Introduction to Educational Studies**

An introduction to the breadth and complexity of educational studies. Unique among academic domains, educational studies not only arises in the intersections of many other fields – including psychology, sociology, anthropology, and a range of disciplinary domains – it must also be responsive to a rapidly changing world.

Prerequisite(s): Admission to the Bachelor of Education program or consent of the program.

Note: All Concurrent and Four-Year BEd students must successfully complete Education 201 before taking 400-level Education courses.

Education 205 3 units; (3S-0)**Reading Educational Research**

Focusing on students' reading skills, this course continues to develop awareness of academic language genres, formal versus informal language use, and the development of critical thinking and logical argumentation skills. Continuing development of study skills and approaches that foster long-term academic success are integrated into course materials.

Prerequisite(s): Admission to Bridging to Community-Based BEd stream in the Bachelor of Education (Community-Based) program, or consent of the program.

Education 207 3 units; (3S-0)**How Children Learn to Read**

Examines how young children learn to read through their world of daily experiences.

Prerequisite(s): Admission to Bridging to Community-Based BEd stream in the Bachelor of Education (Community-Based) program, or consent of the program.

Education 209 3 units; (3S-0)**Supporting Children's Reading**

Students will explore strategies for promoting reading development through integrated experiential learning opportunities.

Prerequisite(s): Admission to Bridging to Community-Based BEd stream in the Bachelor of Education (Community-Based) program, or consent of the program.

Corequisite(s): Education 207.

Education 211 3 units; (3S-0)**Academic Writing in Education**

Focusing on students' writing skills, this course develops awareness of academic language genres, formal versus informal language use, as well as the skills required for researching and referencing academic work in written texts. The development of study skills and approaches that foster long-term academic success are integrated with academic language skills development.

Prerequisite(s): Admission to Bridging to Community-Based BEd stream in the Bachelor of Education (Community-Based) program, or consent of the program.

Education 213 3 units; (3S-0)**How Children Learn to Write**

Examines how young children learn to write through their world of daily experiences.

Prerequisite(s): Admission to Bridging to Community-Based BEd stream in the Bachelor of Education (Community-Based) program, or consent of the program.

Education 215 3 units; (3S-0)**Supporting Children's Writing**

Students will explore strategies for promoting writing development through integrated experiential learning opportunities.

Prerequisite(s): Admission to Bridging to Community-Based BEd stream in the Bachelor of Education (Community-Based) program, or consent of the program.

Corequisite(s): Education 213.

Senior Courses**Education 305** 3 units; (3S-1T)
(Mathematics 305)**Inside Mathematics**

An exploration of the usually-tacit elements of mathematical concepts and processes, the course focuses on strategies for unpacking concepts and for sustained engagement in inquiry.

Prerequisite(s): 18 units at the 200 level, including Mathematics 211 or 213; and 271 or 273.

Education 307 3 units; (3S-0)**Integrating Arts Education**

A preparation for artists and educators to design effective learning in, about, and through the arts. Discipline-specific knowledge and technique in and about art, dance, drama, and music will be acquired in a studio environment, and applied through an interdisciplinary, collaborative lab. Learner outcomes include interdisciplinary planning skills, aesthetic awareness, critical and analysis thinking, and inter-arts competencies.

Prerequisite(s): 18 units at the 200 level.

Education 309 3 units; (3S-0)**Early Childhood Development**

An examination of the science of early childhood and early brain development that accounts for

the physical, cognitive, emotional, and social development of young children from birth to age eight, and a consideration of the implications with respect to children's healthy development and effective educational practices in the early school years.

Prerequisite(s): 18 units at the 200 level.

Education 311 **3 units; (3S-0)**

Language and Literacy, Learning in the Classroom

An introduction to perspectives on the way children and adolescents become "literate", examining language and literacy from a development perspective and children's literature from a genre perspective.

Prerequisite(s): 18 units at the 200 level.

Education 420 **3 units; (3-0)**
(formerly Education 401)

Issues in Learning and Teaching

Presents an overview of the central issues related to the nature of learning and teaching for those preparing for the teaching profession. Themes include: the nature of learning; current realities in society; patterns of growth and development; and the changing dynamics of the teaching profession.

Prerequisite(s): Admission to the Bachelor of Education program.

Education 427 **3 units; (3S-0)**

Science, Technology, Engineering and Mathematics (STEM)

An introduction to key elements of STEM Education, including curriculum, pedagogy, standards and assessment. Participants will learn how to engage students and integrate STEM topics across all subject areas.

427.01 STEM Early Childhood Education

427.02 STEM Elementary Route

427.03 STEM Secondary Route

427.04 STEM K-12 (Community-Based pathways only)

Prerequisite(s): Admission to the corresponding route in the Bachelor of Education program.

Education 430 **3 units; (3S-0)**
(formerly Education 403)

Pragmatics of Learning and Teaching

Examines the concomitant requirements within which teachers operate. The major components that will be addressed include the ways in which teachers work within the parameters of prescribed curricula and assessment requirements, follow system and school policies, participate in team teaching and school culture, and reflect one's work, values and goals.

Prerequisite(s): Admission to the Bachelor of Education program.

Corequisite(s): Education 440.

Education 435 **3 units; (3S-0)**
(formerly Education 404)

Literacy, Language and Culture

The orienting principle is that every teacher is a teacher of reading. Includes a focus on the necessity for teachers across all disciplines and grades to attend to dimensions of language development, linguistic diversity, and literacy learning in their classrooms.

Prerequisite(s): Admission to the Bachelor of Education program.

Education 440 **3 units; (0-3)**
(formerly Education 405)

Field Experience I

Students will participate in Educational Rounds in school settings within and outside of their areas of specializations under the guidance of their university field instructor and the partner school leadership team. They will explore the organization of learning in the school and the perspective of the learner and the teacher.

Note: Registration changes (add/drop) will only be permitted up to and including the first day of term.

NOT INCLUDED IN GPA

Education 445 **3 units; (2-1)**
(formerly Education 406)

Individual Learning: Theories and Applications

Covers contemporary theories regarding the nature of individual learning. Students will examine the ways educators guide and support learning, design effective learning experiences, and understand underpinning factors related to individual learning. The application of these theories will be examined using examples that demonstrate and exemplify individual learning.

Prerequisite(s): Education 440 and admission to the Bachelor of Education program.

Education 450 **3 units; (3S-0)**
(formerly Education 407)

Diversity in Learning

Includes key topics in inclusive education from an interdisciplinary perspective. The development and conception of diversity of learning will be examined from historical and contemporary perspectives. Building upon this foundation, students will consider the multiple and contested ways in which diversity of learning has been conceived, implemented and evaluated in schools.

Prerequisite(s): Education 440 and admission to the Bachelor of Education program.

Education 456 **3 units; (3S-0)**
(formerly Education 555)

Assessment

An array of topics related to assessment to help students develop a professional level of knowledge, skills and attitudes in relation to the philosophy, theory and pedagogical application of assessment practices for K-12 education.

Prerequisite(s): Education 440 and admission to the Bachelor of Education program.

Education 460 **3 units; (3S-0)**
(formerly Education 409)

Specialization I

Introduction on enacting pedagogy in each of the teachable subject areas in the program and pedagogical content knowledge in each area. Includes disciplinary ways of knowing, doing and being;

understanding the Alberta Programs of Study; designing for deep understanding of learners.

460.01 Specialization I Elementary Early Childhood Education

460.02 Specialization I Elementary English Language Learners

460.03 Specialization I Elementary English Language Arts

460.04 Specialization I Elementary Fine Arts

460.05 Specialization I Elementary French

460.06 Specialization I Elementary Inclusive Education

460.07 Specialization I Elementary Mathematics

460.08 Specialization I Elementary Physical Education

460.09 Specialization I Elementary Science

460.10 Specialization I Elementary Second Languages

460.11 Specialization I Elementary Social Studies

460.12 Specialization I Secondary English Language Arts

460.13 Specialization I Secondary Fine Arts

460.14 Specialization I Secondary French

460.15 Specialization I Secondary Mathematics

460.16 Specialization I Secondary Physical Education

460.17 Specialization I Secondary Science

460.18 Specialization I Secondary Second Languages

460.19 Specialization I Secondary Social Studies

460.20 Specialization I K-12 Social Studies (Community-Based pathways only)

460.21 Specialization I K-12 English Language Arts (Community-Based pathways only)

460.22 Specialization I K-12 Mathematics (Community-Based pathways only)

460.23 Specialization I K-12 Science (Community-Based pathways only)

Prerequisite(s): Education 440 and admission to the corresponding teachable subject area in the Bachelor of Education program.

Education 465 **3 units; (0-3)**
(formerly Education 411)

Field Experience II

This block field experience will have major focus on the complexities of individual learning. Prospective teachers will have the opportunity to follow individual students through various classrooms within their assigned schools under the guidance of their university field instructors and partner school leadership teams.

Prerequisite(s): Education 440 and admission to the Bachelor of Education program.

Note: Registration changes (add/drop) will only be permitted up to and including the first day of term.

NOT INCLUDED IN GPA

Education 520 **3 units; (3S-0)**
(formerly Education 502)

Interdisciplinary Learning

Students will be introduced to new knowledge building experiences that deepen their understanding of the interdisciplinary nature of learning and practice in schools and societies. Particular attention will address how teachers integrate ideas to connect learning and knowledge between subject specializations in attending to complex forms of learning and understanding, and how teachers

understand their agency and leadership roles in concert with the responsibility that accompanies it.

Prerequisite(s): Education 465.

Education 525 **3 units; (3-0)**
(formerly Education 503)

Ethics and Law in Education

An introduction to the historical genesis and institutional structure of Alberta's system of education; an understanding of its legal underpinnings; an opportunity for dialogue; on current major issues in education; and discussion involving ethical decision-making surrounding educational issues.

Prerequisite(s): Education 465.

Education 530 **3 units; (3S-0)**
(formerly Education 505)

Indigenous Education

Students will be introduced to the national and international experiences and advances of Indigenous peoples as related to education. Particular attention will be given to understanding the histories and diversity of the First Nations, Métis and Inuit peoples of Canada and the concomitant implications that this has for education policy and practice.

Prerequisite(s): Education 465.

Education 535 **3 units; (3S-0)**
(formerly Education 506)

Specialization II

Deepens students' knowledge on enacting pedagogy in each of the specialization in the program and their pedagogical content knowledge in each specialization.

535.01 Specialization II Elementary Early Childhood Education

535.02 Specialization II Elementary English Language Learners

535.03 Specialization II Elementary English Language Arts

535.04 Specialization II Elementary Fine Arts

535.05 Specialization II Elementary French

535.06 Specialization II Elementary Inclusive Education

535.07 Specialization II Elementary Mathematics

535.08 Specialization II Elementary Physical Education

535.09 Specialization II Elementary Science Specialization

535.10 Specialization II Elementary Second Languages

535.11 Specialization II Elementary Social Studies

535.12 Specialization II Secondary English Language Arts

535.13 Specialization II Secondary Fine Arts Specialization

535.14 Specialization II Secondary French Specialization

535.15 Specialization II Secondary Mathematics

535.16 Specialization II Secondary Physical Education

535.17 Specialization II Secondary Science Specialization

535.18 Specialization II Secondary Second Languages

535.19 Specialization II Secondary Social Studies

535.20 Specialization II K-12 Social Studies (Community-Based pathways only)

535.21 Specialization II K-12 English Language Arts (Community-Based pathways only)

535.22 Specialization II K-12 Mathematics (Community-Based pathways only)

535.23 Specialization II K-12 Science (Community-Based pathways only)

Prerequisite(s): Education 465 and admission to the corresponding teachable subject area in the Bachelor of Education program.

Education 540 **3 units; (0-3)**
(formerly Education 508)

Field Experience III

This team-oriented block practicum is founded upon the principles of collaborative learning. It includes structures and supports that promote positive interdependence, individual accountability, equal participation, and simultaneous interaction.

Prerequisite(s): Education 465.

Note: Registration changes (add/drop) will only be permitted up to and including the first day of term.

NOT INCLUDED IN GPA

Education 546 **3 units; (3S-0)**

Design-based Thinking

An exploration of key design processes in Education. Topics covered include production pedagogy, user-centered design, and principles of design thinking. The course offers tools to incorporate elements of design thinking into effective classroom teaching in a variety of subject areas

546.01 Design-based Thinking Early Childhood Education

546.02 Design-based Thinking Elementary Route

546.03 Design-based Thinking Secondary Route

546.04 Design-based Thinking K-12 (Community-Based pathways only)

Prerequisite(s): Education 540 and admission to the corresponding route in the Bachelor of Education program.

Antirequisite(s): Credit for Education 546 and 545 or 550 will not be allowed.

Education 551 **3 units; (1-2)**

Comprehensive School Health and Wellness

A healthy school community supports the wellness of all its members and healthy students make better learners. Within the broader evidence-based comprehensive school health framework, this course provides the theoretical foundations, research base, community resources, and experiential learning to create the capacity for future teachers to be health champions.

551.01 Comprehensive School Health and Wellness Early Childhood Education

551.02 Comprehensive School Health and Wellness Elementary Route

551.03 Comprehensive School Health and Wellness Secondary Route

551.04 Comprehensive School Health and Wellness K-12 (Community-Based pathways only)

Prerequisite(s): Education 540 and admission to the corresponding route in the Bachelor of Education program.

Education 556 **3 units; (3S-0)**
(formerly Education 455)

Professional Learning

Focuses on adult education perspectives on lifelong learning and the teaching profession. It emphasizes how novice teachers understand and encourage their learning, and the impacts of that learning on their teaching practice. Theoretical frameworks, philosophical underpinnings and

reflections on experiences of adult learning will be explored.

556.01 Professional Learning Early Childhood Education

556.02 Professional Learning Elementary Route

556.03 Professional Learning Secondary Route

556.04 Professional Learning K-12 (Community-Based pathways only)

Prerequisite(s): Education 540 and admission to the corresponding route in the Bachelor of Education program.

Education 560 **6 units; (0-6)**
(formerly Education 513)

Field Experience IV

In this extended block field experience, students will have an opportunity to work one-on-one to lead a class with a mentor teacher. They will be under the guidance of their university advisors and partner school leadership teams.

Prerequisite(s): Education 540.

Note: Registration changes (add/drop) will only be permitted up to and including the first day of term.

NOT INCLUDED IN GPA

Education 570 **6 units; (0-6)**

Field Experience for Certification

An extended block field experience to lead a class with a mentor teacher. Students will be supervised by their University field instructors and partner teachers.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Education 570 and any of Education 440, 465, 540 or 560 will not be allowed.

Note: Restricted to students with a letter from Alberta Education indicating additional requirements or those who have received permission from the Associate Dean.

NOT INCLUDED IN GPA

Education Bridge to Teaching EDBT

For more information about these courses, contact Graduate Programs in Education werkund.ucalgary.ca/gpe.

Education Bridge to Teaching 601 **3 units; (3-2)**
(formerly Educational Research 696.01)

Contemporary Education

Examination of recent philosophical, historical and curricular constructions of contemporary Canadian and Albertan education.

Prerequisite(s): Admission to the Bridge to Teaching program or consent of Graduate Programs in Education.

Education Bridge to Teaching 602 **3 units; (3-2)**
(formerly Educational Research 696.02)

Teaching in Alberta I

Exploration of the core beliefs, values, and practices in contemporary educational environments, and how students can bridge from their own understanding to what is aimed for in Alberta learning environments.

Prerequisite(s): Admission to the Bridge to Teaching program or consent of Graduate Programs in Education.

Education Bridge to Teaching 603 3 units; (3-2)
(formerly Educational Research 696.03)

Practicum Support Seminar I

Examination of how to integrate previous teaching expertise, new learning, and practicum experiences in Alberta.

Prerequisite(s): Admission to the Bridge to Teaching program or consent of Graduate Programs in Education.

Education Bridge to Teaching 604 3 units; (3-2)
(formerly Educational Research 696.04)

Learning with Technology

Examination of ways to create authentic and meaningful learning experiences through the implementation of web and computer technologies in classroom settings.

Prerequisite(s): Admission to the Bridge to Teaching program or consent of Graduate Programs in Education.

Education Bridge to Teaching 605 3 units; (3-2)
(formerly Educational Research 696.05)

Teaching in Alberta II

Further examination of teaching, learning, learners and learning environments in Alberta classrooms.

Prerequisite(s): Admission to the Bridge to Teaching program or consent of Graduate Programs in Education.

Education Bridge to Teaching 606 3 units; (3-2)
(formerly Educational Research 696.06)

Practicum Support Seminar II

Examination of the integration and extension of learning and teaching for practicum students to engage in a second practicum experience.

Prerequisite(s): Admission to the Bridge to Teaching program or consent of Graduate Programs in Education.

Educational Psychology EDPS

For more information about these courses, contact Graduate Programs in Education werklund.ucalgary.ca/gpe.

Graduate Courses

Students must be admitted into a graduate program in Educational Psychology or receive consent of Graduate Programs in Education to enrol in these courses.

Educational Psychology 600 3 units; (3-2)

Theories, Conceptualizations, and Interventions in Counselling Psychology I

Theoretical foundations and practice frameworks for the major schools of counselling psychology.

Prerequisite(s): Admission to a graduate program in Educational Psychology or the consent of Graduate Programs in Education.

Educational Psychology 601 3 units; (3-2)

Theories, Conceptualizations, and Interventions in Counselling Psychology II

A continuation of the theoretical foundations and practice frameworks for the major schools of counselling psychology.

Prerequisite(s): Admission to a graduate program in Educational Psychology or the consent of Graduate Programs in Education.

Educational Psychology 602 3 units; (3S-0)

Counselling Theories and Professional Practice
Engages students in a critical evaluation of a range of contemporary counselling theories and helps them begin to develop a description of their own emerging theory.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 602 and either Educational Psychology 681 or Applied Psychology 602 will not be allowed.

Educational Psychology 603 3 units; (3-0)

Research Methods in School Psychology

Advanced study of research methods for use in applied psychology and education.

Prerequisite(s): Admission to a graduate program in Educational Psychology or the consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 603 and 612.01 will not be allowed.

Educational Psychology 604 3 units; (3-0)

Professional Ethics in Applied Psychology

Ethical, legal and professional knowledge to inform practice in educational, counselling and mental health contexts.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 604 and either Educational Psychology 603 or 614 will not be allowed.

Educational Psychology 605 3 units; (3-0)

Psychological Measurement and Statistics

Advanced study of measurement and quantitative research methods for use in applied psychology and education.

Prerequisite(s): Admission to a graduate program in Educational Psychology or the consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 605 and 612.02 will not be allowed.

Educational Psychology 606 3 units; (3S-0)

Practice Evaluation in School Psychology

Introduction to basic concepts related to the assessment of the quality and effectiveness of educational programs and environments.

Prerequisite(s): Admission to a graduate program in Educational Psychology or the consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 606 and 612.03 will not be allowed.

Educational Psychology 607 3 units; (3-0)

Fundamentals of Measurement

Survey course on educational research methodologies which addresses issues of research design, methods, and interpretation of research findings, including a focus on test construction and psychometrics as they pertain to the development of assessment tools.

Prerequisite(s): Admission to a graduate program in Educational Psychology or the consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 607 and 612.04 will not be allowed.

Educational Psychology 608 3 units; (3S-0)

Introduction to Statistical Analyses

An introductory course on descriptive and inferential statistics designed to give students with mini-

mal statistical background sufficient competence to conduct basic statistical procedures. Topics will include: displaying data; measures of central tendency, variability, and correlation; regression analysis and prediction; probability; parameter estimation; and analysis of variance. Emphasis will be on understanding basic concepts, using software to conduct analyses, and interpretation of results.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 608 and Applied Psychology 608 will not be allowed.

Educational Psychology 609 3 units; (3-2)

Research Design in Statistics II

Research design and statistics, including methods for research in psychology and related laboratory instruction.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 610 and either Applied Psychology 605 or Educational Psychology 605 will not be allowed.

Educational Psychology 610 3 units; (3-0)

Research Methodology in Counselling

Survey course on research methodologies in counselling, which addresses issues of research design, methods and interpretation of research findings.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 610 and either Applied Psychology 605 or Educational Psychology 605 will not be allowed.

Educational Psychology 611 3 units; (3-2)

Qualitative Research Methodologies

Advanced study of qualitative research methods for use in applied psychology and education.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 611 and Applied Psychology 611 will not be allowed.

Educational Psychology 612 3 units; (3-0)

Research Methods in School Psychology

Advanced study of research methods for use in applied psychology and education.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

MAY BE REPEATED FOR CREDIT

Educational Psychology 614 3 units; (3-0)

Ethics in Professional Psychology

Ethical, legal, and professional knowledge to inform practice in educational, counselling, and mental health contexts.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 614 and any of Educational Psychology 603, Educational Psychology 604 or Applied Psychology 603 will not be allowed.

Educational Psychology 615 3 units; (3-0)

Theoretical and Clinical Foundations of Assessment

In-depth review of theoretical and clinical foundations of psycho-educational assessment. Focus is on processes of assessment, properties of

tests, use and interpretation of tests and clinical diagnosis.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 615 and Applied Psychology 615 will not be allowed.

Educational Psychology 616 3 units; (3S-0)

Assessment Theory and Practices

Combines a theoretical and practical focus to develop a framework from which to approach the assessment of client change in a variety of contexts.

Prerequisite(s): Educational Psychology 602, 622 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 616 and Applied Psychology 616 will not be allowed.

Educational Psychology 617 3 units; (3-3)

Psychological Assessment of Adults

Focuses on the knowledge and skills necessary to select, administer, score and interpret formal psychological tests and other assessment instruments commonly used with adults within counselling contexts.

Prerequisite(s): Educational Psychology 615 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 617 and Applied Psychology 617 will not be allowed.

Educational Psychology 618 3 units; (3-2)

Multivariate Design and Analysis

Research design and statistics in psychology, with special reference to large sample techniques.

Prerequisite(s): Educational Psychology 609 and admission to a graduate program in Educational Psychology, or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 618 and either Educational Psychology 607 or Applied Psychology 607 will not be allowed.

Educational Psychology 619 3 units; (3-0)

Counselling Girls and Women

Sex role development; stereotyping and social roles; counselling theories; counselling approaches.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 619 and Applied Psychology 619 will not be allowed.

Educational Psychology 620 3 units; (3-3)

Psychological Assessment of Children and Youth

Focuses on the knowledge and skills necessary to select, administer, score, and interpret formal psychological tests and other assessment instruments commonly used with children and youth within counselling psychology contexts.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 620 and 682.03 will not be allowed.

Educational Psychology 621 3 units; (2-2)

Creating a Working Alliance

Theory and practice in developing skills contributing to working alliance and problem clarification.

Ethical, legal and professional issues are the context for the application of generic counselling skills in laboratory experiences.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 623.

Antirequisite(s): Credit for Educational Psychology 621 and Applied Psychology 621 will not be allowed.

Educational Psychology 622 3 units; (3S-0)

Developing and Sustaining a Working Alliance with Clients

Focuses on the understanding and acquisition of skills that are essential for the development of working alliances in counselling contexts. Introduces a theoretical framework for the application of counselling skills in addition to providing the opportunity for skill practice.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 602.

Antirequisite(s): Credit for Educational Psychology 622 and Applied Psychology 622 will not be allowed.

Educational Psychology 623 3 units; (3-0)

Theory in Counselling

History and systems involved in counselling psychology and client change.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 623 and Applied Psychology 623 will not be allowed.

Educational Psychology 624 3 units; (3-0)

Cultural and Social Justice Issues in Professional Practice

A critical examination of cultural and equity issues related to the lives of clients and the psychological professionals serving them.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 624 and either Applied Psychology 625 or Educational Psychology 625 will not be allowed.

Educational Psychology 625 3 units; (3-0)

Cultural Influences on Professional Practice

An examination of cultural influences on theory and practice in applied psychology.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 625 and Applied Psychology 625 will not be allowed.

Educational Psychology 626 3 units; (3-0)

Group Interventions and Processes

Examines theoretical, research, and experiential knowledge helpful in facilitating diverse educational and psychological groups.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 626 and either Applied Psychology 627 or Educational Psychology 627 will not be allowed.

Educational Psychology 627 3 units; (3-1)

Group Processes in Applied Psychology

Theory of group practice in applied psychology, with experiential laboratory.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 627 and either Educational Psychology 626 or Applied Psychology 627 will not be allowed.

Educational Psychology 628 3 units; (3-0)

Theories and Applications of Child and Youth Therapy

Review of the theoretical foundations and associated clinical strategies of psychosocial intervention with children and youth by drawing on common approaches to contemporary practice.

Prerequisite(s): Educational Psychology 600 and 601 and admission to a graduate program in Educational Psychology.

Educational Psychology 629 3 units; (3S-2)

Theory and Applications: Selected Topics

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 629 and Applied Psychology 629 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 630 3 units; (3-0)

Foundations of Career Counselling

Review and application of theoretical and research literatures relevant to counselling clients with career concerns.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 630 and either Applied Psychology 631 or Educational Psychology 631 will not be allowed.

Educational Psychology 631 3 units; (3-0)

Theories of Career Development

Study of career development theory and related research; implications for the applied field.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 631 and either Educational Psychology 630 or Applied Psychology 631 will not be allowed.

Educational Psychology 632 3 units; (3S-0)

Career Development and Services for Organizational Settings

Designed to combine theoretical and practical concerns regarding applications of career development concepts to human resources contexts in organizations. Concepts will be relevant to counselling and human resources development professionals.

Prerequisite(s): Educational Psychology 602, 603, 622, 625 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 632 and Applied Psychology 632 will not be allowed.

Educational Psychology 633 3 units; (2-2)

Career Counselling

Laboratory and field experiences in career counselling.

Prerequisite(s): Educational Psychology 631 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 633 and Applied Psychology 633 will not be allowed.

Educational Psychology 634 3 units; (3S-0)

Multicultural Career Development and Counselling

Increasing cultural diversity requires career development practitioners to examine the ways that their services are designed and delivered. Designed to enable students to deliver culturally responsive career counselling services to diverse populations.

Prerequisite(s): Educational Psychology 636, 646 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 634 and Applied Psychology 634 will not be allowed.

Educational Psychology 635 3 units; (3-0)

Advanced History, Theory, and Practice in Psychology

Course examines the history of psychological concepts in Western culture, major theoretical systems and research approaches, and the foundational assumptions of contemporary perspectives in psychology.

Prerequisite(s): Admission to a graduate program in Educational Psychology or Educational Research.

Antirequisite(s): Credit for Educational Psychology 635 and Applied Psychology 635 will not be allowed.

Educational Psychology 636 3 units; (3S-0)

Systemic Approaches to Community Change

Provides students with a theoretical and practical basis to work as effective community change agents in a broad range of sectors. An examination of comprehensive guidance in schools provides a foundation for exploring key concepts pertinent to developing and implementing comprehensive services in a variety of contexts, and in the process, gaining a better understanding of communities, and building their strengths and capacities.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 636 and Applied Psychology 636 will not be allowed.

Educational Psychology 637 3 units; (3-0)

Relationship Counselling

Study of theories and intervention strategies of the most common approaches to contemporary practice in couples and family therapy.

Prerequisite(s): Educational Psychology 600 and 601 and admission to a graduate program in Educational Psychology.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 640 or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 637 and Applied Psychology 637 will not be allowed.

Educational Psychology 638 3 units; (3S-0)

Counselling Interventions for Client Change

Combines a theoretical and practical focus to develop a framework from which to plan and implement client change interventions in a variety of contexts.

Prerequisite(s): Educational Psychology 602, 622 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 638 and Applied Psychology 638 will not be allowed.

Educational Psychology 639 3 units; (2-2)

Counselling Interventions

Theory and practice in planning and implementing client change interventions; the application of counselling interventions in laboratory experiences.

Prerequisite(s): Educational Psychology 621, 623 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 639 and Applied Psychology 639 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 640 6 units; (2-7)

Practicum in Counselling Psychology II

Supervised counselling experience and related seminars.

Prerequisite(s): Educational Psychology 621, 625 and admission to a graduate program in Educational Psychology.

Corequisite(s): Prerequisites or Corequisites: Educational Psychology 614, 615, 639 and 695.

Antirequisite(s): Credit for Educational Psychology 640 and Applied Psychology 640 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 641 3 units; (3-0)

Development, Learning and Cognition - Child and Adolescent

The interactions of development, learning and cognition in childhood and adolescence.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 641 and Applied Psychology 641 will not be allowed.

Educational Psychology 642 3 units; (3S-0)

Counselling Practicum I

Provides an opportunity for professional development and supervised practice in a general counselling setting. Students will be involved in direct work with clients under the supervision of a qualified professional.

Prerequisite(s): Educational Psychology 604, 616, 622, 624, 638 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 642 and Applied Psychology 642 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 643 3 units; (3-0)

Development, Learning and Cognition - Adult

The interactions of development, learning and cognition in childhood and adulthood.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 643 and Applied Psychology 643 will not be allowed.

Educational Psychology 644 3 units; (3S-0)

Counselling Practicum II

Provides an opportunity for professional development and supervised practice in a specialized counselling context. Students will be involved in direct work with clients under the supervision of a qualified professional. The practicum allows students to actively explore issues encountered in working with a specialized client population or area of practice.

Prerequisite(s): Educational Psychology 616, 638, 642 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 644 and Applied Psychology 644 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 645 3 units; (3-0)

Indigenous Approaches to Therapy

Focuses on integrating Indigenous ways of knowing, being, and doing into therapeutic practice, including case conceptualization, the therapeutic alliance, treatment planning, interventions, and ethics. Addresses Indigenous approaches to therapy with individuals, families, and groups.

Corequisite(s): Prerequisite(s) or Corequisite(s): Educational Psychology 600, 601 and admission to a graduate program in Educational Psychology.

Educational Psychology 646 3 units; (3S-0)

Processes of Learning

Addresses the essential features of major theories of learning and presents current research in each area of learning. Students will discover how the principles of learning relate to their own learning and behaviour, and how the principles can be used to understand the behaviour of others and enhance counselling practice.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 646 and Applied Psychology 646 will not be allowed.

Educational Psychology 647 3 units; (2-7)

Practicum in Counselling Psychology I

Supervised counselling psychology field experience. Increases conceptual understanding of counselling psychology and develops counselling and consulting skills.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

NOT INCLUDED IN GPA

Educational Psychology 648 3 units; (3S-0)

Lifespan Human Development

Introduces a comprehensive view of human development across the lifespan, drawing on the major theoretical positions. Developmental themes are discussed in terms of their application to typi-

cal and atypical human development in children, adolescents and adults.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 648 and Applied Psychology 648 will not be allowed.

Educational Psychology 650 3 units; (3-0)

Family and Social Bases of Behaviour

Examines theoretical perspectives and contemporary research on socialization processes in childhood and adolescence, with particular emphasis on family and peer interpersonal relations. Students will explore the connections between family and the education system including parent involvement in schools.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 650 and Applied Psychology 650 will not be allowed.

Educational Psychology 651 3 units; (3-0)

Disorders of Learning and Behaviour

Focuses on childhood and adolescent disorders through an examination of theories, diagnostic and associated features and disorders, prevalence, developmental course, cultural and gender context, and familial patterns.

Prerequisite(s): Admission to a graduate program in Educational Psychology or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 651 and Applied Psychology 651 will not be allowed.

Educational Psychology 652 3 units; (3-0)

Academic and Language Assessment

Course provides a broad understanding of the standards that guide assessment practices through an examination of assessment of academic areas and language skills.

Prerequisite(s): Admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 689.

Antirequisite(s): Credit for Educational Psychology 652 and either Educational Psychology 667 or Applied Psychology 652 will not be allowed.

Educational Psychology 653 3 units; (3-0)

Professional Practice of School Psychology

A focus on the preparation, roles, functions, and employment of school psychologists as well as the regulation, evaluation, and accountability of school psychologists.

Prerequisite(s): Admission to a graduate program in Educational Psychology or consent of Graduate Programs in Education.

Educational Psychology 654 3 units; (3-0)

Neurobiological and Developmental Bases of Learning and Behaviour

Examines the field of cognitive neuroscience from an assessment framework. It explores the evolving understanding of neurobehavioural disorders and new testing techniques and practices now avail-

able to assess neuropsychological characteristics in both clinical and research settings.

Prerequisite(s): Admission to a graduate program in Educational Psychology or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 654 and Applied Psychology 654 will not be allowed.

Educational Psychology 655 3 units; (3-0)

Advanced Child Development

Explores the theory and research supporting recent advances in select areas of child development. Topics include: parent/peer relations; personality, self and self-concept; language and thought; emotion and motivation; and pro-social, antisocial, and moral development.

Prerequisite(s): Admission to a graduate program in Educational Psychology or consent of Graduate Programs in Education.

Educational Psychology 656 3 units; (1-14)

Practicum in Academic and Language Assessment and Intervention

This 200-hour practicum provides opportunities to develop competencies in academic and language assessment and interventions within an approved setting.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 656 and Applied Psychology 656 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 657 3 units; (3-0)

Cognitive and Neuropsychological Assessment

Focuses on the theory and practice of intellectual/cognitive, memory, and neuropsychological assessment primarily through the use of individually administered standardized tests.

Prerequisite(s): Admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

Antirequisite(s): Credit for Educational Psychology 657 and Applied Psychology 657 will not be allowed.

Educational Psychology 658 3 units; (3-0)

Interventions to Promote Cognitive, Academic, and Neuropsychological Well-Being

Focuses on evidence-based interventions aimed at promoting cognitive, academic, and neuropsychological development in children and youth.

Prerequisite(s): Admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

Antirequisite(s): Credit for Educational Psychology 658 and Applied Psychology 658 will not be allowed.

Educational Psychology 659 3 units; (3-3)

Academic Assessment and Intervention

Academic and language assessment and intervention primarily through the use of individually administered standardized tests and evidence-based interventions aimed at promoting academic and language development in children and youth.

Prerequisite(s): Educational Psychology 665 and admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

Educational Psychology 660 3 units; (3-0)

Social, Emotional, and Behavioural Assessment

Grounded in bioecological systems perspective and developmental and resiliency frameworks, course focuses on the comprehensive assessment of children and youth referred for social, emotional, and behavioural concerns.

Prerequisite(s): Admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

Antirequisite(s): Credit for Educational Psychology 660 and Applied Psychology 660 will not be allowed.

Educational Psychology 661 3 units; (3-0)

Psychological Foundations of Student Exceptionality

Major trends, developments, theoretical foundations, and current practices and challenges relative to the education of students with diverse learning needs.

Prerequisite(s): Admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

Antirequisite(s): Credit for Educational Psychology 661 and Applied Psychology 661 will not be allowed.

Educational Psychology 662 3 units; (2-15)

School Psychology Practicum I

Provides supervised experience to develop competencies aligned with the practice of school psychology, including consultation, assessment, and intervention. Adherence to all provincial and national ethical and professional guidelines is expected.

Prerequisite(s): Educational Psychology 614, 665, 659, 669 and admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

NOT INCLUDED IN GPA

Educational Psychology 663 3 units; (2-15)

School Psychology Practicum II

Provides supervised experience to further develop and refine school psychologist competencies. Administration of evidenced-based intervention strategies will be also required. Adherence to all provincial and national ethical and professional guidelines is expected.

Prerequisite(s): Educational Psychology 662 and admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

NOT INCLUDED IN GPA

Educational Psychology 664 3 units; (3S-0)

Psychological Approaches to Health

Focuses on how human psychology and human health intersect and is organized according to core principles and skills that guide the practice of health psychology. Will orient students to contemporary theories and models of health, illness, and health promotion, and their relevance in a variety of settings.

Prerequisite(s): Educational Psychology 602, 624, 610 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 664 and Applied Psychology 664 will not be allowed.

Educational Psychology 665 3 units; (3-3)

Cognitive Assessment and Intervention

The theory and practice of intellectual/cognitive, and memory assessment primarily through the use of individually administered standardized tests and evidence-based interventions aimed at promoting cognitive, academic, and neuropsychological development in children and youth.

Prerequisite(s): Admission to a graduate program with specialization in School and Applied Child Psychology.

Corequisite(s): Educational Psychology 653.

Educational Psychology 667 3 units; (3-3)

Assessment of Students with Exceptional Learning Needs

Theory and practice in school-based academic and social-emotional assessment techniques and strategies for use with students with diverse learning needs. Laboratory and field experiences.

Prerequisite(s): Admission to a graduate program with specialization in School and Applied Child Psychology.

Antirequisite(s): Credit for Educational Psychology 667 and either Educational Psychology 652 or Applied Psychology 667 will not be allowed.

Educational Psychology 668 3 units; (3S-0)

Theory and Practice of Clinical Supervision

Intended for students to learn the process of clinical supervision and as a result become better consumers of supervision, more effective supervisors, and more able to evaluate their current and future development and involvement in supervisory roles.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 668 and Applied Psychology 668 will not be allowed.

Educational Psychology 669 3 units; (3-3)

Social-Emotional Assessment and Intervention

Focuses on the theory and practice of social, emotional, and behavioural assessment and on evidence-based interventions to enhance the mental health and behavioural well-being of children and youth.

Prerequisite(s): Educational Psychology 665 and admission to a graduate program with specialization in School and Applied Child Psychology.

Educational Psychology 670 3 units; (3S-0)

Final Project Portfolio

Students complete a culminating independent project in their area of specialization to satisfy the degree requirements.

Prerequisite(s): Educational Psychology 602, 604, 610, 616, 622, 624, 626, 630, 638, 642, 646, 648, and 664.

Antirequisite(s): Credit for Educational Psychology 670 and Applied Psychology 670 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 671 3 units; (1-3)

Practicum in School-based Interventions for Children and Youth with Exceptional Learning Needs: I

Practicum in educational interventions for children and adolescents with special learning needs. Fo-

cus on general assessment, analysis, intervention, and strategies in applied settings.

Prerequisite(s): Educational Psychology 661 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 671 and Applied Psychology 671 will not be allowed.

Educational Psychology 672 3 units; (3S-0)

Counselling Exceptional Children

Intended to help students enhance their awareness and understanding of major trends, developments, theoretical foundations, and current practices and challenges in counselling and providing consultation for special needs children and adolescents.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 672 and Applied Psychology 672 will not be allowed.

Educational Psychology 673 3 units; (3-3)

Practicum in School-based Interventions for Children and Youth with Exceptional Learning Needs: II

Advanced practicum in educational interventions for children and adolescents with special learning needs. Focus on specialized assessment, analysis, interventions, and strategies in applied settings.

Prerequisite(s): Educational Psychology 671 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 673 and Applied Psychology 673 will not be allowed.

Educational Psychology 674 3 units; (3-0)

Interventions to Promote Socio-emotional and Behavioural Well-Being

Focus on strategies to enhance the socio-emotional and behavioural well-being of children and youth who exhibit significant emotional and behavioural needs in school and community settings.

Prerequisite(s): Educational Psychology 660 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 674 and Applied Psychology 674 will not be allowed.

Educational Psychology 675 3 units; (1-14)

Practicum in Cognitive and Neuropsychological Assessment and Intervention

This 200-hour practicum provides opportunities to develop competencies in cognitive and neuropsychological assessment and interventions within an approved setting.

Prerequisite(s): Educational Psychology 651, 654, 657 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 675 and Applied Psychology 675 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 676 3 units; (1-14)

Practicum in Social, Emotional, and Behavioural Assessment

A supervised practicum in social, emotional, and behavioural assessment. Students will undertake comprehensive social, emotional, and behavioural assessment with children and youth presenting

with various developmental disorders. Students will undertake this practicum experience within the Werklund School of Education's Integrated Educational Services office (ISE).

Prerequisite(s): Educational Psychology 696 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 676 and Applied Psychology 676 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 677 3 units; (3-0)

Play Therapy Theory and Process

The theoretical foundations and basic orientation necessary to understand and use play as therapy are outlined, along with the developmental underpinnings of play in children and the basic principles upon which child-centred play therapy is built.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 677 and Applied Psychology 677 will not be allowed.

Educational Psychology 678 3 units; (3S-0)

Art Therapy History

Art therapy is examined from a broad perspective, from its beginnings as a treatment for mentally or emotionally disturbed people, to its development as a distinct profession in North America and Europe. The works of key authors are covered, along with their theoretical approaches and current trends in the field. Students will learn how the foundations of art therapy are incorporated by many disciplines, with applications in many settings.

Prerequisite(s): Educational Psychology 642, 616, 638 and admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 678 and Applied Psychology 678 will not be allowed.

Educational Psychology 679 3 units; (3-0)

Fundamentals of Solution-Oriented Therapy

Provides a working knowledge of the theory and practice of solution-oriented therapy and related models.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 679 and Applied Psychology 679 will not be allowed.

Educational Psychology 680 3 units; (3S-0)

Counselling Graduate Practicum: Selected Topics

Graduate Practicum: Selected Topics.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 680 and Applied Psychology 680 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 681 3 units; (3-0)**Theories and Skills of Counselling**

An introduction to the major theories of counselling as well as counselling micro-skills and interviewing skills.

Prerequisite(s): Admission to Educational Psychology graduate program or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 681 and 602 will not be allowed.

Educational Psychology 682 3 units; (3-3)**Special Topics: Counselling**

Graduate Seminar: Special Topics.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 682 and Applied Psychology 682 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 683 3 units; (3-0)**Consultation in School Psychology**

Examines the purpose and skills of consultation, evaluation issues, and strategies in consultation as well as the role of school psychologists relative to multidisciplinary school teams, school-based problems solving, and student development and learning.

Prerequisite(s): Admission to Educational Psychology graduate program or consent of Graduate Programs in Education.

Educational Psychology 684 3 units; (3-0)**Advanced Seminar in the Domains of School Psychology Leadership and Function in the Schools**

Provides an advanced study of the domains and functions of school and applied child psychologists. Constituting the final course within the MEd program, students are required to demonstrate a comprehensive understanding of and competency in the ten domains identified by the National Association of School Psychologists as central to the school psychology profession. For each of the ten domains, students will complete a case study requiring the integration of theory, research, and skills.

Prerequisite(s): Admission to the MEd program with specialization in School and Applied Child Psychology.

Antirequisite(s): Credit for Educational Psychology 684 and Applied Psychology 684 will not be allowed.

Note: Open only to students enrolled in the MEd School and Applied Child Psychology program who have completed all other course work prior to enrolment.

Educational Psychology 685 3 units; (3-0)**Child and Adolescent Counselling**

Introduces the theory and practice of counselling in school-based settings and fosters student development of rudimentary counselling and psychotherapy skills for school-based service delivery.

Prerequisite(s): Admission to Educational Psychology graduate program or consent of Graduate Programs in Education.

Educational Psychology 686 3 units; (3S-0)**Counselling Graduate Seminar: Selected Topics**

Graduate Seminar: Selected Topics.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 686 and Applied Psychology 686 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 687 3 units; (3-0)**Developmental Psychopathology**

An examination of the history of psychopathology and abnormal psychology, and the DSM-V. An empirical and theoretical scope will be used to approach childhood disorders including issues with classification, etiology, and developmental course.

Prerequisite(s): Admission to Educational Psychology graduate program or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 687 and Educational Psychology 651 will not be allowed.

Educational Psychology 688 3 units; (3-0)**Cognitive and Affective Bases of Behaviour**

A survey of cognitive development in the first two decades of life. Topics may include biological bases of cognition, perception, memory, motivation, emotion, learning, language and motor.

Prerequisite(s): Admission to Educational Psychology graduate program or consent of Graduate Programs in Education.

Educational Psychology 689 3 units; (3-0)**Cognitive Assessment**

A focus on the history, theory and practice of cognitive assessment. This course also focuses on report writing and multicultural assessment within the context of cognitive evaluation.

Prerequisite(s): Educational Psychology 653 and admission to the School and Applied Child Psychology graduate program.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 654.

Antirequisite(s): Credit for Educational Psychology 689 and either Educational Psychology 665 or 657 will not be allowed.

Educational Psychology 690 3 units; (3-0)**School-based Intervention and Consultation**

An exploration of school systems, evidence-based interventions, and theories of consultation.

Prerequisite(s): Admission to the School and Applied Child Psychology graduate program.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 696.

Antirequisite(s): Credit for Educational Psychology 690 and either Educational Psychology 658 or 683 will not be allowed.

Educational Psychology 691 1.5 units; (3/2S-0)**Graduate Seminar: Selected Topics**

Applied course in program planning, design, and evaluation for counselling contexts.

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 691 and Applied Psychology 691 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 692 6 units; (3S-0)**Graduate Seminar: Selected Topics**

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 692 and Applied Psychology 692 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 693 3 units; (3S-0)**Graduate Seminar: Selected Topics**

Prerequisite(s): Admission to a graduate program in Educational Psychology or Educational Research.

Antirequisite(s): Credit for Educational Psychology 693 and Applied Psychology 693 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 694 6 units; (1S-3)**Graduate Practicum: Selected Topics**

Prerequisite(s): Admission to a graduate program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 694 and Applied Psychology 694 will not be allowed.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 695 3 units; (1S-3)**Graduate Practicum: Selected Topics**

Supervised counselling field experience.

Prerequisite(s): Admission to a graduate program in Educational Psychology with specialization in Counselling Psychology.

Antirequisite(s): Credit for Educational Psychology 695 and Applied Psychology 695 will not be allowed.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 696 3 units; (3-0)**Social, Emotional, and Behavioural Assessment and Intervention**

A focus on the assessment and intervention of children and youth who exhibit significant social, emotional, and behavioural needs in school and community settings.

Prerequisite(s): Admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

Antirequisite(s): Credit for Educational Psychology 696 and any of Educational Psychology 660, 669 or 674 will not be allowed.

Educational Psychology 697 3 units; (1-14)**Practicum in Academic and Cognitive Assessment**

With a focus on academic and cognitive functioning, this practicum provides supervised experience to develop competencies aligned with the practice of school psychology including consultation, assessment, and intervention.

Prerequisite(s): Educational Psychology 689 and admission to a graduate program in Educational Psychology with specialization in School and Applied Child Psychology.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 652.

Antirequisite(s): Credit for Educational Psychology 697 and 662 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 698 6 units

Pre-Master's Internship in School and Applied Child Psychology

Within this 1200 hour full-time internship, Masters level interns will have opportunities to demonstrate under supervision their ability to apply their knowledge to develop specific skills needed for effective school psychological service delivery and integrate competencies that address various domains of professional preparation and practice in school psychology.

Prerequisite(s): Admission to the MEd program with specialization in School and Applied Psychology and consent of the Training Director.

Antirequisite(s): Credit for Educational Psychology 698 and Applied Psychology 698 will not be allowed.

Note: All MEd coursework must be completed before starting the internship.

NOT INCLUDED IN GPA

Educational Psychology 701 3 units; (3-0)

Advanced Research Design, Psychometrics and Statistics in Applied Psychology

Provides intensive exposure to sophisticated quantitative techniques relevant to research design, psychometrics, and statistics such as structural equation modelling (SEM), item-response theory (IRT), and hierarchical linear modelling (HLM).

Prerequisite(s): Educational Psychology 618 and admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 701 and Applied Psychology 701 will not be allowed.

Educational Psychology 702 3 units; (3-0)

Advanced Theories in Measurement

This advanced seminar course focuses on a variety of topics and issues related to measurement in the social, educational, and behavioural sciences. As we progress through the course, we will cover topics critical to measurement; including principles of scale development (e.g., item writing, scaling), and validity theory (e.g., construct representation and validation). This course is strongly recommended for anyone planning to pursue applied, clinical, or research studies/careers involving the use of tests and/or measures.

Prerequisite(s): Educational Psychology 618 and admission to a doctoral program in Educational Psychology.

MAY BE REPEATED FOR CREDIT

Educational Psychology 703 3 units; (3-0)

Advanced Seminar in Applied Psychology

Doctoral seminar on issues in applied psychology. Dissertation development.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 703 and Applied Psychology 703 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 704 3 units; (3/2S-0)

Advanced Research Seminar in Counselling Psychology

Seminar in counselling psychology research.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Educational Psychology 705 3 units; (3-0)

Advanced Seminar in Special Education I

Advanced study of theoretical, empirical, and practical issues affecting individuals with exceptional learning needs.

Prerequisite(s): Educational Psychology 661 and admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 705 and Applied Psychology 705 will not be allowed.

Educational Psychology 708 3 units; (3-0)

Advanced Theories of Measurement

Focuses on a variety of topics and issues related to test and scale construction in psychology and education.

Prerequisite(s): Admission to a doctoral program in Educational Psychology or the consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 708 and 702.02 will not be allowed.

Educational Psychology 709 3 units; (3-0)

Advanced Seminar in Applied Learning and Developmental Psychology I

Advanced study of theory and practice in human development and learning.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 709 and Applied Psychology 709 will not be allowed.

Educational Psychology 710 3 units; (3-0)

Latent Factor Modelling

Advanced seminar on latent factor modelling.

Prerequisite(s): Admission to a graduate program in Educational Psychology or the consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Psychology 710 and 702.01 will not be allowed.

Educational Psychology 711 3 units; (3/2-0)

Program Development and Evaluation

Applied course in program planning, design, and evaluation for counselling contexts.

Prerequisite(s): Admission to a doctoral program in Educational Psychology or the consent of Graduate Programs in Education.

Educational Psychology 731 3 units; (3-0)

Advanced Clinical Supervision in Applied Psychology

Provides students with formal training in clinical supervision with the intent of raising an awareness of supervision models, as well as a conceptual framework and vocabulary for thinking through their supervision practice.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 731 and Applied Psychology 731 will not be allowed.

Educational Psychology 732 3 units; (3-0)

Advanced Seminar in School and Applied Child Psychology

Seminar series that links theory and research with practice in the school psychology domains of professional competence.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 732 and Applied Psychology 732 will not be allowed.

Educational Psychology 741 3 units; (3-2)

Advanced Professional Skills and Issues

Focuses on providing knowledge and developing skills in the areas of consultation, supervision, and program development and evaluation across the lifespan.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 741 and Applied Psychology 741 will not be allowed.

Educational Psychology 742 6 units; (2-7)

Advanced Practicum in Counselling

Advanced practicum in counselling psychology, and related seminars.

Prerequisite(s): Admission to a doctoral program in Educational Psychology with specialization in Counselling Psychology.

Antirequisite(s): Credit for Educational Psychology 742 and Applied Psychology 742 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 743 6 units; (3-14)

Advanced Practicum in Psychological Assessment

Advanced applied training in psychological assessment, including assessment of human personhood and standardized assessment. Students will participate in field experience under the supervision of registered psychologists.

Prerequisite(s): Educational Psychology 615 and Educational Psychology 682 or 617, and admission to a doctoral program in Educational Psychology with specialization in Counselling Psychology.

NOT INCLUDED IN GPA

Educational Psychology 760 3 units; (3-0)

Evidenced-Based Consultation for Intervention

Develops advanced problem-solving consultation skills as an indirect service delivery model.

Through role play and consultative work in clinic and/or school settings, students gain hands-on experience in problem identification, problem analysis, plan development/implementation, and plan evaluation/recycling.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Educational Psychology 761 3 units; (2-15)

Advanced Doctoral Practicum in Clinical Assessment and Supervision

Provides opportunities to apply and develop clinical knowledge and skill as well as best-practice approaches to supervision.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 762 3 units; (3-0)**Advanced Neuropsychological Assessment and Intervention**

Builds advanced understanding of neuropsychological approaches to assessment and intervention and the use of the cognitive hypothesis testing model to formulate and test hypotheses.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Educational Psychology 763 3 units; (3-2)**School- and Clinical-based Interventions**

Introduces behavioural, social, emotional, and counselling interventions with a particular focus on their application to school and clinical settings for use with children and adolescents.

Prerequisite(s): Educational Psychology 685 and admission to a doctoral program in Educational Psychology.

Educational Psychology 764 3 units; (3-2)**Advanced Research Statistics**

Provides instruction in advanced statistical methods. Topics include, but are not limited to, multilevel/growth curve modelling, structural equation modelling, and topics related to the measurement of growth and change and the use of advanced statistical software.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Educational Psychology 766 3 units; (2-15)**School-Based Practicum**

This advanced practicum will provide students with specialized assessment, intervention, analysis, and strategies in school settings under the supervision of registered school psychologists.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

NOT INCLUDED IN GPA

Educational Psychology 788 6 units**Pre-Doctoral Internship in Counselling Psychology**

The internship is a full-time commitment over the course of one calendar year or half-time over the course of two consecutive calendar years. The full-time and half-time experiences each provide, at a minimum, 1,600 hours of supervised experience in an approved clinical setting. Practical application of theories and interventions pertaining to individual and group, couple, or family counselling as well as assessment, consultation, and supervision. Experience in addressing a variety of professional issues.

Prerequisite(s): Admission to the doctoral program in Educational Psychology with specialization in Counselling Psychology and consent of the Training Director.

Antirequisite(s): Credit for Educational Psychology 788 and Applied Psychology 788 will not be allowed.

NOT INCLUDED IN GPA

Educational Psychology 792 6 units; (3-0)**Advanced Seminar: Selected Topics**

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 792 and Applied Psychology 792 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 793 3 units; (3S-0)**Graduate Seminar: Selected Topics**

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 793 and Applied Psychology 793 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 794 6 units; (1S-3)**Advanced Practicum: Selected Topics**

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 794 and Applied Psychology 794 will not be allowed.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 795 3 units; (1S-3)**Advanced Practicum: Selected Topics**

Supervised counselling and school and applied child psychology field experience intended to enhance the professional practice skills of students.

Prerequisite(s): Admission to a doctoral program in Educational Psychology.

Antirequisite(s): Credit for Educational Psychology 795 and Applied Psychology 795 will not be allowed.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 798 6 units**Pre-Doctoral Internship in School and Applied Child Psychology**

The internship is a full-time commitment over the course of one calendar year or half-time over the course of two consecutive calendar years. The full-time and half-time experiences each provide, at a minimum, 1,600 hours of supervised experience involving the theory and practice of evaluations, consultation, interventions, research, and related activities within an approved school, clinic, or other human service agency.

Prerequisite(s): Admission to the doctoral program in Educational Research with specialization in School and Applied Child Psychology and consent of the Training Director.

Antirequisite(s): Credit for Educational Psychology 798 and Applied Psychology 798 will not be allowed.

NOT INCLUDED IN GPA

Educational Research EDER

For more information about these courses, contact Graduate Programs in Education werklund.ucalgary.ca/gpe.

Graduate Courses**Educational Research 600** 3 units; (3-0)**Research Methodology in Education**

Examines the foundations of different research methodologies.

Prerequisite(s): Admission to a graduate program in Educational Research, or the consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 600 and 603.21 will not be allowed.

Educational Research 602 3 units; (3-0)**Program and Practice Evaluation**

Introduction to evaluation as a discipline, as a profession, as a process, and as a product in a wide range of educational and social contexts.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 602 and 603.24 will not be allowed.

Educational Research 603 3 units; (3-0)**Research Methods**

Introduction to various approaches to research in education.

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 604 3 units; (3-0)**Collaboratory of Practice**

Focus is on disciplined inquiry on a research problem and/or action research in an educational context. Research is carried out along with a systematic analysis, synthesis of collected information and findings are reported.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 604 and 692 will not be allowed.

Educational Research 606 3 units; (3-0)**Writing Educational Research**

Introduction to forms and structures of academic writing and knowledge mobilization. Focus is on the exploration of various approaches to sharing research findings according to discipline standards.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 606 and 603.23 will not be allowed.

Educational Research 608 3 units; (3-0)**Research Methods in Education**

Examines methods, issues of design, and ethical considerations in educational research.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 608 and 603.26 will not be allowed.

Educational Research 610 3 units; (3-0)**Case Study Research in Education**

Exploration of case study as an approach, methodology, and design related to research in education.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 610 and 603.08 will not be allowed.

Educational Research 612 **3 units; (3-0)**

Participatory Methodology in Education

An examination of participatory approaches to inquiry that is oriented toward meaningful, impactful, and sustainable action in educational contexts.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 612 and 603.27 will not be allowed.

Educational Research 613 **3 units; (3-0)**

Change and Innovation in Education

Examines both traditional and contemporary research literature relevant to change and innovation in educational settings.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 614 **3 units; (3-0)**

Action Research in Education

Introduction to the intellectual and moral traditions, ideas, and approaches to action research. Knowledge and skills related to the design, implementation, critical reflection, and evaluation of action research are developed.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 614 and 603.25 will not be allowed.

Educational Research 616 **3 units; (3-0)**

Design-Based Research Methods in Education

Introduction to the emergence and application of design-based research in education. Explores complexity (systems) theory in addition to key principles and practices.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 616 and 603.06 will not be allowed.

Educational Research 617 **3 units; (3-0)**

Organizational Theory and Analysis in Education

Human organization as the setting for the delivery of educational services.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 618 **3 units; (3-0)**

Research Design and Statistics I

Introduction to descriptive and inferential univariate statistics, sampling distributions, hypothesis testing, and a variety of statistical techniques used in experimental and correlational methods of research in education and related social sciences.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 618 and 603.05 will not be allowed.

Educational Research 619 **3 units; (3-0)**

Special Topics in Educational Leadership

Attends to the contemporary and timely debates that shape educational leadership at local, national and international levels. Topics are reflective of

the pressing and current issues in educational leadership.

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 620 **3 units; (3-0)**

Introduction to Interpretive Inquiry

Introduction to interpretive approaches to qualitative inquiry such as phenomenology, hermeneutics, narrative inquiry, and interpretive forms of case study.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 620 and 603.01 will not be allowed.

Educational Research 621 **3 units; (3-0)**

Assessment of Classroom Learning

Examines both traditional and emerging assessment techniques, including Performance Assessment and Learning Portfolios, for examining students' learning outcomes.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 623 **3 units; (3-0)**

Topics in Educational Technology

Topics and issues in educational technology.

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 624 **3 units; (3-0)**

Introduction to Phenomenology and Hermeneutics

Advanced study of critical interpretive research methods, featuring phenomenology and hermeneutics as approaches to understanding and exploring engagement within educational research.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 624 and 603.28 will not be allowed.

Educational Research 625 **3 units; (3-0)**

Teacher Evaluation

Examines the techniques for assessing teacher performance.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 626 **3 units; (3-0)**

Ethnographic Research Approaches in Education

Introduction to ethnographic approaches to research in educational contexts. Explore historical, conceptual, theoretical, practical and ideological issues.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 626 and 603.29 will not be allowed.

Educational Research 628 **3 units; (3-0)**

Indigenous Methodologies in Education

Introduction to key theoretical concepts, issues and methodologies based on Indigenous ways of

knowing, being, and doing within the context of educational research.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 628 and 603.30 will not be allowed.

Educational Research 629 **3 units; (3-0)**

Special Topics in Assessment/Evaluation

Examination of assessment and evaluation theories and practices.

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 630 **3 units; (3-0)**

Indigenous Research Methods in Education

An exploration of Indigenous research methods and related issues of design, and ethical considerations in conducting research.

Prerequisite(s): Admission to a graduate program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 630 and 603.31 will not be allowed.

Educational Research 631 **3 units; (3-0)**

Special Topics in Adult Learning

Examines topics in adult learning.

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 635 **3 units; (3-0)**

Topics in Adult Learning

Explores a variety of current topics and discourses pertaining to adult education and adult learning.

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 641 **3 units; (3-0)**

Research on the Reading Process

Examination of various theories about the teaching and learning of reading in the elementary school.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 649 **3 units; (3-0)**

Special Topics in English Language Education

Explores a variety of theoretical perspectives and discourses in English Language Education.

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 651 **3 units; (3-0)**

Philosophy of Education

Philosophical topics in the context of education.

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 653 **3 units; (3-0)**

Sociology of Education

Sociological topics in the context of education.

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 655 **3 units; (3-0)**

Comparative Education

Topics in comparative education.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 657 **3 units; (3-0)**

Culture and Gender Studies

Culture and gender topics in the context of education.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 659 **3 units; (3-0)**

History of Education

Historical topics in the context of education.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 664 **3 units; (3-0)**

Language and Literacy: Theory and Research

Introduction to the principles of language learning from cognitive, sociocultural, and critical perspectives.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 667 **3 units; (3-0)**

Second Language Reading and Writing

Research and practice in second language reading and writing.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 668 **3 units; (3-0)**

Theory and Research in Languages and Diversity

Topics include the acquisition, use, learning and teaching of language(s) and literacy in a variety of settings.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 669 **3 units; (3-0)**

Aspects of Second Language and Culture

Introduction to research and issues on various aspects of second language and culture.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 671 **3 units; (3-0)**

Conceptualizing Educational Technology

Seminar to familiarize students with the terrain of educational technology.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 673 **3 units; (3-0)**

Instructional Design

Integration of theory and practice associated with the selection and sequencing of content across the instructional spectrum and the matching of instruc-

tional strategies to characteristics of learners and content.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 675 **3 units; (3-0)**

Principles of Instructional Development

Topics include the examination of a variety of instructional development models, the systems approach to developing instruction, front-end analysis and needs assessment, risk analysis, constraint analysis, resource analysis, task analysis, and evaluation.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 677 **3 units; (3-0)**

Distributed Learning

Examination of distributed teaching and learning processes in educational systems with attention to computer mediated teaching and communication and integrated instructional design methodologies.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 678 **3 units; (3-0)**

Special Topics in Learning Sciences

Examination of current topics and issues in learning sciences and related areas.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 679 **3 units; (3-0)**

Special Topics in Educational Technology

Examination of current topics and issues in educational technology and related areas.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 681 **3 units; (3-0)**

Studying Curriculum

Curriculum research, theory, and practice with particular reference to curriculum aims, content, organization and change.

Prerequisite(s): Admission to a graduate program in Educational Research.**Antirequisite(s):** Credit for Educational Research 681 and any of 665, 669.27 or 699.42 will not be allowed.

Educational Research 682 **3 units; (3-0)**

Conceptualizing Interpretive Inquiry

In-depth study of the various approaches to conducting interpretive studies in curriculum, teaching, and learning.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 683 **3 units; (3-0)**

Curriculum Development, Implementation and Assessment

Making sense of what happens when curriculum policy becomes reality and affects students, teachers, parents and politicians.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 684 **3 units; (3-0)**

Contemporary Themes in Critical Pedagogy and Social Justice

Explores the relationship between structural inequalities, education and curriculum theory.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 685 **3 units; (3-0)**

Interpretive Curriculum Discourses

The field of interpretive work in curriculum theory.

Prerequisite(s): Admission to a graduate program in Educational Research.

Educational Research 687 **3 units; (3-0)**

Interpretive Study of Curriculum I

Introduction to the study of curriculum, theory and practice with an emphasis on lived experience at the Master's level.

Prerequisite(s): Admission to a graduate program in Educational Research.**Antirequisite(s):** Credit for Educational Research 687 and either 681 or 683 are not allowed.

Educational Research 688 **3 units; (3-0)**

Interpretive Study of Curriculum II

In-depth study of the historical movements and philosophical contexts of contemporary curriculum theorizing and practice at the Master's level.

Prerequisite(s): Admission to a graduate program in Educational Research.**Antirequisite(s):** Credit for Educational Research 688 and 685 is not allowed.

Educational Research 689 **3 units; (3-0)**

Aspects of School Curriculum

Introductory systematic study of research and issues focused on various areas of the school curriculum.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 692 **3 units; (3-0)**

Collaboratory of Practice

An examination of real world problems and practices through reviewing the theoretical and research literature linking these to an analytical framework.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 693 **3 units; (3-0)**

Interpretive Study of Curriculum

Introduction to the various forms of educational inquiry.

Prerequisite(s): Admission to a graduate program in Educational Research.**MAY BE REPEATED FOR CREDIT**

Educational Research 696 **3 units; (3-2)**

Special Topics in Education

Topics designed to prepare foreign-prepared teachers to meet Alberta Education teacher certification requirements.

Prerequisite(s): Admission to the Bridge to Teaching program or consent of the program.

Antirequisite(s): Credit for Educational Research 696 and any of Education Bridge to Teaching 601, 602, 603, 604, 605 or 606 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Research 697 **1.5 units; (1.5-0)**

Special Topics

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 698 **6 units; (3-0)**

Special Topics

Prerequisite(s): Admission to a graduate program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 700 **6 units; (3-0)**

Seminar for First-Year Doctoral Students

An examination of assumptions underpinning a range of educational traditions and their relationships to educational research. An interdisciplinary forum to investigate, debate, and develop knowledge of the major historical, epistemological, theoretical and pedagogical trends in formal education within and beyond the modern era.

Prerequisite(s): Admission to a doctoral program in Educational Research.

NOT INCLUDED IN GPA

Educational Research 701 **3 units; (3-0)**

Advanced Research Methodologies

Advanced study in the conduct of research.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 703 **3 units; (3-0)**

Directed Study

Individual doctoral study in a selected area.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 705 **3 units; (3-0)**

Doctoral Seminar in Educational Leadership

Provides doctoral students with a contemporary Canadian focus on significant issues in educational leadership.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 707 **3 units; (3-0)**

Collaboratory of Practice I

Critically review and apply the tenets of a literature review to inform proposed doctoral research.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 708 **3 units; (3-0)**

Collaboratory of Practice II

Critically review and apply the tenets of various research methodologies and design to inform proposed doctoral research.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 709 **3 units; (3-0)**

Dissertation Seminar I

Ongoing engagement in doctoral research activities, post-candidacy, as appropriate to the research timelines, research design and methodology, and requirements for writing and defending the dissertation.

Prerequisite(s): Admission to a doctoral program in Educational Research.

NOT INCLUDED IN GPA

Educational Research 710 **3 units; (3-0)**

Dissertation Seminar II

Ongoing engagement in doctoral research activities, post-candidacy, as appropriate to the research timelines, research design and methodology, and requirements for writing and defending the dissertation.

Prerequisite(s): Admission to a doctoral program in Educational Research.

NOT INCLUDED IN GPA

Educational Research 713 **3 units; (3-0)**

Participatory Research Methods

Advanced study of educational research methodologies broadly defined as 'participatory'. An exploration of impactful, sustainable research approaches intended to support the involvement of interested and affected agents and agencies.

Prerequisite(s): Admission to a doctoral program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 713 and either 701.06 or 701.09 will not be allowed.

Educational Research 714 **3 units; (3-0)**

Action Research Methods

Advanced study of the traditions, ideas, and variety of approaches to action research. An examination of the design, implementation, critical reflection, and evaluation of action research.

Prerequisite(s): Admission to a doctoral program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 714 and 701.08 will not be allowed.

Educational Research 716 **3 units; (3-0)**

Design-Based Research

Advanced study of the emergence and application of design-based research in education. An exploration of complexity (systems) theory, key principles and practices in design based research: analysis, exploration, design, implementation, evaluation, reflection, and applications within education.

Prerequisite(s): Admission to a doctoral program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 716 and 701.07 will not be allowed.

Educational Research 718 **3 units; (3-0)**

Research Design and Statistics II

Advanced study of quantitative approaches to data collection and statistical analysis in experimental

and correlational methods of research in education and related social sciences.

Prerequisite(s): Admission to a doctoral program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 718 and 701.11 will not be allowed.

Educational Research 719 **3 units; (3-0)**

Advanced Special Topics in Educational Leadership

Provides doctoral students with advanced exploration of diverse, contemporary topics in k-12 and post-secondary learning organizations.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 720 **3 units; (3-0)**

Advanced Approaches to Interpretive Inquiry

Advanced study of an array of interpretive approaches to qualitative inquiry such as phenomenology, hermeneutics, narrative inquiry, and interpretive forms of case study.

Prerequisite(s): Admission to a doctoral program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 720 and 701.10 will not be allowed.

Educational Research 724 **3 units; (3-0)**

Advanced Approaches to Phenomenology and Hermeneutics

Advanced study of critical interpretive research methods, featuring phenomenology and hermeneutics as approaches to understanding and exploring engagement within educational research.

Prerequisite(s): Admission to a doctoral program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 724 and 701.13 will not be allowed.

Educational Research 726 **3 units; (3-0)**

Ethnographic Research Approaches in Education

Advanced study and consideration of the historical, conceptual, theoretical, practical and ideological issues in ethnographic approaches to research in education.

Prerequisite(s): Admission to a doctoral program in Educational Research or consent of Graduate Programs in Education.

Antirequisite(s): Credit for Educational Research 726 and 701.12 will not be allowed.

Educational Research 733 **3 units; (3-0)**

Advanced Workplace and Adult Learning

Advanced exploration of diverse topics in adult learning.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 735 **3 units; (3-0)**

Advanced Topics in Adult Learning

Provides a deeper understanding of foundational topics and discourses that inform the field of adult learning, scholarship, and practice.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 741 3 units; (3-0)**Advanced Seminar in Theory and Research in Literacy Education**

A critical examination of theories, models, and research that underpin literacy education.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 762 3 units; (3-0)**Theory and Research in Leading Language and Literacy**

An examination of leadership in language and literacy, assessment and evaluation, language and identity, multiliteracies, digital literacy, and Indigenous literacies.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 764 3 units; (3-0)**Advanced Language and Literacy: Theory and Research**

An examination of the principles of language learning from cognitive, sociocultural, and critical perspectives.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 768 3 units; (3-0)**Theory and Research in Languages and Diversity**

Topics include current issues in language and literacy, assessment and evaluation, language and identity, multiliteracies, digital literacy, and Indigenous literacies.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 770 3 units; (3S-0)**Historical and Philosophical Foundations in Learning Sciences**

An examination of theories, designs, and practices in learning sciences.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 771 3 units; (3S-0)**Doctoral Seminar in Educational Technology**

An examination of the historical and philosophical foundations of the field that informs the critical analysis of current and emerging research in educational technology.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 772 3 units; (3S-0)**Advanced Seminar in Design**

An introduction to various perspectives on designing formal and informal learning environments in technological and non-technological settings, including exploration of research approaches and methodologies.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 773 3 units; (3S-0)**Advanced Seminar in Design and Development of Learning**

An exploration of advances and trends in learning and instructional design and development theory and evaluation.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 774 3 units; (3S-0)**Leadership, Learning, and Systemic Change**

An exploration of systemic and organizational change and innovation theories in relation to leading teaching and learning in agile and changing educational systems and networks.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 775 3 units; (3S-0)**Advanced Seminar in Technology Enabled Learning Environments**

An evaluation of contemporary distributed, blended and collaborative learning environments through design, development and inclusive learning perspectives.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 777 3 units; (3S-0)**Advanced Seminar in Leading Systemic Change**

An examination of systemic change theory, network/systems theory, diffusion of innovations and change theories, complex adaptive leadership, and transformed leadership.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 778 3 units; (3-0)**Advanced Learning Sciences**

Advanced concepts in learning sciences.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 779 3 units; (3-0)**Advanced Educational Technology**

Advanced concepts in educational technology.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 780 3 units; (3-0)**Interpretive Study of Curriculum III**

In-depth study of the various approaches to conducting interpretive studies in curriculum, teaching and learning at the doctoral level.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 781 3 units; (3-0)**Conceptualizing Curriculum Research**

Analysis of different approaches to curriculum research, especially assumptions, meaning frameworks, and views of the theory/practice relationship.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 783 3 units; (3-0)**Advanced Topics in Curriculum and Learning**

Advanced study of topics in curriculum and learning at the doctoral level.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 784 3 units; (3-0)**Doctoral Seminar on Perspectives of Learning**

Study of particular aspects of Learning Theory at the doctoral level.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 785 3 units; (3-0)**Advanced Study of Interpretive Curriculum Discourses**

An advanced study of interpretive curriculum discourses focusing on cutting-edge examples of such work.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 786 3 units; (3-0)**Doctoral Seminar in Interpretive Curriculum Discourses**

Study of particular aspects of Interpretive Curriculum Discourses at the doctoral level.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Educational Research 787 3 units; (3-0)**Contemporary Themes in Critical Pedagogy and Social Justice**

Explores the relationship between structural inequalities, education and curriculum theory.

Prerequisite(s): Admission to a doctoral program in Educational Research.

Educational Research 798 6 units; (3-0)**Advanced Special Topics**

Provides doctoral students with advanced exploration and study of emerging topics in education.

Prerequisite(s): Admission to a doctoral program in Educational Research.

MAY BE REPEATED FOR CREDIT

Electrical Engineering ENEL

For more information about these courses, see the Department of Electrical and Computer Engineering: <https://schulich.ualgary.ca/electrical-computer>.

Electrical Engineering 101 1.5 units; (16 hours)**Computing Tools I**

Introduction to computing tools in Electrical engineering. Basic data input/output and arithmetic operations; matrix variables; interpreted programming scripts and data management; plotting; functions. Applications in numerical methods and analysis.

Prerequisite(s): Engineering 233.

NOT INCLUDED IN GPA

Electrical Engineering 102 1.5 units; (16 hours)

Computing Tools II

Methods for solving electrical engineering problems using computing tools for the solution of: multivariable linear and non-linear equations; polynomial curve-fitting; single and multi-variable integration; function optimization; differential equations. Graphical data representation.

Prerequisite(s): Electrical Engineering 101 and Applied Mathematics 307 or Mathematics 375.

NOT INCLUDED IN GPA

Senior Courses

Electrical Engineering 300 3 units; (2-3)

Electrical and Computer Engineering Professional Skills

Introduction to the electrical and computer engineering profession, fundamentals of electrical and computer engineering design, testing, and product development; critical thinking and problem solving skills development; electrical engineering standards, regulatory issues, intellectual property protection, research methods, project management, identifying market needs and commercialization considerations. Case studies and projects may be drawn from a range of electrical and computer engineering areas.

Prerequisite(s): Engineering 225, 233 and Electrical Engineering 353.

Electrical Engineering 327 3 units; (3-1.5T)

Signals and Transforms

Continuous-time systems. Impulse response and convolution. Fourier series and Fourier transform. Basics of discrete time signals. Sampling theory. Discrete convolution. Difference equations and the Z-transform. Discrete-time Fourier representations.

Prerequisite(s): Mathematics 375 or Applied Mathematics 307.

Electrical Engineering 343 3 units; (3-1T-3/2)

Circuits II

Laplace transform methods for circuit analysis. Transfer functions and series and parallel resonance. Basic filter theory and Bode diagrams. Natural, step, and transient responses of RL, RC, and RLC circuits. Two-port circuits. Two-port circuit parameters: admittance, impedance and hybrid parameters.

Prerequisite(s): Mathematics 375 or Applied Mathematics 307 and Engineering 225.

Corequisite(s): Electrical Engineering 327.

Electrical Engineering 353 3 units; (3-1T-3/2)

Digital Circuits

Number systems and simple codes. Combinational logic: Boolean algebra, truth tables, minterms, maxterms, Karnaugh maps; gates, buffers, multiplexers and decoders; combinational circuit timing. Sequential circuits: latches and D flip flops; timing considerations; analysis and synthesis techniques; Mealy and Moore machine models; counters and registers. Introduction to memory arrays.

Prerequisite(s): Admission to Electrical Engineering or Software Engineering, or Computer Science 233 and Mathematics 271.

Antirequisite(s): Credit for Electrical Engineering 353 and Computer Science 321 will not be allowed.

Electrical Engineering 361 3 units; (3-1T-3/2)

Electronic Devices and Materials

Properties of atoms in materials, classical free electron model, conduction electrons in materials,

and band electrons. Properties of semiconductors and insulators; Doping and PN Junctions, Diodes, rectifier and clamping circuits, BJTs, MOSFETs.

Prerequisite(s): Engineering 225 and Mathematics 277 or Applied Mathematics 219.

Electrical Engineering 400 3 units; (1-3)

Electrical Engineering Design and Technical Communications

Fundamentals of electrical and computer engineering design, testing, and product development; critical thinking and problem solving skills development; regulatory issues, project management, teamwork and leadership. Effective and efficient writing will be emphasized. Case studies and projects may be drawn from a range of electrical and computer engineering areas.

Prerequisite(s): Electrical Engineering 300, 327 and 343.

Electrical Engineering 419 3 units; (3-1.5T)

Probability and Random Variables

Expressing engineering data and systems in terms of probability, introduction to probability theory, discrete and continuous random variables, functions of random variables, goodness-of-fit testing hypothesis testing and stochastic processes. Applications chosen from electrical engineering.

Prerequisite(s): Electrical Engineering 327.

Antirequisite(s): Credit for Electrical Engineering 419 and either Engineering 319 or Biomedical Engineering 319 will not be allowed.

Electrical Engineering 441 3 units; (3-1T-3/2)

Control Systems I

Component modelling and block diagram representation of feedback control systems. Mathematical modelling of dynamic systems; state-space representation and frequency domain representation of dynamic systems. Transient response analysis and steady-state error analysis. Root-locus analysis and design. Frequency response analysis with Bode and Nyquist stability criterion. Compensation design techniques. Introduction to multi sensor state feedback compensator design. Overview of digital control systems and industrial controllers.

Prerequisite(s): Electrical Engineering 327 and 343.

Electrical Engineering 453 3 units; (3-3/2)

Digital Systems Design

Design, implementation and testing of a digital system. Mask programmable and field programmable technology. Logic design for integrated systems. Design for testability. Real versus ideal logic design. CAD tools for digital systems design: simulation, synthesis and fabrication.

Prerequisite(s): Electrical Engineering 353 and Engineering 225.

Electrical Engineering 469 3 units; (3-1T-3/2)

Analog Electronic Circuits

BJT biasing, load-line analysis, BJT as amplifier and switch, small-signal model, single-stage and two-stage small-signal BJT amplifiers, current sources and current steering, differential pair and multistage BJT amplifiers, BJT power amplifiers, operational amplifier circuits.

Prerequisite(s): Electrical Engineering 361.

Electrical Engineering 471 3 units; (3-1T-3/2)

Introduction to Communications Systems and Networks

Introduction to communications systems and networks. Analog communications concepts including filtering and analog modulation. Sampling and digital communications concepts including binary baseband/passband modulation, matched filtering and detection. Telecommunications and data network fundamentals including network protocol architectures, design and performance.

Prerequisite(s): Electrical Engineering 327.

Electrical Engineering 475 3 units; (3-2T)

Electromagnetic Fields and Applications

Electrostatic and magnetostatic fields and applications; applications of vector calculus for electromagnetics; introduction to Maxwell's equations for time-varying fields; plane wave propagation.

Prerequisite(s): Physics 259 and Mathematics 375 or Applied Mathematics 307.

Electrical Engineering 476 3 units; (3-1T-3/2)

Electromagnetic Waves and Applications

Plane wave propagation, reflection, and refraction; transmission line theory and applications; introduction to scattering parameters, matching networks, Smith charts; propagation in waveguides; cavities and resonant modes; advanced topics.

Prerequisite(s): Electrical Engineering 475.

Electrical Engineering 487 3 units; (3-1T-3/2)

Electrical Engineering Energy Systems

Fundamental of energy resources and electric power generation, transmission and distribution; steady-state models for generators, load, transformers, and transmission lines; three phase systems, per unit representation; transmission line parameters; power flow analysis.

Prerequisite(s): Engineering 225.

Electrical Engineering 500 6 units; (1-3)

Computer, Electrical, and Software Engineering Team Design

Preliminary and detailed engineering design and implementation of an engineering system that applies engineering knowledge to solving a real-life problem. The emphasis is on the design process as it is associated with electrical, computer and software engineering, design methodology, general design principles for engineers, teamwork and project management.

Prerequisite(s): Fourth-year standing or above.

Antirequisite(s): Credit for Electrical Engineering 500 and either 583 or 589 will not be allowed.

Electrical Engineering 503 3 units; (3-2)

Computer Vision

Introduction to the fundamentals of image processing and computer vision. Image/video acquisition and raw data matrix manipulation; image processing operations and compression methods; object detection, isolation, and classification; 3D tracking and ego-motion with projective transformations.

Prerequisite(s): Electrical Engineering 327 and Computer Engineering 335 or 339 or Software Engineering for Engineers 337.

Electrical Engineering 514 3 units; (3-1T)

Introduction to Nanotechnology

Introduction to nanotechnology, limits of smallness, quantum nature of the nanoscaled

materials, Nanotechnology device fabrication and characterization techniques, Nanotechnology applications, Nanotechnology safety.

Prerequisite(s): Electrical Engineering 361.

Electrical Engineering 519 3 units; (3-2) or (3-0)

Special Topics in Electrical Engineering

Current topics in electrical engineering.

Prerequisite(s): Consent of the Department.

Note: Consult Department for announcement of topics.

MAY BE REPEATED FOR CREDIT

Electrical Engineering 525 3 units; (3-2)

Machine Learning for Engineers

Neural networks: neuron models and network architectures, perceptrons, Widrow-Hoff learning and backpropagation algorithm, associative memory, Hebbian learning, pseudo-inverse learning. Fuzzy systems: basic operations and properties of fuzzy sets; fuzzy rule generation and defuzzification of fuzzy logic; fuzzy neural networks. Applications such as pattern recognition, character recognition, stock market prediction, and control.

Prerequisite(s): Electrical Engineering 327.

Electrical Engineering 529 3 units; (3-1T-2)

Wireless Communications Systems

Overview of terrestrial wireless systems including system architecture and industry standards; propagation characteristics of wireless channels; modems for wireless communications; cells and cellular traffic; cellular system planning and engineering; fading mitigation techniques in wireless systems; multiple access techniques for wireless systems.

Prerequisite(s): Electrical Engineering 471 and one of Engineering 319 or Electrical Engineering 419.

Electrical Engineering 541 3 units; (3-1T-3/2)

Control Systems II

Introduction to sampled-data control systems, discretization of analog systems, discrete-time signals and systems, causality, time-invariance, z-transforms, stability, asymptotic tracking, state-space models, controllability and observability, pole assignment, deadbeat control, state observers, observer-based control design, optimal control.

Prerequisite(s): Electrical Engineering 441.

Electrical Engineering 559 3 units; (3-2/2)

Analog Filter Design

This class deals with the theory and design of active filters, for audio-frequency applications, using op amps. It consists, basically, of two phases. Phase 1 deals with the realization of a given transfer function using cascade of first and/or second-order RC-op amps circuits. In phase II, the transfer functions of filters are studied in combination with frequency-response approximations such as Butterworth, Chebyshev, Inverse-Chebyshev, Cauer (or Elliptic) and Bessel-Thompson.

Prerequisite(s): Electrical Engineering 469 and 471.

Electrical Engineering 562 3 units; (3-0)

Photovoltaic Systems Engineering

Prospect of photovoltaics in Canada; solar radiation; fundamentals of solar cell; photovoltaic system design; grid connected photovoltaic systems; mechanical and environmental considerations.

Prerequisite(s): Electrical Engineering 361.

Electrical Engineering 563 3 units; (3-2)

Biomedical Signal Analysis

Introduction to the electrocardiogram, electroencephalogram, electromyogram, and other diagnostic signals. Computer techniques for processing and analysis of biomedical signals. Pattern classification and decision techniques for computer-aided diagnosis. Case studies from current applications and research.

Prerequisite(s): Electrical Engineering 327.

Electrical Engineering 565 3 units; (3-1T-2/2)

Digital Integrated Electronics

Semiconductor devices, modelling of CMOS switching, CMOS logic families, performance and comparison of logic families, interconnect, semiconductor memories, design and fabrication issues of digital IC's.

Prerequisite(s): Computer Engineering 467.

Electrical Engineering 567 3 units; (3-2/2)

CMOS Analog Circuit Design

Introduction to CMOS very large-scale integrated (VLSI) circuit design. Review of MOS transistor theory and operation. Introduction to CMOS circuits. CMOS processing, VLSI design methods and tools. CMOS subsystem and system design for linear integrated circuits.

Prerequisite(s): Electrical Engineering 469 and Computer Engineering 467.

Antirequisite(s): Credit for Electrical Engineering 567 and 519.47 will not be allowed.

Electrical Engineering 569 3 units; (3-1T-3/2)

Electronic Systems and Applications

Introduction to electronic systems; the four elements of electronic monitoring systems; system modelling; sensors; amplifiers; noise characterization; power supplies; frequency conditioning; active filters; analog to digital conversion and anti-aliasing requirements; multichannel data acquisition; real-time conditioning of signals; real-time control.

Prerequisite(s): Electrical Engineering 469.

Electrical Engineering 571 3 units; (4-1.5/2)

Digital Communications

Fundamentals of digital communication systems. Digital coding of analog waveforms; digital pulse modulation, pulse code modulation, delta modulation. Intersymbol interference; baseband transmission, correlative coding. Probability theory. Optimal demodulation of data transmission; matched filtering; bit error rate.

Prerequisite(s): Electrical Engineering 471 and one of Engineering 319 or Electrical Engineering 419.

Electrical Engineering 573 3 units; (3-1T)

Computer Networks

Overview of the network protocol stack. Reliable communications over a link; medium access; packet routing; the transport and application layers. Data and network security. Internet and telecommunications packet network architectures. Mathematical network analysis and network performance software tools.

Prerequisite(s): Engineering 319 or Electrical Engineering 419.

Antirequisite(s): Credit for Computer Science 441 and Electrical Engineering 573 will not be allowed.

Electrical Engineering 574 3 units; (3-2/2)

Microwave Engineering

Modelling and analysis of lumped and distributed RF networks, analysis and design of passive structures and impedance matching networks, S parameters, linear modelling of transistors. Power, noise and distortion calculations for communication transceivers, analysis and design of wireless radio link and satellite communication link. Theory, analysis and design of small signal amplifiers, low noise and balanced amplifiers. Prototyping using printed circuit board technology, introduction to Computer Aided Design (CAD) tools and Computer Aided Testing Equipment.

Prerequisite(s): Electrical Engineering 476.

Antirequisite(s): Credit for Electrical Engineering 574 and 519.49 will not be allowed.

Electrical Engineering 575 3 units; (3-1T-3/2)

Radio-frequency and Microwave Passive Circuits

Study and design of radio-frequency and microwave passive circuits such as filters, couplers, splitters, combiners, isolators, circulators; advanced transmission lines; antenna fundamentals; network analysis; advanced topics.

Prerequisite(s): Electrical Engineering 476.

Electrical Engineering 582 3 units; (3-1T-3/2) (formerly Electrical Engineering 489)

Modelling and Control of Electric Machines and Drives

Principles of electromechanical energy conversion. Rotating Machines (DC, Synchronous and Induction machines). Synchronous Generator voltage and power control, motor drive systems.

Prerequisite(s): Engineering 225.

Electrical Engineering 584 3 units; (3-2)

Electrical Power Systems in Commercial and Institutional Buildings

Electrical engineering design and practice applied to the building industry; Power Distribution Components, Types of power distribution systems, Uninterruptible, Emergency and Standby power systems, Bonding and Grounding, Ground Fault Protection, Light and optics, Measurement of light, lighting engineering, and quality of visual environments is discussed. Overview of basic requirements of the National and Alberta Building Code, and the Canadian Electrical Code that most impact design including rules for life safety systems and installation procedures and requirement.

Prerequisite(s): Electrical Engineering 487.

Antirequisite(s): Credit for Electrical Engineering 584 and 519.53 will not be allowed.

Electrical Engineering 585 3 units; (3-2/2)

Introduction to Power Electronics

Commutation. Diode rectifiers. Fully controlled 3-phase rectifiers. Choppers, inverters, ac controllers. Single-phase switch mode converters: dc-to-dc, ac-to-dc, dc-to-ac. Circuit and state-space averaging techniques. Switching devices and magnetics.

Prerequisite(s): Electrical Engineering 469.

Electrical Engineering 586 3 units; (3-2)

Power System Protection

Power System Protection philosophy, Short circuit calculation, Protective relaying fundamentals and design principles, Over-current relay co-ordination, Relay input sources, System Grounding, generator

protection, Transformer Protection, Transmission line protection.

Prerequisite(s): Electrical Engineering 487.

Antirequisite(s): Credit for Electrical Engineering 586 and 519.50 will not be allowed.

Electrical Engineering 587 **3 units; (3-1T-3/2)**

Power Systems Analysis

Advanced power flow studies including decoupled, fast decoupled and DC power flow analysis, distribution factors and contingency analysis, transmission system loading and performance, transient stability, voltage stability, load frequency control, voltage control of generators, economics of power generation.

Prerequisite(s): Electrical Engineering 487.

Electrical Engineering 591 **3 units; (0-6)**

Individual Engineering Design Project I

This project involves individual work on an assigned Computer, Electrical or Software Engineering design project under the supervision of a faculty member. The project will normally involve following an established design process. Engineering Communications, including written reports, logbooks and oral presentations.

Prerequisite(s): Consent of the project supervisor and course co-ordinator(s).

Electrical Engineering 592 **3 units; (0-6)**

Undergraduate Research Thesis I

A directed studies research project in an area of interest, directed by a project advisor/faculty member. Includes an independent student component covering the scientific process, ethics, review of literature, and writing scientific proposals and manuscripts. Projects may involve experimental, analytical or computer modelling studies.

Prerequisite(s): Admission to Electrical or Software Engineering and consent of the project supervisor and course co-ordinator(s).

Electrical Engineering 593 **3 units; (3-1T-2/2)**

Digital Filters

Recursive and non-recursive systems. Time-domain and frequency-domain analysis. Z-transform, bilinear transform and spectral transformations. Filter structures and non-ideal performance.

Prerequisite(s): Electrical Engineering 327.

Electrical Engineering 594 **3 units; (0-6)**

Undergraduate Research Thesis II

A directed studies research project intended for students who have completed a suitable Electrical Engineering 592 project and wish to continue the assigned project by completing a more extensive investigation. The course culminates with a written thesis and presentation. Projects may involve experimental, analytic and computer modelling studies.

Prerequisite(s): Electrical Engineering 592, admission to Electrical or Software Engineering and consent of the project supervisor and course co-ordinator(s).

Electrical Engineering 597 **3 units; (3-1T-3/2)**

Power Systems Operation and Markets

Power system operation and economic load dispatch, concept of marginal cost, Kuhn-Tucker's conditions of optimum, unit commitment, hydrothermal co-ordination, power flow analysis, optimal power flow, probabilistic production simulation, power pools and electricity markets, market design, auction models, power system

reliability, primary and secondary frequency control and AGC, steady-state and transient stability, power sector financing and investment planning.

Prerequisite(s): Electrical Engineering 487, 489 or 587.

Electrical Engineering 599 **3 units; (0-6)**

Individual Engineering Design Project II

This individual project is intended for students who have completed a suitable Electrical Engineering 591 Individual Project and wish to continue the assigned research project by completing a more extensive project. The project will normally involve following an established design process. Engineering Communications, including written reports, logbooks, and oral presentations.

Prerequisite(s): Electrical Engineering 591 and consent of the project supervisor and course co-ordinator(s).

Graduate Courses

Registration in all courses requires the approval of the Department of Electrical and Computer Engineering.

Electrical Engineering 601 **3 units; (3-0)**

Advanced Power System Analysis

Energy transfer in power systems; real and reactive power flows; VAR compensation. Power system control, interconnected operation. Power system stability, techniques of numerical integration. Load representation, power quality. Computational paradigms for typical power system problems. Computer simulation of representative power system problems.

Prerequisite(s): Electrical Engineering 487 or consent of the Department.

Electrical Engineering 602 **3 units; (3-1)**

Virtual Environments and Applications

Introduction to virtual reality (VR) technologies; Characterization of virtual environments; hardware and software; user interfaces; 3D interaction; research trends. Applications: medicine, manufacturing, oil and gas reservoirs, the arts, and education.

Antirequisite(s): Credit for Electrical Engineering 604 and 619.38 will not be allowed.

Electrical Engineering 603 **3 units; (3-0)**

Rotating Machines

General theory of rotating machines providing a unified approach to the analysis of machine performance. General equations of induced voltage and torque. Transient performance of machines.

Electrical Engineering 604 **3 units; (3-1)**

System Design of Wireless Transceivers

Linear and nonlinear system analysis. Radio architectures – super-heterodyne, low intermediate frequency, direct conversion, sub-sampling; receiver system analysis and design; transmitter system analysis and design. Applications of transceiver system design to satellite and wireless communications.

Prerequisite(s): Electrical Engineering 327 and 471.

Antirequisite(s): Credit for Electrical Engineering 604 and 619.38 will not be allowed.

Electrical Engineering 606 **3 units; (3-0)**

Optical Instrumentation

Review of ray and wave optics. Free-space and fiber optic components. Linear, non-linear, and super-resolution microscopy. Light measurement

and characterization. Digital imaging. Solid state light sources. Spectroscopy.

Antirequisite(s): Credit for Electrical Engineering 606 and 619.68 will not be allowed.

Electrical Engineering 609 **1.5 units; (3-1)**

Special Topics

Designed to provide graduate students, especially at the PhD level, with the opportunity of pursuing advanced studies in particular areas under the direction of a faculty member.

MAY BE REPEATED FOR CREDIT

Electrical Engineering 610 **3 units; (3-0)**

Biometric Technologies and Systems

Biometric systems, sensors and devices. Integration of biometric-based hardware and software. Biometric applications in healthcare and security access.

Prerequisite(s): Engineering 419 and Electrical Engineering 327, or consent of the Department.

Antirequisite(s): Credit for Electrical Engineering 610 and Electrical Engineering 619.76 will not be allowed.

Electrical Engineering 613 **3 units; (3-0)**

Nonlinear Microwave Engineering

Theory, design and optimization of RF power amplification systems for wireless and satellite communication applications. A detailed treatment of linear and non-linear characterization and modelling of amplifiers/transmitters from device to system level perspective. Theory of operation as well as design techniques of linear amplifiers (class A, AB, B, C), switching mode amplifiers (class E, D and F) and balanced amplifiers are presented. Linearization and power efficiency enhancements techniques of power amplifiers/transmitters are also covered.

Prerequisite(s): Electrical Engineering 574 or consent of the Department.

Antirequisite(s): Credit for Electrical Engineering 613 and 619.22 will not be allowed.

Electrical Engineering 615 **3 units; (3-0)**

Non-linear Control

Non-linear systems; phase portraits, equilibrium points, and existence of solutions. Lyapunov stability definitions and theorems. Non-linear control design; feedback linearization, sliding modes, adaptive control, backstepping, and approximate-adaptive control. Frequency domain stability analysis using describing functions.

Antirequisite(s): Credit for Electrical Engineering 615 and 619.16 will not be allowed.

Electrical Engineering 617 **3 units; (3-0)**

RF Integrated Circuit Design

Introduction to complementary metal oxide semiconductor (CMOS) wireless communication circuits; radio frequency integrated circuit building blocks; computer-aided design.

Prerequisite(s): Electrical Engineering 567 or 647.

Antirequisite(s): Credit for Electrical Engineering 617 and 619.31 will not be allowed.

Electrical Engineering 619 **3 units; (3-1) or (3-0)**

Special Problems

Designed to provide graduate students, especially at the PhD level, with the opportunity of pursuing advanced studies in particular areas under the direction of a faculty member.

MAY BE REPEATED FOR CREDIT

Electrical Engineering 623 3 units; (3-1)**Biomedical Systems and Applications**

Introduction to biomedical systems. The four elements of a biomedical monitoring system. Biomedical system modelling. Biomedical sensors: basic concepts. Biomedical amplifiers and signal conditioning circuits. Noise, noise sources and non-idealities. Repeatability of measurements. Power supplies for biomedical monitoring systems. Frequency conditioning. Isolation amplifiers and patient safety. Analog-to-Digital conversion and anti-aliasing requirements. Multichannel biomedical data acquisition. Real-time requirements. Real-time digital conditioning of biomedical signals. The concept of closed-loop real-time control.

Prerequisite(s): Consent of the Department.

Electrical Engineering 625 3 units; (3-0)**Estimation Theory**

Fundamentals of estimation theory as applied to general statistical signal processing applications such as communication systems, image processing, target and position tracking, and machine learning. Estimator fundamentals including probability density functions, Cramer Rao bounds, Fisher information, linear and nonlinear regression, sufficient statistics, maximum likelihood estimation, minimum mean square error, least squares, Bayesian estimators and concepts. Statistical tracking filters such as Kalman filter and particle filter.

Electrical Engineering 627 3 units; (3-0)**Antennas**

Foundations of theory and practice of modern antennas. Topics covered will include: theoretical background, antenna parameters, simple radiators, antenna array theory, wire antennas, broadband antennas, microstrip antennas, aperture radiators, base station antennas, antennas for mobile communications, antenna measurements.

Electrical Engineering 629 3 units; (3-0)**Advanced Logic Design of Electronic and Nanoelectronic Devices**

Two-level and multi-level logic synthesis; flexibility in logic design; multiple-valued logic for advanced technology; multi-level minimization; Binary Decision Diagrams, Word-level Decision Diagrams, sequential and combinational equivalence checking; technology mapping; technology-based transformations; logic synthesis for low power, optimizations of synchronous and asynchronous circuits, logical and physical design from a flow perspective; challenges of design of nanoelectronic devices.

Electrical Engineering 631 3 units; (3-0)**System Identification and Parameter Estimation**

Parametric models of linear time-invariant systems. System and noise models. Estimation of model parameters. Structure and order selection. Model validation. Convergence and sensitivity analysis. Experiment design. MIMO systems. Subspace methods. Introduction to non-linear and/or time-varying systems.

Prerequisite(s): Electrical Engineering 649.

Electrical Engineering 633 3 units; (3-0)**Wireless Networks**

Wireless networks architectures and protocols. Resource management. Mobility management. Interference management. Modelling and analysis of wireless networks. Optimization of wireless networks.

Electrical Engineering 635 3 units; (3-0)**Cryptography and Number Theory with Applications**

The topic of the course is to provide the students with vital information about the use of number theory in designing and implementing various public key cryptographic schemes. We will stress on the efficacy of the algorithms used and their application in areas outside cryptography and coding theory.

Antirequisite(s): Credit for Electrical Engineering 635 and 619.87 will not be allowed.

Electrical Engineering 637 3 units; (3-0)**Arithmetic Techniques with DSP Applications**

The course is aimed at the use of specific computer arithmetic techniques for efficient design of DSP algorithms. We will provide comprehensive information from the theory of computer arithmetic. We will show how the performance of different algorithms can be optimized by using efficient arithmetic techniques. Many examples will be provided.

Antirequisite(s): Credit for Electrical Engineering 637 and 619.88 will not be allowed.

Electrical Engineering 641 3 units; (3-0)**Optimization for Engineers**

Introduction to optimization techniques for solving engineering problems. Modelling engineering problems as optimization problems. Recognizing and solving convex sets, functions and optimization problems. Numerical linear algebra including: matrix structure, algorithm complexity, LU factorization. Unconstrained optimization methodology and engineering applications. Constrained optimization techniques and engineering applications. Special topics in optimization such as multi-objective optimization and geometric programming.

Antirequisite(s): Credit for Electrical Engineering 641 and 619.05 will not be allowed.

Electrical Engineering 645 3 units; (3-0)
(Environmental Engineering 645)**Data Mining and Machine Learning**

Types of data mining: classification, clustering, association, prediction. Processes: data preparation, model building. Techniques: decision tree, neural network, evolutionary computing, Bayesian network. Applications: multi-media, text and web mining.

Antirequisite(s): Credit for Electrical Engineering 645 and 619.51 will not be allowed.

Electrical Engineering 647 3 units; (3-0)**Analog Integrated Circuit Design**

Review of static and dynamic models of field effect transistors. Basics of analog integrated circuit design. Computer-aided modelling. Fabrication processes and their influence on analog design. Operational voltage amplifier and transconductance amplifier design techniques. Case studies of complementary metal oxide semiconductor (CMOS) designs.

Electrical Engineering 649 3 units; (3-0)**Random Variables and Stochastic Processes**

Probability; continuous and discrete random variables; functions of random variables; stochastic processes; stationarity and ergodicity; correlation and power spectrum; Markov chains and processes.

Antirequisite(s): Credit for Electrical Engineering 649 and 619.22 will not be allowed.

Electrical Engineering 651 3 units; (3-0)**Resource Management for Wireless Networks**

Qualitative and mathematical formulation of the resource management problem in wireless networks; elements of radio resource management: power and Walsh code allocation and control. Call admission control, traffic load control, packet scheduling; radio resource management algorithms: fixed resource allocation, handover resource management, transmitter power management, dynamic resource allocation, and packet scheduling algorithms; quality-of-service (QoS) and resource management; joint radio resource management problem across heterogeneous wireless networks; applications and case studies: resource management in advanced wireless networks; open research challenges in resource management for wireless networks.

Antirequisite(s): Credit for Electrical Engineering 651 and 619.04 will not be allowed.

Electrical Engineering 653 3 units; (3-1T-3/2)**Theory and Practice Advanced DSP Processor Architecture**

Architecture and capabilities of SISD, SIMD and VLW processors; Developing high speed algorithms: code timing, reliability, background DMA activity, maintainability; Developing a personal software process appropriate for embedded systems.

Antirequisite(s): Credit for Electrical Engineering 653 and 619.23 will not be allowed.

Electrical Engineering 659 3 units; (3-0)**Active-RC and Switched-Capacitor Filter Design**

The filter design problem; operational amplifier characteristics; cascade methods of RC-active filter design; filter design with the active biquad; active filter design based on a lossless ladder prototype. Switched-capacitor (SC) integrators; design of cascade, ladder, and multiple feedback SC filters; non-ideal effects in SC filters; scaling of SC filters; topics in fabrication of SC filters.

Electrical Engineering 661 3 units; (3-0)
(Environmental Engineering 647)**Grid-Connected Inverters for Alternative Energy Systems**

Analysis and design of grid-connected inverters fed by an alternative energy source. Switch mode converters, inverter topologies, harmonics, drive electronics, control methodologies, implementation techniques, course project.

Antirequisite(s): Credit for Electrical Engineering 661 and 619.18 will not be allowed.

Electrical Engineering 663 3 units; (3-0)**Numerical Electromagnetic Field Computation**

Solution techniques for electromagnetic fields: finite difference, finite elements/volumes, boundary elements, finite difference time domain, and moment methods. Practical aspects concerning computer implementation: accuracy, speed, memory, and solvers.

Antirequisite(s): Credit for Electrical Engineering 663 and 619.09 will not be allowed.

Electrical Engineering 667 3 units; (3-0)**Intelligent Control**

Application of machine learning algorithms in control systems: neural networks, fuzzy logic, the cerebellar model arithmetic computer, genetic

algorithms; stability of learning algorithms in closed-loop non-linear control applications.

Prerequisite(s): Electrical Engineering 441 or 541 or consent of the Department.

Antirequisite(s): Credit for Electrical Engineering 667 and 619.25 will not be allowed.

Electrical Engineering 671 **3 units; (3-0)**

Adaptive Signal Processing

Fundamentals: Performance objectives, optimal filtering and estimation, the Wiener solution, orthogonality principle. Adaptation algorithms: MSE performance surface, gradient search methods, the Widrow-Hoff LMS algorithm, convergence speed and misadjustment. Advanced techniques: recursive least-squares algorithms, gradient and least-squares multiple filter, frequency domain algorithms, adaptive pole-zero filters. Applications: system identification, channel equalization, echo cancellation, linear prediction, noise cancellation, speech.

Electrical Engineering 675 **3 units; (3-0)**

Digital Communications

Physical layer digital communications. Linear modulation and demodulation using signal space concepts. Optimal and sub-optimal detection of symbols and sequences. Pulse shaping and spectral analysis. Wireless propagation and system design. Error correction using channel codes. Advanced techniques for high speed communications.

Prerequisite(s): Electrical Engineering 571.

Electrical Engineering 683 **3 units; (3-0)**

Algorithms for VLSI Physical Design Automation

Aspects of physical design including: VLSI design cycle, fabrication processes for VLSI devices, basic data structures and algorithms, partitioning, floor planning, placement and routing.

Antirequisite(s): Credit for Electrical Engineering 683 and 619.19 will not be allowed.

Electrical Engineering 685 **3 units; (3-1)**

Software Defined Radio Systems

Advanced design aspects related to the design of Software Defined Radio (SDR) systems applicable to wireless and satellite communication systems. System level modelling and baseband design aspects of SDR systems. Transmitter and receiver architectures appropriate for SDR transceivers. Multi-band transmitters, sub-sampling receivers and six-port based receivers. Design strategies and calibration techniques for SDR systems.

Prerequisite(s): Electrical Engineering 574 or consent of the Department.

Antirequisite(s): Credit for Electrical Engineering 641 and 619.64 will not be allowed.

Electrical Engineering 687 **3 units; (3-0)**

Switch Mode Power Converters

Design and analysis of dc-to-dc and ac-to-ac single-phase power converters. Device characteristics. Dc-to-dc topologies, dc-to-ac topologies and ac-to-ac topologies. Linearized models. Classical feedback control; introduction to state-space analysis methods. Input harmonic analysis, output harmonic analysis, and techniques to obtain unity input power factor.

Electrical Engineering 691 **3 units; (3-0)**

Integrated Micro and Nanotechnology Sensory Systems

Integrated circuits for sensing. The physical process of sensing photons and ions. The

circuitry of signal amplification. Considerations for integrated circuit implementation. Solid state sensors and development in CMOS technology. Analog to Digital conversion in sensory arrays. Technology scaling and impact. Low voltage and implications regarding signal processing. Other types of sensors such as pH sensing. MEMS technology and applications. Integrated Light sources. System examples.

Antirequisite(s): Credit for Electrical Engineering 691 and 619.26 will not be allowed.

Electrical Engineering 693 **3 units; (3-0)**

Restructured Electricity Markets

Basics of power systems economics, vertically integrated power monopolies, models of competition, market design and auction mechanisms, players in restructured electricity markets, generation scheduling in restructured electricity markets, perspective of large consumers, transmission operation in competitive power markets, transmission rights, the need for ancillary services in electricity markets, procurement and pricing of ancillary services, transmission and generation expansion in competitive markets.

Prerequisite(s): Electrical Engineering 587 or 601 or consent of the Department.

Electrical Engineering 695 **3 units; (3-1T)**

Applied Mathematics for Electrical Engineers

Understanding of vector spaces and function spaces; eigenvalues and eigenvectors in both the linear algebraic and differential equation sense; special functions in mathematics; advanced methods for solutions of differential equations.

Prerequisite(s): Electrical Engineering 327.

Antirequisite(s): Credit for Electrical Engineering 695 and either 519.42 or 619.95 will not be allowed.

Electrical Engineering 697 **3 units; (3-2)**

Digital Image Processing

Image formation and visual perceptual processing. Digital image representation. Two dimensional Fourier transform analysis. Image enhancement and restoration. Selected topics from: image reconstruction from projections; image segmentation and analysis; image coding for data compression and transmission; introduction to image understanding and computer vision. Case studies from current applications and research.

Prerequisite(s): Electrical Engineering 327.

Electrical Engineering 698 **6 units; (0-4)**

Graduate Project

Individual project in the student's area of specialization under the guidance of the student's supervisor.

Prerequisite(s): Admission to the MEng course-based program in Electrical and Computer Engineering.

Energy and Environment, Engineering ENEE

For more information about these courses, see the Centre for Environmental Engineering Research and Education: schulich.ualgary.ca/ceere.

Senior Courses

Energy and Environment, Engineering 355
3 units; (3-2T)

Introduction to Energy and the Environment

History of energy technologies, energetics of natural systems and agriculture, formation, extraction, and transformations of fossil fuels, renewables such as biomass, solar and wind; and the electricity system, environmental impacts of energy systems, technical options for transforming energy systems to reduce environmental impacts.

Prerequisite(s): Admission to the Energy and Professional Land Management Concentration (Haskayne School of Business) or the Engineering Energy and Environment Specialization (Schulich School of Engineering) or the Energy Sciences Concentration (Faculty of Science) or the Energy Engineering Program (Schulich School of Engineering).

Energy and Environment, Engineering 501
3 units; (3-1T)

Pollution Prevention and Control for Energy Industry

An overview of environmental laws and regulations. Environmental standards for air quality, water and land. Regulatory approval process for new energy projects. Base-Line Study and Environmental Impact Assessment. Environmental review of new energy projects. Pollution prevention methodology and techniques. Separation and recycle streams. Process modification, integration, analysis and control. Risk assessment.

Prerequisite(s): Third-year standing, or higher, in the Schulich School of Engineering, and Engineering 311.

Energy and Environment, Engineering 503
3 units; (3-1T)

Life Cycle Assessment

Concepts of life cycle analysis. Applications to energy utilization, environmental consequences, sustainable development, environmental process analysis, and optimization. Inventory, impact and improvement analyses of energy systems. LCA Model development and utilization. Human health and safety considerations.

Prerequisite(s): Third-year standing, or higher, in the Schulich School of Engineering, and Engineering 311.

Energy and Environment, Engineering 505
3 units; (3-1T)

Effluent Treatment Processes for Energy Industry

Application of fundamental engineering concepts to develop process design specifications for various unit operations and separation processes used for the treatment of gaseous (air), aqueous (wastewater) and solid effluents from mining, exploration, production, transportation and utilization of carbon-based energy sources.

Prerequisite(s): Chemical Engineering 331 or Mechanical Engineering 341, as well as third-year standing, or higher, in the Schulich School of Engineering.

Energy and Environment, Engineering 507
3 units; (3-1T)

Introduction to Sustainable Development

Motivations for development of a sustainable industrial economy. Relationship among economic systems, growth and sustainable alternatives. International dimensions. Roles and responsibilities of stakeholders, including government, industry, and society. Tools for assessing sustainability. Sustainability challenges in industrial economies.

Scope for sustainable innovations in the energy, manufacturing, and transportation sectors. Case studies of sustainable development.

Prerequisite(s): Third-year standing, or higher, in the Schulich School of Engineering.

Antirequisite(s): Credit for Energy and Environment, Engineering 507 and Energy and Environment, Engineering 519.05 will not be allowed.

Energy and Environment, Engineering 519
3 units; (3-1T)

Special Topics in Energy and Environment

Current advanced topics in Energy and Environment.

Prerequisite(s): Consent of the CEERE Director or designate, as well as third-year standing, or higher, in the Schulich School of Engineering.

MAY BE REPEATED FOR CREDIT

Energy and Environment, Engineering 573
3 units; (3-1T)

Engineering Aspects of Sustainable Communities

Ecological footprint, life cycle assessment, sustainable construction, energy efficiency in buildings, intelligent and sustainable transportation, control of water/air pollution from mobile and stationary sources, energy from waste.

Prerequisite(s): Third-year standing, or higher, in the Schulich School of Engineering.

Energy and Environment, Engineering 575
3 units; (3-1T)

Alternative Energy Systems

An overview of alternative energy systems including hydroelectric, wind, solar (thermal, concentrating, and photovoltaic), distributed generation using gas turbines. Energy system performance quantified using thermodynamic, fluid mechanic, and heat transfer analysis.

Prerequisite(s): Engineering 311, as well as, third-year standing, or higher, in the Schulich School of Engineering.

Energy and Environment, Engineering 577
3 units; (3-1T)

Electrical Transmission System Planning and Operation

Electricity markets, carbon markets, optimal operation of electricity systems, environmental impacts of transmission networks, regulatory issues.

Prerequisite(s): Third-year standing, or higher, in the Schulich School of Engineering.

Energy and Environmental Systems EESS

Graduate Courses

Energy and Environmental Systems 601
3 units; (3-1T)

Introduction to Energy and Environmental Systems

The course provides a structured overview to the interactions of energy systems and the environment. The lectures are taught collaboratively by several EESS faculty. The course aims to foster a unified, scientific understanding of energy flows and transformations in industrial society and the natural world; a scientific overview of some of the most important links between energy and environmental systems; and an introduction to the business, legal and regulatory

systems that shape the interactions between energy and environment.

Prerequisite(s): Graduate standing in Energy and Environmental Systems specialization or instructor permission.

Energy and Environmental Systems 603
3 units; (1-3T)

Project Course

Projects are applied interdisciplinary problem-solving courses in which students work as leaders or as members of project teams. Most course time is devoted to project management and presentations from students. The project course gives students experience working on weakly structured, real-world problems that require teamwork and contributions from diverse disciplines. They are co-managed by students and faculty advisors and should be responsive to an external "client" or expert panel. Problem areas are abstracted from local, provincial and national situations and involve the interaction of energy systems, the environment and public policy. Oral and written presentations concerning the results of project studies are required

Prerequisite(s): Graduate standing in Energy and Environmental Systems specialization or instructor permission.

Energy and Environmental Systems 606
3 units; (2S-0)

(formerly Energy and Environmental Systems 605)

Graduate Seminar

The graduate research seminar fosters the development of presentation and communication skills as well as engagement in critical analysis and debate. Course time is primarily research presentations by faculty, research staff and students. All students must present their work.

Prerequisite(s): Graduate standing in Energy and Environmental Systems specialization or instructor permission.

Energy and Environmental Systems 607
3 units; (3-0)

Tools for Systems Analysis

This course provides an introduction to analytical methods and software tools that are most frequently used for research in energy and environmental systems. Analytical methods include risk, uncertainty and decision analysis; an introduction to engineering economics; and an introduction to tools for environmental modelling. Software tools include Excel, and extensions such as Crystalball, general purpose systems such as Matlab and Mathematica; and GIS tools for non-specialists.

Prerequisite(s): Graduate standing in Energy and Environmental Systems specialization or instructor permission.

Energy and Environmental Systems 619
3 units; (3-0)

Special Topics

Students will be provided with the opportunity to focus on advanced studies in specialized topics pertaining to energy system engineering, law, public policy or economics, or a combination of these issues.

Prerequisite(s): Graduate standing in the Energy and Environmental Systems specialization or instructor permission.

MAY BE REPEATED FOR CREDIT

Energy Engineering ENER

For more information about these courses, see the Schulich School of Engineering.

Junior Courses

Energy Engineering 200 3 units; (3-3)

Engineering Design and Innovation

An interdisciplinary course involving the application of engineering principles and analysis to design and evaluate integrity and quality of engineering components and systems through a sequence of team-based design projects.

Prerequisite(s): Admission to the BSc Energy Engineering program.

Antirequisite(s): Credit for Energy Engineering 200 and Engineering 200 will not be allowed.

Energy Engineering 240 3 units; (4-3)

Introductory Dynamics for Energy Engineering

Calculus with applications to dynamics. Kinematics of particles undergoing rectilinear and curvilinear motion. Analysis of the kinetics of particles by direct use of Newton's laws of motion, work and energy methods, and impulse and momentum methods.

Prerequisite(s): Admission to the BSc Energy Engineering program.

Energy Engineering 260 3 units; (3-2)

Statics for Energy Engineering

Engineering Statics topics: force vectors; equilibrium of a particle in two and three dimensions; force system resultants; equilibrium of a rigid body in two and three dimensions; trusses; frames and machines. Vector and linear algebra methods and applications to static engineering mechanics.

Prerequisite(s): Admission to the BSc Energy Engineering program.

Senior Courses

Energy Engineering 300 3 units; (3-3)

Engineering Design and Energy Policy

Introduction to the mechanical, petroleum, and energy engineering profession, fundamentals of energy engineering design, testing, and product development; problem solving skills development; oil and gas standards, intellectual property protection, project management; regulatory issues; public policy. Case studies and projects may be drawn from a range of energy engineering areas.

Prerequisite(s): Energy Engineering 200 and admission to the BSc Energy Engineering program.

Energy Engineering 340 3 units; (4-2)

Dynamics for Energy Engineering I

Systems of particles. Kinematics of rigid bodies. Rotation and translation. Torque and angular momentum. Moment of inertia. Two-dimensional dynamics of rigid bodies. Applications of mathematics to dynamics including first-order ordinary differential equations, integrating factor, separable and exact equations, second-order ordinary differential equations, characteristic equation and variation of parameters method, and series solutions of ordinary differential equations.

Prerequisite(s): Energy Engineering 240 and admission to the BSc Energy Engineering program.

Energy Engineering 350 3 units; (3-3)

Computing Tools for Energy Engineers

The application of computer tools to solve practical Energy Engineering problems;

fundamentals of engineering computing including algorithm development, selection of appropriate tools, documentation of solutions, and verification and interpretation of results; applications using engineering analysis and spreadsheet tools; numerical methods; fundamentals of engineering graphics and computer aided design including technical drawing conventions used in the energy industry, dimensioning and tolerances; applications using Computer-Aided Design (CAD) software.

Prerequisite(s): Admission to the BSc Energy Engineering program.

Energy Engineering 360 **3 units; (3-2T-2)**

Mechanics of Materials for Energy Engineering

Internal forces in trusses, beams, shafts, frames and machines. Axial-force, shear-force, bending-moment and internal-torque diagrams. The concept of stress. Normal and shear components in a co-ordinate system. The concept of strain and its components. Stress-strain relations. Elasticity. Hooke's law and its generalization. Stress and deformation of uniaxially loaded members. Stress and deformation in the torsion of shafts of a circular cross section. Stress and deformation in transversely loaded beams of a symmetric cross section. General analysis of plane stress. Principal stresses. Mohr's circle. Stress in structures subjected to combine loading.

Prerequisite(s): Energy Engineering 240, 260 and admission to the BSc Energy Engineering program.

Energy Engineering 400 **3 units; (3-3)**

Engineering Design and Economics

Design of chemical and oil & gas processing units and plants; cost estimates and chemical process economics; identifying market needs and commercialization considerations; Safety and environmental considerations in process design; critical thinking and problem solving skills development; case studies and projects may be drawn from a range of energy engineering areas.

Prerequisite(s): Energy Engineering 300 and admission to the BSc Energy Engineering program.

Energy Engineering 425 **3 units; (4-2)**

Electricity, Magnetism and Electrical Circuits

Electric charges and electric current; Ohm's Law, Kirchhoff's Laws, application to simple circuits; Definitions of electric and magnetic fields. Introduction to circuit theory: DC circuits, amplifiers, operational amplifiers, single and three phase AC circuits. Introduction to basic electronic devices. Applications of mathematics to circuit analysis including solving systems of linear equations, first order derivatives and integrals, and complex numbers and arithmetic.

Prerequisite(s): Energy Engineering 240 and Mathematics 209 and admission to the BSc Energy Engineering program.

Energy Engineering 460 **3 units; (3-1T)**

Dynamics for Energy Engineering II

Planar kinematics and kinetics of rigid bodies; work, energy, impulse and momentum of rigid bodies; kinematics, statics, and dynamics of planar mechanisms; design of cams, gears, and gear trains.

Prerequisite(s): Energy Engineering 240 and 260 and admission to the BSc Energy Engineering program.

Energy Engineering 480 **3 units; (3-1T-3/2)**

Energy Engineering Fluid Mechanics

Basic principles of mechanics of fluids; properties of fluids; fluids at rest; manometers and other pressure measuring devices; dimensional analysis;

the laws of conservation of mass and momentum; Bernoulli's equation for incompressible flow and the energy equation; flow measurements; elementary pipe flow problems including losses, pumps, etc.; applications to a variety of problems in energy engineering. Applications of calculus and simultaneous linear equations to fluid mechanics, including applications of differential elements to derive material and momentum balances.

Prerequisite(s): Engineering 201 and Energy Engineering 340 and admission to the BSc Energy Engineering program.

Energy Engineering 560 **3 units; (3-2)**

Energy Engineering Thermodynamics

Review of the principles of the first and second law of thermodynamics; application to the properties of fluids and solutions; vapour liquid and chemical equilibria; applications such as engine gas cycles including simple gas turbines; gas turbines with reheat, intercooling and heat exchange, heat-pump and refrigeration cycles. Applications of mathematics to thermodynamics including ordinary and partial differential equations, total differentials, integration, and curve-fitting.

Prerequisite(s): Engineering 311 and admission to the BSc Energy Engineering program.

Energy Engineering 570 **3 units; (3-1T-3/2)**

Automation and Controls

Linear systems and their characteristics; the Laplace transform, block diagram manipulation, frequency response, application to first and second order physical systems; analysis and design of sensors and actuators; industrial automation systems, programmable logic controllers (PLC), supervisory control and data acquisition (SCADA) systems, distributed control systems (DCS).

Prerequisite(s): Energy Engineering 340 and Energy Engineering 425 and admission to the BSc Energy Engineering program.

Energy Management ENMG

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses

Energy Management 301 **3 units; (3-0)**

Electricity Regulation

An examination of energy development and the business, law and policy issues arising from the development of different electricity sources (nuclear and renewable energy sources).

Prerequisite(s): Admission to the Energy and Professional Land Management Concentration (Haskayne School of Business) or the Engineering Energy and Environment specialization (Schulich School of Engineering) or the Energy Sciences Concentration (Faculty of Science).

Energy Management 403 **3 units; (3-0)**

Overview of the Alberta Oil and Gas Industry

Provides an understanding of the upstream petroleum industry and will focus on the development of petroleum resources by Alberta-based corporations. Analysis of shale gas and oil development will be included.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units.

Energy Management 485 **3 units; (3-0)**

Oil and Gas Marketing

Practical introduction to crude oil (light and heavy) and natural gas marketing. Marketing of refined oil products and retail gasoline are not covered.

Prerequisite(s): Admission to the Haskayne School of Business and Finance 317.

Energy Management 487 **3 units; (3-0)**

Energy Risk Management

Provides an overview of key issues related to energy risk management. Some of the key topics to be addressed are: managing pricing risks associated with changing market conditions and deregulation; tools used to manage volatility, including futures and options for energy risk management; environmental risk management, and risk financing for the energy sector.

Prerequisite(s): Admission to the Haskayne School of Business and Finance 317.

Energy Management 489 **3 units; (3-0)**

International Energy Development

A focus on international energy development, energy contracts, sustainable development, and the management of environmental and corporate social responsibility issues.

Prerequisite(s): Admission to the Haskayne School of Business.

Engineering ENGG

For more information about these courses, see the Schulich School of Engineering.

Junior Courses

Engineering 200 **3 units; (3-1S-3)**

Engineering Design and Communication

An interdisciplinary course involving the application of engineering principles, design, communications, leadership and project management concepts through a sequence of team-based design projects.

Antirequisite(s): Credit for Engineering 200 and any of Engineering 251, 253 or Energy Engineering 200 will not be allowed.

Engineering 201 **3 units; (3-1.5T-3/2)**

Behaviour of Liquids, Gases and Solids

An introduction to the behaviour of fluids and solids; phase transformations, the phase rule and phase diagrams. Ideal and real gases; equations of state and their engineering applications; simple kinetic theory; transport properties of fluids. Liquid state; vapor pressure; shear behaviour; flow of fluids in pipelines. Solids; crystalline and non-crystalline structure; non-equilibrium solid phases; electrical and thermal conductivity; dislocations; stress and strain; creep; fracture.

Engineering 202 **3 units; (3-1.5T)**

Engineering Statics

Force vectors; equilibrium of a particle in two and three dimensions; force system resultants; equilibrium of a rigid body in two and three dimensions; internal forces in trusses; frames, machines and beams; bending moment and shear force diagrams; friction; centre of gravity; centroids of areas; composite bodies.

Antirequisite(s): Credit for Engineering 202 and either Engineering 203 or 205 will not be allowed.

Engineering 209 3 units; (3-1T)
(Economics 209)**Engineering Economics**

The basic tools and methodology of engineering economic studies. Topics include investment decisions, theory of replacement, economies of scale, externalities, social decision making and government regulation. Examples are drawn from engineering projects.

Prerequisite(s): Registration in the Faculty of Engineering with second-year standing or higher. If not registered in the Schulich School of Engineering, consent of the Department of Economics. If required for APEGA, consent of the Schulich Undergraduate Studies Office.

Engineering 213 3 units; (3-0)**Engineering Communication**

Professional and technical communication with a focus on developing the ability to communicate complex engineering concepts to engineers as well as general audiences. Planning and composing effective verbal, written, and graphical communication. Providing constructive and professional review and critique of presentations by peers. Identifying key points and summarizing information in a concise and informative manner.

Antirequisite(s): Credit for Engineering 213 and Communications Studies 363 will not be allowed.

Engineering 225 3 units; (4-3/2)**Fundamentals of Electrical Circuits and Machines**

Current, voltage and power; Kirchhoff's current and voltage laws; capacitors; electricity and magnetism fundamentals applied to circuit elements and machines; inductors; topics in electrical circuits and systems; instrumentation; circuit design, DC and AC circuit analysis methods; DC and AC machines; first order circuits and transient analysis.

Antirequisite(s): Credit for Engineering 225 and any of Engineering 325, Biomedical Engineering 327 or Electrical Engineering 341 will not be allowed.

Engineering 233 3 units; (3-2)**Computing for Engineers**

Overview of computer systems. Functions of software components: operating systems, editors, compilers. Programming in a high-level language: selection and loop structures, routines, array and record types, text file operations. Introduction to object-based programming: use of class libraries and construction of simple classes.

Antirequisite(s): Credit for Engineering 233 and any of Computer Science 217, 231, 235, or Computer Engineering 339 will not be allowed.

Senior Courses**Engineering 311** 3 units; (3-1.5T-3/2)**Engineering Thermodynamics**

Energy, thermodynamic systems, properties and state, temperature and the zeroth law, equilibrium, properties of the pure substance, equations of state. Work, reversibility, heat, first law, specific heats, enthalpy, ideal gas, flow systems. Entropy and the second law, Carnot cycle, thermodynamic temperature scale, process efficiencies, cycles, calculation of entropy change, exergy analysis.

Prerequisite(s): Engineering 201 and one of Mathematics 275 or Applied Mathematics 217 or Energy Engineering 240.

Engineering 317 3 units; (3-1.5T-3/2)**Mechanics of Solids**

Axial-force, shear-force and bending moment diagrams; stress and strain; stress-strain relations; elastic and plastic behaviour; elastic constants; simple statically indeterminate (one-degree) problems; review of moment of inertia, product of inertia and principal axes of inertia; elastic torsion of circular shafts; elastic and plastic bending about principal axes of beams with symmetrical cross-section; composite beams; shear stresses due to bending; Mohr's circle for stress; thin-walled pressure vessels; deflection of beams by integration; Euler buckling.

Prerequisite(s): Engineering 202 and Mathematics 275 or Applied Mathematics 217.

Engineering 319 3 units; (3-1.5T)**Probability and Statistics for Engineers**

Presentation and description of data, introduction to probability theory, Bayes' theorem, discrete and continuous probability distributions, estimation, sampling distributions, tests of hypotheses on means, variances and proportions, simple linear regression and correlation. Applications are chosen from engineering practice.

Prerequisite(s): Mathematics 277 or Applied Mathematics 219 or Energy Engineering 240.

Antirequisite(s): Credit for Engineering 319 and Biomedical Engineering 319 will not be allowed.

Note: Credit towards degree requirements will be given for only one of Engineering 319, Political Science 399, Psychology 300, 301, 312, Sociology 311, Statistics 205, 213 and 217, 327; that one being a course(s) appropriate to the particular degree program.

Engineering 349 3 units; (3-1.5T)**Dynamics**

Kinematics of particles and rigid bodies: rectilinear, curvilinear and general plane motion. Kinetics of particles and planar rigid bodies: Newton's 2nd Law, Principle of Work and Energy, Principle of Impulse and Momentum. Introduction to three dimensional rigid body dynamics.

Prerequisite(s): Engineering 202; and Mathematics 275 or Applied Mathematics 217; and Mathematics 277 or Applied Mathematics 219.

Engineering 391 1.5 units; (1.5-0)**Advanced Topics I**

Special topics in engineering and engineering complementary studies.

Prerequisite(s): Consent of the Associate Dean (Academic & Planning).

MAY BE REPEATED FOR CREDIT

Engineering 393 3 units; (3-0)**Advanced Topics II**

Special topics in engineering and engineering complementary studies.

Prerequisite(s): Consent of the Associate Dean (Academic & Planning).

MAY BE REPEATED FOR CREDIT

Engineering 407 3 units; (3-2T)**Numerical Methods in Engineering**

The theory and use of numerical computational procedures to solve engineering problems. Methods for: solution of non-linear equations, solution of simultaneous linear equations, curve fitting, solution of the algebraic eigenvalue problem, interpolation, differentiation, integration, solution of ordinary differential equations and solution of partial differential equations are

included. The tutorial includes the application to elementary problems and the computer solution of comprehensive engineering problems.

Prerequisite(s): Engineering 233 and Mathematics 375 or Applied Mathematics 307.

Engineering 481 3 units; (3-1.5S)**Technology and Society**

An interpretive course on the interrelationship between technology and society. The first part of the course surveys significant historical developments within disciplinary areas such as energy, materials, production processes, structures, transport, communications, and computation. Sequence within each area: discovery, development, application, impact, future. Social and economic consequences are also considered. The latter part of the course explores contemporary problems of society and technology.

Engineering 501 3 units; (0-4)**Senior Capstone Design Project I**

A team-based design course in which students apply the knowledge and skills acquired in earlier courses while refining their skills in teamwork and project management. Students work towards innovative, solutions to industry-sponsored design projects, and engage in individual critical reflection on their course activities, team performance, and on their growth as an engineering designer within their undergraduate program.

Prerequisite(s): Fourth-year standing or above.

Note: Engineering 501 and 502 are a required two-course sequence that must be completed in the same academic year. Concurrent enrolment in Engineering 501 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Engineering 502 3 units; (0-4)**Senior Capstone Design Project II**

A continuation of the capstone design project, where student teams build on their design work in Part I.

Prerequisite(s): Engineering 501.

Note: Engineering 501 and 502 are a required two-course sequence that must be completed in the same academic year. Concurrent enrolment in Engineering 502 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Engineering 503 3 units; (0-4)**Entrepreneurial Capstone Design Project I**

A team-based design course in which students apply the knowledge and skills acquired in earlier courses while refining their skills in teamwork and project management. Students work towards innovative solutions to design projects with an entrepreneurial focus, and engage in individual critical reflection on their course activities, team performance, and on their growth as an engineering designer within their undergraduate program.

Prerequisite(s): Fourth-year standing or above.

Note: Engineering 503 and 504 are a required two-course sequence that must be completed in the same academic year. Concurrent enrolment in Engineering 503 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Engineering 504 3 units; (0-4)

Entrepreneurial Capstone Design Project II

A continuation of the entrepreneurial capstone design project, where student teams build on their design work in Part I.

Prerequisite(s): Engineering 503.

Note: Engineering 503 and 504 are a required two-course sequence that must be completed in the same academic year. Concurrent enrolment in Engineering 504 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Engineering 513 3 units; (3-0)

The Role and Responsibilities of the Professional Engineer in Society

The professional duties and responsibilities of the engineer as they relate to society. Ethics and the engineering profession. Public and worker safety and health. Design for safety. Sustainable development. The engineer and the environment. Environmental stewardship. Essentials of leadership. Gender issues. Employment equity. Fundamentals of Engineering Law. Professional organizations. The Engineering Professions Act.

Prerequisite(s): Third-year standing or above.

Engineering 515 3 units; (3-2T)

Project Management for Engineers

Covers the application of project management principles such as planning, scope development, design, procurement, construction, commissioning and start-up to engineering projects. Class reviews aspects of a current major engineering projects and case studies.

Antirequisite(s): Credit for Engineering 515 and Manufacturing Engineering 527 will not be allowed.

Engineering 517 3 units; (3-0)

Engineering Safety

Introduction to Professional Responsibility, Risk Management and Identification, Process Safety Management, Incident Investigation and Reporting; Engineering Ethics and Public Safety; Key national safety codes, standards and regulations, Business case for safety, and common best practices, fundamentals of Crisis and Emergency Management, change management to successful incorporate safety into teams and the design process; Engineering Discipline specific Engineering Safety Management including Electrical Safety, Chemical Safety, Fire, Dust Hazard and Explosions, and Biological Risks.

Engineering 519 3 units; (3-2) or (3-0)

Special Topics in Engineering

Current topics in Engineering.

Prerequisite(s): Consent of the student's department.

MAY BE REPEATED FOR CREDIT

Engineering 521 3 units; (3-1.5T)

Art and Engineering

Focuses on history, concepts, contemporary issues, and techniques of engineering in art. Topics may include Arithmetic and Geometry, Proportion, Formalism, Symmetry, Computation, Geometric Abstraction, and Mathematics as they relate to historical, theoretical and critical contexts in Art. Students will gain experience and a working knowledge of concept development and construction of an engineering-inspired art project.

Engineering 523 3 units; (3-1.5T)

Bio-inspired Engineering

Engineering can take inspiration from nature to develop new products, processes, and systems, or improve existing designs. Topics in this course include design by analogy, functional biology, principles and techniques of biomimicry and bio-inspired engineering methods, and bio-inspired computation. Students will gain experience and a working knowledge of ideation, concept development and will model and create a bio-inspired engineering project.

Engineering 525 3 units; (3-1.5T)

Engineering Entrepreneurship

This highly experiential course helps the engineering student build a personal practice in entrepreneurship, design thinking, and human-centered design for innovation. Topics include the entrepreneurial mindset; idea generation, validation, and feasibility analysis; product prototyping and prototyping; and the basics of business design and execution. Leading edge practical tools and frameworks are examined and put to use in authentic learning activities that teach the student to get to first revenues.

Antirequisite(s): Credit for Engineering 525 and 519.01 will not be allowed.

Engineering 599 3 units; (0-6)

Individual Engineering Project

Individual work on an assigned Engineering project under the supervision of a faculty member. The project will normally involve a literature review, theoretical work, and laboratory or field work. Engineering Communications, including written reports, logbooks and oral presentations.

Prerequisite(s): Consent of the project supervisor and the student's department.

Graduate Courses

Engineering 601 1.5 units; (3S-0)

Professional Development I

Topics covered include: health and safety, communication styles, supervisory relationships and respect in the lab, presentation skills including presentation planning and voice projection, reference gathering and management, awareness of plagiarism, and writing abstracts.

NOT INCLUDED IN GPA

Engineering 603 1.5 units; (3S-0)

Professional Development II

Topics covered include: presentation skills, skills for writing scientific manuscripts, peer review process, defence and candidacy, engineering design, intellectual property, and networking basics.

NOT INCLUDED IN GPA

Engineering 681 3 units; (3-2)

Engineering Tools

The theory and use of numerical computational procedures to solve engineering problems.

Engineering 682 3 units; (3-0)

Sustainability

Explores the interaction between resources and the environment. Technical and environmental aspects within the energy and environment cycle for project evaluation and management.

Antirequisite(s): Credit for Engineering 682 and Civil Engineering 693 will not be allowed.

Engineering 683 3 units; (3-3)

Innovation and Entrepreneurship

Definitions, contexts, language, dynamics, historical and contemporary examples of Engineering Innovation and Entrepreneurship; innovation process from a multidisciplinary perspective; Engineering inventive processes.

Engineering 684 3 units; (3-3)

Introduction to Project Management

Application of management principles to the project environment; planning, control, scope, time and cost processes; project organization and human resource issues. Students review aspects of a current major capital project and submit and defend a project report.

Engineering 687 3 units; (3-0)

Ethics, Law, and the Engineering Profession

The professional duties and responsibilities of the engineer as they relate to society. Ethics and the engineering profession. Public and worker safety and health. Design for safety. Sustainable development. The engineer and the environment. Environmental stewardship. Essentials of leadership. Gender issues. Employment equity. Fundamentals of Engineering Law. Professional organizations. The Engineering Profession's Act.

Antirequisite(s): Credit for Engineering 687 and 513 will not be allowed.

English ENGL

For more information see the Department of English website: <https://english.ucalgary.ca/>.

Junior Courses

English 203 3 units; (3-0)

Introductory Seminar

An intensive introduction to the field of English emphasizing critical reading and writing as well as discussion. Expectations for writing and research will be higher than in other junior English courses. Includes the study of at least one text by an Indigenous author.

Antirequisite(s): Credit for English 203 and 201 will not be allowed.

English 251 3 units; (2-1T) or (1.5-1.5T)

Literature and Society

An examination of the relationship of literature to the world around us, with instruction in close reading and critical writing. Considers how literature as a cultural practice responds to and reflects its social context. Includes the study of at least one text by an Indigenous author.

Antirequisite(s): Credit for English 251 and 201 will not be allowed.

English 253 3 units; (2-1T) or (1.5-1.5T)

Studies in Genre

A study of the conventions of a genre, with emphasis on close reading and critical writing skills. Includes the study of at least one text by an Indigenous author.

253.01 Short Fiction

253.02 Poetry

253.03 Novel

253.04 Drama

253.05 Non-fiction

English 265 3 units; (1.5-1.5S)**Introductory Creative Writing**

Instruction in the rudiments of craft for poetry, scripts, and fiction, emphasizing the centrality of reading and revision to literary composition.

Note: Does not count toward the Embedded Certificate in Creative Writing.

Senior Courses**English 302** 6 units; (3-0)**Introduction to Contemporary Theory**

An examination of the claims and assumptions of a range of contemporary critical practices, such as formalism, structuralism, deconstruction, feminism and gender studies, new historicism, psychoanalytic criticism, and cultural and ideological critique. Includes sustained engagement with original theoretical texts.

Prerequisite(s): 6 units of English.

Note: Students with prior credit in English 302 will not be allowed to take 303.

English 303 3 units; (3-0)**Theories for Reading**

An examination of contemporary critical and cultural theories and their practical applications to reading. Students will learn models of critical reading and gain experience applying them to a variety of literary and cultural texts.

Antirequisite(s): Credit for English 303 and 302 will not be allowed.

Note: Students with prior credit in English 302 will not be allowed to take 303. Students are permitted to take English 303 prior to 302.

English 305 3 units; (1.5-1.5S)**Literature Before 1700**

A survey of representative works of literature in English from the Middle Ages through 1700.

Prerequisite(s): 6 units of English.

Antirequisite(s): Credit for English 305 and 340 will not be allowed.

English 307 3 units; (1.5-1.5S)**Literature After 1700**

A survey of representative works of literature in English from 1700 to the Present.

Prerequisite(s): 6 units of English.

Antirequisite(s): Credit for English 307 and 340 will not be allowed.

English 309 3 units; (3-0)**Literature and the Environment**

An examination of the field of nature writing, environmental literature and ecological literary criticism.

Antirequisite(s): Credit for English 309 and any of 383, 387.03 or 387.30 will not be allowed.

English 311 3 units; (3-0)**Shakespeare and Performance**

A consideration of Shakespeare's plays that pairs representative works with stage and/or film adaptations.

Antirequisite(s): Credit for English 311 and 205 will not be allowed.

English 322 3 units; (3-0)**Comics**

An examination of the formal, historical, and social aspects of comics (comic strips, comic books, and graphic novels). Topics to be examined include the

historical development of the comic form; formal analysis of the properties of comics; and the significance of comics in the contemporary media landscape.

Antirequisite(s): Credit for English 322 and 388.04 will not be allowed.

English 333 3 units; (3-0)**Experiential Learning and Reading**

Approaches literary study through theories and practices of experiential learning. Incorporates multiple forms of critical written reflection on assigned literary texts and on reading as a form of experiential learning.

English 334 3 units; (3-0)**Literature and Community**

Focuses on the literary treatment of an issue relevant to the larger community. Combines critical and literary readings with service in a community organization.

Note: A minimum of 10 hours of community service is required in addition to course contact hours.

English 335 3 units; (3-0)**Creative Writing and Reading Like a Writer**

Introduction to reading from a writerly perspective as an early but important step in the development of writing practice.

English 336 3 units; (3-0)**Introduction to Creative Writing Practice**

An introduction to the elements of creative writing as the basis of an artistic practice.

336.01 Poetry

336.02 Fiction

336.03 Popular Writing

336.04 Across the Genres

Antirequisite(s): Credit for English 364 and 336.01 will not be permitted; credit for English 336.02 and 366 will not be permitted.

English 351 3 units; (3-0)**Poetry: Reading and Analysis**

A study of poetic forms in English from a wide range of historical periods, social contexts, and national literatures. Through textual analysis and close reading, acquaints students with the characteristic techniques of prosody and basic poetic terminology, giving detailed attention to tropes and figures along with other poetic concepts such as form, tone, diction, implication, and point of view.

Note: This course cannot be used by Majors or Honours students to fulfill historical breadth requirements.

English 353 3 units; (3-0)**Drama: Reading and Analysis**

A study of dramatic literature in English from a wide range of historical periods, social contexts, and national literatures. Through textual analysis and close reading, acquaints students with the characteristic techniques of dramaturgy and basic theatrical terminology, giving detailed attention to the formal conventions of literature written to be performed on stage.

Note: This course cannot be used by Majors or Honours students to fulfill historical breadth requirements.

English 361 3 units; (3-0)**Gender and Sexuality in Literature**

Reading and analysis of gender and sexuality in literature. Topics may include queer theory; feminism and women's writing; masculinity; transgender fictions and theory; gender and sexuality across regions, cultures, and/or historical periods; intersectionality with, for instance, critical race theory, disability studies, and/or indigeneity.

Antirequisite(s): Credit for English 361 and any of 317, 384 or 389 will not be allowed.

English 372 3 units; (3-0)**Canadian Literature**

A broad historical survey of Canadian writing from its origins to the present. An introduction to major writers and creative voices in Canada, as well as to significant critical and cultural ideas that have developed about this nation's literature.

English 376 3 units; (3-0)**North American Indigenous Literatures**

An overview of writing by North American Indigenous Peoples with a focus on authors from Canada.

Antirequisite(s): Credit for English 376 and 385 will not be allowed.

English 378 3 units; (3-0)**Comparative Global Literatures**

A comparative overview of literature from a range of regions around the world. May include an examination of post-colonial, diasporic, and globalization theories.

Antirequisite(s): Credit for English 378 and 391 will not be allowed.

English 381 3 units; (3-0)
(Linguistics 381)**The History of English**

An examination of important changes and stages in the history of English including its Indo-European and Germanic origins and a consideration of Modern English grammar and orthography from a historical perspective.

Prerequisite(s): Linguistics 201.

English 382 3 units; (3-0)**Topics in American Literature**

A selected topic in American literature focused on a particular theme, time period or geographical region.

MAY BE REPEATED FOR CREDIT

English 387 3 units; (3-0)**Current Topics in English Studies**

Selected topics attentive to current and emergent research directions in the discipline.

MAY BE REPEATED FOR CREDIT

English 388 3 units; (3-0)**Topics in Reading Popular Culture**

Selected topics in popular culture across media, genres, time, and regions. Examination of popular texts as sites of cultural meaning and socio-political intervention and learn to assess their significance. Topics may include fan culture; television; film; music; performance; adaptation; the intersection of high and low culture; gaming; food; social media; and sport.

MAY BE REPEATED FOR CREDIT

English 393 **3 units; (3-0)**

Speculative Fiction I: Science Fiction

Survey of the genre of science fiction, from its origins to the present

English 395 **3 units; (3-0)**

Speculative Fiction II: Fantasy

A survey of the genre of fantasy literature. May include works from a range of historical and national contexts.

English 396 **3 units; (3-0)**

Literature for Young People

A historical survey of children's and young adult literature from its origins to the present day.

English 399 **3 units; (3-0)**

Detective Fiction

A survey of the genre of detective fiction. May include works from a range of historical and national contexts.

English 401 **3 units; (3-0)**

Old English Language and Prose Literature

A study of the language of the Anglo-Saxons through reading of prose texts.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 403 **3 units; (3-0)**

Old English Poetry

Reading and analysis of Old English poetry in the original language.

Prerequisite(s): English 401.

English 405 **3 units; (3-0)**

Middle English Literature: The Canterbury Tales

A study of Geoffrey Chaucer's *Canterbury Tales* in its social, cultural and historical contexts. Texts will be read in the original language and the course will include instruction in Middle English.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 406 **3 units; (3-0)**

Middle English Literature: Selected Works

A study of selected works of Middle English poetry, prose and drama (excluding Geoffrey Chaucer's *Canterbury Tales*) in their social, cultural and historical contexts. Texts will be read in the original language and the course will include instruction in Middle English.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 410 **3 units; (3-0)**

Renaissance Literature and Culture I

A study of representative literary works from the reign of Henry VIII to Elizabeth I will be examined in their cultural and historical contexts. May include works by authors such as John Skelton, Sir Thomas More, Thomas Wyatt, Christopher Marlowe, Elizabeth I, Edmund Spenser, and William Shakespeare.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 411 **3 units; (3-0)**

Renaissance Literature and Culture II

A study of representative literary works from the reigns of James I, and Charles I, and the English Civil War will be examined in their cultural and historical contexts. May include works by John

Donne, George Herbert, Mary Wroth, Amelia Lanyer, Andrew Marvell and John Milton.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 412 **3 units; (3-0)**

Early English Drama

A study of representative dramatic works from the emergence of the genre to 1600, including the medieval, Tudor, and Elizabethan periods. Works will be examined in their relevant historical contexts.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 413 **3 units; (3-0)**

Shakespeare and his Contemporaries

An examination of the drama of the seventeenth century, examining works written for both public and private theatres as well as for court performance. Will include plays from major writers of the period such as William Shakespeare, Ben Jonson, and Thomas Middleton.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 422 **3 units; (3-0)**

Advanced Studies in Comics

Considers the role and nature of comics (comic strips, comic books, graphic novels) as a distinct form. Topics may include the influence of comics genres; the relationship of comics to other art forms (including literature); major authors; and distinct historical or national cartooning traditions.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 426 **3 units; (3-0)**

Selected Topics in Contemporary Theory

Advanced study in contemporary literary or cultural theory with a focus on a particular school, author, or approach.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

Antirequisite(s): Credit for English 426 and 483 will not be allowed.

MAY BE REPEATED FOR CREDIT

English 429 **3 units; (3-0)**

Eighteenth-Century Poetry

An examination of the major poetic forms of the long eighteenth century with an emphasis on tradition and innovation in poetic techniques. Includes such authors as John Wilmot, Earl of Rochester; John Dryden; Aphra Behn; Alexander Pope; Jonathan Swift; Samuel Johnson; Thomas Gray; Stephen Duck; Ann Yearsley; Mary Collier; Mary Leapor; and Phillis Wheatley.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

Antirequisite(s): Credit for English 429 and 433 will not be allowed.

English 431 **3 units; (3-0)**

Restoration Voices

An exploration of the diverse literary and cultural productions of England during the years 1660-1700 with an emphasis on both court and common spheres. Topics may include the re-opening of the theatres; professional women writers; transatlantic conversations and encounters with indigeneity; newspapers and broadsides; comedy and satire; medicine and science; political and religious dis-

sent; sexuality and gender; town versus country debates; and coffee house culture.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 436 **3 units; (3-0)**

Creative Writing Workshop

A close examination and discussion of the student's own work, with emphasis on technique, in order to develop a portfolio.

436.01 Poetry: Short Forms

436.02 Poetry: Long Forms

436.03 Fiction: Short Stories and Microfictions

436.04 Fiction: Long Short Stories and the Novella

436.05 Popular Genre Writing

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for English 436.01 or 436.02 and 494 will not be allowed; credit for English 436.03 or 436.04 and 496 will not be allowed.

Note: One month before the start of classes, prospective students must submit a portfolio of their own work for evaluation before consent of the Department will be given. Details of this procedure are available from the Department of English.

English 438 **3 units; (3-0)**

Experiments in Early Fiction

A study of selected works of prose fiction to 1832 with an emphasis on the development of the novel in England and/or across the Atlantic. Includes such authors as Aphra Behn, Daniel Defoe, Eliza Haywood, Samuel Richardson, Henry Fielding, Laurence Sterne, Frances Burney, Frances Brooke, Charlotte Lennox, James Hogg, Maria Edgeworth, and Jane Austen.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 441 **3 units; (3-0)**

British Romanticism

A study of selected British literary works from the period roughly between the 1780s and 1830s. Includes such authors as Jane Austen, William Wordsworth, William Blake, Percy Bysshe Shelley, and Mary Shelley.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

Antirequisite(s): Credit for English 441 and 443 will not be allowed.

English 445 **3 units; (3-0)**

Early to Mid-Victorian Literature

An examination of the Victorian novel, poetry, and prose. Includes such authors as Charles Dickens, Alfred Tennyson, Robert Browning, and the Brontës.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

Antirequisite(s): Credit for English 445 and 447 will not be allowed.

English 449 **3 units; (3-0)**

Late Victorian Literature

An examination of the poetry, prose, and drama of the 1880s and 1890s, with a focus on aestheticism and decadence. Includes such authors as Oscar Wilde, Vernon Lee, and Walter Pater.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 451 3 units; (3-0)**British Literature from 1900 to 1950**

A survey of British literature from the first half of the twentieth century.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 453 3 units; (3-0)**British Literature since 1950**

A survey of British literature from the last half of the twentieth century to the present.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 459 3 units; (3-0)**Digital Research in Literary Studies**

An introduction to digital research methods for literary studies. Topics may include text encoding and analysis, data visualization, and public scholarship.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 461 3 units; (3-0)**Early American Literature and the American Renaissance**

A survey of American literature from its origins to the Civil War. Examines both canonical and newly relevant works of literature and place them in a cultural and critical context.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 463 3 units; (3-0)**American Literature from the Late 1800s to the Mid-1900s**

A survey of American literature from the Civil War to World War II, encompassing realism, naturalism, and modernism. Examines both canonical and newly relevant works of literature and place them in a cultural and critical context.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 465 3 units; (3-0)**American Literature since the Mid-1900s**

A survey of American literature since World War II. Examines both canonical and newly relevant works of literature and place them in a cultural and critical context.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 471 3 units; (3-0)**Canadian Literature from its Origins to 1950**

A survey of Canadian literature from its beginnings to the middle of the twentieth century.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 472 3 units; (3-0)**Advanced Studies in Young Adult Literature**

Contemporary approaches to selected works of young adult literature. Topics may include the problem novel; dystopian literature; gender and sexuality; diversity in young adult books; banned/controversial books; fan culture; and young adults in the digital age.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 473 3 units; (3-0)**Canadian Literature since 1950**

A survey of Canadian literature from 1950 to the present.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 477 3 units; (3-0)**Literature and Science**

Study of the relationship between literature and science with respect to a special topic or theoretical approach. Course may cover advanced topics in science fiction such as Cyberpunk or Steampunk; how philosophies of science and technology pertain to literature; or interdisciplinary inquiry into literary texts using, for instance, neuroscience, ecology, and physics.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 479 3 units; (3-0)**Studies in Text and Image**

An examination of the relationship between the visual and literary. Students will develop a vocabulary for talking about visual texts and learn to articulate the shared and distinctive ways that these texts create meaning. Topics may include illustrated books and manuscripts; visual poetics; graphic novels; adaptation; digital literary forms; history of the book; and letterpress printing.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 481 3 units; (3-0)**Literary Theory Pre-1900**

A survey of the major theories and approaches to literature from antiquity to 1900.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 486 3 units; (3-0)**Advanced Studies in Literature and the Environment**

Selected topics in nature writing, environmental literature, ecocriticism and eco-theory. Topics may include climate change; bioregionalism; animals and animality; indigenous environmental perspectives; risk, disaster, and crises; pollution and waste; the body toxic; and dystopias.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 487 3 units; (3-0)**Advanced Studies in Children's Literature**

Contemporary approaches to selected works of historical and/or contemporary children's literature. Topics may include the Golden Age of children's literature; picture books; literacy; censorship in children's literature; gender and sexuality; genre; fan culture; reading in the digital age; storytelling; and diversity in children's books.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 491 3 units; (3-0)**Advanced Studies in Global Literatures**

Focused study of post-colonial, transnational, and/or diasporic literatures, with an emphasis on a selection region, author(s), and/or particular theoretical approaches.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 493 3 units; (3-0)**International Indigenous Literatures**

Focused study of writing by indigenous peoples in an international context. May be comparative in approach and/or focus on indigenous theoretical contexts.

Prerequisite(s): English 302 and one of 305 or 307.

English 495 3 units; (3-0)**Studies Across Literary History**

A historical or transhistorical examination of a literary theme, genre, form, and/or writing and publication practice.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

English 499 3 units; (3-0)**Topics in a Selected Author**

Advanced study of a selected author. A close look at one writer's oeuvre in social, historical, or theoretical contexts.

Prerequisite(s): 12 units of courses labelled English at 300 level or above.

MAY BE REPEATED FOR CREDIT**English 504** 6 units; (3S-0)**Honours Project**

Capstone seminar for English Honours students focusing on research methods and professional issues. Supports and includes the writing of the Honours thesis.

Prerequisite(s): 6 units of English at the 400 level, admission to the English Honours program and consent of the Department.

Note: Students are advised to consult with the English Department for information and advice by January 31 of the year in which they plan to register in English 504. See the departmental website for more information.

English 508 3 units; (3S-0)**Advanced Seminar in a Literary Genre**

An in-depth examination of a select literary genres in a critical context. Students will learn to develop research questions and conduct original research.

Prerequisite(s): 6 units of English at the 400 level.

MAY BE REPEATED FOR CREDIT**English 509** 3 units; (3S-0)**Advanced Seminar in Canadian Literature**

An in-depth examination of a topic in Canadian literature in its critical context. Students will learn to develop research questions and conduct original research.

Prerequisite(s): 6 units of English at the 400 level.

MAY BE REPEATED FOR CREDIT**English 515** 3 units; (3S-0)**Advanced Seminar in Global/Indigenous Contexts**

Advanced study of a particular topic in post-colonial, transnational, diasporic, and/or indigenous literary studies, with an emphasis on theoretical context. Students will learn to develop research questions and conduct original research.

Prerequisite(s): 6 units of English at the 400 level.

MAY BE REPEATED FOR CREDIT

English 517 3 units; (3S-0)

Advanced Seminar in Theoretical and Cultural Studies

An in-depth examination of a topic involving advanced theoretical inquiry. Students will learn to develop research questions and conduct original research.

Prerequisite(s): 6 units of English at the 400 level.

MAY BE REPEATED FOR CREDIT

English 519 3 units; (3S-0)

Advanced Seminar in a Historical Topic

An in-depth examination of historical literary or cultural texts in a critical context. Students will learn to develop research questions and conduct original research.

Prerequisite(s): 6 units of English at the 400 level.

MAY BE REPEATED FOR CREDIT

English 520 3 units; (3-0)

Community Engagement Through Literature

Combines classroom and community-based learning undertaken in association with the Calgary Public Library or other associated non-profit organizations that promote engagement with literature.

Prerequisite(s): Consent of the Department.

Note: Enrolment to this course is by application and subject to departmental approval.

English 523 3 units; (3S-0)

(formerly English 521)

Advanced Seminar in Book and Digital Culture

Advanced topics in book history, digital humanities, and new media.

Prerequisite(s): 6 units of English at the 400 level.

MAY BE REPEATED FOR CREDIT

English 525 3 units; (3S-0)

Advanced Seminar in a National or Transnational Literature

An in-depth examination of a national or transnational author, genre, or issue in a critical context. Students will learn to develop research questions and conduct original research.

Prerequisite(s): 6 units of English at the 400 level.

MAY BE REPEATED FOR CREDIT

English 527 3 units; (3S-0)

Advanced Seminar in a Selected Author

An in-depth examination of a selected author in a critical context. Students will learn to develop research questions and conduct original research.

Prerequisite(s): 6 units of English at the 400 level.

MAY BE REPEATED FOR CREDIT

English 529 3 units; (3S-0)

Advanced Seminar in Popular/Experimental Genres

An in-depth examination of works or author that operate outside the traditional literary canon. May include the study of such topics as new or emergent literary forms; the cultural products of fan or digital culture; comics; bestselling genres such as true crime, fantasy, or romance; art books; and formally experimental literature in a historical or contemporary context. Students will learn to develop research questions and conduct original research.

Prerequisite(s): 6 units of English at the 400 level.

MAY BE REPEATED FOR CREDIT

English 593 3 units; (3-0)

Studies in Creative Writing: Poetry

A close examination and discussion of the student's own work, with emphasis on advanced technique.

Prerequisite(s): Consent of the Department.

Note: One month before the class begins, prospective students must submit a portfolio of their own work for evaluation before consent to register for this course will be given. Details of this procedure are available from the Department of English.

MAY BE REPEATED FOR CREDIT

English 594 3 units; (3-0)

Studies in Creative Writing: Prose Fiction

A close examination and discussion of the student's own work, with emphasis on advanced technique.

Prerequisite(s): Consent of the Department.

Note: One month before the class begins, prospective students must submit a portfolio of their own work for evaluation before consent to register for this course will be given. Details of this procedure are available from the Department of English.

MAY BE REPEATED FOR CREDIT

English 595 3 units; (3-0)

Studies in Creative Writing: Creative Non-Fiction

A close examination and discussion of the student's own work, with emphasis on advanced technique.

Prerequisite(s): Consent of the Department.

Note: One month before the class begins, prospective students must submit a portfolio of their own work for evaluation before consent to register for this course will be given. Details of this procedure are available from the Department of English.

MAY BE REPEATED FOR CREDIT

English 598 6 units; (3-0)

The Book-Length Manuscript

A close examination and discussion of the student's own work, with emphasis on advanced technique.

Prerequisite(s): Consent of the Department.

Note: One month before the start of classes, prospective students must submit a portfolio of their own work for evaluation before consent of the Department will be given. Details of this procedure are available from the Department of English. Recommended preparation for English 598 is dependent on genre.

MAY BE REPEATED FOR CREDIT

Graduate Courses

English 603 3 units; (3S-0)

Topics in Genre

Specialized study of a topic involving a single genre or multiple genres.

MAY BE REPEATED FOR CREDIT

English 605 3 units; (3S-0)

Topics in National or Transnational Literatures

Specialized study of a topic in national or transnational literary studies, in a critical context.

MAY BE REPEATED FOR CREDIT

English 607 3 units; (3S-0)

Topics in Theoretical and Cultural Studies

Specialized study of a topic involving theoretical inquiry.

MAY BE REPEATED FOR CREDIT

English 609 3 units; (3S-0)

Topics in a Literary Period

Specialized study of a topic in a literary period in its critical context.

MAY BE REPEATED FOR CREDIT

English 677 3 units; (3S-0)
(formerly English 676)

Topics in Canadian Literature

Specialized study of a topic in Canadian literature in its critical context.

MAY BE REPEATED FOR CREDIT

English 681 3 units; (3S-0)
(formerly English 680)

Topics in Literary Criticism

Specialized study of a topic in the field of literary criticism.

MAY BE REPEATED FOR CREDIT

English 685 3 units; (3S-0)
(formerly English 684)

Special Topics

Specialized study of a topic in the field of literary studies.

MAY BE REPEATED FOR CREDIT

English 691 3 units; (3S-0)

Graduate Pro-seminar

Introduces incoming graduate students to critical skills and professional issues in graduate level literary studies.

NOT INCLUDED IN GPA

English 693 3 units; (3S-0)

Topics in Creative Writing: Poetry

A close examination and discussion of the student's own work, with emphasis on advanced technique.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

English 694 3 units; (3S-0)

Topics in Creative Writing: Prose Fiction

A close examination and discussion of the student's own work, with emphasis on advanced technique.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

English 695 3 units; (3S-0)

Topics in Creative Writing: Creative Non-Fiction

A close examination and discussion of the student's own work, with emphasis on advanced technique.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

English 698 6 units; (3S-0)

Topics in Creative Writing: The Book-Length Manuscript

A close examination and discussion of the student's own work, with emphasis on advanced technique in a selected genre(s).

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

English 710 3 units; (1-0)

Capstone Project

Independent research and original work to be undertaken under the direction of a faculty member in English, after all required course work has been completed.

Prerequisite(s): Consent of the Department.

NOT INCLUDED IN GPA

Entrepreneurship and Innovation ENTI

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Junior Course

Entrepreneurship and Innovation 201
3 units; (3-0)

Introduction to Business Venturing

Introduction to the various business disciplines from the perspective of creating a new business venture. The primary learning methodology is a term project; students identify a business opportunity, research the opportunity, and write a business plan for the business.

Antirequisite(s): Credit for Entrepreneurship and Innovation 201 and either Management Studies 217 or Strategy and Global Management 217 will not be allowed.

Note: Not available for credit towards the Bachelor of Commerce. Required for the Minor in Management and Society and the Minor in Entrepreneurship and Enterprise Development.

Senior Courses

Entrepreneurship and Innovation 317
3 units; (3-3T)

Entrepreneurial Thinking

Leaders in today's business environment are challenged to think entrepreneurially - to seek opportunities and find ways to turn opportunities into viable for-profit business ventures, social ventures or not-for-profit organizations. They are challenged to do more than just business; giving back to society is expected. The primary learning methodology is through a project in which an opportunity is identified, researched, and the results of a feasibility assessment are written and presented.

Prerequisite(s): Admission to the Haskayne School of Business, Management Studies 217 and Strategy and Global Management 217.

Entrepreneurship and Innovation 359
3 units; (3-0)

Selected Topics in Entrepreneurship and Innovation

Investigation of selected topics related to entrepreneurship and innovation, emphasizing both gener-

ally applicable practical applications and academic research, as well as specific industries or contexts.

Prerequisite(s): 24 units. For certain topics consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Entrepreneurship and Innovation 381
3 units; (3-0)

Principles of Entrepreneurship

Overview of the process of entrepreneurship with focus on the role of the entrepreneur in new venture initiative and development. Introduction to the processes involved in: idea generation, evaluation, business planning or operations.

Prerequisite(s): Entrepreneurship and Innovation 201.

Note: Not available for credit towards the Bachelor of Commerce.

Entrepreneurship and Innovation 401
3 units; (3-0)

Opportunity Identification

Application of knowledge of the processes involved in idea generation and evaluation ending in the technical, market, financial and human resource feasibility of a concept. Critical literature will be reviewed as it applies to the early stages of concept development and evaluation.

Prerequisite(s): Entrepreneurship and Innovation 317 or 381.

Entrepreneurship and Innovation 403
3 units; (3-0)

New Venture Planning

A project-based course in developing and writing a business plan for an existing and/or growth oriented venture. Focus will be given to the content, form and uses of a formal business plan.

Prerequisite(s): Entrepreneurship and Innovation 317 or 381.

Entrepreneurship and Innovation 405
3 units; (3-0)

New Venture Start-Up

Application of the strategies and tactics for the creation and growth of a potential new venture. Key questions in bringing together critical resources to launch a venture are addressed, and important empirical research in the field is reviewed. Project work participation is required.

Prerequisite(s): Entrepreneurship and Innovation 317 or 381.

Entrepreneurship and Innovation 407
3 units; (3-0)

Technology for Entrepreneurs

Explores emerging internet-based technologies and digital tools that support, improve and transform the nature of entrepreneurship. Involves hands-on exercises using various tools and practice providing technology recommendations.

Prerequisite(s): Entrepreneurship and Innovation 317 or 381.

Antirequisite(s): Credit for Entrepreneurship and Innovation 407 and 559.07 will not be allowed.

Entrepreneurship and Innovation 411
3 units; (3-0)

Technology Commercialization

Investigation of building the founding team, marketing, financing, hiring human resources, and

implementing growth strategies, emphasizing the practical application of theory and principles to a high technology business setting.

Prerequisite(s): Entrepreneurship and Innovation 201 or 317.

Antirequisite(s): Credit for Entrepreneurship and Innovation 411 and 559.06 will not be allowed.

Entrepreneurship and Innovation 413
3 units; (3-0)

Social Enterprise Strategies

Social enterprise uses the logic of business to solve social challenges. Explores themes on entrepreneurial thinking, business model development, impact measurement, and other issues to create and improve social enterprises.

Prerequisite(s): Entrepreneurship and Innovation 201 or 317.

Antirequisite(s): Credit for Entrepreneurship and Innovation 413 and 559.08 will not be allowed.

Entrepreneurship and Innovation 531
3 units; (3-0)

Entrepreneurship Law

Legal issues that commonly confront emerging businesses and the law impacting business decisions are addressed. Topics may include: corporate structure, directors' and officers' liability, financing and securities, intellectual property law, licensing, contractual interpretation and drafting, and other relevant legal issues.

Prerequisite(s): Business and Environment 395 or Entrepreneurship and Innovation 317 or 381.

Antirequisite(s): Credit for Entrepreneurship and Innovation 531 and 559.04 will not be allowed.

Entrepreneurship and Innovation 559
3 units; (3-0)

Selected Topics in Entrepreneurship and Innovation

Investigation of selected topics related to entrepreneurship, venture development and family business, emphasizing the practical application of theory and principles to actual business situations and venture opportunities.

Prerequisite(s): Entrepreneurship and Innovation 317 or 381. For certain topics consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Entrepreneurship and Innovation 601
3 units; (3-0)

Entrepreneurial Thinking

Business leaders are challenged to think entrepreneurially - to seek opportunities and find ways to turn opportunities into viable ventures. These may be for-profit, not-for-profit, or social ventures. Students will engage in experiential learning to complete a feasibility assessment of such an opportunity, including the concept of giving back to society.

Entrepreneurship and Innovation 672
1.5 units; (3-1T)

Thinking like an Entrepreneur

Focuses on identifying and successfully exploiting opportunities by applying research and analytical tools. Some of the topics covered include design thinking and business modelling.

Prerequisite(s): Admission to the Master of Management program.

Entrepreneurship and Innovation 674 1.5 units; (3-IT)

Innovation in Organizations

Focuses on innovation in different organizational contexts (e.g. established and start-up organizations, public and privately owned, or government and not-for-profit).

Prerequisite(s): Admission to the Master of Management program.

Entrepreneurship and Innovation 731 3 units; (3-0)

New Venture Law

Legal principles impacting business decisions regarding new venture creation, growth and routine business operations. Topics may include: corporate structure, directors' and officers' liability, financing, intellectual property law, contracts and regulations.

Antirequisite(s): Credit for Entrepreneurship and Innovation 731 and 797.02 will not be allowed.

Entrepreneurship and Innovation 735 3 units; (3-0)

Cultivating Entrepreneurship and Innovation

Designed to leverage innovative and effective ideas so as to take advantage of opportunities, effectively incorporate innovation and entrepreneurship throughout the organization, and create an environment where new ideas that add value must be an organizational priority.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Entrepreneurship and Innovation 781 3 units; (3-0)

Introduction to Entrepreneurship

An experience-based course covering the prestart-up stage of business development through group projects and case studies designed to provide experience-based skill development in creativity, idea generation, and feasibility analysis.

Entrepreneurship and Innovation 783 3 units; (3-1)

Opportunity Development

A project- and case-based course designed to explore concepts of opportunity development.

Entrepreneurship and Innovation 785 3 units; (3-0)

Venture Development

A project-based course designed around the formation of business concepts in the formalization of a business plan.

Entrepreneurship and Innovation 787 3 units; (3-0)

Applied Business Analysis

Approaches to advising new and existing ventures on effective venture development. Projects will involve the student conducting analysis of several ventures and providing advice to them.

Prerequisite(s): Marketing 601 or consent of the Haskayne School of Business.

Entrepreneurship and Innovation 789 3 units; (3S-0)

Seminar in Entrepreneurship and Innovation

Study and discussion of current research literature and contemporary issues on topics related to Entrepreneurship and Innovation.

MAY BE REPEATED FOR CREDIT

Entrepreneurship and Innovation 791 3 units; (3-0)

Technology Commercialization

The process of taking a technology product or service from development to the market, including market strategies, finding investors and potential early customers, the role of advisors, legal issues and the importance of the exit strategy for founders and early stage investors. Students will be required to complete a major project to write a feasibility study for a new technology or a case study of a successful technology venture.

Entrepreneurship and Innovation 793 3 units; (3-0) (formerly Entrepreneurship and Innovation 797.03)

Technology and Innovation Management

The dynamics of innovation as the primary driving force within firms and modern industrialized economies. Potential concepts are: incremental versus radical innovations, market-pull versus technology-push theories, dominant designs, technological trajectories, key factors for successful innovation. The emergence of new technologies; the importance of national and regional innovation systems; the role of science, regulations and social pressure in innovations dynamics; knowledge management; and implications for firms in rapidly changing industrial settings may be discussed.

Entrepreneurship and Innovation 797 3 units; (3S-0)

Advanced Seminar in Entrepreneurship and Innovation

Intensive study and discussion of current literature and research with respect to selected, advanced topics in Entrepreneurship and Innovation. May include formal academic or applied research project.

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Entrepreneurship and Innovation 799 3 units; (3S-0)

Doctoral Seminars in Venture Development

799.01. Entrepreneurship: The State of the Art

799.02. Conceptual Models and Theories of New Venture Development

799.03. Special Topics in Entrepreneurship and Innovation

799.04. Advanced Topics in Entrepreneurship

Environmental Design EVDS

For more information about these courses see the School of Architecture, Planning and Landscape website: evds.ucalgary.ca/.

Environmental Design 401 3 units; (3-0)

Introduction to Architecture, Planning and Landscape Architecture

An examination of the central concepts of architecture, planning and landscape architecture delivered in an online format.

Environmental Design 402 3 units; (3-0)

Design, Digital Technology and the Built Environment

An introduction to the fundamental principles underlying modern digital technology-based systems, from a design of the built environment perspective. Topics include The

Attention Economy, Big Data, Surveillance Capitalism, Ambient Intelligence, the Internet of Things, Opaque and Transparent Algorithms, Biocreeepiness, and Systems Thinking. No specific technical background is required. Participants will complete a design project on a topic of personal interest.

Environmental Design 502 3 units; (3-0)

Designing Powerful Communication

Accurate and persuasive communication is becoming increasingly vital to accomplish our goals, whether they are to present research, defend a thesis, or make a compelling argument in the workplace. Participants will iteratively design professional quality oral presentations on a topic of personal interest. In addition to understanding the psychology of communication, students will learn how to determine which communication techniques are most appropriate for specific purposes.

Environmental Design 523 3 units; (3-0)

Sustainability in the Built Environment

The principle of sustainability recognizes people as temporary stewards of their environments, working toward a respect for natural systems and a higher quality of life. Examination of the built environment and the tools to achieve a stable and balanced and a regenerative ecosystem in a process of responsible consumption, wherein waste is minimized and the built environment interacts with natural environments and cycles. Healthful interior environments, resource efficiency, ecologically benign materials, renewable energies and social justice issues are examined.

Antirequisite(s): Credit for Environmental Design 523 and Architectural Studies 423 will not be allowed.

Environmental Design 583 3 units; (3-0)

Special Topics in Environmental Design

Thematic inquiry and design related to environmental design topics.

MAY BE REPEATED FOR CREDIT

Environmental Design 597 1.5 units; (3-0)

Special Topics in Environmental Design

Thematic inquiry and design related to environmental design topics.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Environmental Design 601 3 units; (3-0)

Conceptual Bases of Environmental Design
Conceptual frameworks in Environmental Design and theories related to design and environment that influence environmental design thinking, research, and practice.

Note: Students are strongly encouraged to complete Environmental Design 601 prior to entering their second registration year.

Environmental Design 603 3 units; (0-8)

Introduction to Design Thinking

Foundation concepts in design and form making involving a sequence of progress skill building, visual and spatial thinking and problem solving exercises.

Antirequisite(s): Credit for Environmental Design 603 and Environmental Design Architecture 580 will not be allowed.

Environmental Design 616 3 units; (3-0)**Urban Infrastructure and Land Use**

Acquaints students with the key infrastructure systems of a city. Examines current policies, standards and practices, challenges, and innovations in the following infrastructure sectors: water, sewage, waste management, open space, energy, transportation, and communication. Discusses the relationship between infrastructure systems and land use, and its impacts on quality of life, economic development, spatial structure, and the environment. Emphasis is given to green infrastructure development. The course also examines various financial and institutional frameworks for delivering infrastructure systems, and how they vary across different contexts.

Environmental Design 620 6 units; (0-8)
(formerly Environmental Design 618)**Urban Design Studio**

This studio aims to further develop skills in conceptualization and visualization through consideration of contemporary urban design issues. It includes documentation and analysis of urban form and process, and explores site planning and design of the public realm. Issues of local and regional identity and sustainability inform the approach of the studio.

Prerequisite(s): Environmental Design Planning 636 or Environmental Design Landscape 667.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design 621 3 units; (3-0)**Health in the Built Environment**

Concepts of health in an environmental context; historic approaches to preventative medicine; medical basis of building-related illness; case studies in indoor air quality; strategies for prescription and design of healthy indoor environments.

Environmental Design 622 3 units; (3-0)**Real Estate Development and Finance**

Focuses on the principles of real estate development and finance. Provides hands-on experience through real-world simulations and case studies. Goal is for students to gain a basic understanding of the planning process in real estate development, including private public partnerships, and development impacts. Introduces fundamental tools for conducting an economic and fiscal analysis of real estate proposals. Students will have an opportunity to develop a pro forma as part of a risk assessment. Other topics include the use of GIS for location studies and market assessment.

Environmental Design 624 3 units; (3-0)**Impact Assessment and Risk Management**

EIA is the process of identifying, predicting, evaluating and mitigating the environmental effects of development proposals prior to major decision-making. Biophysical, economic and social impact assessment will be reviewed in an integrated, interdisciplinary approach which will include lectures, studies of methodologies, theory and practical problems, and discourse with practitioners. Federal and various Provincial environmental impact assessment policies and procedures will be critically analyzed.

Environmental Design 628 3 units; (3-0)**Housing and Neighbourhood Change**

Considers urban growth management, affordable housing, suburban growth and inner-city redevelopment, current suburban development patterns, as well current municipal goals regarding

density and intensification and precedents/best practices. Theoretical understanding and practical insights into these issues through assessment of the social, economic, and spatial aspects related to housing and neighbourhood change.

Environmental Design 630 3 units; (3-0)**Geography of Crime**

Introduces the fields of environmental criminology and the social and geographic aspects of crime. Explores the reasons why certain neighbourhoods, and certain features of neighbourhoods, tend to promote or discourage criminal activity. Special emphasis is placed upon the relationship between crime and the environment, crime prevention, spatial dynamics of crime, the criminality of place and the decision processes involved in criminal events. Ethical considerations and privacy aspects will be addressed throughout.

Prerequisite(s): Admission to the Certificate in Designing Smart and Secure Communities.

Environmental Design 632 3 units; (3-0)**Designing Safe Communities**

Based on the established training curriculum for certification of the SAFE Design Council, with supplementary material to increase the theoretical foundations of the topics. The SAFE Design Standard® begins with the assessment of the risk posed to a site by outside factors, and then includes an assessment of site access points, wayfinding and signage, pathways and roadways, barriers and fencing, visibility and illumination, mechanical and electronic security, and other design elements intended for controlling access and movement within a building or site.

Prerequisite(s): Environmental Design 630.

Environmental Design 634 3 units; (3-0)**Designing Smart Communities**

Provides an introduction to the emerging field of Smart Communities, showcasing groups and individuals that have made a conscious and deliberate effort to use information and communications technology (ICT) to transform the community's life and work in significant and fundamental ways. Smart Communities may be physical or virtual, and the concept is more about the creative use of ICT infrastructure than merely building it. The social, economic, technical, design and ethical aspects of Smart Communities will all be considered.

Prerequisite(s): Environmental Design 630.

Environmental Design 636 3 units; (3-0)**Integrative Project**

A capstone project course involving an independent, guided research project, which builds on student interests and faculty expertise. The projects may be completed individually or in small groups. The course will involve an initial face-to-face project definition session, online mentoring throughout the project, and final presentations on lessons learned and future research directions.

Prerequisite(s): Environmental Design 630, 632 and 634.

Environmental Design 640 6 units; (0-8)
(formerly Environmental Design 623)**Regional Planning Studio**

An overview of the history and theory of regional planning and an overview of regional planning institutional frameworks and issues in a Canadian regional planning context. Understanding current regional planning issues and institutional, legislative and policy frameworks in a Canadian land use planning context related to growth management, resource extraction, infrastructure and services,

transportation, strategic planning, water and airshed management. A review and examination of regional land use planning and policy tools and role of regional planners in inter-jurisdictional and transboundary government and public-private stakeholder engagement mechanisms. Preparation of a plan.

Prerequisite(s): Environmental Design Planning 636 or Environmental Design Landscape 667.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design 643 3 units; (3-0)**Field Studies**

Introduction to the architecture, urban landscape, planning issues, design culture and other relevant faculty topics in an international setting. Specific destination and itinerary in any given year are dependent on availability and interest. Through a week long field trip students will learn about the built and natural environment of the selected city and its context.

Prerequisite(s): Admission to Environmental Design graduate degree program.

Environmental Design 650 3 units; (3-0)**Theories of Sustainable Urban Design**

Covers contemporary urban design history as well as seminal urban design theory. Also includes a review of the most up-to-date research in sustainable urban design, including its relationship to public health, global warming and adaptability to climate change trends.

Prerequisite(s): Admission to the Certificate in Sustainable Urban Design.

Environmental Design 652 6 units; (0-6)**Site/Context Analysis and Sustainable Design Studio**

Introduces the student to an analytical and comprehensive approach for understanding a project's site and context. Provides the student with tools and methods for the implementation of a sustainable urban design proposal in different climatic, environmental and cultural settings.

Prerequisite(s): Environmental Design 650.

Environmental Design 654 3 units; (3-0)**Green Infrastructure and Land Use**

Acquaints the student with the latest knowledge and technology in green urban infrastructure and sustainable practices of land use planning, including aspects of winter city design. Includes various site visits to state-of-the-art infrastructure facilities and lectures from invited experts.

Prerequisite(s): Environmental Design 652.

Environmental Design 656 6 units; (0-6)**Advanced Urban Design Studio**

Provides the opportunity for the integration of all the knowledge acquired in Environmental Design 650, 652 and 654. Includes the development of a comprehensive sustainable urban design proposal based on site and context analysis. The project site will be situated in Calgary and will involve local community advocates, developers, planners and engineers.

Prerequisite(s): Environmental Design 654.

Environmental Design 660 3 units; (3-0)**Principles of Historic Conservation**

Provides a foundation to historic conservation. Focuses on principles and theories pertaining to preservation and restoration practices; recognition of architectural periods, styles, and construction methods in context of the evolution of cultural

landscapes; the definition of significance and integrity in buildings and districts; strategies by which buildings and their settings have been preserved and used; and methods of reading and interpreting the cultural environment. Also includes a review of the most up-to-date research in heritage conservation.

Environmental Design 662 3 units; (3-0)

Heritage Conservation Policy and Planning

This practice-based course prepares students to act in some capacity as manager, architect, planner, and policy maker for historic sites and buildings. Provides an overview of the aspects of heritage conservation related to policy and planning. Reviews preservation policy and jurisdictional issues within a community development context, addresses complex social equity considerations associated with historic designation, examines economic incentives, and explores preservation philosophy and historic impact assessments. Includes visits to heritage sites and lectures from invited experts.

Environmental Design 664 3 units; (3-0)

Sustainability and Historic Preservation

Examines the role of historic preservation in the context of pragmatic, social, economic and environmental imperatives of sustainable community development. Topics to be addressed include a range of historic examples of sustainable cultural practices, building envelope assessments, pathology and retrofit of heritage buildings, current trends of adaptive reuse of historic sites and case studies of effective implementation of heritage legislation in historic buildings. Although grounded in international experience and precedents, the course emphasizes relevance to western Canadian history and regional building traditions. Includes visits to heritage sites and lectures from invited experts.

Environmental Design 668 3 units; (3-0)

Advanced Heritage Conservation Project

Provides an opportunity to work in an interdisciplinary manner to address real issues related to heritage conservation. Includes the development of a comprehensive heritage conservation proposal based on site and context analysis of a site in Alberta. The project will use the framework of the Historic Places Initiative (Identify, Protect and Preserve) to document buildings, districts and cultural landscapes and to interpret their historical and architectural significance. An Identification component will consider heritage resource documentation and evaluation; a Protection component will review heritage legislation, regulatory frameworks, and incentive programs; and a Preservation component will examine standards and guidelines, and preservation strategies and techniques.

Environmental Design 671 3 units; (3-0)

Urban Design Theory

Intended to provide students with an introduction to theories, concepts, methods and contemporary issues in urban design. The course consists of lectures, case studies, seminars and short projects.

Environmental Design 675 3 units; (3-0)

Urban Systems

Provides a general overview of urban history, development and planning traditions. Lectures and field studies give a chronological overview of urban, architectural and design history and the inter-relation to political programs, economic and strategic planning as well as cultural nationalism.

The course will extract a number of more general issues about contemporary cities for debate.

Prerequisite(s): Admission to Environmental Design graduate degree program.

MAY BE REPEATED FOR CREDIT

Environmental Design 683 3 units; (3-0)

Advanced Special Topics in Environmental Design

Thematic inquiry and design related to environmental design topics.

MAY BE REPEATED FOR CREDIT

Environmental Design 697 1.5 units; (3-0)

Advanced Special Topics in Environmental Design

Thematic inquiry and design related to environmental design topics.

MAY BE REPEATED FOR CREDIT

Environmental Design 703 1.5 units; (0-3)

Directed Study in Environmental Design

Thematic research, readings or design studio project related to environmental design topics.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Environmental Design 711 3 units; (0-8)

Theoretical Basis for Interdisciplinary Intervention and Design

Comparisons and contrasts among disciplinary, multidisciplinary and interdisciplinary intervention and research. Focus on interdisciplinary teamwork knowledge and skills, on the ability to integrate research into professional real world contexts and on the ability to communicate research results effectively. This course is open only to students registered in a PhD program.

Environmental Design 723 3 units; (0-6)

Interdisciplinary Intervention in Environmental Design

Interdisciplinary teams will tackle client-based real world environmental design problems. Intervention strategies and design as a problem-solving approach to complex urban, ecological, social, and technological interactions will be addressed.

723.02. Sustainable Futures and Planning Scenarios

723.03. People and Technology

Environmental Design 753 3 units; (3-0)

Research Skills and Critical Thinking

Exploration of the research process in an environmental design context and using design as a method of research. Design of innovative research methods appropriate for environmental design research. Development of skills in research design and critical thinking while writing a research proposal.

MAY BE REPEATED FOR CREDIT

Environmental Design 783 3 units; (0-3)

Directed Study in Environmental Design

Thematic research, readings or design studio project related to urban design, architecture, environmental design topics.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Environmental Design 793 3 units; (0-8)

Workshop in Environmental Design

Instruction and supervised experience in the use of tools and equipment for the development of study models, prototypes and graphic material related to student projects.

Prerequisite(s): Consent of the Faculty.

Environmental Design 797 3 units; (3-0)

Preceptorship

A Preceptorship is a study and training arrangement made between a student and an employer or an equivalent supervisor which has specific educational objectives, a method of evaluation, and is an integral part of a student's Program of Studies. Preceptorships offer a number of benefits: acquiring skills and knowledge which may be better obtained outside the University; developing first-hand experience of professional design practice; preparing for more focused studies in the Faculty; and conducting research.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Environmental Design Architecture EVDA

For more information about these courses see the School of Architecture, Planning and Landscape website: evds.ucalgary.ca/.

Environmental Design Architecture courses are only open to students in the Master of Architecture program.

Environmental Design Architecture 511 3 units; (3-0)

Building Science and Technology I

Functioning of the building enclosure: demonstration of the behaviour of building elements and their sub-assemblies under differential temperature and pressure stresses; fundamentals of acoustics; nature and use of building materials; response of building materials to climatic cycles radiation, precipitation, heating and cooling.

Prerequisite(s): Admission to the Master of Architecture Program.

Antirequisite(s): Credit for Environmental Design Architecture 511 and Architectural Studies 449 will not be allowed.

Environmental Design Architecture 523 3 units; (3-0)

History of Architecture and Human Settlements

A survey history of architecture and human settlement from the prehistoric times until the present. The first course addresses the premodern traditions of the major world cultures. The second course explores the traditions of the Western world from the beginning of the Italian Renaissance until the present. The courses will examine the changes in world view that have altered the course of

architecture through the study of selected works of architecture and urbanism.

523.01. History of Architecture and Human Settlements I - Premodern Traditions of the World.

523.02. History of Architecture and Human Settlements II - The Rise of Modernity, 1750 to Present.

Prerequisite(s): Admission to the Master of Architecture Program.

Antirequisite(s): Credit for Environmental Design Architecture 523 and Architectural Studies 457 will not be allowed.

Environmental Design Architecture 541
3 units; (0-8)

Graphics Workshop I

A skill building course with instruction and supervised experience in basic drafting, sketching and rendering; principles of perspective, drawing and presentation conventions. A variety of instruction may be offered to accommodate the varied level of student development.

Prerequisite(s): Admission to the Master of Architecture Program.

Corequisite(s): Environmental Design Architecture 580.

Antirequisite(s): Credit for Environmental Design Architecture 541 and Architectural Studies 451 will not be allowed.

Environmental Design Architecture 543
3 units; (0-8)

Graphics Workshop II

Instruction and supervised experience in drafting, sketching and rendering; drawing and presentation conventions. Builds on Environmental Design Architecture 541. A variety of instruction may be offered to accommodate the varied level of student development.

Prerequisite(s): Environmental Design Architecture 541, 580 and admission to the Master of Architecture Program.

Corequisite(s): Environmental Design Architecture 582.

Antirequisite(s): Credit for Environmental Design Architecture 580 and Architectural Studies 453 will not be allowed.

Environmental Design Architecture 580
(formerly Environmental Design 503)
6 units; (0-8)

Studio I – Design Thinking

Foundation concepts in design and form making involving a sequence of progress skill building, visual and spatial thinking and problem-solving exercises.

Prerequisite(s): Admission to the Master of Architecture Program.

Corequisite(s): Environmental Design Architecture 541.

Antirequisite(s): Credit for Environmental Design Architecture 580 and Architectural Studies 484 will not be allowed.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design Architecture 582
6 units; (0-8)

Studio II in Architecture

An introduction to the application of ordering principles of architecture and to the numerous layers that contribute to the quality of inhabitation of place and space through design. Issues explored include the formal, the experiential and the theo-

retical concerns of architectural design in today's cultural context.

Prerequisite(s): Environmental Design Architecture 541, 580 and admission to the Master of Architecture Program.

Corequisite(s): Environmental Design Architecture 543.

Antirequisite(s): Credit for Environmental Design Architecture 582 and Architectural Studies 444 will not be allowed.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Graduate Courses

Environmental Design Architecture 611
3 units; (3-0)

Building Science and Technology II

Theory and principles of structural, foundation and building service systems. Application of building science principles to building structure and enclosure, examination of the types and manufacture of building elements and the application of building components to specific problems in architecture.

Environmental Design Architecture 613
3 units; (3-0)

Structures for Architects I

Fundamentals of Structural Analysis including the characteristics and performance of the various components of structures; the terminology and notation necessary for effective teamwork with structural engineering consultants; and basic design calculations for simple structures.

Environmental Design Architecture 615
3 units; (3-0)

Environmental Control Systems

Approaches to the design of heating, cooling, and ventilation systems for buildings. Issues in system design such as energy efficiency and indoor air quality.

Environmental Design Architecture 617
1.5 units; (3-0)

Architectural Lighting Design

Fundamentals of light and visual perception. Approaches to the design of non-uniform and uniform lighting systems for buildings. Issues in system design such as human satisfaction, performance and energy efficiency. Development of skills in the selection and design of lighting systems.

Environmental Design Architecture 619
3 units; (3-0)

Structures for Architects II

Advanced structural systems for buildings including: structural connections and composite structures; system characteristics and architectural intent; and case studies in contemporary building structures.

Environmental Design Architecture 621
3 units; (3-0)

Introduction to Design Theories

The contemporary cultural, social, and philosophical arenas in which architecture exists are examined through lectures, readings and seminars.

Environmental Design Architecture 661
3 units; (3-0)

Architectural Professional Practice

The nature of the building industry, stakeholders and many of the participants and their responsibilities. Brings together the theoretical framework of the architect's role in society with the practicality of managing a practice. Project management and office administration, trends, liabilities and systems for project control such as building economics; cost analysis and estimating techniques; and cost controls during design and construction.

Environmental Design Architecture 665
1.5 units; (3-0)

Leadership in Architecture

The practice of architecture deals with complex design requirements, diverse groups of people, changing processes, evolving contexts, and a range of modes of production. This course introduces students to a broad set of contemporary themes around the concept of leadership and architecture.

Environmental Design Architecture 682
6 units; (0-8)

Intermediate Architectural Design Studio

An intermediate design studio in which students work on projects defined by the instructor. Topics may vary from year to year and are determined by the creative interests of the faculty assigned to the course. Enrolment may be limited.

682.02 Intermediate Studio

682.04 Comprehensive Design Studio

Prerequisite(s): For 682.02: Environmental Design Architecture 582. For 682.04: Environmental Design Architecture 682.02.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design Architecture 703
3 units; (0-3)

Directed Study in Architecture

Research and readings in architecture and design related to the Senior Research Studio in Architecture.

MAY BE REPEATED FOR CREDIT

Environmental Design Architecture 782
6 units; (0-8)

Senior Research Studio in Architecture

A research design studio in which students collaborate with design faculty in exploring projects that engage contemporary issues defining the built and natural environments.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

Environmental Design Landscape EVLD

For more information about these courses see the School of Architecture, Planning and Landscape website: evds.ucalgary.ca/.

Graduate Courses

Environmental Design Landscape 603
3 units; (2-2)

Site Technology I: Grading and Landform

Provides a working knowledge of grading, landform and storm water management systems

and techniques. Covers fundamentals and advanced technologies including GPS grading and landform manipulation.

Environmental Design Landscape 605
3 units; (2-2)

Site Technology II: Construction and Materials

Provides a working knowledge of landscape construction methods and materials through practical application of theories and techniques via a design project.

Environmental Design Landscape 607
3 units; (2-2)

GIS for Landscape Architecture

Application of GIS modelling techniques to landscape planning, design and management issues. Advanced consideration of GIS for spatial planning and application to studio and research projects.

Environmental Design Landscape 609
3 units; (0-3)

Advanced Digital Design, Representation and Communication for Landscape Architecture

Digital media offers a variety of tools and techniques to experiment, communicate and visualize their ideas and to collaborate with colleagues, allied professionals, and the public. Provides instruction in current methods and techniques of digital media used in the research and practice of landscape architecture, as well as state-of-the-art communication, collaboration and visualization hardware and software.

Environmental Design Landscape 629
3 units; (3-0)

Landscape Architecture History and Theory

An introduction to the history, theory and contemporary issues of landscape architecture. Develop a critical awareness of major conceptual frameworks, and the socio-political contexts in which they developed, both conceptually and in realized projects.

Environmental Design Landscape 639
3 units; (2-2)

Landscape Responses to Climate Change, Energy and Water

Identifies landscape-oriented solutions to local and global issues of climate change, energy, and water problems through research and project proposals. Provides the opportunity to identify the most pressing local, regional or international issues and develop solutions.

Environmental Design Landscape 641
3 units; (2-2)

Green Infrastructure/Winter City Design

An introduction to the systems of urban and regional resource management through targeted green infrastructure projects, particularly in a winter city context. Provides background on current methods, the state-of-the-art, and research and development that will shape future technologies. Identifies contemporary approaches, sociocultural, and ecological concepts for using plant material in landscapes, green roofs and biomass.

Environmental Design Landscape 643
3 units; (3-0)

Professional Practice and Project Management for Landscape Architecture

An introduction to the professional practice of landscape architecture. Includes the legal and ethical frameworks for practice, as well as project management.

Environmental Design Landscape 645
3 units; (3-0)

Plants in the Landscape

Introduces students to plant taxonomy, plant identification, and planting design. Covers both natural and designed landscapes, and focuses on plant materials appropriate in the context of Calgary and region.

Environmental Design Landscape 667
6 units; (0-8)

Landscape Architecture Studio I

An integration of skills and processes developed to this point in the program through an investigation into a topical, issue-based problem, and development of solution(s) in a landscape context.

Prerequisite(s): Environmental Design Planning 625.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design Landscape 668
6 units; (0-8)
(formerly Environmental Design Landscape 677)

Landscape Architecture Studio II

An integration of skills and processes developed to this point in the program through an investigation into a topical, issue-based problem, and development of solution(s) in a landscape context. Builds on skills and knowledge from previous studios and is a progression in terms of complexity and design process.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design Landscape 767
6 units; (0-8)

Regional Landscape Systems Studio

An introduction to landscape planning and design at the regional scale. Particular emphasis on the interrelationships between biophysical (i.e. ecological, geological) systems and anthropogenic (i.e. social, political, economic) systems and processes as agents of landscape transformation, and determinants of form.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design Landscape 777
6 units; (0-8)

Senior Research Studio in Landscape Architecture

A research-oriented project studio that explores contemporary themes in landscape architecture. Centres on a real world problem or project; the analysis of issues and context, and the formulation of a comprehensive design solution involving advanced methods, techniques and practices.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design Planning EVDP

For more information about these courses see the School of Architecture, Planning and Landscape website: evds.ucalgary.ca/.

Graduate Courses

Environmental Design Planning 602
3 units; (2-2)
(formerly Environmental Design 602)

Computer Modelling for Urban Design

Introduction to the use of computer modelling, animation and virtual reality in urban design. Professional CAD and rendering applications will be used to explore the aesthetic and technical aspects of design. Emphasis given to developing sensitivity to the application appropriate to communicating three dimensional urban and natural form using computer generated images.

Corequisite(s): Environmental Design Planning 625.

Environmental Design Planning 611
3 units; (2-2)
(formerly Environmental Design 611)

Geographic Information Systems for Environmental Design

Introduction to the use of GIS in urban planning and environmental management. GIS modelling focusing on population projection, location theory, land use modelling and environmental and ecological management. Case studies from both the public and private sector provide the basis of assignments. Emphasis given to developing sensitivity to the application appropriate for specific GIS problems.

Environmental Design Planning 621
3 units; (3-0)

Professional Planning Practice

Considers various plans, policies, regulatory processes, legal institutions and administrative frameworks involved in urban and regional planning. Examines the role of planners in municipal development processes related to land use re-designations, development permits, subdivision and appeals. Discusses professional planning issues including ethics, relationships with clients, the public, and other professions. Discusses practice options for graduates including professional certification/registration.

Environmental Design Planning 625
3 units; (0-8)

Site Planning Studio

Introduction to urban design practice. Emphasizes sense of place, human behaviour/built form relationships and sustainability. Completion of a series of progressively complex site planning projects. Skills development in hand and computer-aided drawing to describe, document and analyze urban form and processes and to develop physical plans.

Corequisite(s): Environmental Design Planning 602.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design Planning 626
3 units; (4-4)
(formerly Environmental Design 626)

Landscape Ecology and Planning

Key concepts in ecology, landscape ecology and environmental science relevant to planning at landscape scales. Principles of urban ecology, regional landscape ecology, watershed management and parks and protected area design are coupled with knowledge of landscape processes, ecosystem services, ecological infrastructure, and habitat to assess planning interventions in the built and natural environments. Skills are developed in geographic information systems (GIS) for monitoring the current state

of landscapes and potential challenges to landscape function and for proposing solutions to these challenges. Includes guest speakers from government and industry, GIS exercises and field visits to various areas within the region.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design Planning 627 3 units; (3-0)

Planning History and Theory

An introduction to theories and practices of planning with a focus on the late nineteenth century to the present. Explores the forces that shaped cities/regions and key ideas/models invented in response. Examines the relationship between theory/practice and past/present. Explores the influence of planners, architects, landscape architects, and others on planning theory and resulting physical form. Presents case studies and examples in the Canadian context. Develops a critical awareness of the roles of environmental design professionals within a framework that of technical, social, environmental and political factors.

Environmental Design Planning 632 1.5 units; (3-0)
(formerly Environmental Design Planning 631)

Planning and Public Engagement

Overview of key principles and theories, and contemporary issues and tools of participation and public engagement as it applies to planning. Consideration of public engagement, facilitation, negotiation and conflict resolution processes from the point of view of community activists, city planners, developers and planning/design professionals. Development and implementation of public engagement plans.

Environmental Design Planning 634 3 units; (3-1)
(formerly Environmental Design Planning 633)

Project Management for Planners

Principles, techniques and tools of project management. Development, administration, monitoring and evaluation of implementation plans, including financial aspects are discussed. Project risk analysis and management.

Environmental Design Planning 635 3 units; (3-0)

Analytic Methods for Planners

Approaches to identify, gather and critically analyze strategic information needed to assess planning situations and support decision-making. Focuses on both quantitative and qualitative planning methods. Techniques to present information effectively.

Environmental Design Planning 636 6 units; (0-8)
(formerly Environmental Design Planning 637)

Community Planning Studio

Introduction to land use planning and development issues. Provides a step-by-step introduction to community planning processes and essential planning policies to create development that is economically feasible, socially inclusive and environmentally sustainable.

Prerequisite(s): Environmental Design Planning 625.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Design Planning 644 6 units; (0-8)

Advanced Professional Planning Studio

An advanced studio exploring contemporary themes in planning and professional planning practice. Centres on a real world problem or client project; involves analysis, synthesis, and formulation of a planning or urban design solution. Culminates in a professional report and presentation.

Prerequisite(s): Environmental Design Planning 625; 636 or 637; and one of Environmental Design 618, 620, 623 or 640.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Engineering ENEN

For more information about these courses, see Centre for Environmental Engineering Research & Education (CEERE): schulich.ucalgary.ca/ceere/graduate.

Graduate Courses

Environmental Engineering 603 3 units; (3-0)

Principles of Environmental Engineering

Mass and energy balance for reacting and non-reacting environmental engineering systems under steady state and unsteady state conditions. Fundamentals of momentum, heat and mass transfer as applied in air and water pollution. Thermodynamic and phase equilibria considerations. Contaminant partitioning and transport in air, surface water and groundwater. Chemical reaction kinetics. Application of ideal continuously stirred tank reactor (CSTR) and plug flow reactor (PFR) concepts in environmental engineering. Residence time distribution (RTD) and reactor non-idealities. Introduction to life cycle analysis.

Environmental Engineering 605 3 units; (3-0)

Environmental Chemistry and Microbiology

Chemistry of organic and inorganic contaminants in the environment. Natural chemical cycles in the biosphere, geosphere, hydrosphere and atmosphere, and consequences of anthropogenic disturbances. Aquatic, atmospheric and soil chemistry. The fate of hazardous, refractory and heavy metal pollutants in the environment. Introductory toxicological chemistry and atmospheric chemistry. Analytical techniques for contaminants in air, water, energy and soil. Introductory microbiology: characteristics and classification of microorganisms, kinetics and mathematical models of microbial growth, applications in environmental engineering. Introduction to ecology.

Environmental Engineering 616 3 units; (3-0)

Environmental Fluid Mechanics

Overview of fluid mechanics fundamentals; Boundary layer theory; Turbulence theory; Turbulent structures; Simulation of environmental flow and transportation of air pollutants; Dynamics of particulates dispersed in gases; Environmental applications (Two-phase flow and particulate removal); Turbulence and dispersion in low atmosphere).

Antirequisite(s): Credit for Environmental Engineering 616 and any of Mechanical Engineering 616, 619.06 or Environmental Engineering 619.11 will not be allowed.

Environmental Engineering 619 3 units; (3-0)

Special Topics

New courses on specialized topics relevant to environmental engineering. It may also be offered to doctoral degree students to enable them to pursue advanced studies in particular areas under the direction of a faculty member, which must be arranged and approved prior to registration.

MAY BE REPEATED FOR CREDIT

Environmental Engineering 620 3 units; (3-0)

Water Quality

Water quality parameters, indicators of water pollution, pesticides, nutrients and other contaminants in water, fate and distribution of effluents in water bodies, water treatment options.

Environmental Engineering 621 3 units; (3-0)
(Chemical Engineering 701)

Experimental Design and Error Analysis

Statistical analysis and design of engineering experiments. Random variables and sampling distributions; estimation and hypothesis testing; concepts of central tendency, variability, confidence level; correlation, regression and variation analysis; robust estimation; experiments of evaluation; experiments of comparison; factorial experiments (analysis of variance); experimental designs (involving randomization, replication, blocking and analysis of covariance).

Antirequisite(s): Credit for Environmental Engineering 621 and Chemical Engineering 701 will not be allowed.

Environmental Engineering 623 3 units; (3-0)

Air Dispersion Modelling

Regulations and policy. Mathematical models of contaminant transport in the atmosphere. Atmospheric thermodynamics. Turbulence in the planetary boundary layer. Turbulence and air pollution meteorology. Gaussian plume. Gradient transport and higher-order closure models. Point, area and line sources. Similarity theories. Basic statistical methods applied to turbulent flows. Urban air shed modelling. Theoretical development and practical applications to engineering problems. Air dispersion modelling using computer software.

Environmental Engineering 625 3 units; (3-0)

Numerical Methods for Engineers

Introduction, mathematical modelling, sources of errors in the process of numerical analysis and solution methodology; Elements of numerical analysis, Taylor series, round-off error, truncation error, concept of stability, consistency and convergence; Linear algebra, normal forms, Gauss elimination method, LU-decomposition, tridiagonal systems of equations; iterative methods, Jacobi, Gauss-Seidel, SOR, SSOR methods, conjugate gradient methods and preconditioning and principles of the multi-grid methods; Elliptic "equilibrium" equation, Laplace and Poisson equations, finite difference and finite control volume concepts and stability analysis; Parabolic equations: explicit, implicit and Crank-Nicolson methods, time-splitting method, method of lines, Stability analysis; Hyperbolic equations; Introduction to other methods; future challenging problems.

Antirequisite(s): Credit for Environmental Engineering 625 and Mechanical Engineering 625 will not be allowed.

Environmental Engineering 627 3 units; (3-0)

Contaminant Transport

Mathematical models for contaminant transport in ground water. Flow/transport through porous

media, advection, dispersion, diffusion. Sources and sinks. Applications of analytical finite element and finite difference equations, Environmental modelling using computer software.

Environmental Engineering 630 3 units; (3-0)
(Geomatics Engineering 645)

Spatial Databases and Data Mining

Comprehensive overview of spatial database management systems and issues related to spatial data mining. Topics include: overview of spatial databases, spatial concepts and data models, spatial query languages, spatial storage and indexing, spatial networks, spatial data mining, and trends in spatial databases.

Environmental Engineering 631 3 units; (3-0)

Spatial Statistics for Environmental Modelling

Spatial statistics for topological, geometric and geographic properties. Spatial statistical models for data having an explicit spatial distribution. Basic and advanced methods in geo-spatial statistics for point, area and continuous variables. All levels (from visual to analytical) of possible spatial analysis techniques are examined for each type of variable and applications in environmental modelling are used to illustrate the concepts.

Environmental Engineering 633 3 units; (3-0)

Fuzzy Logic for Environmental Engineering

Complex, non-linear, or ambiguous system models. Fuzzy set theory, fuzzy logic operations, fuzzification and de-fuzzification. Development of membership functions, fuzzy system simulation, Rule-based reduction methods, Fuzzy classification and pattern recognition, Fuzzy arithmetic and extension principle, Fuzzy Control and Fuzzy cognitive mapping, applications in environmental engineering.

Environmental Engineering 635 3 units; (2-2)
(Geomatics Engineering 583)

Environmental Modelling

Nature and purpose of environmental modelling; the top-down and the bottom-up approaches; typology of environmental models; definition of fundamental concepts; steps involved in designing and building a model; calibration, verification and validation of models; scale dependency; sensitivity analysis; characteristics, architecture and functioning of selected environmental models.

Environmental Engineering 637 3 units; (3-0)
(Geomatics Engineering 637)

Earth Observation for the Environment

An introduction to environmental earth observation systems in particular to satellite platforms. Topics include: discussion of physical principles; imaging system geometries; radiometric corrections, including calibration and atmospheric correction; spatial filtering for noise removal and information extraction; geometric corrections, including rectification and registration; fusion of multi-dimensional datasets; and application of satellite images in addressing selected environmental issues.

Antirequisite(s): Credit for Environmental Engineering 637 and Geomatics Engineering 637 or 655 will not be allowed.

Environmental Engineering 639 3 units; (3-0)
(Geomatics Engineering 694)

Advanced Topics in Sensor Web and Internet of Things

Overview of the sensor web architecture and algorithms, with a focus on Internet of Things. Topics include: sensor web data management, sensor web search and discovery, sensor web

server design and implementation, interoperability issues, sensor-based analytics and visualization, introduction to sensor networks, and trends in sensor web and Internet of Things.

Environmental Engineering 641 3 units; (3-0)
(Chemical Engineering 643)

Air Pollution Control Engineering

Introduction to air quality and air pollution. Energy and air pollution. Fossil fuel combustion and related air pollution. Industrial air pollution control. Control of particulate matter. Control of VOCs, SO_x, and NO_x. Adsorption, absorption and biofiltration of air pollutants. GHG emission control. Recent advances on related topics.

Antirequisite(s): Credit for Environmental Engineering 641 and Chemical Engineering 643 will not be allowed.

Environmental Engineering 643 3 units; (3-0)

Air Pollutant Sampling and Characterization

Fundamentals and principles of air pollutant sampling and characterization. Kinematics of gases. Principles of gaseous pollutant sampling. Aerosol technology. Isokinetic sampling. Statistics and data analyses for airborne particulate matter. Particle size and concentration measurements. Indoor air quality assessment.

Environmental Engineering 645 3 units; (3-0)
(Electrical Engineering 645)

Data Mining and Machine Learning

Types of data mining: classification, clustering, association, prediction. Processes: data preparation, model building. Techniques: decision tree, neural network, evolutionary computing, Bayesian network. Applications: multi-media, text and web mining.

Environmental Engineering 647 3 units; (3-0)
(Electrical Engineering 661)

Grid-Connected Inverters for Alternative Energy Systems

Analysis and design of grid-connected inverters fed by an alternative energy source. Switch mode converters, inverter topologies, harmonics, drive electronics, control methodologies, implementation techniques, course project.

Environmental Engineering 651 3 units; (3-0)

Solid Waste Engineering

Analysis and implementation of solid waste minimization strategies. Aerobic biological treatment of waste. Landfill bioreactors for energy recovery. Performance-based design of landfills, soil-chemical interactions and implications. Leachate migration in unsaturated/saturated zones. Design and construction of barrier systems. Leachate collection systems. Landfill closure issues. Life cycle assessment of waste management systems.

Environmental Engineering 653 3 units; (3-0)
(Civil Engineering 747)

Contaminated Soil Remediation

Overview of soil remediation engineering. Contaminant partitioning in air, water and gas phases. Phases of site assessments, Physical and chemical treatment processes, soil vapour extraction, air sparging, soil washing, soil flushing, thermal desorption and incineration, solidification and stabilization, vitrification, biological treatment processes, bioremediation kinetics, ex situ and in situ techniques. Liquid phase bioremediation as it pertains to soil remediation.

Antirequisite(s): Credit for Environmental Engineering 653 and Civil Engineering 747 will not be allowed.

Environmental Engineering 655 3 units; (3-0)
(Civil Engineering 745)

Hazardous Waste and Contaminated Sites Management

Integrated waste management. Functional and fundamental properties of hazardous waste. Toxicological properties of contaminants. Contaminant release mechanisms. Fate and transport of contaminants in the environment. Contaminated site assessment principles. Quantitative human health risk assessment (QHHRA) as applied to contaminated sites. Hazard identification, exposure pathway analysis, risk characterization. Risk management and site remediation. Methods of hazardous waste treatment and contaminated site remediation. Secure land disposal of hazardous waste and contaminated soils and sludges.

Antirequisite(s): Credit for Environmental Engineering 655 and Civil Engineering 745 will not be allowed.

Environmental Engineering 661 3 units; (3-0)
(Chemical Engineering 645)

Industrial and Produced Wastewater Treatment

Sources and characterization of industrial wastewater. Treatment objectives and regulations. Unit and process design. Physical/chemical treatment including sedimentation, coagulation, filtration, absorption, adsorption, ion exchange, membrane processes and pH adjustment.

Antirequisite(s): Credit for Environmental Engineering 661 and Chemical Engineering 645 will not be allowed.

Environmental Engineering 663 3 units; (3-0)
(Civil Engineering 741)

Biological Processes for Wastewater Treatment

Specialized biological wastewater treatment processes for removal of impurities not effectively removed by conventional secondary wastewater treatment systems, such as nutrients (e.g. nitrogen and phosphorus), residual organics, residual solids, bacteria and viruses. Wetlands. Activated sludge modelling. Biological nutrient removal. Sludge management. Disinfection.

Antirequisite(s): Credit for Environmental Engineering 663 and Civil Engineering 741 will not be allowed.

Environmental Engineering 665 3 units; (3-0)
(Chemical Engineering 665)

Wastewater Issues for the Oil and Gas Industry

Produced water characteristics, regulations governing produced water management, management options. Technologies used for produced water treatment, novel/emerging technologies. Process design approaches and comparative evaluation of various technologies. Case Studies.

Antirequisite(s): Credit for Environmental Engineering 665 and Chemical Engineering 665 will not be allowed.

Environmental Engineering 671 3 units; (3-0)

Energy and Environment

Introduction to formation, extraction, transportation and conversion of fossil fuels; electricity generation, transmission and distribution; thermal power and cogeneration; nuclear power; renewable energy sources; energy efficiency and conservation; energy analysis; greenhouse gas emissions; air, land and water pollution and their mitigation.

Environmental Engineering 673 3 units; (3-0)
(Mechanical Engineering 637)**Thermal Systems Analysis**

Fundamentals of thermodynamics, fluid mechanics and heat transfer; thermal and energy systems, heat exchangers, co-generation; Second law of thermodynamics and concept of entropy generation and thermo-economics; Environmental issues and pollution control; Renewable energy system; Co-generation design; Heat exchanger design; Energy storage systems; Optimization process.

Antirequisite(s): Credit for Environmental Engineering 673 and Mechanical Engineering 637 will not be allowed.

Environmental Engineering 681 3 units; (0-6)**Project in Environmental Engineering I**

Allows course-based MEng degree students with the opportunity of pursuing advanced studies or a design project in environmental engineering under the direction of one or more faculty members, which must be arranged and approved prior to registration. A written proposal, progress reports, and a final report are required.

Prerequisite(s): Consent of the Centre.

Antirequisite(s): Credit for Environmental Engineering 681 and 682 will not be allowed.

Note: Available to course-based MEng degree students only after completing most other courses for the degree.

Environmental Engineering 682 6 units; (0-6)**Project in Environmental Engineering II**

Allows course-based MEng degree students with the opportunity to work on a comprehensive research or design project under the supervision of one or more faculty members, which must be arranged and approved prior to registration. A written proposal, progress reports, and a final report are required.

Prerequisite(s): Consent of the Centre.

Antirequisite(s): Credit for Environmental Engineering 682 and 681 will not be allowed.

Note: Available to course-based MEng degree students only after completing most other courses for the degree.

Environmental Engineering 691 3 units; (3-0)**Environmental Policy Analysis**

An examination of the policy tools used in decision-making related to the environment, the course aims to facilitate dialogue between political scientists and engineers. Topics include: risk analysis; decision analysis; uncertainty assessment; and benefit-cost analysis. The structure and evolution of environmental regulation will be used as a theme with an emphasis on energy.

Antirequisite(s): Credit for Environmental Engineering 691 and Political Science 755.31 will not be allowed.

Environmental Engineering 693 3 units; (3-0)**Life Cycle Assessment**

Concepts of life cycle assessment. Consideration of environmental and economic impacts from the extraction of resources to the disposal of unwanted residuals. Review and evaluation of tools and frameworks (e.g. process, input-output, hybrid life cycle assessment). Relative merits of various methods for interpreting and valuing the impacts. Examples of applications in environmental engineering and the energy industry.

Antirequisite(s): Credit for Environmental Engineering 693 and Environmental Design 683.85 will not be allowed.

Environmental Science ENSC

For more information about these courses contact the Environmental Science Program: ucalgary.ca/ensc/.

Limited amounts of non-scheduled class time involvement will be required for these courses.

Junior Course**Environmental Science 201 3 units; (3-0)****Introduction to Environmental Science**

Topical issues in environmental science including climate change, aquatic systems, agriculture, forestry, mining, energy, endangered species, and protected areas contextualized within the framework of law, policy, economics, sustainability, and the precautionary principle.

Senior Courses**Environmental Science 401 3 units; (160 hours)****Environmental Science Field Course I**

An introduction to the common field techniques in quantifying air, land and water quality, as well as data analysis and report writing. A field portion is held in the two weeks prior to the start of the regular Fall Term, partly based at the Biogeoscience Institute's Barrier Lake Field Station.

Prerequisite(s): Geography 339 or Biology 315 or Statistics 327 and admission to the Environmental Science program.

Note: This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Science 501 3 units; (160 hours)**Environmental Science Field Course II**

The focus will be on disturbances to aquatic and terrestrial ecosystems. Site visits and data collection will be conducted to appropriate areas that have either undergone or are undergoing industrial disturbance to assess impacts. The course is held for two weeks immediately prior to the start of the regular Fall Term.

Prerequisite(s): Environmental Science 401 and admission to the Environmental Science program.

Note: This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee will be assessed to cover additional costs associated with this course.

Environmental Science 502 6 units; (3-0)**Special Problems in Environmental Management**

Aspects of the professional practice of environmental science including environmental management and assessment, sustainability, life cycle assessment, remediation/reclamation technologies, law and regulations, ethics, philosophy and communication. Includes a major collaborative research project on a local environmental issue.

Prerequisite(s): Admission to the Environmental Science program.

Corequisite(s): Prerequisite or Corequisite: Environmental Science 401.

Environmental Science 503 3 units; (3-0)**Environmental Assessment and Hearings**

An introduction to federal and provincial environmental impact assessment (EIA), which is implicit

in much of Environmental Science 401, 501 and 502.

Prerequisite(s): Admission to the Environmental Science program.

Environmental Science 504 6 units; (0-9)**Research Project in Environmental Science**

An independent study or research project under the supervision of one or more faculty members in the Environmental Science program. Originality is emphasized and laboratory and/or field studies are encouraged. Formal written and oral reports will be presented as a necessary component of this course.

Prerequisite(s): Consent of the Environmental Science Program Director.

MAY BE REPEATED FOR CREDIT**Environmental Science 505 3 units; (0-9)****Special Problems in Environmental Science**

A research project under the supervision of one or more faculty members in the Environmental Science program. Formal written and oral reports will be presented as a necessary component of this course.

Prerequisite(s): Consent of the Environmental Science Program Director.

MAY BE REPEATED FOR CREDIT**Film FILM**

For more information about these courses see the Department of Communication, Media and Film website: commfilm.ucalgary.ca/.

Junior Courses**Film 201 3 units; (1-1T-3)****Introduction to Film Studies**

An introduction to the foundational issues and vocabulary of film studies explored through a wide range of filmic texts. Privileging questions of film technique and style, the course also considers cinema as an institution that comprises an industrial system of production, social and aesthetic norms and codes and particular modes of reception.

Film 203 3 units; (2-3)**Introduction to Research in Film Studies**

An in-depth introduction to conducting research in film studies, emphasizing critical viewing, reading and writing through the examination of a specific topic, such as a film genre, a national cinema, or a filmmaker.

Corequisite(s): Prerequisite or Corequisite: Film 201.

Note: Recommended for (but not limited to) students who intend to Major or Minor in Film Studies.

Senior Courses**Film 301 3 units; (2-3) or (3-0)****Topics in National Cinema**

Topics will explore various aspects of, or historical moments in, a particular nation's cinematic culture. Topics might include Quebecois cinema, current British cinema, German cinema Between the Wars, Canadian cinema, the History of Chinese cinema, etc.

MAY BE REPEATED FOR CREDIT

Film 305 3 units; (2-3) or (3-0)

Topics in Genre

Topics will focus on the style, narrative form, and historical evolution of selected genres, for example, the Documentary, the Western, the Melodrama, the Musical, etc.

MAY BE REPEATED FOR CREDIT

Film 307 3 units; (2-3) or (3-0)

Topics in Cinema and Gender Studies

Topics will explore the representation of gender and sexuality in cinema. Topics might include: Images of Women in the American 1940s, Lesbian Images in Current Cinema, The Queer 1950s, Comparative Images of Women in American and French Cinema, etc.

MAY BE REPEATED FOR CREDIT

Film 321 3 units; (2-3)

History of Popular Cinema

An assessment of the various ways in which the history of film production can be approached, including the development of filmmaking technologies, evolutions in cinematic style and narrative traditions, particularly as they relate to popular cinema, and changing industrial practices.

Prerequisite(s): Film 201.

Film 323 3 units; (2-3) or (3-0)

Issues in Film History

An introduction to key concepts in cinematic historiography. Emphasis will be placed upon non-traditional or non-canonical films and their relationship to dominant histories of filmmaking.

Prerequisite(s): Film 201.

Film 331 3 units; (2-3)

Film Theory up to 1950

An introduction to theoretical perspectives on film before the mid-twentieth century. Connects film with broader debates on aesthetics, medium specificity, genre, and realism. Includes theories developed in the first half of the twentieth century related to Silent Film, Formalism, Montage, Critical Theory, and Auteur theories.

Prerequisite(s): Film 201.

Film 333 3 units; (2-3)

Film Theory after 1950

An introduction to theoretical perspectives on film developed since the mid-twentieth century, specifically Structuralism, Linguistics, Psychoanalysis, Feminism, Post-structuralism, Cultural Studies, Post-colonialism and Queer Theory.

Prerequisite(s): Film 201.

Film 351 3 units; (2-3) or (3-0)

Canadian Film

An introduction to key historical and theoretical aspects of Canadian film. Topics will include the study of Canadian film auteurs, documentary and social change, feature film genres, and the role of government regulations. Explores the central themes and issues facing Canadian filmmakers and audiences.

Antirequisite(s): Credit for Film 351 and Canadian Studies 331 will not be allowed.

Film 401 3 units; (2-3)

Topics in Film Theory

Topics will be organized around particular theorists, schools of theory, historical issues in film culture, or contemporary thought on film. Topics

may include: Psychoanalysis and/as Film Theory; Kaja Silverman and Teresa de Lauretis; Modernism and Post-modernism; Feminist Film Theory; Queer Theory and Film; Post-colonial Theory and Film; Semiotics.

Prerequisite(s): Film 331 or 333.

MAY BE REPEATED FOR CREDIT

Film 403 3 units; (2-3) or (3-0)

Topics in the Director's Cinema

Topics will examine the distinctive style and concerns of a particular director or directors.

Prerequisite(s): Film 201.

MAY BE REPEATED FOR CREDIT

Film 405 3 units; (2-3) or (3-0)

Advanced Topics in Film Genre

Topics will be organized around a specific film generic tradition.

Prerequisite(s): Film 201 and one of 305 or 321.

MAY BE REPEATED FOR CREDIT

Film 407 3 units; (0-4)

Experiential Learning in Film

Provides the opportunity to combine interests in film studies research with experiential learning opportunities in the community and workplace (internships, paid employment, approved film production training or volunteer position).

Prerequisite(s): Film 201, admission to the BA in Film Studies or the Bachelor of Film Studies and consent of the Department.

Film 409 3 units; (2-3) or (3-0)

Special Topics in Film Studies

Topic may be historical, theoretical or analytical in emphasis.

Prerequisite(s): One of Film 321, 331 or 333.

MAY BE REPEATED FOR CREDIT

Film 441 3 units; (2-3)

The Film Festival

An exploration of the social practices (cultural tourism, tastemaking, identity formation, celebrity and star formation) and operational aspects (marketing, promotion, jurying, lobbying, audience cultivation) of film festivals. Students will be encouraged to participate in community service learning through volunteer opportunities with a particular festival.

Prerequisite(s): Film 321.

Film 451 3 units; (2-3)

The Canadian Film Industry: National and Global Perspectives

A study of the nature of the Canadian film industry. Emphasis will be on the evolution of the Canadian motion picture industry in the twentieth century and how it is situated in contemporary popular culture. Other topics include Canada's historic relationship to Hollywood, the audience for Canadian films, the role of the state in funding, distribution and production systems, the impact of new technologies, and how the structure of Canada's film industry compares with those of other countries.

Prerequisite(s): 3 units of Film, Communication and Media Studies, Communications Studies, or Canadian Studies at the 300 level.

Film 461 3 units; (2-3)

Film Audience and Reception

Explores aspects of spectatorship, audience and reception approaches as they intersect with the experience and study of cinema.

Prerequisite(s): One of Film 321, 331 or 333.

Film 471 3 units; (2-3)

Experimental Film and Video

Explores the genre of experimental film and video. Particular emphasis will be given to the history and evolution of works in this genre with attention to Canadian contributions and the impact of digital and new media.

Prerequisite(s): One of Film 321, 331 or 333.

Film 501 3 units; (0-1T)

Research in Selected Topics in Film Studies

Supervised individual study of a special topic.

Prerequisite(s): Consent of the Department.

Note: Students who wish to propose a topic must secure a supervisor among the Film instructors and have the topic approved by the Department at least two weeks prior to the first day of classes.

MAY BE REPEATED FOR CREDIT

Film 509 3 units; (2-3)

Advanced Special Topics in Film Studies

Selected topic in film studies suitable for advanced studies in the degree. Topic may be historical, theoretical or analytical in emphasis.

Prerequisite(s): 6 units of Film at the 400 level.

MAY BE REPEATED FOR CREDIT

Film 591 3 units; (2-3)

Senior Seminar in Film Studies

Explores the variety of ways in which film and the technologies of motion pictures connect with social life with reference to a specific topic. Completion of a major project that will integrate understanding of film theory, history and genres.

Prerequisite(s): Admission to the BA in Film Studies and 78 units, of which, 6 units must be taken from Film 321, 323, 331, or 333.

Film 595 3 units; (2S-0)

Honours Seminar

Individual research and seminar activities (e.g., critiques, presentations, and peer reviews of drafts) to produce a proposal and a paper to be used as the basis for the honours thesis.

Prerequisite(s): Admission to BA Honours Film Studies.

Antirequisite(s): Credit for Film 595 and Film 590 or Communication and Media Studies 590 will not be allowed.

Film 597 3 units; (0-1)

Honours Thesis

Supervised individual research and preparation of an honours thesis. Incorporating material from the Film 595 final paper, to complete the honours thesis.

Prerequisite(s): Film 595 and admission to BA Honours in Film Studies.

Antirequisite(s): Credit for Film 597 and Film 590 or Communication and Media Studies 590 will not be allowed.

Graduate Courses

For graduate courses, please see the listing in the Communication and Media Studies (COMS) section.

Finance FNCE

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses

Finance 317 3 units; (3-3T) or (3-1.5T)

Financial Management

An introduction to the allocation of financial capital, from a theoretical as well as a practical perspective. The course builds on a modern understanding of how risk, time horizon, and market imperfections each affect the value of real and financial assets. Topics include time value of money, the risk-return trade-off, financial investing, corporate financing, and corporate investing.

Prerequisite(s): Admission to the Haskayne School of Business, 30 units including Mathematics 249 or 251 or 265 or 281, Economics 201 and 203, Statistics 213 and 217, Accounting 217 or 317, and Business and Environment 291 or Management Studies 217.

Antirequisite(s): Credit for Finance 317 and either 341 or 343 will not be allowed.

Finance 341 3 units; (3-0)

Canadian Business Finance

An introduction to business financial management practices in Canada including investment decision, capital markets, and sources, uses and costs of capital over short, intermediate and long run situations.

Prerequisite(s): 30 units.

Antirequisite(s): Credit for Finance 341 and 317 will not be allowed.

Note: Not available for credit toward the Bachelor of Commerce degree. Preference in enrolment is given to students who have declared a Management and Society Minor.

Finance 343 3 units; (3-3T)

Personal Financial Management

An introduction to personal financial management practices in Canada. Topics discussed may include goal setting, personal financial statements, the mathematics of personal finance, taxation, general and life insurance, retirement planning, investments, and estate planning. Completion of the course should enable students to properly prepare and plan their own financial future.

Prerequisite(s): 30 units.

Antirequisite(s): Credit for Finance 343 and either 317 or 477 will not be allowed.

Note: Not available for credit toward the Bachelor of Commerce degree. Preference in enrolment is given to students who have declared a Management and Society Minor.

Finance 443 3 units; (3-0)

Security Analysis and Investments

A comprehensive exploration of security analysis and investments aimed at advancing understanding of financial markets, risk, arbitrage, market efficiency, portfolio selection, and valuation techniques. Topics such as capital allocation, diversification, risk-assessment, and security (stocks and bonds) valuation are covered.

Prerequisite(s): Admission to the Haskayne School of Business and Finance 317.

Finance 445 3 units; (3-0)

Futures and Options

Extensive introduction to the operation of derivative markets and the valuation of derivative

securities. Typical derivatives including forward and future contracts, options, and interest rate derivatives will be covered.

Prerequisite(s): Admission to the Haskayne School of Business, Finance 317 and 443.

Finance 447 3 units; (3-0)

Capital Budgeting

Capital investment policies, real options, required rate of return calculation, tax factors, risk analysis, buy versus lease, abandonment considerations.

Prerequisite(s): Admission to the Haskayne School of Business, Finance 317 and 451.

Finance 449 3 units; (3-0)

Trading and Market Data Management

Introduction to accessing data feeds as they are used by professional financial market traders and analysts. Data for stock, bond, futures and options markets, accounting statements and securities commission filings, as well as real-time and historical news events and analysis will be studied. Practice trading securities in a simulated environment.

Prerequisite(s): Admission to the Haskayne School of Business, Finance 317 and consent of the Haskayne School of Business.

Antirequisite(s): Credit for Finance 449 and Management Studies 559.15 will not be allowed.

Note: Enrolment is strictly limited by the Haskayne School of Business.

Finance 451 3 units; (3-0)

Corporate Finance

A deeper understanding of topics such as capital budgeting, capital structure, valuation, payout policy, and financing decisions.

Prerequisite(s): Admission to the Haskayne School of Business and Finance 317.

Finance 461 3 units; (3-0)

International Finance

A study of the forces affecting the financial environment of the corporate sector which appear to stem from requirements in the international sector. Balance-of-payments problems, exchange rates, currency risk hedging techniques, international reserve creations and transfers are some of the major elements studied.

Prerequisite(s): Admission to the Haskayne School of Business, Finance 317 and 443.

Finance 463 3 units; (3-0)

Portfolio Theory and Management

Analysis of the major aspects of the grouping of financial assets. Portfolio analysis and its application to portfolio management, capital market theory and the measurement of financial performance in the presence of risk.

Prerequisite(s): Admission to the Haskayne School of Business, Finance 317 and 443.

Finance 465 3 units; (3-0)

Mergers and Acquisitions

A study of the economic theory and practical issues around takeover and takeover defence strategies. Valuation issues, corporate restructuring, corporate governance, and methods of ensuring congruence between management and shareholder goals are also discussed.

Prerequisite(s): Admission to the Haskayne School of Business, Finance 317 and 451.

Antirequisite(s): Credit for Finance 465 and 559.01 will not be allowed.

Finance 467 3 units; (3-1T)

Financial Risk Management

A framework for evaluating financial risks and managing them with the use of financial securities including derivatives. Includes firm valuation with risk management, value-at-risk, testing financial models, optimal hedging strategies, energy risk management, market risk, static versus dynamic strategies, interest rate risk, credit risk and liquidity risk. Case analysis of financial disasters due to risk management failures.

Prerequisite(s): Admission to the Haskayne School of Business, Finance 317 and 443.

Finance 471 3 units; (3-0)

The Calgary Portfolio Management Trust

A comprehensive hands-on review of the modern theories and applications of portfolio management. Students will be responsible for completing the fiduciary duties of an actual fund manager, reporting to a Board of Trustees. Topics may include: selecting securities, hedging with covered options, benchmarking a portfolio, financial reporting, evaluation of risk, risk/return trade-offs and management.

Prerequisite(s): Admission to the Haskayne School of Business and Finance 317.

Note: Enrolment is strictly limited by the Haskayne School of Business.

Finance 473 3 units; (3-0)

New Venture Finance

Application of financial theory and analysis to the valuation and financing of new ventures. Course balances learning of concepts, development of analytical skills, and practice in decision making. Opportunity to apply learning to live projects.

Prerequisite(s): Admission to the Haskayne School of Business and Finance 317.

Finance 475 3 units; (3-0)

Management of Financial Institutions

Management of funds and their allocation among cash, primary reserves, loans and investments to provide liquidity and earnings. Services to depositors. Consideration of factors involved in the lending decision, pricing of services, branch location, etc. Strategies for maintaining profitability and liquidity in the face of changing monetary policy.

Prerequisite(s): Admission to the Haskayne School of Business, Finance 317 and 451.

Finance 477 3 units; (3-3T)
(formerly Management Studies 577)

Personal Financial Management in Canada

An introduction to personal financial management in Canada. Topics covered may include goal setting, personal financial statements analysis, the time value of money, the Canadian personal income tax system, taxation issues for small businesses, risk management, an introduction to investments, retirement planning and estate planning. Students will be expected to display a comprehensive knowledge of the tools necessary to complete their own personal financial plan.

Prerequisite(s): Admission to the Haskayne School of Business and 48 units including Finance 317.

Antirequisite(s): Credit for Finance 477 and 343 or Management Studies 559.03 will not be allowed.

Note: This course may not be used towards the Finance concentration.

Finance 479 **3 units; (3-0)**

Corporate Risk Management

Introduction to the management of operational and hazard risks based on contemporary financial theories, including risk identification, loss estimation, risk control, risk financing with insurance and other techniques, and enterprise risk management.

Prerequisite(s): Admission to the Haskayne School of Business and Finance 317.

Finance 559 **3 units; (3-0)**

Selected Topics in Financial Management

Investigation of selected topics related to financial management, emphasizing the application of financial management principles to actual problems in the corporate sector.

Prerequisite(s): Admission to the Haskayne School of Business and Finance 317. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Finance 601 **3 units; (3-0)**

Managerial Finance

The major decision-making areas confronting modern financial managers today. Provides a general understanding of financial markets and how they can be used for personal finance. Covers traditional subjects such as capital budgeting, net present value, risk/return, capital structure and dividend policy. Topical areas covered are IPOs, mergers and acquisitions, derivatives and options. The course is integrated with current events from the financial world.

Prerequisite(s): Accounting 601.

Finance 672 **1.5 units; (3-1T)**

Introduction to Finance

Covers the basic analytical tools and theoretical foundations for financial decisions. Topics include: financial markets and instruments, time value of money, valuation of assets and projects under certainty and uncertainty, corporate financing policy and financial risk management.

Prerequisite(s): Admission to the Master of Management program.

Finance 674 **1.5 units; (3-1T)**

Special Topics in Finance

Introduction to modern financial tools which may include: entrepreneurial finance, investment management, financial institutions, mergers and acquisitions, capital raising and investment banking. Some of the sub-topics will include: blockchain and bitcoin, equity crowdfunding and peer-to-peer lending, robo-dash advisors, big data in finance and early-stage financing.

Prerequisite(s): Admission to the Master of Management program.

Finance 737 **3 units; (3-0)**

Finance and Governance for Managers

Introduction to basic and advanced concepts of financial management, and application of the tools of financial analysis from the standpoint of the CEO and C-level executives. Topics include ratio analysis, risk concepts, valuation principles, capital budgeting, cost of capital, interest rates, time value of money, leverage, capital structure, dividend policy, financial instruments, working capital

management, short- and long-term financing, mergers and acquisitions, and long-range financial planning. The relationship between financial policy and corporate strategy is examined. The broad framework of corporate governance, including incentive structures, monitoring systems, agency problems, payout policies, capital structure, board and ownership structure, executive compensation and corporate control is also covered, with a special focus on accounting and auditing as corporate governance devices.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Finance 745 **3 units; (3-0)**

Futures and Options

After presenting basic definitions, institutional details, and strategies, a general theory of derivative pricing based on the principle of No Arbitrage will be developed. This theory will then be applied to the basic derivative contracts (futures, forwards, put options and call option) as well as exotic options. Using the binomial model, as well as the continuous time model of Black Scholes, hedging and replication will also be examined.

Prerequisite(s): Finance 601.

Finance 751 **3 units; (3-0)**

Advanced Topics in Financial Administration

Classical and contemporary topics in the theory and practice of financial management including capital structure, cost of capital, real options valuation, bankruptcy costs and debt holder-equity holder conflicts, corporate financial strategy, managerial incentives and financial decisions, information conveyed by financial decisions, and mergers and acquisitions.

Prerequisite(s): Finance 601.

Finance 753 **3 units; (3-0)**

Problems in Financial Management

The application of financial management principles to real-world problems in the corporate sector, including such areas as working capital management, project financing, debt vs. equity financing, payout policy and reorganization.

Prerequisite(s): Finance 601.

Finance 755 **3 units; (3-0)**

Capital Budgeting

Capital investment policies, real options, required rate of return calculation, tax factors, risk analysis, buy versus lease, abandonment considerations.

Prerequisite(s): Finance 601.

Finance 757 **3 units; (3-0)**

Management of Financial Institutions

Financial intermediaries such as banking and brokerage. Explains the risks faced by institutions and the integration through modern financial markets. Covers issues such as lending, trading, securitization, deposit insurance and the regulatory environment. Concludes with modern bank management from the shareholder value point of view.

Prerequisite(s): Finance 601.

Finance 759 **3 units; (3-0)**

Investment and Portfolio Management

Theory and analysis of investment and portfolio management decisions. Main topics include capital allocation, diversification, risk-assessment, and security (stocks and bonds) valuation.

Prerequisite(s): Finance 601.

Finance 765 **3 units; (3-0)**

Mergers and Acquisitions

A study of economic theory and practical issues around takeover strategies, and takeover defence strategies. Valuation issues, corporate restructuring, corporate governance, and methods of ensuring congruence between management and shareholder goals are also discussed.

Prerequisite(s): Finance 601.

Finance 767 **3 units; (3-0)**

Financial Risk Management

A framework for evaluating financial risks and managing them with the use of financial securities including derivatives. Includes firm valuation with risk management, value-at-risk, testing financial models, optimal hedging strategies, energy risk management, market risk, static versus dynamic strategies, interest rate risk, credit risk and liquidity risk. Case analysis of financial disasters due to risk management failures.

Prerequisite(s): Finance 601.

Finance 777 **3 units; (3-0)**
(formerly Management Studies 761)

Personal Financial Management in Canada

Introduction to personal financial management in Canada. Goal setting, personal financial statements analysis, the time value of money, the Canadian personal income tax system, taxation issues for small businesses, risk management, an overview of investments, retirement planning and estate planning. Completion of a personal financial plan by the end of the course.

Prerequisite(s): Finance 601.

Note: May not be used as part of a student's major in Finance.

Finance 785 **3 units; (3-0)**

New Venture Finance

Problems of valuing and financing new ventures. Emphasis on financial theory, best practices and modelling of new ventures. Case studies and opportunities to develop detailed financial plan for live new venture.

Prerequisite(s): Finance 601 or consent of the Haskayne School of Business.

Finance 789 **3 units; (3S-0)**

Seminar in Financial Management

Intensive study and discussion of current literature and research with respect to selected, advanced topics in Finance.

MAY BE REPEATED FOR CREDIT

Finance 795 **3 units; (3-0)**

International Finance

A study of the international financial environment and the issues firms face when operating in this environment. Currency regimes, currency crises, balance of payments, exchange rate and interest rate parity conditions, supernational agencies, political risks, management of foreign exchange exposure are some of the major topics studied.

Prerequisite(s): Finance 601.

Finance 797 **3 units; (3S-0)**

Advanced Seminar in Finance

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Finance 799 **3 units; (3S-0)****Doctoral Seminars in Finance**

- 799.01. Theory of Finance
 799.02. Empirical Methods in Finance
 799.03. Topics in Finance
 799.04. Financial Engineering
 799.05. Theory of Corporate Finance
 799.06. Asset Pricing
 799.07. Topics in Asset Pricing and Corporate Finance

Fine Arts FINA

For more information, see the Department of Art: art.ucalgary.ca.

Graduate Courses**Fine Arts 601** **3 units; (0-3)****Studies at the Banff Centre**

Interdisciplinary fine arts studies. Although the Banff Centre does not provide credit course instruction, students with advanced experience in art, dance, drama or music at the Banff Centre may apply for graduate-level credit from the University of Calgary.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

French FREN

Pour de plus amples informations, veuillez consulter le site Internet de la School of Languages, Linguistics, Literatures and Cultures: sllc.ucalgary.ca/.

Information sur le test de placement, voir 4.59 Placement in Language Courses.

For more information about these courses, see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

Language Placement information see 4.59 Placement in Language Courses.

Junior Courses**French 209** **3 units; (3-1)****Beginners' French I**

Basic elements of the French language, including training in comprehension, speaking, reading and writing of French.

Antirequisite(s): Credit for French 209 and any of 20, 30, or 31 will not be allowed

Note: See 4.59 Placement in Language Courses.

French 211 **3 units; (3-1)****Beginners' French II**

A continuation of French 209.

Prerequisite(s): French 20 or French 209.

Antirequisite(s): Credit for French 211 and either 30 or 31 will not be allowed.

French 213 **3 units; (3-1)****Intermediate French**

Further development of abilities in spoken and written French. Review of French grammar along with extensive oral and written practice.

Prerequisite(s): One of French 211, 30, or N30.

Antirequisite(s): Credit for French 213 and any of 215, 217 or 225 will not be allowed.

French 225 **3 units; (3-1)****La Grammaire par les textes I**

Apprentissage des structures grammaticales et logiques du français contemporain avec lectures de morceaux choisis de textes de la francophonie mondiale.

Prerequisite(s): Prérequis: French 30N ou 30S ou 31 (ou équivalents), ou French Language Arts 30, ou French 213.

Antirequisite(s): Anti-prérequis: Les étudiants qui ont pris le cours French 315 ne peuvent s'inscrire en French 225.

French 227 **3 units; (3-1)****La Grammaire par les textes II**

Suite du cours French 225 et mise en pratique des structures acquises.

Prerequisite(s): Prérequis: French 225.

Antirequisite(s): Anti-prérequis: Les étudiants qui ont pris French 315 ou 317 ne peuvent s'inscrire en French 227.

French 291 **3 units; (3-0)****Francophonie: Langue et Culture I**

Étude de la langue et de la culture des pays francophones, y compris la France, le Canada et les pays de l'Afrique, de l'Asie et des Caraïbes. Introduction aux sources et aux outils de recherche nécessaires pour cette étude et pour la production de travaux écrits et oraux.

Prerequisite(s): Prérequis: French 30N ou 30S ou 31 (ou équivalents), ou French Language Arts 30, ou French 213.

Antirequisite(s): Anti-prérequis: Les étudiants qui ont pris le cours French 215 ne peuvent s'inscrire en French 291.

Senior Courses

Ne sont admis aux cours avancés que les étudiants qui possèdent déjà une connaissance suffisante de la langue française. En cas de doute, prière de consulter le Département.

Senior courses are open only to students who have a sufficient knowledge of French. Students who are in doubt about their level of knowledge should consult the School of Languages, Linguistics, Literatures and Cultures.

French 329 **3 units; (3-0)****Expression écrite et orale**

Grammaire avancée. Perfectionnement de techniques d'expression écrite et orale. Introduction la recherche.

Prerequisite(s): Prérequis: French 227.

Antirequisite(s): Anti-prérequis: Les étudiants qui ont pris le cours French 415 ne peuvent s'inscrire en French 329.

French 339 **3 units; (3-0)****Concepts littéraires**

Concepts fondamentaux de l'analyse littéraire. L'accent sera placé principalement sur les traditions littéraires des pays francophones. Initiation à l'utilisation de sources bibliographiques particulières à l'étude de la littérature de langue française.

Prerequisite(s): Prérequis: French 227.

French 343 **3 units; (3-2)****Cinéma de langue française**

Introduction l'analyse de films en français.

Prerequisite(s): Prérequis: French 227.

French 353 **3 units; (3-0)**
(Anciennement French 359)**Histoire littéraire**

Aperçu chronologique des périodes, mouvements et écoles des littératures de langue française, accompagné d'études de textes.

Prerequisite(s): Prérequis: French 227.

French 369 **3 units; (3-0)****Introduction à la linguistique française**

Initiation l'approche scientifique (objective et systématique) du langage humain. Fonctions du langage et rôle des linguistes. Concepts de base de la linguistique: langage, langue, parole; synchronie vs diachronie; signifiant vs signifié; paradigmatique vs syntagmatique; double articulation; phonèmes, monèmes. Différents domaines de la linguistique.

Prerequisite(s): Prérequis: French 227.

French 391 **3 units; (3-0)****Francophonie: langue et culture II**

Étude de la langue française et de la culture des pays de la francophonie: France, Canada, pays d'Afrique, des Caraïbes et d'Asie. Recherche documentaire et production de textes écrits.

Prerequisite(s): Prérequis: French 227.

French 393 **3 units; (3-0)****Français professionnel**

Cours de langue française sur objectifs spécifiques et à visée professionnelle. Idéal pour les domaines aussi variés que les affaires, le tourisme, le droit, la médecine, les sciences, les relations internationales, la traduction, etc. Le format et le contenu peuvent varier d'une année à l'autre.

Prerequisite(s): Prérequis: French 227.

MAY BE REPEATED FOR CREDIT

French 399 **3 units; (3-0)****Langue française, littérature et culture**

Étude des aspects de la langue française, de la littérature et de la culture. Les supports utilisés incluent les textes authentiques, la BD, la chanson, les media, etc. Exemples de sujets traités: le monde francophone, l'histoire de la langue française, etc. Le format et le contenu peuvent varier d'une année à l'autre.

Prerequisite(s): Prérequis: French 227.

MAY BE REPEATED FOR CREDIT

French 439 **3 units; (3-0)****Le Canada francophone**

Panorama de la littérature canadienne de langue française.

Prerequisite(s): Prérequis: French 329, plus six autres unités de français de niveau 300.

French 449 **3 units; (3-0)****Littératures francophones**

Panorama des productions littéraires de langue française en Afrique, au Maghreb et aux Antilles.

Prerequisite(s): Prérequis: French 329, plus six autres unités de français de niveau 300.

French 453 **3 units; (3-0)****Littérature du Moyen-Âge et de la Renaissance**

Panorama de la littérature française du Moyen-Âge et de la Renaissance.

Prerequisite(s): Prérequis: French 329, plus six autres unités de français de niveau 300.

French 455 **3 units; (3-0)**

Littérature du XVIIe siècle

Panorama de la littérature française du XVIIe siècle.

Prerequisite(s): Prérequis: French 329, plus six autres unités de français de niveau 300.

French 457 **3 units; (3-0)**

Littérature du XVIIIe siècle

Panorama de la littérature française du XVIIIe siècle.

Prerequisite(s): Prérequis: French 329, plus six autres unités de français de niveau 300.

French 459 **3 units; (3-0)**

Littérature du XIXe siècle

Panorama de la littérature française du XIXe siècle.

Prerequisite(s): Prérequis: French 329, plus six autres unités de français de niveau 300.

French 463 **3 units; (3-0)**

Littérature des XXe-XXIe siècles

Panorama de la littérature française des XXe -XXIe siècles.

Prerequisite(s): Prérequis: French 329, plus 339, six autres unités de français de niveau 300.

French 489 **3 units; (3-0)**

Aspects de la linguistique française

Étude des différents aspects de la langue française. Méthodes d'analyse et de description. Le format et le contenu peuvent varier d'une année à l'autre.

- 489.01. Phonologie
- 489.02. Morphologie
- 489.03. Syntaxe
- 489.04. Sémantique
- 489.05. Lexicologie

Prerequisite(s): Prérequis: French 369 plus six autres unités de français de niveau 300.

Antirequisite(s): Anti-prérequis: Les étudiants qui ont pris le cours French 349 ne peuvent s'inscrire en French 489.01 (Phonologie).

French 499 **3 units; (3-0)**

Langue française, littérature et culture II

Étude des aspects de la langue française, de la littérature et de la culture. Les thèmes de ce cours seront abordés l'aide de méthodes novatrices.

Prerequisite(s): Prérequis: French 329, plus six autres unités de français de niveau 300.

MAY BE REPEATED FOR CREDIT

French 511 **3 units; (3-0)**

Théories critiques

Présentation de certaines théories contemporaines qui ont cours en études littéraires et culturelles. Le format et le contenu peuvent varier d'une année à l'autre.

Prerequisite(s): Prérequis: Neuf unités de français de niveau 400.

Note: Remarque: Ce cours est obligatoire pour les étudiants inscrits au programme du baccalauréat spécialisé ("Honours") de français.

MAY BE REPEATED FOR CREDIT

French 525 **3 units; (0-3T)**

Études indépendantes: apprentissage expérientiel

Stage de recherche sous la direction de professeurs du Département ou stage en milieu

francophone. Rapport de fin de stage rédigé en français.

Prerequisite(s): Prérequis: Autorisation du Département après remise par l'étudiant d'une proposition écrite avant le 1er décembre précédant immédiatement le cours.

Note: Remarque: Ce cours sera offert en hiver seulement pour permettre aux étudiants (a) de prendre les dispositions nécessaires avant le 1er décembre et (b) de recevoir l'approbation du Département.

NOT INCLUDED IN GPA

French 539 **3 units; (3-0)**

Étude spécialisée du Canada français

Séminaire sur des sujets avancés dans le domaine de la langue, de la littérature ou de la culture du Canada français. Le format et le contenu peuvent varier d'une année à l'autre.

Prerequisite(s): Prérequis: Neuf unités de français de niveau 400.

MAY BE REPEATED FOR CREDIT

French 543 **3 units; (3-2)**

Étude spécialisée du Cinéma de langue française

Séminaire sur des sujets avancés ayant trait au cinéma de langue française. Le format et le contenu peuvent varier d'une année à l'autre.

Prerequisite(s): Prérequis: Neuf unités de français de niveau 400.

MAY BE REPEATED FOR CREDIT

French 549 **3 units; (3-0)**

Étude spécialisée de la francophonie

Séminaire sur des sujets avancés ayant trait la langue, aux littératures ou aux diverses cultures de la francophonie. Le format et le contenu peuvent varier d'une année à l'autre.

Prerequisite(s): Prérequis: Neuf unités de français de niveau 400.

MAY BE REPEATED FOR CREDIT

French 565 **3 units; (3-0)**

Étude spécialisée de littérature française

Séminaire sur des sujets avancés ayant trait la littérature française. Le format et le contenu peuvent varier d'une année à l'autre.

Prerequisite(s): Prérequis: Neuf unités de français de niveau 400.

MAY BE REPEATED FOR CREDIT

French 579 **3 units; (3-0)**

Étude spécialisée de linguistique française

Séminaire sur des sujets avancés dans le domaine de la linguistique française. Le format et le contenu peuvent varier d'une année à l'autre.

Prerequisite(s): Prérequis: Neuf unités de français de niveau 400.

Antirequisite(s): Anti-prérequis: Les étudiants qui ont pris le cours French 479 ne peuvent s'inscrire en French 579.

MAY BE REPEATED FOR CREDIT

French 598 **6 units; (0-3T)**

Mémoire de baccalauréat spécialisé

Prerequisite(s): Prérequis: Neuf unités de français de niveau 400, et autorisation du Département.

Note: Remarque: Ce cours est obligatoire pour les étudiants inscrits au programme du baccalauréat spécialisé ("Honours") de français. Le mémoire est rédigé en français.

French 599 **3 units; (3-0)**

Études spécialisées de la langue, de la littérature ou de la culture

Séminaire sur des questions d'actualité ayant trait à la langue, à la littérature ou à la culture au sens large. Exemples de sujets traités: l'histoire des idées, la littérature française du Moyen-Âge, l'autobiographie, l'écriture des femmes de langue française, le créole dans les écrits de langue française, etc. Le format et le contenu peuvent varier d'une année à l'autre.

Prerequisite(s): Prérequis: Neuf unités de français de niveau 400.

MAY BE REPEATED FOR CREDIT

Graduate Courses

(Dans des cas considérés comme exceptionnels, l'école accordera des crédits au niveau supérieur pour des cours de niveau 500. L'autorisation de l'école sera alors indispensable. Les étudiants qui suivront un cours de niveau 500 dans le but d'obtenir des crédits comptant pour leurs études supérieures seront tenus d'effectuer des travaux supplémentaires.)

(The School will give graduate credit for 500-level courses in cases it deems exceptional. This option is subject to the approval of the School. Graduate students taking a 500-level course for graduate credit will be asked to complete additional requirements.)

French 605 **3 units; (3-0)**

Problématiques littéraires

MAY BE REPEATED FOR CREDIT

French 609 **3 units; (3-0)**

Problématiques linguistiques

MAY BE REPEATED FOR CREDIT

French 625 **3 units; (3-2)**

Études cinématographiques

MAY BE REPEATED FOR CREDIT

French 635 **3 units; (3-0)**

Le texte narratif

MAY BE REPEATED FOR CREDIT

French 637 **3 units; (3-0)**

Études théâtrales

MAY BE REPEATED FOR CREDIT

French 639 **3 units; (3-0)**

Poésie de langue française

MAY BE REPEATED FOR CREDIT

French 655 **3 units; (3-0)**

Francophonies

MAY BE REPEATED FOR CREDIT

French 675 **3 units; (3-0)**

Féminismes et Gender

MAY BE REPEATED FOR CREDIT

French 685 **3 units; (3-0)**

Voix québécoises et canadiennes

MAY BE REPEATED FOR CREDIT

French 689 **3 units; (3-0)**

Arts et Cultures

MAY BE REPEATED FOR CREDIT

French 691 3 units; (3-0)

Autour d'un auteur
MAY BE REPEATED FOR CREDIT

French 695 3 units; (3-0)

Profession et recherche
MAY BE REPEATED FOR CREDIT

Geography GEOG

For more information about these courses, see the Department of Geography website: <https://geog.ucalgary.ca/>.

Junior Courses

Geography 204 3 units; (3-1/2T)

Global Environmental Change

Examination of current environmental issues related to physical geography, including topics such as climate change, energy and sustainable resource development, weather extremes, and natural hazards. The course uses contemporary topics to introduce fundamental principles of physical and environmental geography while highlighting societal impacts and influences.

Antirequisite(s): Credit for Geography 204 and 205 or 211 will not be allowed.

Geography 254 3 units; (3-1/2T)

Society and Environment

Foundations of human geography presented with integrative case studies of current and urgent human-environment issues from global to regional to local. Examines the complex interconnections between humans and environment using topics such as climate change, sustainability, development, poverty, food, urbanization, and technologies of the digital age.

Antirequisite(s): Credit for Geography 254 and any of 205, 251, 253 or Urban Studies 253 will not be allowed.

Geography 280 3 units; (3-1/2T)

Thinking Spatially in a Digital World

Introduces mapping technologies and digital spatial data for solving geographical problems that focus on how to collect, manage, analyze, and communicate diverse spatial data. Topics include geographic information systems (GIS), remote sensing, spatial statistics, geovisualization, cartography, and web mapping.

Antirequisite(s): Credit for Geography 280 and 231 will not be allowed.

Senior Courses

Geography 308 3 units; (3-2)

Climate and Ecosystems

Introduction to the Earth's atmospheric environment (elements and controls of climate and their implications for hydrology, vegetation, and soils) and the nature and distribution of ecosystems and vegetation. Incorporates interactions between humans and their environment, especially those leading to global change on the decade to century time-scale.

Antirequisite(s): Credit for Geography 308 and either 305 or 313 will not be allowed.

Geography 310 3 units; (3-2)

Landforms and Soils

Introduction to physical landscapes and soils, emphasizing the formation and geographic distribution of mountains, volcanoes, valleys, and

deserts, and their shaping by rivers and glaciers; and the fundamental concepts in soil science. Incorporates human modification of the Earth's surface.

Antirequisite(s): Credit for Geography 310 and either 307 or 313 will not be allowed.

Geography 324 3 units; (3-1/2T) or (3-0)

Society and Environmental Change

Environmental and resource issues, with emphasis on topics such as climate change, sustainability, ethics, planning, policy and decision making, and management strategies. Case examples highlight issues in resource sectors such as freshwater, oceans, parks and wildlife, tourism and recreation, forests and energy.

Antirequisite(s): Credit for Geography 324 and 321 will not be allowed.

Note: May be offered as part of a group study program. A supplementary fee may be assessed to cover additional costs associated with this course.

Geography 326 3 units; (3-0)

Geographies of Canada

Exploration of what it means to be Canadian in a global context. Examination of the historic, cultural, social, political, economic, and environmental factors that promote unity and inter-regional tensions.

Antirequisite(s): Credit for Geography 326 and 381 will not be allowed.

Geography 328 3 units; (3-0)

Geographies of East and Southeast Asia

An introduction to the geographies of East and Southeast Asia utilizing the foundations of physical and human geography. The logical divisions based on culture, physiography, history, migration, social and economic both currently and historically. Issues of development and the environmental impacts relating to rapid growth, urbanization, and intensive use of resources will be addressed.

Antirequisite(s): Credit for Geography 328 and 397.06 will not be allowed.

Note: May be offered as part of a group study program. A supplementary fee may be assessed to cover additional costs associated with this course.

Geography 330 3 units; (3-0)

Geographies of Europe

An introduction to the geographies of Europe utilizing the foundations of physical and human geography. The logical divisions based on culture, physiography, history, migration, social, and economy will be explored both currently and historically. Settlement patterns, transportation networks, economic activities, and contrasting cultural, ethnic, linguistic and religious variations will be emphasized.

Antirequisite(s): Credit for Geography 330 and 397.04 will not be allowed.

Note: May be offered as part of a group study program. A supplementary fee may be assessed to cover additional costs associated with this course.

Geography 352 3 units; (3-2)

Political, Economic, and Urban Geography

A introduction to the major concepts of human geography including political geography, economic geography, the uneven distribution of development across the surface of the Earth, and the urbanization of the developed and developing world.

Antirequisite(s): Credit for Geography 352 and any of 341, 351, or 365 will not be allowed.

Geography 354 3 units; (3-2)

Social and Cultural Geography

An introduction to the major concepts of human geography including demography, migration, cultures, languages, and religions.

Antirequisite(s): Credit for Geography 354 and any of 351, 361, or 367 will not be allowed.

Geography 380 3 units; (3-2)

Geospatial Communication

An introduction to fundamentals in cartography, remote sensing, geographic information systems, and descriptive spatial statistics.

Antirequisite(s): Credit for Geography 380 and 231 will not be allowed.

Geography 390 3 units; (1-2)

International Field Studies

An introduction to conducting international reconnaissance research in geography. Provides a background in various aspects of ethical research practices, qualitative and quantitative data collection, analysis, and dissemination.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geography 390 and 597.23 will not be allowed.

Note: May be offered as part of a group study program. A supplementary fee may be assessed to cover additional costs associated with this course.

Geography 391 3 units; (70 hours)

Geographic Field Studies

An introduction to field research techniques and topics in physical and human geography. Lectures and projects will provide an introduction to a range of geographic disciplines. Field exercises will normally be conducted away from Calgary for about ten days before Fall Term.

Prerequisite(s): Consent of the Department.

Note: Enrolment in Geography 391 is limited. A supplementary fee will be assessed to cover additional costs associated with this course.

Geography 408 3 units; (3-2)

Meteorology and Hydrology

Atmospheric connections with the hydrological cycle, including evapotranspiration, water vapour, stability, cloud development, and precipitation. Water transport is followed through soil moisture, groundwater, and stream flow. Discussed methods focus on tracking water transport through the land-atmosphere system at various scales. Additional topics may include water quality, water resource management, and hydrology of selected landscapes.

Prerequisite(s): 3 units from Geography 211, 308.

Antirequisite(s): Credit for Geography 408 and 305 will not be allowed.

Geography 410 3 units; (3-2)

Process Geomorphology

A systematic study of the physical processes that shape the Earth's surface. Emphasis is on the mechanics of geomorphic processes and their interaction with Earth materials.

Prerequisite(s): 3 units from Geography 211, 310.

Antirequisite(s): Credit for Geography 410 and 307 will not be allowed.

Geography 412 3 units; (3-2)

Soil Science

Exploration of soil science including the chemical, physical, and biological properties of soils; soil formation and development, including the

classification of soils, and the application of soil science to land use, environmental quality, global change, and sustainable development.

Prerequisite(s): 3 units from Geography 211, 308, 310.

Antirequisite(s): Credit for Geography 412 and either Geography 413 or Archaeology 413 will not be allowed.

Geography 426 **3 units; (3-0)**

Climate Change and Society

Overview of social dimensions of climate change. Addresses representation, governance, knowledge production, power and justice. Examines how responses and policies are shaped across various scales including global, national, regional, urban and individual.

Prerequisite(s): 3 units in courses labelled Geography at the 300 level or above.

Geography 428 **3 units; (3-1T)**

Sustainability and Political Ecology

Exploration of the challenges associated with environmental management and governance, particularly in terms of achieving sustainability. Emphasis is placed on ongoing local, regional, and global environmental problems, using political ecology perspectives to understand power, discourse and interest mechanisms behind environmental rights, controls, and sustainability needs.

Prerequisite(s): 3 units in courses labelled Geography at the 300 level or above.

Antirequisite(s): Credit for both Geography 428 and 421 will not be allowed.

Note: May be offered as part of a group study program. A supplementary fee may be assessed to cover additional costs associated with this course.

Geography 430 **3 units; (3-1T)**

Animal Geography

Explores the socio-spatial relationships between humans and animals, with the goal of elucidating the ecological, economic, political, social, and cultural pressures shaping these relations, and the conflicts arising from human-animal interactions. Inter-species bonds and emotional lives of animals are also covered.

Prerequisite(s): 3 units from courses labelled Geography at the 300 level or above.

Antirequisite(s): Credit for Geography 430 and 317 will not be allowed.

Geography 432 **3 units; (3-1/2T)**

Global Change and Hazards

Examination of the factors that influence vulnerability and resiliency to environmental hazards. Emphasis on how human activities change both the dynamics of natural processes and the spatio-temporal variability of vulnerability and resiliency.

Prerequisite(s): 3 units in courses labelled Geography at the 300 level or above.

Antirequisite(s): Credit for Geography 432 and Geography 311 or Geophysics 375 will not be allowed.

Note: May be offered as part of a group study program. A supplementary fee may be assessed to cover additional costs associated with this course.

Geography 434 **3 units; (3-0)**

Field Studies in Social and Economic Geography

Field research and reconnaissance survey techniques. Individual and group travel-study combined with formal instruction and seminars.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geography 434 and 593 will not be allowed.

Note: May be offered as part of a group study program. A supplementary fee may be assessed to cover additional costs associated with this course.

Geography 436 **3 units; (3-0)**

Field Studies in Physical and Environmental Geography

Field research and reconnaissance survey techniques. Individual and group travel-study combined with formal instruction and seminars.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geography 436 and 591 will not be allowed.

Note: May be offered as part of a group study program. A supplementary fee may be assessed to cover additional costs associated with this course.

Geography 452 **3 units; (3-2)**

Urban Social Geography

Concepts of urban geography with particular reference to intra-urban social issues.

Prerequisite(s): 3 units from Geography 251, 253, 352, 354, Urban Studies 253.

Antirequisite(s): Credit for Geography 452 and 351 will not be allowed.

Geography 454 **3 units; (3-1T)**

Economic Geography

Theories, concepts and techniques of economic geography with emphasis on policy issues relating to examples at the urban, regional, and national levels.

Prerequisite(s): 3 units from Geography 251, 253, 352, Urban Studies 253.

Antirequisite(s): Credit for Geography 454 and 341 will not be allowed.

Geography 456 **3 units; (3-1T)**

Uneven Development

Foundations of development geography and its concern with multiscale, multidimensional processes of intervention and change. Focus on urban-rural and global-local change effects and human settlement. An interrogation of globalization, poverty, marginality, human settlement and the diversity of development actors, the state, the aid community, and the people directly affected by development.

Prerequisite(s): 3 units from Geography 251, 253, 352, 354, Urban Studies 253.

Antirequisite(s): Credit for both Geography 456 and 425 will not be allowed.

Geography 458 **3 units; (3-1T)**

Political Geographies

Spatial study of political systems, structures, and processes, and their relationship to geographic factors.

Prerequisite(s): 3 units from Geography 251, 253, 352, Urban Studies 253.

Antirequisite(s): Credit for Geography 458 and 365 will not be allowed.

Geography 480 **3 units; (3-2)**

Cartography and Geovisualization

Focuses on mapping technologies for cartography and geo-visualization. The role of cartography and geovisualization is explored both theoretically, and practically in the communication of spatial data. In lecture and lab-based settings, examines data considerations, map design fundamentals and techniques, map use and interactive design for the communication of geographic information.

Prerequisite(s): 3 units from Geography 231, 380.

Antirequisite(s): Credit for Geography 480 and 437 will not be allowed.

Geography 482 **3 units; (3-2)**

Geographic Information Systems and Science

The technical and theoretical foundations of Geographic Information Science. Explorations of data types and structures, data integrity, metadata, data acquisition and maintenance, analytical techniques, and methods for geovisualization will be explored in lecture and laboratory.

Prerequisite(s): 3 units from Geography 231, 380.

Antirequisite(s): Credit for Geography 482 and 357 will not be allowed.

Geography 483 **3 units; (3-1T)**

Ways of Knowing in Geography

Conceptualizing human-environment realities into research: an introduction to philosophical foundations of ways of thinking and critical perspectives; qualitative and mixed methods approaches. Examination of 'rules' of research and the challenges of real world complexities. In-depth examples of human-environment research from theory to practice, broad research design and proposal writing practice.

Prerequisite(s): 3 units from Urban Studies 253, Geography 251, 253 or from courses labelled Geography at the 300 level or above.

Antirequisite(s): Credit for Geography 483 and 340 will not be allowed.

Geography 484 **3 units; (3-2)**

Remote Sensing Essentials

Instruction in the background, use and interpretation of remote sensing imagery. Labs and topics introduce fundamental principles of raster-based image analysis, visualization and classification. Labs will include identification, interpretation and mapping of both physical and cultural landscape features.

Prerequisite(s): 3 units from Geography 231, 380.

Antirequisite(s): Credit for Geography 484 and 333 will not be allowed.

Geography 485 **3 units; (3-2)**

Quantitative Analysis

Introduction to quantitative research methodology, sampling and survey design in geography. Covers the background analytical techniques for an understanding of geographic literature. Examples will involve the use of statistical computer packages.

Prerequisite(s): 3 units from Geography 231, 380.

Antirequisite(s): Credit for Geography 485 and 339 will not be allowed.

Geography 500 **3 units; (3-0)**

Critical Zone Science

Examination of the Critical Zone, Earth's outer layer that extends from the top of vegetation to the bottom of the fresh groundwater zone. It is a constantly evolving boundary layer where rock, soil, water, air, and living organisms interact to regulate the landscape and natural habitats.

and determine the availability of life-sustaining resources, including our food production and water quality.

Prerequisite(s): 3 units from Geography 305, 307, 313, 408, 410, 412.

Geography 502 **3 units; (3-0)**

Arctic Systems Science

Investigates the Arctic as a coupled system, and how the Arctic interacts with other Earth systems. Draws on physical, chemical, and biological sciences to understand linked topics such as Arctic glaciers, marine environments, hydrology, permafrost, wildlife, vegetation, and sea ice. Particular focus is paid to cycles of carbon, water, and energy as key drivers of the Arctic system. Selected human interactions with the Arctic system are also examined.

Prerequisite(s): 3 units from Geography 305, 408.

Geography 503 **3 units; (3-0)**

Climate Change

Overview of global climate dynamics and the interactions between ocean, atmosphere, biosphere, cryosphere, and biogeochemical cycles. Examination of climate change in Earth's past, present, and future, scrutinizing both natural and anthropogenic influences on the global climate system.

Prerequisite(s): 3 units from Geography 305, 408.

Geography 504 **3 units; (3-2)**

Oceanography

Physical ocean processes including circulation, waves, and tides are examined as part of the Earth's climate system. These physical processes are then linked to controls on primary production in the ocean, and marine foodwebs/ecosystems. Chemical processes driven by circulation and biology are examined, with a focus on marine feedbacks related to past and present climate change.

Prerequisite(s): 3 units from Geography 305, 408.

Antirequisite(s): Credit for Geography 504 and 403 will not be allowed.

Geography 506 **3 units; (3-0)**

Wind Science

Physical laws governing wind processes in the upper atmosphere and the planetary boundary layer. Topics include: global wind patterns, boundary layer wind flow, pollution, wind energy, wind erosion, and wind storms.

Prerequisite(s): 3 units from Geography 305, 408.

Antirequisite(s): Credit for Geography 506 and 407 will not be allowed.

Geography 510 **3 units; (3-0)**

Biogeography and Landscape Ecology

Explores the distribution (past and present) of animals and plants, causes of variation in species types, and their abundance and survival. Topics focus on bioregions, biodiversity, communities, ecosystems at multiple scales, as well as investigation of ways that human and natural disturbance affect these patterns. Uses qualitative and quantitative approaches to measure these effects to inform management and conservation.

Prerequisite(s): 3 units from Geography 313, 412.

Antirequisite(s): Credit for Geography 510 and either 417 or 519 will not be allowed.

Geography 512 **3 units; (1-3)**

Advanced Field Methods

Focuses on field data collection and laboratory and computational analysis techniques practiced

by physical geographers. Students will conduct an integrated analysis of a local landscape, including site selection, sample collection, lab analysis, and data assimilation and interpretation for report writing. Approximately one-half of the course is taught outdoors.

Prerequisite(s): 3 units from Geography 305, 307, 313, 408, 410, 412.

Note: This course may occur in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee will be assessed to cover additional costs associated with this course.

Geography 526 **3 units; (3S-0)**

Urban Political Ecology

Urban political ecology helps to untangle the interconnected economic, political, social, and ecological processes that together form highly uneven urban landscapes. Through theoretical and case study articles, discussions of themes such as water, food, green space, housing, waste, and through local case-studies, students will examine the evolution of urban political ecology, its main tenets and its relevance for understanding urbanization processes.

Prerequisite(s): 3 units from Geography 341, 351, 365, 421, 428, 429, 430, 452, 454, 456, 458.

Antirequisite(s): Credit for Geography 526 and 521 will not be allowed.

Geography 528 **3 units; (3-1T)**

Development and Participation

Critical engagement with development studies, with emphasis on local populations as development subjects, actors and potential agents of change. Opportunities and limitations of participation as development paradigm, methodology and practice are addressed in diverse problem settings to interrogate the multi-dimensional challenges of development for sustainability.

Prerequisite(s): 3 units from Geography 351, 365, 426, 428, 432, 434, 452, 454, 456, 458.

Geography 530 **3 units; (3-0)**

Environmental Governance and Conflict

Foundations of environmental governance, management and discourse research from literature to practice, paired with case-specific applications on the changing roles of global, local and online spheres in today's environmental conflicts. Examples include global conservation, international climate change negotiations, carbon forests, environmental services, indigenous movements, renewable technologies, oil and gas conflicts, ecotourism, rural marginalization, and international environmental action strategies.

Prerequisite(s): 3 units from Geography 321, 324, 341, 351, 365, 426, 428, 432, 434, 452, 454, 456, 458.

Geography 532 **3 units; (3S-0)**

Science, Technology, and Society

Seminar-style overview of core readings, key concepts and central debates in science, technology and society (STS) in Geography. Considers mutual shaping of science, technology and society as context-dependent practices involving institutions and discourses that vary across regions and time. Themes include social construction of knowledge and technology, agency, networks, co-production, expertise, authority, legitimacy, and democratic engagement. Empirical cases at global, national,

and regional scales illustrate key concepts and debates.

Prerequisite(s): 9 units in courses labelled Geography at the 300 level or above.

Antirequisite(s): Credit for Geography 532 and 465 will not be allowed.

Geography 534 **3 units; (3S-0)**

Geographies of Food

Explores geographies of food on different scales – from the global to the local – with an emphasis on links between urban and rural contexts. By applying diverse perspectives (ecology, economy, equity, culture, policy, politics, gender, justice etc.) and normative concepts such as food sovereignty, we learn about the current globalized industrial agri-food regime as well as alternative and sustainable food systems.

Prerequisite(s): 3 units from Geography 341, 351, 361, 365, 452, 454, 456, 458.

Geography 536 **3 units; (3-0)**

Environment and Behaviour

An approach to human geography that attempts to understand human activity in space, place, time, and the environment through the lens of the individual. Focus on how humans perceive the environment around them in both perceptual, cognitive, physical and behavioural terms, and how they use this information when making judgments and choices that lead to spatial behaviour.

Prerequisite(s): 3 units from Geography 341, 351, 365, 452, 454, 456, 458.

Geography 538 **3 units; (3-0)**

Tourism, Parks and Protected Areas

Interdisciplinary perspectives that directly influence policy, planning, and management of nature-based parks and protected areas. Examines the evolving social, economic, political and environmental aspects of parks and protected areas and considers current management challenges.

Prerequisite(s): 3 units from Geography 321, 324.

Antirequisite(s): Credit for Geography 538 and either 421 or 429 will not be allowed.

Geography 539 **3 units; (3-0)**

Globalization and the City

Introduction to the social, cultural, political and economic forces operating on a global scale that increasingly shape the dynamics of cities. Emphasis is placed on social and cultural hybridity, translocal interaction, geographies of social and economic polarization, and the scalar politics and regulation of globalization.

Prerequisite(s): 3 units from Geography 341, 351, 365, 452, 454, 456, Anthropology 379, 387, Economics 365, Sociology 353.

Geography 544 **3 units; (3-0)**

Social Movements, Possible Worlds

How urban social movements arise in the context of broader urban and societal processes. The geographical strategies and social, cultural, and political grievances of urban social movements are examined in a variety of contexts around the world.

Prerequisite(s): 3 units from Geography 351, 452, Sociology 353.

Geography 558 **3 units; (3-0)**

Urban and Regional Political Economy

A critical review of the geographical principles of urban growth and uneven development in the context of local, regional and global urban systems. Topics may include urbanization

processes under capitalism, city-regions, global city networks, returns to urban agglomeration, inter-spatial competition, and transnational movements of capital and labour.

Prerequisite(s): 3 units from Geography 351, 452 and 3 units from Geography 341, 454.

Antirequisite(s): Credit for Geography 558 and 451 will not be allowed.

Geography 565 **3 units; (3-0)**

Spaces of Urban Politics

An examination of how urban spatial relations shape, and are shaped by, political institutions, organizations, and social movements. Themes may include the politics of urban growth, urban environmental justice, urban sustainability, place-based politics, and multi-scalar politics.

Prerequisite(s): 3 units from Geography 351, 452.

Geography 567 **3 units; (3-2)**

Introduction to Programming in Geographic Information Systems

Introduction to computer programming for customizing and automating a GIS. Topics include object-oriented programming techniques, advanced geoprocessing, scripting, and automation using a programming language such as Python or Visual Basic.

Prerequisite(s): 3 units from Geography 357, 482.

Geography 582 **3 units; (3S-0)**

Technology, Society, and Space

Explores the relationship between spatial technologies and social/political systems. Examines the ways geographers have made sense of the social construction and societal implications of technologies across time and place.

Prerequisite(s): 3 units from Geography 357, 482.

Geography 583 **3 units; (3-0)**

Advanced Qualitative Methods

Exploration of the underlying theories and procedures of qualitative research, in human geography. Overview of methodologies including conventional approaches such as case studies and ethnographies and critical avenues such as feminist, indigenous and science and technology studies approaches. Main qualitative research methods (interviews, discourse analysis, observation, action-oriented research) are covered.

Prerequisite(s): 3 units from Geography 340, 483.

Geography 584 **3 units; (3-2)**

Advanced Remote Sensing

Advanced remote sensing topics and labs (e.g., Geographic Object Based Image Analysis (GEOBIA), LiDAR, Urban Heat Islands, microwave remote sensing, etc.). Students will develop a remote sensing project with potential to result in a commercial remote sensing product/service and formally present their ideas (in class) as if they were presenting to their business manager/supervisor.

Prerequisite(s): 3 units from Geography 333, 484.

Antirequisite(s): Credit for Geography 584 and 433 will not be allowed.

Geography 585 **3 units; (3-2)**

Multivariate Statistics

Methods for the analysis of temporal, spatial and multivariate data sets. Emphasis is placed on data sets relating to geographic phenomena, resource utilization and environmental problems, with

examples from the geographic literature. Examples will involve the use of computer packages.

Prerequisite(s): 3 units from Geography 339, 485.

Antirequisite(s): Credit for Geography 585 and 439 will not be allowed.

Geography 586 **3 units; (3-2)**

Web Mapping and Internet GIS

Explores and practices theoretical and applied concepts related to online mapping. Covers advantages and techniques for publishing, visualizing and accessing maps and data on the Internet. Develops web mapping applications including static and interactive platforms.

Prerequisite(s): 3 units from Geography 357, 437, 480, 482.

Geography 587 **3 units; (3-2)**

Geospatial Project Management

Capstone course applying the broad methodological training from GIS, remote sensing, cartography, qualitative and quantitative methods. Collaborative research and project management is stressed.

Prerequisite(s): 3 units from Geography 333, 339, 357, 437, 480, 482, 484, 485.

Geography 588 **3 units; (3-2)**

Urban GIS

Surveys GIS applications for urban studies, and the data structures, sources, and analysis techniques used in them. Explores urban spatial analysis, decision-making in a GIS environment, and representational challenges, including project planning, spatial data acquisition, data preparation and coding, analysis and visualization of project findings, and communication and implementation of project results.

Prerequisite(s): 3 units Geography 357, 482.

Antirequisite(s): Credit for Geography 588 and 457 will not be allowed.

Geography 595 **3 units; (0-1T)**

Honours Thesis Research

Initiation of an individual research project and preparation leading to an Honours thesis under the supervision of a faculty member.

Prerequisite(s): Admission to Geography Honours or Earth Science Honours and consent of the Department.

Geography 596 **3 units; (0-1T)**

Directed Independent Study

Advanced study of a particular topic under the direct supervision of a faculty member.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 597 **3 units; (3S-0)**

Advanced Topics in Human Geography

An examination of selected topics in Human Geography in a seminar format.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 598 **3 units; (0-1T)**

Honours Thesis

Continuation of supervised individual research and completion of an Honours thesis under the super-

vision of a faculty member. A public presentation of the thesis is expected.

Prerequisite(s): Admission to Geography Honours or Earth Science Honours and consent of the Department.

Geography 599 **3 units; (3S-0)**

Advanced Topics in Physical Geography

An examination of selected topics in Physical Geography in a seminar format.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Geography 601 **3 units; (0-1.5S)**

Graduate Research Seminar

Presentation and evaluation of graduate research seminars.

Prerequisite(s): Consent of the Department.

Note: Normally offered over both Fall and Winter Terms. Normally open to Geography thesis-based graduate students only.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Geography 603 **3 units; (3-3)**

Remote Sensing: Basics and Beyond

Introduction to the theory and practice of remote sensing. Topics include physics of remote sensing, sensor systems, resolutions, geometric and radiometric correction, image analysis (enhancements, filtering, texture analysis, principal components, classification approaches and algorithms and accuracy). May include specific image acquisition systems and their methodological requirements. Emphasis is on fundamental concepts. Laboratory provides experience with fundamental image processing techniques.

Prerequisite(s): Consent of the Department.

Geography 605 **3 units; (3-3)**

Statistical Analysis: Basics and Beyond

Introduction to applied statistics, particularly as they are used in geographical analysis. Topics include sampling design, summary statistics, probability theory, inferential statistics, and multivariate analysis. Laboratory exercises give students hands-on experience in computer-based statistical analysis.

Prerequisite(s): Consent of the Department.

Geography 607 **3 units; (3-3)**

Geographic Information Systems: Basics and Beyond

Introduction to the world of Geographic Information Systems (GIS). Includes: representing reality in the digital realm, georeferencing, data structures, software history and comparison, and the full spectrum of analytical approaches associated with advanced GIS software. A major part of the work will be hands on. Software is used as a vehicle for taking the theory and concepts into a working reality.

Prerequisite(s): Consent of the Department.

Geography 621 3 units; (2-2)**The Politics of Environment**

Contemporary issues in environmental conflict, management and governance with case-specific applications from global to local.

Prerequisite(s): Consent of the Department.

Note: May not be offered every year. Consult the department for more information.

Geography 633 3 units; (3-3)**Research and Applications in Remote Sensing**

Review and basic and advanced principles of image analysis. Includes advanced laboratory techniques, integration of remote sensing with GIS, current research in remote sensing, project organization, and data sources for remote sensing.

Prerequisite(s): Consent of the Department.

Geography 639 3 units; (3-3)**Advanced Spatial Analysis and Modelling**

History of spatial modelling in geography; comprehensive coverages of techniques, spatial analysis and spatial modelling as currently used within GIS and remote sensing.

Prerequisite(s): Consent of the Department.

Geography 647 3 units; (3-3)**Advanced Research and Applications in Geographic Information Systems**

Focus on advanced GIS applications in core areas; methodological developments in GIS, and current research directions in GIS.

Prerequisite(s): Consent of the Department.

Geography 681 3 units; (3-0)**Geographic Information Systems Project: Theoretical Issues**

A critical and comprehensive review of information and literature on a GIS research topic. This course provides the conceptual basis for Geography 683.

Prerequisite(s): Geography 633, 639 and 647 and consent of the Department.

Geography 683 3 units; (3-0)**Geographic Information Systems Project: Application**

Implementation of a project on a GIS topic which will involve demonstrating mastery of GIS project design and the implementation and presentation of results commensurate with graduate level work. This topic will relate to material covered by the student in Geography 681.

Prerequisite(s): Geography 681 and consent of the Department.

Geography 685 3 units; (3-0)**Arctic System Science**

This course investigates the process linkages at various spatiotemporal scales between the atmosphere, lithosphere and hydrosphere operating within high latitude environments of the Northern Hemisphere. Of particular interest is the response of the terrestrial and marine cryosphere to climate variability and change, including methods for its detection and quantification.

Prerequisite(s): Consent of the Department.

Geography 687 3 units; (3-3)**Advanced Glacial Geomorphic Systems**

Contemporary topics in glacial geomorphology and sedimentology. Course consists of lecture, seminar and field trip components.

Prerequisite(s): Consent of the Department.

Geography 689 3 units; (3-3)**Advanced Topics in Geocryology**

Contemporary topics in the science and engineering of seasonally and perennially frozen ground. Course consists of lectures and seminars.

Prerequisite(s): Consent of the Department.

Geography 691 3 units; (3-3)**Advanced Fluvial Geomorphology**

Advanced theory and research issues in fluvial geomorphology. Topics may include flow hydraulics, sediment transport, river morphology, channel networks, sediment routing, drainage basin evolution, and channel response to environmental change.

Prerequisite(s): Consent of the Department.

Note: May not be offered every year. Consult the department for more information.

Geography 695 3 units; (3-0)**Seminar in Geographic Research Methods**

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 696 3 units; (3-0)**Urban, Regional and Global Political Economy Seminar**

Spatial and power relations that shape urban, regional and global processes. Investigation of a wide range of processes, ranging in scale from the local to the global: capital investment and disinvestment; state power and policymaking; planning, governance and governmentality; political struggle, all in multiple forms of spatiality: place, scale, territory, networks.

Prerequisite(s): Consent of the Department.

Note: Intended for students enrolled in a Geography graduate degree program or a graduate degree program of a cognate discipline.

Geography 697 3 units; (3-0)**Seminar in the Philosophy and Nature of Human Geography**

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 699 3 units; (3-0)**Seminar in the Philosophy and Nature of Physical Geography**

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

A list of specific subtitles for the 700-level courses listed below is available in the Department.

Geography 795 3 units; (3-0)**Selected Topics in Geographic Research Methods**

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 797 3 units; (3-0)**Selected Topics in Human Geography**

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 799 3 units; (3-0)**Selected Topics in Physical Geography**

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geology GLGY

For more information about these courses contact the Department of Geoscience: geoscience.ucalgary.ca/.

Junior Courses**Geology 201** 3 units; (3-3)**Principles of Geoscience**

Composition and internal structure of the Earth; surface processes; internal processes and global tectonics; rocks and minerals, topographic and geologic maps.

Antirequisite(s): Credit for Geology 201 and either 209 or 471 will not be allowed.

Geology 202 3 units; (3-3)**Applications of Geoscience**

Applications of geology and geophysics to the study of earthquakes, volcanoes and other geologic hazards; natural resources; environmental management; human impact on the Earth and global change.

Prerequisite(s): Geology 201.

Antirequisite(s): Credit for Geology 202 and 203 will not be allowed.

Geology 209 3 units; (3-0)**Introduction to Geology**

Basic concepts regarding the major features of Earth; its rock and mineral composition, processes controlling erosion, deposition and surface structures; formation of mountains, ocean basins and continents; internal structure of the Earth and plate tectonics.

Antirequisite(s): Credit for Geology 209 and 201 will not be allowed.

Note: Not open for credit to Honours, Majors or Minors in Geology, Geology (Petroleum Geology Concentration), Applied and Environmental Geology, Geophysics, Environmental Science (Geology Concentration) or Natural Sciences (Geoscience Concentration).

Geology 297 3 units; (3-0)**Topics in Geology**

Lectures and study in geological sciences.

Note: This course is not part of the Field of Geology.

MAY BE REPEATED FOR CREDIT

Senior Courses**Geology 301** 3 units; (3-0)**Geology of the Mountain Regions of Western Canada**

Selected topics encountered in introductory physical geology will be pursued in greater depth in order to explain the geology of Western Canadian Mountain Parks and adjacent areas.

Prerequisite(s): Geology 201 or 209.

Geology 305 3 units; (2-1T)**Introduction to Dinosaurs**

Biology, evolution, and extinction of dinosaurs; geographic and temporal distribution, habitats, and ecology of the various dinosaur groups; preservation, exploration, collection, preparation, and identification of dinosaur fossils.

Geology 307 3 units; (3-0)**Geological History of Life**

The history of life from the earliest records to the present. Fossils, geological time, extinction, basic

paleontology. The rise and development of various animals and plants including dinosaurs, mammals and humans.

Geology 308 **3 units; (3-0)**

Geology and Human Health

An overview of human health issues related to geological phenomena. Examples of possible topics include medical geology, heavy metals in groundwater, effects of volcanic eruptions, effects of asbestos-type minerals, acid mine drainage and soil nutrient deficiencies.

Prerequisite(s): Geology 201 or 209.

Geology 313 **3 units; (3-3)**

Mineralogy

The chemical and physical properties of the common minerals in the context of the common rock types; introduction to crystallography; optical properties of minerals; introduction to mineral associations and rock textures in hand samples and thin sections; introduction to analytical techniques (XRD, electron microprobe, etc.).

Prerequisite(s): Geology 201; Geology 202 or 203; Chemistry 201 or 211; Mathematics 249 or 265 or 275; Physics 211 or 221.

Antirequisite(s): Credit for Geology 313 and 423 will not be allowed.

Geology 323 **3 units; (3-3)**

Geochemical Processes

Focus is on chemical processes taking place in geological settings with emphasis on the abundance relationships of the elements in the Earth and the processes governing the differentiation, migration and distribution of the elements. Discussions include mineral, rock and aqueous chemistry; applications of radiogenic and stable isotopes; thermodynamics and phase diagrams; biogeochemistry and organic geochemistry; analytical techniques; applications and case studies.

Prerequisite(s): Geology 313; Chemistry 201 or 211; Chemistry 203 or 213.

Geology 333 **3 units; (3-3)**

Igneous, Metamorphic and Ore Rocks and Processes

Origin, identification, classification and interpretation of igneous and metamorphic rocks. Including common rock types, mineral assemblages and textures in hand samples and thin section, volcanic and plutonic processes and conditions, thermo-chemical conditions of metamorphic rock formation, introduction to ore deposits and ore minerals in hand sample, Canadian examples of ore deposits, tectonic settings of igneous, metamorphic and ore rocks.

Prerequisite(s): Geology 313; Chemistry 201 or 211; Chemistry 203 or 213.

Antirequisite(s): Credit for Geology 333 and 311 will not be allowed.

Geology 337 **3 units; (96-120 hours)**

Introduction to Geologic Field Methods

Study of various rock types and sediment exposures focusing on recognition and description of rock types, construction of geological maps and cross-sections and measurement of stratigraphic sections. Field skills will include map interpretation, navigation, and measuring planar and linear features. Field exercises will normally be conducted

off campus for about 12-15 days during August before the Fall Term of third year.

Prerequisite(s): Geology 333; and Geology 343; and Geology 381 and admission to programs in Geology or Geophysics or Applied and Environmental Geology or Environmental Science (Geology concentration) or Natural Sciences (Geoscience concentration) and consent of the Department.

Note: This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee will be assessed to cover additional costs associated with this course. Students will require consent of the department to drop this course.

Geology 343 **3 units; (3-3)**

3D Geologic Structures and Methods

Methods of 3D geologic data collection, manipulation and interpretation. Special emphasis on maps and cross sections and the geometric methods and data types used to understand and work with 3D geologic relationships. Course will emphasize hands-on exercises and teach the application of: geologic maps, subsurface data; relative dating; cross-cutting relations, and 3D visualization of the architecture of geological bodies and surfaces and their relationship to causative processes.

Prerequisite(s): Geology 381.

Geology 353 **3 units; (3-3)**

Surficial Systems

Overview of the geomorphologic and hydrologic processes that operate on and just beneath the Earth's surface. Includes hydrology (precipitation, evaporation, soil water, ground water, and their interaction in watersheds), surface processes (erosion, weathering, rivers, glaciers, Quaternary geology, landforms); engineering properties of surface materials; applications (including aggregates and water as resources, geotechnical issues, water quality, etc.).

Prerequisite(s): Geology 201 and 202; Chemistry 203 or 213; Physics 211 or 221, and 223; Mathematics 267 or 277.

Antirequisite(s): Credit for Geology 353 and 373 will not be allowed.

Geology 377 **3 units; (3-3)**

Petroleum Engineering Geology

The principles and methods of physical geology with special emphasis on their application to the exploitation of oil and gas. Laboratory: properties of minerals and rocks, analysis and interpretation of surface and subsurface maps, interpretation of borehole logs and core, properties of sedimentary rocks.

Antirequisite(s): Credit for Geology 377 and 201 will not be allowed. This course is not open to Geology majors.

Note: This course is restricted to engineering students.

Geology 381 **3 units; (3-3)**

Sedimentary Rocks and Processes

Origin, identification, classification and interpretation of sediments, siliciclastic, carbonate and evaporite rocks. Study of sediment/rock components (minerals), fossils and textures in hand sample and thin section; sedimentary structures and processes; introduction to depositional environments; burial, lithification and diagenesis; applications, including introduction to basin analy-

sis/tectonics, exploration for water and petroleum resources, etc.

Prerequisite(s): Geology 201 and 202; Chemistry 201 or 211 or 203 or 213; Physics 211 or 221.

Geology 401 **3 units; (3-2)**

Physical Hydrogeology

Hydrologic cycle, conservation principle, Darcy's Law, groundwater flow systems, aquifer testing, soil hydrology, effective stress, land subsidence, solute transport.

Prerequisite(s): Geology 353 or Geophysics 457.

Antirequisite(s): Credit for Geology 401 and 601 will not be allowed.

Geology 403 **3 units; (3-3)**

Aqueous Geochemistry

Theoretical and applied aspects of aqueous solution chemistry. Topics include: methods for collection and preservation of water samples in the field, laboratory analysis of waters, theory and application of aqueous thermochemical models.

Prerequisite(s): Geology 323.

Antirequisite(s): Credit for Geology 403 and 503 will not be allowed.

Geology 431 **3 units; (3-3)**

Igneous Petrology

Petrogenesis of igneous rocks using field data, geochemistry and experiments. Application of igneous petrology to Earth processes and evolution.

Prerequisite(s): Geology 323 and 333.

Antirequisite(s): Credit for Geology 431 and either 443 or 531 will not be allowed.

Geology 433 **3 units; (3-3)**

Metamorphic Petrology

Petrogenesis of metamorphic rocks. Application of metamorphic petrology to Earth processes and evolution.

Prerequisite(s): Geology 323 and 333.

Antirequisite(s): Credit for Geology 433 and either 443 or 533 will not be allowed.

Geology 435 **3 units; (80-100 hours)**

Field Methods

Field study of geometrically complex geological problems. Involves independent mapping and report writing. Field exercises will normally be conducted away from Calgary for about 10-12 days preceding the Fall Term or following the Winter Term.

Prerequisite(s): Geology 333, 343, 337, 381 and admission to the Geology or Applied and Environmental Geology programs and consent of the Department.

Antirequisite(s): Credit for Geology 435 and either Geology 437 or 439 will not be allowed.

Note: A maximum of 6 units may be taken. This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. It may occur outside Canada. A supplementary fee will be assessed to cover additional costs associated with this course. Students will require consent of the department to drop this course.

MAY BE REPEATED FOR CREDIT

Geology 441 **3 units; (80-100 hours)**

Field Techniques in Hydrogeology

Entails a week at a hydrogeology field site in Alberta or British Columbia. Hydrogeology and geotechnical techniques will be demonstrated and will involve hands-on participation by

students. After the field work, students will conduct extensive analysis and interpretation of data gathered during the field session, complete exercises and prepare a written report. The course normally runs for two to three weeks following Winter Term Final Examinations or prior to the Fall Term.

Prerequisite(s): Geology 401 and consent of the Department.

Antirequisite(s): Credit for Geology 441 and 639 will not be allowed.

Note: This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee will be assessed to cover additional costs associated with this course. Students will require consent of the department to drop this course.

Geology 445 3 units; (3-3)

Structural Geology

Mechanical principles involved in the deformation of rocks; classification of tectonic structures in stratified and non-stratified rocks; manipulation of structural data and its predictive use. Includes basic kinematics, dynamics, rheology, and descriptive structural geology. Also includes a strong lab component emphasizing 3D problem solving, structural analysis, and the use of geologic data sets to construct geologic cross-sections.

Prerequisite(s): Geology 343.

Antirequisite(s): Credit for Geology 445 and 341 will not be allowed.

Geology 463 3 units; (3-3)

Siliciclastic Sedimentology

Depositional and diagenetic facies models applied to main depositional settings for siliciclastic sedimentary rocks, based on both modern and ancient examples. Investigation of the linkages between provenance, deposition, stratigraphic stacking and diagenesis of siliciclastic rocks, and how these factors affect the quality of subsurface fluid reservoirs.

Prerequisite(s): Geology 313, 323, 343 and 381.

Antirequisite(s): Credit for Geology 463 and 461 will not be allowed.

Geology 471 3 units; (3-3)

Geology, Engineering, and the Environment

The principles and methods of physical geology with special emphasis on their application in dealing with civil engineering and environmental problems. Laboratory: properties of minerals and rocks, analysis and interpretation of geological maps, photogeology and seismic refraction in site investigation problems.

Antirequisite(s): Credit for Geology 471 and 201 will not be allowed.

Note: This course is restricted to engineering students. Students who have completed this course may visit the Undergraduate Science Centre to have Geology 471 used in lieu of Geology 201 for prerequisite purposes.

Geology 475 3 units; (3-0)

The Geological Record of Global Change

Geochemical relationships among the atmosphere, hydrosphere, and lithosphere will be examined. Topics include the carbon cycle, chemical weathering, mid-ocean ridge hydrothermal activity, past changes in seawater chemistry, stable isotopes, climate change.

Prerequisite(s): Geology 201 and 202; Chemistry 201 or 211; Chemistry 203 or 213; Mathematics 249 or 265 or 275.

Geology 483 3 units; (3-3)

Carbonate Sedimentology

Petrography of carbonate sediments and their biotic and abiotic constituents. Ocean chemistry of carbonate systems and ocean acidification. Sedimentological, biological and climatic significance of modern and ancient carbonates. Warm- and cool-water carbonate factories. Lacustrine, peritidal, neritic, reef, slope, and pelagic environments. Diagenesis, dolomitization and carbonate reservoirs.

Prerequisite(s): Geology 323, 343, 381 and 493.

Antirequisite(s): Credit for Geology 483 and either 461 or 583 will not be allowed.

Geology 493 3 units; (3-3)

Evolution of Earth Through Life and Time

Origin and evolution of life within the framework of evolution of continents, oceans and atmosphere. Processes and signature of life. Concepts and patterns of evolutionary biology/paleobiology, extinctions, and diversity of life forms. Morphology and taxonomy of fossil groups and geological applications.

Prerequisite(s): Geology 381.

Antirequisite(s): Credit for Geology 493 and 491 will not be allowed.

Geology 505 3 units; (3-3)

Contaminant Hydrogeology

Chemical and biological processes in surface water and groundwater systems. Topics include: water quality, contaminant transport and dispersal, fluid-sediment interactions, remediation of contamination. Techniques will include the use of thermochemical models, numerical modelling of contaminant migration, and examination of case studies.

Prerequisite(s): Geology 401 or 601 and Geology 403 or 503.

Antirequisite(s): Credit for Geology 505 and 609 will not be allowed.

Geology 509 3 units; (0-9)

Independent Study

A written report based on independent study. Originality is emphasized, laboratory and field studies are encouraged.

Prerequisite(s): Science 311; consent of the Department and of a departmental faculty member.

MAY BE REPEATED FOR CREDIT

Geology 510 6 units; (0-9)

Senior Thesis

A written report based on extensive independent study. Originality is emphasized, laboratory and field studies are encouraged.

Prerequisite(s): Science 311; consent of the Department and of a departmental faculty member who will act as a supervisor.

Geology 523 3 units; (3-3)

Advanced Mineralogy

Crystal chemistry of important mineral groups. Relations between structure, property, and composition. Common structure types and their use in understanding complex minerals. Elements of symmetry, space groups, X-ray diffraction techniques, and introduction to crystal structure determination and refinement using experimental data sets and extensive use of computers. Emphasis is on the interpretation and application of results to solving problems in Earth Sciences.

Prerequisite(s): Geology 313 or 423 and 78 units.

Geology 527 3 units; (3-3)

Ore Deposits

Processes of formation of metallic ore and diamond ore deposits. Classification of ores based on petrologic association. Introduction to ore microscopy.

Prerequisite(s): Geology 431 and 433; or Geology 443.

Note: A week-end field trip will be run in September.

Geology 535 3 units; (3-2S)

Early Earth Evolution

Geological evolution in the early stages (Precambrian) of Earth's history including planetary accretion, core formation, evolution of mantle and differentiation of bulk silicate earth, evolution of continental crust and its tectonic mechanisms, evolution of continental mantle lithosphere, evolution of atmosphere and hydrosphere, geologic record of early life, etc. Current geochemical and geodynamic models that attest to these events in the geological record will be explored.

Prerequisite(s): Geology 431 and 433; or Geology 443.

Antirequisite(s): Credit for Geology 535 and 599.18 will not be allowed.

Geology 537 3 units; (80-100 hours)

Advanced Field Methods

Field study of geological problems using advanced methods. Field exercises will normally be conducted away from Calgary for about 10-12 days.

Prerequisite(s): Geology 333, 381, 435, 445 and consent of the Department.

Note: This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. It may occur outside Canada. A supplementary fee will be assessed to cover additional costs associated with this course. Students will require consent of the department to drop this course.

Geology 541 3 units; (3-3)

Advanced Structural Geology

Structural features of complexly folded strata; advanced fold and fault analysis; simple statistical analysis of data; structural analysis; applications to exploration and exploitation; cross-sections and balancing; advanced map interpretation; tectonics; neotectonics.

Prerequisite(s): Geology 445 or 341 and 78 units.

Antirequisite(s): Credit for Geology 541 and 641 will not be allowed.

Note: There may be a week-end field excursion during the term.

Geology 543 3 units; (3-3)

Advanced Igneous and Metamorphic Petrology

Advanced study of igneous and/or metamorphic petrology, and integration with structure, geochronology and tectonics. Applications to problems in earth science. Includes use of microscopy and geochemistry, as well as possible application of instrumental methods.

Prerequisite(s): Geology 431 and 433; or Geology 443.

Geology 545 3 units; (80-100 hours)

Petroleum Geology Field School

Description and analysis of sedimentary rocks in the field with the objective of recognizing and developing analog models for basin- and field-

scale subsurface fluid reservoirs. Consideration of the range of factors affecting reservoir quality e.g. depositional settings, stratigraphy, diagenesis, deformation, etc. Field School will normally be conducted away from Calgary for about 10-12 days preceding the Fall Term or following the Winter Term.

Prerequisite(s): Geology 435 and consent of the Department.

Note: This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee will be assessed to cover additional costs associated with this course. Students will require consent of the department to drop this course.

Geology 555 **3 units; (3-2S)**

Global Tectonics

Global aspects of plate tectonics and regional geology through time. Application of fundamental stratigraphic and structural principles. Contributions of geophysics, geochemistry, experimental and theoretical petrology to the modern plate tectonic model. Analysis and interpretation of major structural provinces as they relate to plate boundary interactions.

Prerequisite(s): Geology 431 or 443, and Geology 493 or 491.

Geology 561 **3 units; (3-3)**

Sequence Stratigraphy

Integrated approach to the study of genetic stratigraphic sequences and their bounding surfaces, linked to facies analysis of clastic and carbonate successions. Principles of sequence stratigraphy and applications to petroleum reservoirs.

Prerequisite(s): Geology 343, 381 and 78 units.

Geology 571 **3 units; (3-3)**

Engineering Geology

The role of geology in engineering problems. Characterization of rock, rock masses and soil. Mechanical behaviour of geologic material. Investigation methods and case histories.

Prerequisite(s): Geology 353 and 445.

Geology 577 **3 units; (3-3)**

Introduction to Petroleum Geology

Fundamental concepts of petroleum geology from deposition/maturation of source rocks to hydrocarbon generation, migrate on and accumulation. Principles of hydrocarbon production, introduction to techniques of subsurface geological analysis applied to the evaluation and quantification of oil and gas reservoirs.

Prerequisite(s): Geology 445 and one of 463 or 483 or Geophysics 457.

Antirequisite(s): Credit for Geology 577 and any of 575, 589.01, 589.02, 589.07, 589.08, 591, 595.01, 596, 689.01, 689.02, 689.07, 689.08, 694.01, 694.03, 696, will not be allowed.

Geology 579 **3 units; (3-3)**

Basin Analysis

Origin of basin subsidence, basin fills and petroleum systems. Basins in their geodynamic environment. Physical state of the lithosphere. Basins due to lithospheric stretching, flexure, and strike-slip deformation. Effects of mantle dynamics. Sediment provenance and routing system. Basin stratigra-

phy. Subsidence and thermal history. Petroleum basins from around the world.

Prerequisite(s): Geology 445; and 463 or 483; and 493; and Geophysics 351 or 355.

Antirequisite(s): Credit for Geology 579 and 595.05 will not be allowed.

Geology 581 **3 units; (3-3)**

Advanced Petroleum Geology

Principles and applications of the characterization of petroleum systems, reservoirs and their fluids with a focus on unconventional resources. Methods of reservoir characterization, log analysis, subsurface mapping and the evaluation of reservoir heterogeneity with respect to geological characteristics and fundamental fluid flow related reservoir and fluid properties. Also examines subsurface CO₂ storage and other routes to eliminating CO₂ emissions from fossil fuel use as well as looking at the role of geoscience in energy recovery innovation and technology development.

Prerequisite(s): Geology 577.

Antirequisite(s): Credit for Geology 581 and any of 575, 589.01, 589.02, 589.07, 589.08, 591, 595.01, 596, 689.01, 689.02, 689.07, 689.08, 694.01, 694.03, 696 will not be allowed.

Geology 587 **3 units; (3-3)**

Invertebrate Paleobiology

Advanced study of selected groups of invertebrate fossil groups, micro- and macrofossils, with extensive presentation of various aspects related to morphology, fossilization, taxonomy, classification, biostratigraphical distribution, evolution, extinction, and industry applications. The lab component includes direct study on each of the fossil groups and advanced biostratigraphy exercises.

Prerequisite(s): Geology 493; or Geology 202 and Zoology 401.

Geology 597 **3 units; (3-3)**

Geostatistics

Statistical analysis of spatial data, multivariate data analysis, regression, variogram analysis, kriging, co-kriging and stochastic simulation.

Prerequisite(s): Mathematics 211; one of 267 or 277 and 78 units.

Antirequisite(s): Credit for Geology 597 and 697 will not be allowed.

Geology 599 **3 units; (3-0) or (3-3)**

Contemporary Topics in Geology

Courses are offered in contemporary topics in areas such as geochemistry, hydrogeology, mineralogy, paleontology, petroleum geology, petrology, quantitative geology, sedimentology, structural geology, and surficial geology.

Prerequisite(s): 78 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Graduate students are urged to read the Geoscience Department section in the Graduate Studies calendar. Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599. Courses numbered 600 are available to fourth-year students who obtain Departmental approval and who have credit for the prerequisite courses.

Geology 601 **3 units; (3-2)**

Advanced Physical Hydrogeology

An advanced treatment of topics covered in Geology 401.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 601 and 401 will not be allowed.

Geology 602 **3 units; (3-3)**

Advanced Aqueous Geochemistry and Environmental Microbiology

An advanced treatment of Aqueous Geochemistry and Environmental Microbiology.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 602 and either of 403 or 699.10 will not be allowed.

Geology 605 **3 units; (3-2T)**

Groundwater Flow and Transport Modelling

Review of the partial differential equations and boundary conditions that describe groundwater flow and transport. Introduction to numerical methods. The course emphasizes the practical aspects of building groundwater and transport models using computer exercises and a groundwater modelling project.

Prerequisite(s): Geology 401 or 601.

Geology 607 **3 units; (3-0)**

Advanced Physical Hydrology

Coverage of more advanced topics in the physical hydrology of surface and subsurface waters including land-atmosphere exchange, vadose zone processes, and watershed hydrology.

Prerequisite(s): Mathematics 253 or 267 or 277 or 283 or Applied Mathematics 219 and Geography 415 and Geology 401.

Geology 609 **3 units; (3-3)**

Advanced Contaminant Hydrogeology

An advanced treatment of topics covered in Geology 505.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 609 and 505 will not be allowed.

Geology 611 **3 units; (2-2)**

Groundwater Resource Management

Advanced topics related to groundwater resource development and management, including exploration methods, aquifer test analysis, aquifer-aquitard systems, groundwater recharge, and the role of models. Fundamental issues related to regional integrated management of water resources.

Prerequisite(s): Mathematics 253 or 267 or 277 or 283 or Applied Mathematics 219 and Geology 401 or Geography 415.

Geology 615 **3 units; (3-3)**

Advanced Laboratory Methods in Geoscience

An overview of analytical methods (XRD, SEM, FESEM, EPMA, XRF, ICP-MS, MS, organic geochemical analyses, etc.) in geoscience and their applications. The course will provide the theoretical background of the techniques as well as opportunities for practical experience. Particular

emphasis will be placed on analytical techniques available within the department.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 615 and 699.57 will not be allowed.

Note: Students must complete appropriate safety training prior to commencing lab related work.

Geology 623 **3 units; (3-3)**

Modern Diffraction and Scattering Techniques

Space groups and principles of X-ray, neutron, and electron diffraction and their applications. Crystal structure determination and refinement using single crystal and Rietveld methods. X-ray and neutron scattering techniques (using the Pair Distribution Function, PDF) to examine local disorder in nano-materials and glasses. Phase transition and structural evolution with pressure, temperature, and composition. Analyses of experimental data sets and extensive use of computers.

Prerequisite(s): Geology 523.

Geology 633 **3 units; (3-3)**

Advanced Petrologic Methods

Theoretical and applied problems in petrology, including some or all of: numerical techniques in petrology, phase equilibria, geothermometry and geobarometry, kinetics in petrology, physics and chemistry of magmatic processes. Laboratory will consist of petrographic study of rock suites.

Prerequisite(s): Geology 543.

Geology 637 **3 units; (80-100 hours)**

Advanced Geoscience Field Studies

Application of advanced concepts and/or methods to field problems of current interest.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 633 and any of 435, 537 or 545 will not be allowed.

Note: A maximum of 6 units may be taken.

MAY BE REPEATED FOR CREDIT

Geology 639 **3 units; (80-100 hours)**

Field Laboratory in Groundwater Hydrogeology

Entails a week at a hydrogeology field site in Alberta or British Columbia. Hydrogeology and geotechnical techniques will be demonstrated and will involve hands-on participation by students. After the field work, students will conduct extensive analysis and interpretation of data gathered during the field session, complete exercises and prepare a written report. Relative to Geology 441, Geology 639 requires more sophisticated analyses of data and additional exercises.

Prerequisite(s): Geology 401 or 601 and consent of the Department.

Antirequisite(s): Credit for Geology 639 and 441 will not be allowed.

Note: This course has limited enrolment. This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. A supplementary fee will be assessed to cover additional costs associated with this course. Students will require consent of the department to drop this course.

Geology 641 **3 units; (3-3)**

Advanced Structural Methods

Analysis of mesoscopic and megascopic structural data; the construction and analytical use of cross-sections, subsurface maps and 3-dimen-

sional models; structural analysis of the Canadian Cordillera.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 641 and 541 will not be allowed.

Note: There may be a week-end field excursion during the term.

Geology 647 **3 units; (2-2-2T)**

Geology Well Log Applications

Geological applications of petrophysical well logs and integration with core descriptions and core analysis data. Derivation of reservoir properties from single-well and multi-well studies.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 647 and any of Geology 449, 699.71, or Geophysics 449 will not be allowed.

Geology 655 **3 units; (3-0)**

Unconventional Gas Reservoir Characterization and Evaluation

Overview of the unique storage and production mechanisms associated with coalbed methane, tight gas and shale gas reservoirs; adsorbed gas storage and modelling; gas-in-place determination and volumetric reserves estimation; material balance techniques; fracture and matrix flow mechanisms; completion/stimulation methods; reservoir characterization methods including core analysis, rate-transient and pressure-transient analysis; exploration and development concepts.

Prerequisite(s): Petroleum Engineering 523 or consent of the Department.

Antirequisite(s): Credit for Geology 655 and 699.37 will not be allowed.

Geology 660 **3 units; (3-3)**

Advanced Sequence Stratigraphy

Concepts and application of sequence stratigraphy to seismic, outcrops, cores, and well logs, with a focus on siliciclastic depositional systems.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 660 and either of 561 or 699.34 will not be allowed.

Geology 663 **3 units; (2-1)**
(Physics 663)

Applications of Stable Isotopes

Application of stable isotope techniques with special focus on Hydrogeology, Geology and Environmental Sciences. The use of isotopes to understand the water, carbon, nitrogen and sulphur cycles is demonstrated. Topics include hydrology, paleoclimates, geothermometry, fossil fuels exploration and recovery, pollutant tracing, food webs, forensic investigations, among others.

Prerequisite(s): Consent of the Department.

Geology 675 **3 units; (3-0)**

Advanced Topics in Dinosaur Paleontology

Topics related to the paleobiology, paleoecology, and paleoenvironments of the Dinosauria will be covered.

Prerequisite(s): Consent of the Department or enrolment in a paleontology-based graduate program.

Geology 683 **3 units; (3-3)**

Advanced Carbonate Sedimentology

Advanced coverage of carbonate sedimentology, including the origin of carbonate sediments,

modern and ancient, and their depositional and diagenetic environments.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 683 and either Geology 483 or 699.02 will not be allowed.

Geology 691 **3 units; (3-2)**

Geological Applications of Well Logs

Geological applications of petrophysical well logs and integration with core descriptions and core analysis data. Derivation of reservoir properties from single-well and multi-well studies.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 691 and any of Geology 699.71, 449, 649, Geophysics 449, or 649 will not be allowed.

Geology 697 **3 units; (3-3)**

Advanced Geostatistics

Advanced treatment of the topics covered in Geology 597.

Prerequisite(s): Mathematics 253 or 267 or 277 or 283 or Applied Mathematics 219 and Mathematics 211.

Antirequisite(s): Credit for Geology 697 and 597 will not be allowed.

Note: Completion of Mathematics 331 and/or Statistics 357 or 327 is recommended prior to taking this course.

Geology 698 **6 units; (3-0)**
(Chemical Engineering 698)

Reservoir Characterization for Field Development

A team-based, integrated reservoir description experience working with geophysical, geological, petrophysical, and engineering data to produce a field development plan.

Prerequisite(s): Chemical Engineering 621 and Geology 697 and Organizational Behaviour and Human Resources 789.

Note: This course is intended for graduate students in the Master of Science in Geology or Geophysics with a specialization in Reservoir Characterization.

Geology 699 **3 units; (3-3) or (3-0)**

Selected Topics in Geology

Courses are offered in specific topics in areas such as geochemistry, hydrogeology, mineralogy, paleontology, petroleum geology, petrology, quantitative geology, sedimentology, structural geology, and surficial geology.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geology 701 **3 units; (0-6)**

Advanced Independent Study

A written report based on laboratory and field studies is required.

Note: Open only to graduate students in the Department of Geoscience.

Geology 703 **3 units; (0-6)**

Readings in Geology

A written report based on a literature review is required.

Note: Open only to graduate students in the Department of Geoscience.

Geology 705 **3 units; (3-3)**
(Geophysics 705)

Graduate Skills in Geoscience

Provides incoming graduate students with an overview of professional skills that are key to success in graduate school and beyond. Presentation skills, writing scientific manuscripts, the peer review process, defence and candidacy exams, intellectual property and innovation, and networking basics.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 705 and 699.56 will not be allowed.

Geology 707 **3 units; (2-2)**

Geology and Geophysics of Western Canada

Topics include stratigraphy, sedimentology, structure, petrology, geophysics and economic geology. Laboratories contain a field component.

Note: Open only to graduate students in the Department of Geoscience and compulsory for beginning doctoral students in Geology.

Geology 733 **3 units; (3-0)**

Analytical Methods in Petrology

Topics may include scanning electron microscope, electron probe, X-ray diffraction and X-ray fluorescence.

Geomatics Engineering ENGO

For more information about these courses, see the Department of Geomatics: <https://schulich.ualgary.ca/geomatics>.

Senior Courses

Geomatics Engineering 319 **3 units; (3-1.5T-2)**

Introduction to Probability, Statistics, and Estimation

Presentation and description of data, introduction to probability theory, Bayes' theorem, discrete and continuous probability distributions. Theory of errors and adjustment of observations. Familiarization with geomatics engineering methodology and estimation. The least squares method for linear parametric and conditional models.

Prerequisite(s): Mathematics 211 and 277.

Antirequisite(s): Credit for Geomatics Engineering 319 and Engineering 319 will not be allowed.

Geomatics Engineering 327 **3 units; (3-1.5T)**

Spectral Analysis in Geomatics

Continuous signals and systems and their properties. Frequency analysis and Fourier series. The continuous Fourier transform (CFT) and its properties. Convolution, correlation and power spectral density functions. Discrete signals and systems and their properties. The discrete Fourier transform (DFT). Sampling theory, aliasing and truncation effects. Linear and circular convolution and correlation. The fast Fourier transform (FFT). The two-dimensional CFT and DFT. Applications of spectral analysis in geodesy, remote sensing, digital imaging, positioning and navigation.

Prerequisite(s): Mathematics 375 or Applied Mathematics 307.

Antirequisite(s): Electrical Engineering 327.

Geomatics Engineering 333 **3 units; (3-2)**

Computing for Geomatics Engineers

Review of procedural programming and introduction to object-based programming using high level compiled and interpreted languages.

Binary and ASCII File I/O, use of function libraries and class libraries. Construction of simple classes. Inheritance and polymorphism. Programming for Geomatics Engineering applications. Visualization and data representation.

Prerequisite(s): Engineering 233.

Geomatics Engineering 343 **3 units; (3-3)**

Fundamentals of Surveying

Levelling: differential and trigonometric levelling. Angular. Distance measurements by taping and EDM. Precision and accuracy of survey observations. Computations: traversing and area, the first and second geodetic problem on the plane, trig sections, intersections, three-point resection and co-ordinate transformations. Route surveying: horizontal and vertical curves, earthwork computations. Routine procedures: setting out straight lines and right angles; measurement with obstructions. Setting out surveys. Topographic surveys.

Prerequisite(s): Engineering 319 or Geomatics Engineering 319.

Geomatics Engineering 351 **3 units; (3-3)**

Introduction to Geospatial Information Systems

Introduction to Geospatial Information Systems and Geographic Information Science, Georelational vector data model, object-based vector data model, raster data model, map projections, geodetic datums, co-ordinate systems, georeferencing, database design and management, query language, geometric transformations, vector data analysis, raster data analysis, spatial interpolation, terrain modelling and analysis, triangulated irregular network data model, path and network analysis.

Prerequisite(s): Engineering 233.

Geomatics Engineering 363 **3 units; (3-1.5T-2)**

Estimation and Statistical Testing

Least squares method: parametric, condition and combined cases. Linearization. Problem formulation and solution: error propagation, analysis of trend, problems with a priori knowledge of the parameters, step-by-step methods, combination of models, sequential solution methods, summation of normals. Introduction to univariate and multivariate statistical testing applied to geomatics engineering problems. Sampling distributions, tests of hypotheses on means, variances, proportions, and residuals.

Prerequisite(s): Geomatics Engineering 319 and 333.

Antirequisite(s): Credit for Geomatics Engineering 363 and 361 will not be allowed.

Geomatics Engineering 401 **3 units; (1-2T-3)**

Geomatics Engineering Design and Communication

Design and implementation of topographic surveys: survey specifications, equipment calibration, reconnaissance, design of survey control points, resection, traversing, differential levelling, and mapping. Error analysis, error figures and error visualization using a graphical approach. Principles of cartography: design, constraints and planning, generation and production of maps including scale, contours, and co-ordinate grids. UTM and 3TM co-ordinates. Digital cartography: computer-aided survey mapping and digital data generation. Communication of geomatics engineering informa-

tion: technical reports, field notes, and graphical data representation.

Prerequisite(s): Geomatics Engineering 343 and one of Geomatics Engineering 361 or 363.

Note: Field work prior to the start of classes will be required.

Geomatics Engineering 419 **3 units; (3-3)**

Geomatics Networks

A systematic approach to "Geomatics Network Analysis and Optimal Design", which are two of the most important processes in establishing a Geodetic Network. Network observation reductions and pre-analysis. Network co-ordinate systems, observation models and least-squares adjustment. Network precision, reliability measures and analysis. Network design concepts, classification and methods. Network design for deformation monitoring and analysis. Other geodetic network applications. New network concepts.

Prerequisite(s): Geomatics Engineering 361 or 363.

Geomatics Engineering 421 **3 units; (3-3)**

Co-ordinate Systems

Fundamental concepts, definitions and basic aims of geodesy. Representation of the Earth's surface: physical and mathematical figures of the Earth, geodetic reference systems, frames and co-ordinates, reference ellipsoids and geodetic datums, maps. Time systems, basic motions of the Earth, dynamic behaviour of the Earth. Basic types of geodetic reference systems, computational procedures and co-ordinate transformation methods. Celestial co-ordinate systems and astronomic positioning. Elements of map projections, examples and applications.

Prerequisite(s): Geomatics Engineering 333 and 351.

Geomatics Engineering 423 **3 units; (3-3)**

Geodesy

Introduction to geodesy, its principles, tasks and applications. Measurements and methods for geodetic positioning. The gravity field and the geoid in science and engineering. Elements from potential theory, vector calculus, Gauss divergence, Green's theorems, boundary value problems. The normal field. Gravimetry and gravimetric measurements. Gravity reductions, isostasy. Geoid determination, Stokes's formula, combination methods, least-squares collocation. Vertical positioning and height datums and systems. Fundamentals of Earth's figure and gravity field estimation using perturbations of orbits of satellites and planets. Principles and applications of satellite gravimetry and satellite altimetry.

Prerequisite(s): Geomatics Engineering 421.

Corequisite(s): Geomatics Engineering 327 or Electrical Engineering 327.

Geomatics Engineering 431 **3 units; (3-3)**

Principles of Photogrammetry

The role of photogrammetry in mapping applications (image acquisition and image measurement). Mathematical relationships between image space and object space. Two- and three-dimensional co-ordinate transformations. Conditions of collinearity and coplanarity; orientation procedures (interior, exterior, relative, absolute orientation and direct georeferencing); measurement and correction of image co-ordinates; stereomodel formation and error analysis; mathematical models for strip and block adjustments; project planning; principles of laser scanning.

Prerequisite(s): Geomatics Engineering 419.

Geomatics Engineering 435 **3 units; (3-3)****Remote Sensing**

A survey of modern quantitative remote sensing using optical, infrared and microwave radiation. Topics include: physical principles, including governing equations; imaging system geometries; radiometric corrections, including calibration and atmospheric correction; geometric corrections, including registration and land cover classification algorithms, including accuracy assessment and geospatial data integration.

Prerequisite(s): Geomatics Engineering 333 and 351.

Geomatics Engineering 443 **3 units; (2-4)****Geodetic and Engineering Surveys**

Instrument systems and procedures for engineering and geodetic surveys: precise levels, high-precision theodolites, electronic distance measurement instruments, gyro-theodolites. Heighting, triangulation, instrument calibration, observation procedures and reductions, introductory deformation analysis, error analysis, survey computations, map projection computations.

Prerequisite(s): Geomatics Engineering 343 and one of Geomatics Engineering 361 or 363.

Corequisite(s): Geomatics Engineering 103 or 401.

Geomatics Engineering 451 **3 units; (3-3)****Design and Implementation of Geospatial Information Systems**

Overview of Geographical Information Systems from a computing perspective. Topics include: Fundamental Database Concepts: relational algebra, UML modelling, and SQL; Fundamental Spatial Concepts: Geometry, Euclidean space, topological space, set notations, point set topology, and base graph theory; Models for Geospatial Information: object models and field models; Representations and Algorithms for GIS: computational complexity, discretization algorithms, topological data models and algorithms, TIN model, and computational geometry algorithms for GIS; Spatial Access Methods: B-Tree, Quadtree, and R-Tree; and Architectures: centralized and decentralized architectures.

Prerequisite(s): Geomatics Engineering 351.

Corequisite(s): One of Engineering 213, Communications Studies 363 or Strategy and Global Management 217.

Geomatics Engineering 455 **3 units; (3-3)****Land Tenure and Cadastral Systems**

Land tenure, cadastral systems, real property law, methods of acquiring rights in land, boundary concepts, cadastral survey computations, land registration systems, entity relationship models of land tenure systems, case law of boundary systems. History of cadastral systems, land administration, fiscal and juridical cadastres, dominion land systems, land registration in Alberta, special types of surveys relating to Canada Lands, structure of professional surveying bodies in Canada.

Prerequisite(s): Geomatics Engineering 421 and one of Geomatics Engineering 103 or 401; and one of Engineering 213, Communications Studies 363 or Strategy and Global Management 217.

Geomatics Engineering 465 **3 units; (3-3)****Satellite Positioning**

Satellite orbit motion and Kepler's laws. Description of GPS signal structure and derivation of observables. Characteristics of instrumentation. Analysis of atmospheric, orbital and other random

and non-random effects. Derivation of mathematical models used for absolute and differential static and kinematic positioning. Pre-analysis methods and applications. Concept of Kalman filtering applied to kinematic positioning. Ambiguity resolution procedures Overview of other GNSS, GNSS augmentation and high-sensitivity receivers Introduction to inertial navigation.

Prerequisite(s): Geomatics Engineering 361 or 363; and 421; and one of 103 or 401.

Geomatics Engineering 500 **6 units; (1-5)****Geomatics Engineering Project**

Principles of project management and applications in geomatics projects. Group project, under the supervision of a faculty member, on an assigned Geomatics Engineering topic. The project will normally involve a literature review, theoretical work, and laboratory or field work.

Prerequisite(s): One of Engineering 213, Communications Studies 363 or Strategy and Global Management 217.

Corequisite(s): Geomatics Engineering 501.

Geomatics Engineering 501 **3 units; (152 hours)****Field Surveys**

Field exercises include: instrument calibration, cadastral retracement, determination of astronomic azimuth, conventional control survey for deformation analysis, real time kinematic surveying, geodetic control using static GPS, precise levelling, hydrographic surveying, and geographic information systems and data management. This course adopts a team-based learning approach and emphasis is placed on practical professional experience, planning, and logistic for field survey operations. Each team is required to produce a field work report for each field activity, and each student is responsible for a chapter, detailing one of the exercises, of the primary team report describing all of the work accomplished by the team during the course. The course concludes with a half-day seminar that focuses on the practice and profession of Land Surveying.

Prerequisite(s): Geomatics Engineering 419, 455, 465; and 103 or 401; and one of 451 or 443.

Note: A two-week field camp will be held at the Biogeoscience Institute at Barrier Lake prior to the start of the Fall Term lectures. Students will be assessed a supplementary fee to cover the costs of the field camp.

Geomatics Engineering 531 **3 units; (2-2)****Advanced Photogrammetric and Ranging Techniques**

Geometry and orientation of multi-image networks, self-calibrating bundle adjustment, direct versus indirect geo-referencing, 3D point cloud generation via structure-from-motion approaches, geometry of line cameras, principles of active imaging systems, mathematics of LiDAR mapping (registration and calibration), 3D point-cloud manipulation (feature extraction, segmentation and classification), photogrammetry and LiDAR data integration and fusion.

Prerequisite(s): Geomatics Engineering 421, 431 and 435.

Geomatics Engineering 545 **3 units; (2-3)****Hydrographic Surveying**

Water levels and flow. Underwater acoustics including velocity and system parameters. Sonar and echosounder systems. Acoustic positioning concepts. Vertical positioning and datums. Types

of surveys and specifications. Practical examples and survey data processing.

Prerequisite(s): Fourth-year standing or higher.

Geomatics Engineering 551 **3 units; (2-2)****Advanced Geospatial Topics**

Progress in research, development and applications in the field of geospatial technologies; importance of geospatial knowledge and evolution of geospatial technologies in the last decades; focus on six major geospatial technologies that characterize the so-called Geospatial Revolution; Geoweb, Virtual Globes, Volunteered Geographic Information, Location-Based Services, Big data and geospatial cyber-infrastructure; data/product quality, privacy and confidentiality, and societal implication of these technologies will be discussed.

Prerequisite(s): Fourth-year standing.

Geomatics Engineering 559 **3 units; (2-2)****Digital Imaging and Applications**

An introduction to digital image processing (IP) and computer vision (CV) concepts, methods and algorithms which will enable the students to implement IP/CV systems or use IP/CV software with emphasis on remote-sensing and photogrammetry applications and problem solving. Course components include: image formation and intensity transformation, filtering in the spatial and frequency domain, colour image processing, feature detection and matching, image restoration, image segmentation, mathematical morphology and multi-source image/data fusion.

Prerequisite(s): Geomatics Engineering 435 and one of Geomatics Engineering 327 or Electrical Engineering 327.

Geomatics Engineering 563 **3 units; (2-2)****Data Analysis in Engineering**

Fundamental of matrix theory, linear systems, probability and statistics. Data classification, analysis and bias identification. Random data acquisition, qualification and analysis. Least squares estimation and data analysis. Random process, stationarity test and kinematic modelling. Kalman filtering and real-time data analysis. Introduction to signal processing and time series analysis. Practical applications of data analysis and processing in geomatics engineering.

Prerequisite(s): Geomatics Engineering 361 or 363.

Geomatics Engineering 567 **3 units; (2-3)****High-Precision Surveys**

Instrument systems and procedures for high-precision surveys: precise levels, high-precision theodolites, electronic distance measurement instruments. High-precision industrial surveys: computation of three-dimensional orientations and rotations by autoreflection and autocollimation; computation of three-dimensional co-ordinates and co-ordinate changes by theodolite intersection methods, total station methods, scale bar on target methods, digital camera methods, laser scanner methods; systematic errors and their control; geometric form fitting. Case studies in high precision surveys.

Prerequisite(s): Geomatics Engineering 419 and 443.

Geomatics Engineering 573 **3 units; (2-2)****Digital Terrain Modelling**

Digital Terrain Modelling (DTM, DEM, DHM, DTEM) concepts and their implementation and applications in geomatics engineering and other disciplines. Emphasis will be on mathematical tech-

niques used in the acquisition processing, storage, manipulation, and applications of DTM. Models of DTM (Grids, Contours, and TINs), data structures (Delaunay triangulation, Voronoi diagram, Octree, k-D tree) processing (filtering, random sample consensus, surface normal computation), surface representation from point data using moving averages, linear projection, and Kriging techniques. Grid resampling methods and search algorithms used in gridding and interpolation. DTM derivatives (slope maps, aspect maps, viewsheds, and watershed). Applications of DTM in volume computation, and drainage networks.

Prerequisite(s): Engineering 407 and Geomatics Engineering 431.

Geomatics Engineering 579 3 units; (2-3)

Survey Law and Practice

Review of legislation, standards of practice and case law affecting property interests, property boundaries and boundary surveys. Evidence and boundary survey principles, riparian rights, title to land; Canada lands; Aboriginal rights; inter-jurisdictional boundaries; law of the sea. Reforms in the surveying profession. Field exercises may take place off campus over week-ends.

Prerequisite(s): Geomatics Engineering 455 and 443.

Corequisite(s): Geomatics Engineering 501.

Geomatics Engineering 581 3 units; (2-2)

Land Use Planning

Theoretical and historical bases of planning. Urban reform and development of planning in Canada. Sustainable development. Subdivision planning process. Provincial and municipal planning approval requirements. Public participation. Site assessments. Field exercises may take place off campus over week-ends.

Prerequisite(s): Geomatics Engineering 579.

Geomatics Engineering 583 3 units; (2-2)
(Environmental Engineering 635)

Environmental Modelling

Nature and purpose of environmental modelling; the top-down and the bottom-up approaches; typology of environmental models; definition of fundamental concepts; steps involved in designing and building a model; calibration, verification and validation of models; scale dependency; sensitivity analysis; characteristics, architecture and functioning of selected environmental models.

Prerequisite(s): Fourth-year standing.

Geomatics Engineering 585 3 units; (2-2)

Wireless Location

Fundamentals of radio-frequency propagation, principles of radio-frequency positioning, observations and their associated error sources. Introduction to self-contained inertial sensors including odometers, gyros, accelerometers, and augmentation of RF methods with self-contained sensors and other data sources. Current systems: Assisted GPS, cellular telephone location techniques, pseudolites, location with wireless computer networks, ultra-wideband. Applications: outdoor and indoor personal location, asset tracking.

Prerequisite(s): Geomatics Engineering 465 and one of Geomatics Engineering 327 or Electrical Engineering 327.

Graduate Courses

Following are the graduate courses normally offered in the Department. Additional courses are also offered by visiting international lecturers. Please refer to the Department website (geomatics.ualgary.ca) for current course listings.

Geomatics Engineering 601 3 units; (0-4)

Graduate Project

Individual project in the student's area of specialization under the guidance of the student's supervisor. A written proposal, one or more written progress reports, and a final written report are required. An oral presentation is required upon completion of the course.

Note: Open only to students in the course-based route MEng.

Geomatics Engineering 610 3 units; (3-0)

Geospatial Vision

Covers relevant computer vision methods for solving mapping problems. Topics include 2D/3D interest points and feature descriptors, stereo and multi-view stereo, image alignment, 3D reconstruction, range data processing (pre-processing, segmentation and alignment), 3D modelling from point clouds, deep learning for mapping, map inference and map matching.

Geomatics Engineering 612 3 units; (3-0)

Wellbore Positioning by MWD Sensors in the Directional Drilling

Provides a basic knowledge and techniques of wellbore positioning in the directional drilling by using measurement-while-drilling (MWD) gravity and magnetic sensors.

Geomatics Engineering 615 3 units; (3-0)

Advanced Physical Geodesy

Potential theory and geodetic boundary value problems (GBVPs). Solution approaches to the Molodensky problem. Least-squares collocation (LSC). Hilbert spaces with kernel functions. Variational principles, improperly posed problems and regularization. The altimetry-gravimetry and overdetermined GBVPs. Solution of GBVPs by integral techniques, fast Fourier transforms and LSC. Use of heterogeneous data sets and noise propagation. Applications to gravity prediction, geoid determination, deflection estimation, satellite altimetry and airborne gravimetry and gradiometry. Current research activities.

Geomatics Engineering 617 3 units; (3-0)

Participatory Geographic Information Systems (PGIS)

Introduction of methods to engage in effective dialogue and advocacy through the adoption of Participatory Geographic Information Systems (PGIS). Approaches learned to safeguard culturally sensitive information from external misuse and exploitation; methods to ensure traditional custodians maintain control of their spatial information; methods for producing, georeferencing and visualizing (indigenous) spatial knowledge that promote peer-to-peer dialogue, and their aspirations and concerns with higher-level authorities. The course will be a workshop forward that incorporates readings and various group exercises to provide students with a road map to undertaking PGIS.

Geomatics Engineering 620 3 units; (2-2)

Estimation for Navigation

Overview of estimation fundamentals including stochastic processes, covariance matrices, auto-correlation functions, power spectral densities, and error propagation. Review of least-squares estimation, summation of normals and sequential least-squares formulations, and role of measurement geometry in least-squares position estimation. Constraints and implementations. Concept of Kalman filtering; relationship between Kalman filtering and least-squares; linear, linearized and extended Kalman filter formulations;

system model formulation; process noise model determination; measurement models, and effect of time-correlated measurements and possible remedies. Numerical stability issues in estimation and possible solutions. Statistical reliability in least-squares and Kalman filtering and related RAIM concepts. Introduction to other estimation techniques including unscented Kalman filters and particle filters. Application of above topics to relevant navigation estimation problems.

Geomatics Engineering 623 3 units; (3-0)

Inertial Surveying and INS/GPS Integration

Inertial sensors and their application in inertial navigation, existing inertial systems, new developments in strapdown technology. Practical aspects of inertial positioning definition of an operational inertial frame, inertial error models. Effect of inertial sensor errors on the derived navigation parameters, performance characteristics of inertial sensors, calibration of inertial sensors. Mechanization equations in different co-ordinate frames, step by step computation of the navigation parameters from the inertial sensor data introduction to Kalman filtering for optimal error estimation, modelling INS errors by linear state equations, practical issues for the implementation of update measurements (ZUPT, CUPT, Integrated systems), current research activities.

Geomatics Engineering 625 3 units; (3-2)

Advanced GNSS Theory and Applications

Overview of space positioning and navigation systems; concepts and general description. Global Navigation Satellite System signal description. Receiver and antenna characteristics and capabilities; signal measurements indoor; GNSS error sources and biases; atmospheric delays, signal reflection and countermeasures. Mathematical models for static point and relative positioning. Kinematic single point and differential post mission and real time positioning, navigation and location. Augmentation methods. Land, marine, airborne and indoor applications. Case studies.

Geomatics Engineering 629 3 units; (3-0)

Advanced Estimation Methods and Analysis

Introduction of different estimation criteria, error sources in estimation, modelling and testing requirements. Advanced least squares method, estimation equations and analysis. Random processes, dynamic models, Kalman filter equations and analysis. Implementation aspects. Concept of signal, least squares collocation equations and applications. Robust estimation principle and robustified least squares and Kalman filter. Data modelling issue in estimation, functional and stochastic model development for least squares and Kalman filter. Error analysis, conventional and robust statistical testing methods and analysis. Applications to geomatics engineering problems in geodesy, positioning and navigation, photogrammetry, etc.

Geomatics Engineering 633 3 units; (3-0)

Atmospheric Effects on Satellite Navigation Systems

Theoretical and observed aspects of radio wave propagation in the ionosphere and troposphere, with an emphasis on L-band (GPS) signals. Fundamentals of absorption, attenuation, depolarization, and refraction will be covered, in addition to characteristics and physical properties of the propagation medium and atmospheric constituents. The impact of such effects, and methods of mitigation, will be interpreted with respect to satellite navigation applications.

Geomatics Engineering 637 3 units; (3-0)
(Environmental Engineering 637)

Earth Observation for the Environment

An introduction to environmental earth observation systems in particular to satellite platforms. Topics include: discussion of physical principles, including governing equations; imaging system geometries; radiometric corrections, including calibration and atmospheric correction; spatial filtering for noise removal and information extraction; geometric corrections, including rectification and registration; fusion of multi-dimensional datasets (i.e., multispectral, multi-temporal, multi-resolution, and point-source ground data); and application of satellite images in addressing selected environmental issues.

Antirequisite(s): Credit for Geomatics Engineering 637 and any of Geomatics Engineering 619.04, Environmental Engineering 637 or 619.05 will not be allowed.

Geomatics Engineering 638 3 units; (2.5-1)

GNSS Receiver Design

Global Navigation Satellite System signal structure, overview of receiver architecture, measurements, antenna design, receiver front-end, reference oscillator, sampling and quantization, phase lock loops, frequency lock loops and delay lock loops, tracking loop design and errors, signal acquisition and detection, interference effects.

Geomatics Engineering 639 3 units; (3-0)

Advanced Topics in Digital Image Processing

Review of basic digital imaging; advanced topics in multispectral or hyperspectral analysis, multiresolution analysis, image segmentation, image transform, data fusion, pattern recognition or feature matching; current research applications especially in geomatics.

Geomatics Engineering 642 3 units; (3-0)

Optical Imaging Metrology

Optical imaging methods for precise close-range measurement. Photogrammetric techniques with emphasis on the bundle adjustment. Photogrammetric datum definition, network design and quality measures. Principles of laser rangefinding and laser scanning. Imaging distortions, sensor modelling and system self-calibration for a variety of imaging sensors including digital cameras, panoramic cameras, 3D laser scanners and 3D range cameras. Automated point cloud processing methods; registration, modelling and segmentation. Selected case studies.

Geomatics Engineering 645 3 units; (3-0)
(Environmental Engineering 630)

Spatial Databases and Data Mining

Comprehensive overview of spatial database management systems and issues related to spatial data mining. Topics include: overview of spatial databases, spatial concepts and data models, spatial query languages, spatial storage and indexing, spatial networks, spatial data mining, and trends in spatial databases.

Geomatics Engineering 658 3 units; (3-0)

Geocomputation

Overview of the fundamental concepts, approaches, techniques, and applications in the field of Geocomputation. Topics being discussed include Geocomputation, Computational intelligence, Complex Systems theory, Cellular automata modelling, Multi-agent system modelling, Calibration and validation of dynamic models, Scale, Artificial neural network, Data mining and knowledge discovery, Geovisualization, and Post-

normal science. Individual projects involving the application of Geocomputational techniques and models are conducted.

Geomatics Engineering 667 3 units; (3-0)

Advanced Topics in Photogrammetry

Overview of aerial triangulation procedures (strip triangulation, block adjustment of independent models, bundle block adjustment, automatic aerial triangulation, direct versus indirect orientation). Mapping from space (modelling the perspective geometry of line cameras, epipolar geometry for line cameras). Multi-sensor aerial triangulation (integrating aerial and satellite imagery with navigation data). Photogrammetric products (Digital Elevation Models, ortho-photos). The role of features in photogrammetric operations (utilizing road network captured by terrestrial navigation systems in various orientation procedures).

Geomatics Engineering 675 3 units; (3-0)

Spatial Statistics

Spatial phenomena and spatial processes. Spatial data analysis and the importance of spatial data in scientific research. Methods will range from exploratory spatial data analysis through to recent developments such as nonparametric semivariogram modelling, generalized linear mixed models, estimation and modelling of nonstationary covariances, and spatio-temporal processes.

Geomatics Engineering 681 3 units; (3-0)
(Geophysics 681)

Advanced Global Geophysics and Geodynamics

Elasticity, figure of the Earth, Earth structure and seismology, gravity and its temporal variations, isostasy, tides, Earth rotation and orientation, time, plate flexure, glacial rebound, continental drift, geodetic observation methods for geodynamics.

Geomatics Engineering 691 3 units; (3-0)

Polarimetric Synthetic Aperture Radar

Introduction to image formation with polarimetric synthetic aperture radar (POLSAR), theory of polarized electromagnetic waves, polarimetric scattering from targets, POLSAR data models, speckle filtering, data decomposition, classification, and segmentation.

MAY BE REPEATED FOR CREDIT

Geomatics Engineering 693 3 units; (3-0)

Cadastral Information Systems

Cadastral Systems, cadastral data, land registration, data structures and schemas for land administration information, ISO standards, evolutionary models, land tools, effectiveness metrics.

Geomatics Engineering 694 3 units; (3-0)
(Environmental Engineering 639)

Advanced Topics in Sensor Web and Internet of Things

Overview of the sensor web architecture and algorithms, with a focus on Internet of Things. Topics include: sensor web data management, sensor web search and discovery, sensor web server design and implementation, interoperability issues, sensor-based analytics and visualization, introduction to sensor networks, and trends in sensor web and Internet of Things.

Geomatics Engineering 697 3 units; (3-0)

Directed Studies

Individual project study conducted under the guidance of a faculty member and intended to familiarize the student with the literature and techniques

that are required for their research program, but are not available in regular courses.

Prerequisite(s): Consent of the Department Head or Associate Head Graduate Studies.

MAY BE REPEATED FOR CREDIT

Geomatics Engineering 698 3 units; (3S-0)

Professional Development Seminar

This professional development seminar aims at providing relevant skills to be a successful graduate student and to make a smooth transition to a rewarding professional career. In addition to efficient communication skills, this course will place an emphasis on research methodologies such as formulating research problems, preparing a scholarship application, writing a paper for publication, and defending a thesis. How to prepare for a successful interview in industry or academia and the required process for becoming a professional engineer will also be discussed.

NOT INCLUDED IN GPA

Geomatics Engineering 699 3 units; (3-0)

Special Studies

Focus on advanced studies in specialized topics that are not offered in the regular graduate curriculum of the Department.

MAY BE REPEATED FOR CREDIT

Geophysics GOPH

For more information about these courses contact the Department of Geoscience: geoscience.ucalgary.ca/.

Senior Courses

Geophysics 351 3 units; (3-3)

Introduction to Geophysics

The key geophysical concepts and methods that are used to study the Earth and solve various geoscientific problems. Includes: earthquake seismology, gravity and magnetism, figure of the Earth, isostasy, heat flow, reflection and refraction seismology, radioactivity and geochronology, geodynamics, applications and case studies.

Prerequisite(s): Geology 201 and 202; Mathematics 267 or 277; Physics 211 or 221, and 223.

Antirequisite(s): Credit for Geophysics 351 and 359 will not be allowed.

Geophysics 355 3 units; (3-3)

Exploration Geophysics

An introduction to refraction seismic, reflection seismic, gravity and magnetic methods applied to exploration for hydrocarbons, and their use in engineering studies.

Prerequisite(s): Geology 201 and 202; Mathematics 267 or 277; Physics 211 or 221, and 223.

Antirequisite(s): Credit for Geophysics 355 and 365 will not be allowed.

Geophysics 375 3 units; (3-0)

Natural Disasters and Critical Earth Phenomena

Causes of disasters such as earthquakes, tsunamis, volcanic eruptions, mud flows, landslides, avalanches, flooding, tornadoes and hurricanes, and other critical phenomena such as sinkholes, ozone depletion and radiation, carbon dioxide and global warming, El Nino, toxic natural materials and pollution, and extraterrestrial impacts. Surveys of historic disasters and their effects on life on Earth. Methods of prediction and prevention of

disasters and precautions for the mitigation of their effects.

Note: This course is not part of the Field of Geophysics.

Geophysics 419 **3 units; (3-3)**

Computational Methods for Geophysicists

Topics in numerical analysis emphasizing geophysics applications. Topics will include error analysis, Taylor series, root finding algorithms, linear system solver algorithms, LU decomposition, curve fitting, numerical differentiation and integration, numerical solution of ODEs, introduction to PDE solvers.

Prerequisite(s): Geophysics 351 or 355; Computer Science 217 or 231 or 235 or Data Science 211; Mathematics 211 and 331.

Antirequisite(s): Credit for Geophysics 419 and any of 619, 599.09 or 699.09 will not be allowed.

Geophysics 453 **3 units; (3-3)**

Mining Geophysics

Electromagnetic, resistivity, induced polarization, self-potential, radiometric and gravity methods applied to problems in the search for metallic mineral deposits.

Prerequisite(s): Geology 201, Physics 223, Mathematics 211 and one of 267 or 277.

Geophysics 457 **3 units; (3-3)**

Physical Properties of Rocks

Physical properties of minerals and rocks, their relationship to geophysical measurements and surveys.

Prerequisite(s): Geophysics 351 or 355; Mathematics 331 or 367 or 377; Physics 321.

Geophysics 509 **3 units; (0-9)**

Independent Study

A written report based on independent study. Originality is emphasized, laboratory and field studies are encouraged.

Prerequisite(s): Consent of the Department and of a Departmental faculty member who will act as a supervisor.

MAY BE REPEATED FOR CREDIT

Geophysics 517 **3 units; (3-3)**

Time Series Analysis and 1D Data Processing

Analysis of geophysical time series, especially real and synthetic seismic signals, is introduced using theoretical concepts and their practical application in a computational lab using commercial computational software.

Prerequisite(s): Geophysics 355, Mathematics 211 and 415.

Geophysics 547 **3 units; (3-3)**

Gravity and Magnetics

The nature of the magnetic and gravitational fields of the earth. Theory and applications of the gravity and magnetic methods of geophysical exploration.

Prerequisite(s): Geophysics 351 or 355; Mathematics 415 and one of 331 or 367 or 377.

Geophysics 549 **3 units; (60-70 hours)**

Field School

Seismic, gravity, magnetic, electromagnetic, resistivity, induced polarization and topographic surveys will be conducted prior to the Fall Term.

Prerequisite(s): Geophysics 355, 453 and 457, admission to the Major or Honours program in Geophysics and consent of the Department.

Note: This course occurs in rugged field conditions and varying weather, for which participants must

be prepared and equipped. A supplementary fee will be assessed to cover additional costs associated with this course. Students will require consent of the department to drop this course. Data collected will be processed during Fall Term tutorials.

Geophysics 551 **3 units; (3-3)**

Seismic Theory and Methods

Seismic wave propagation theory; various techniques of exploration seismology.

Prerequisite(s): Geophysics 355, Physics 321, 323, Mathematics 211, 415 and one of Mathematics 331 or 367 or 377.

Geophysics 557 **3 units; (3-3)**

Multidimensional Data Analysis and Processing

Analysis and processing of 2D and 3D seismic data is explored using theoretical and practical concepts and applied in a computational lab using both commercial computational software and a commercial seismic data processing system.

Prerequisite(s): Geophysics 517.

Geophysics 559 **3 units; (3-2)**

Geophysical Interpretation

Analysis and integration of geophysical and geological data. Qualitative and quantitative interpretation. Industrial case studies.

Prerequisite(s): Geophysics 351 or 355; and 78 units.

Geophysics 565 **3 units; (3-3)**
(formerly Geophysics 465)

Environmental Applications of Geophysics

Application of geophysical methods such as resistivity, electromagnetics, and ground penetrating radar to investigations of geological, geotechnical, hydrological, and environmental problems. Small-scale high resolution applications of other geophysical methods (seismic, gravity, magnetics).

Prerequisite(s): One of Mathematics 249, 265 or 275 and 78 units.

Antirequisite(s): Credit for Geophysics 565 and either 365 or 465 will not be allowed.

Geophysics 599 **3 units; (3-0) or (3-3)**

Contemporary Topics in Geophysics

Courses are offered in contemporary topics in areas such as seismology, gravity and magnetics, electrical and electromagnetic methods, exploration and environmental geophysics, and integrated geophysical methods.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Graduate students are urged to read the Geoscience Department section in the Graduate Studies calendar. Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599. Courses numbered 600 are available to fourth-year students who obtain Departmental approval and who have credit for the prerequisite courses.

Geophysics 619 **3 units; (3-3)**

Advanced Computational Methods for Geophysicists

Review of important mathematical models in geophysics (Poisson equation, acoustic wave equation, elastic wave equation) and typical boundary conditions for elliptic and parabolic partial differential equations. Numerical solutions using finite difference, finite volume and finite element

approaches. Algorithms for nonlinear constitutive behaviour and introduction to nonlinear optimization/inversion algorithms. Course includes an independent term project.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geophysics 619 and Geophysics 699.09 will not be allowed.

Geophysics 645 **3 units; (3-0)**

Seismic Wave Propagation

Seismic body and surface waves, reflection, refraction, diffraction, anelasticity, anisotropy, ray methods, point and line source solutions to the equation of motion, finite-difference methods for seismic waves, additional topics depending on current research interests.

Prerequisite(s): Geophysics 551.

Geophysics 657 **3 units; (3-0)**

Seismic Signal Analysis

Advanced methods of seismic data analysis in exploration and production geophysics. Topics include velocity analysis, polarization filtering, median filtering, migration, inversion and tomography.

Geophysics 665 **3 units; (3-0)**

Theoretical Seismology

Seismic ray theory, inverse theory, full-wave methods, matrix methods, numerical methods, additional topics depending on current research interests.

Prerequisite(s): Geophysics 551.

Geophysics 667 **3 units; (3-0)**

Introduction to Microseismic Methods

Use of microseismic methods as surveillance technology during hydraulic-fracture treatment of tight reservoirs. Methods for acquiring, processing and interpreting microseismic data. Methods for picking events, determining hypocenter location and magnitude, and interpreting the stimulated rock volume.

Prerequisite(s): Consent of the Department.

Geophysics 669 **3 units; (3-0)**

Global Seismology

An introduction to theory and practice of global seismology. Topics include: seismograph systems, global wave propagation, moment tensors, shear-wave splitting, surface waves, receiver functions, seismic tomography and teleseismic receiver functions.

Prerequisite(s): Admission to the graduate program in geophysics.

Geophysics 671 **3 units; (3-0)**

Inverse Theory and Applications I

An introduction to the mathematical and numerical techniques of geophysical inversion. Topics include least squares, singular value decomposition, and Tikhonov regularization. Development of numerical codes to solve real inverse problems is stressed.

Prerequisite(s): Admission to the graduate program in geophysics.

Geophysics 673 **3 units; (3-0)**

Inverse Theory and Applications II

Multidimensional real-world inverse problems, such as constrained seismic, gravity, or resistivity inversion. Fourier, maximum entropy, Bayesian approaches and iterative solution techniques such as Kaczmarz and conjugate gradient are covered.

Prerequisite(s): Consent of the Department.

Geophysics 681 **3 units; (3-0)**
 (Geomatics Engineering 681)

Advanced Global Geophysics and Geodynamics
 Elasticity, figure of the Earth, Earth structure and seismology, gravity and its temporal variations, isostasy, tides, Earth rotation and orientation, time, plate flexure, glacial rebound, continental drift, geodetic observation methods for geodynamics.

Geophysics 687 **3 units; (3-0)**
Theory of Seismic Imaging

The theories of wave propagation in acoustic and elastic media are used to develop the major algorithms used in seismic imaging (migration). Green's theorem, Huygen's principle, Kirchhoff diffraction theory, raytracing, wavetracking, multidimensional Fourier analysis, and Radon transforms are explored.

Note: Elementary knowledge of vector calculus and partial differential equations is assumed.

Geophysics 695 **3 units; (3-0)**
Research Topics and Tools

An introduction to seismic structural imaging and interpretation, seismic velocity anisotropy, and multicomponent seismology, including seismic survey design for PS converted waves. Discussion of software packages used for graduate research programs.

Prerequisite(s): Consent of the Department.

Geophysics 699 **3 units; (3-3)**
Selected Topics in Geophysics

Courses are offered in specific topics in areas such as seismology, environmental geophysics, potential methods, integrated geophysical studies, and geodynamics.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geophysics 701 **3 units; (0-6)**
Advanced Independent Study

A written report based on laboratory and field studies is required.

Prerequisite(s): Admission to a graduate program in Geoscience.

Geophysics 703 **3 units; (0-6)**
Readings in Geophysics

A written report based on a literature review is required.

Prerequisite(s): Admission to a graduate program in Geoscience.

Geophysics 705 **3 units; (3-3)**
 (Geology 705)

Graduate Skills in Geoscience

Provides incoming graduate students with an overview of professional skills that are key to success in graduate school and beyond. Presentation skills, writing scientific manuscripts, the peer review process, defence and candidacy exams, intellectual property and innovation, and networking basics.

Prerequisite(s): Consent of the Department

Antirequisite(s): Credit for Geophysics 705 and 699.56 will not be allowed.

German GERM

For more information about these courses, see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

Language Placement information see 4.59 Placement in Language Courses.

Note: Course outcomes for German have been aligned with the descriptions found in the internationally recognized Common European Framework of Reference for Languages (CEFR) coe.int/t/dg4/Linguistic/CADRE_EN.asp. These CEFR designations enable easier transfer between institutions, both within Canada and abroad, and provide better evidence of language proficiency for employment purposes. The correlations with the CEFR given for each language course provide an orientation, but do not confer accreditation for a particular level. However, if they choose, students will be able to take an internationally recognized exam through the Language Research Centre as accreditation for the proficiency level they have achieved.

Junior Courses
German 200 **3 units; (3-0)**
Made in Germany

An introduction to the study of German-language cultures through key historical and contemporary works.

Note: Taught in English.

German 202 **3 units; (3-1T)**
German I

A comprehensive course for students with no prior knowledge of the language. Includes training in listening, speaking, reading and writing of German in its cultural context. Corresponds to level A1 of the Common European Framework of Reference.

Antirequisite(s): Credit for German 202 and any of 30, 31, 213 or 305 will not be allowed.

Note: Students must complete an online placement form before classes begin. For information, consult <https://sllc.ucalgary.ca/> placement

German 204 **3 units; (3-1T)**
German II

A continuation of German 202. Corresponds to level A2.1 of the Common European Framework of Reference.

Prerequisite(s): German 202.

Senior Courses
German 305 **3 units; (3-0)**
Reading German

An introduction to analytic reading strategies for the purpose of understanding the content of moderately difficult texts with diverse content and discourse styles. Designed for students with no knowledge of German, who wish to be able to understand German texts.

Antirequisite(s): Credit for German 305 and 202 will not be allowed.

Note: This is an online course. Taught in English.

German 317 **3 units; (3-0)**
Topics in German Culture

Distinctive features of German culture within a historical and contemporary context.

Note: Taught in English. May be repeated for a maximum credit of 6 units.

MAY BE REPEATED FOR CREDIT

German 331 **3 units; (3-1T)**
Continuing German I

A comprehensive course that includes training in listening, speaking, reading and writing of German in its cultural context. Development of increased sophistication in language production and cultural understanding. Corresponds to A2.2 of the Common European Framework of Reference.

Prerequisite(s): One of German 30 or 30-3Y, 204, 223, 302, or 303.

German 333 **3 units; (3-1T)**
Continuing German II

A continuation of German 331. Corresponds to B1.1 of the Common European Framework of Reference.

Prerequisite(s): German 331.

German 349 **3 units; (3-0)**
German Studies Research Methods

Introduction to research questions and research methods in German studies through case-study application.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: Taught in English. German 333 is recommended as preparation for this course.

German 353 **3 units; (3-0)**
Structure of German

Development of a structural understanding of the German language through an introduction to linguistic analysis, including research questions and research methods in German linguistics.

Prerequisite(s): German 333.

German 357 **3 units; (3-3) or (3-0)**
Topics in Film

German film from the perspectives of film theory and political and cultural history. May concentrate on a specific director, a period, or a genre in German film.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

German 359 **3 units; (3-0)**
German Texts in Translation

Study of literary and cultural texts within the rich tradition of Germany's Dichter und Denker (poets and philosophers).

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

German 369 **3 units; (3-0)**
Telling Stories: Exploring German Literature

An introduction to historical and contemporary literary and cultural texts in German.

Prerequisite(s): German 333.

German 413 **3 units; (3-0)**
Intermediate German: Speaking and Listening

Targeted focus on aural/oral communication skills in a variety of contexts and media. Corresponds to B1.2 of the Common European Framework of Reference.

Prerequisite(s): German 333.

German 415 **3 units; (3-0)**
Intermediate German: Reading and Writing

Targeted focus on reading strategies, interpretive skills, and the production of a variety of texts.

Corresponds to B1.2 of the Common European Framework of Reference.

Prerequisite(s): German 333.

German 451 **3 units; (3-0)**

Cross-Cultural Explorations

Cross-cultural comparison of events, cultural patterns, historical periods, or social movements which find a parallel in more than one of the cultural traditions represented in the School of Languages, Linguistics, Literatures and Cultures.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

German 467 **3 units; (3-0)**

Topics in Advanced German Linguistics

In-depth exploration of topics in German linguistics, such as synchronic linguistics, diachronic linguistics and language acquisition.

Prerequisite(s): German 353.

MAY BE REPEATED FOR CREDIT

German 469 **3 units; (3-0)**

Topics in Culture Change: Concepts and Critique

In depth exploration of topics in German culture, such as memory and memorials, counter cultures, (trans)nationalism, and media/intermediality, with an approach to texts and representations that incorporates new directions in cultural criticism.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

MAY BE REPEATED FOR CREDIT

German 497 **3 units; (3-0)**

Inter-Cultural Immersion Experience

Independent study course. Project with inter-cultural theme, derived from an immersion experience at an advanced level, most likely abroad.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

NOT INCLUDED IN GPA

German 501 **3 units; (3-0)**

Advanced German

Students will increase their overall proficiency, enhance their intercultural communication competencies, and review key grammatical concepts. Corresponds to B2.1 of the Common European Framework of Reference.

Prerequisite(s): German 413 or 415.

German 503 **3 units; (3-0)**

Senior Projects in Language

Students will integrate theory and practice in the use of German through a variety of class projects. Designed to expand and refine overall linguistic and intercultural competence. Corresponds to B2 of the Common European Framework of Reference.

Prerequisite(s): German 501.

MAY BE REPEATED FOR CREDIT

German 551 **3 units; (3-0)**

Independent Study

Research project developed in consultation with and under supervision of instructor.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

MAY BE REPEATED FOR CREDIT

German 561 **3 units; (3-0)**

New Research Directions in German Studies

Centred on a professor's current research project, the course will engage senior students as members of a collaborative research team. Independent research, discussion, group presentations.

Prerequisite(s): German 469.

MAY BE REPEATED FOR CREDIT

German 591 **3 units; (0-3T)**

Honours Project

The Honours project for Honours students in their final year.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

German 627 **3 units; (3S-0)**

Seminar in German Literature and Culture

Selected topics in literary history.

MAY BE REPEATED FOR CREDIT

German 629 **3 units; (3S-0)**

Seminar in German Language and Linguistics

MAY BE REPEATED FOR CREDIT

German 631 **3 units; (3S-0)**

Seminar in German Language Pedagogy

MAY BE REPEATED FOR CREDIT

German 696 **6 units; (1-0)**

Bibliography, Research Methods and Grant Proposal Writing

Note: Required of all graduate students who have not had an equivalent course.

NOT INCLUDED IN GPA

German 699 **3 units; (3-0)**

Conference Course

Meets the needs of individual students. It may include a general or specific linguistic topic; or the detailed study of an author, period, genre; or any literary problem not dealt with in the honours or graduate courses listed above.

MAY BE REPEATED FOR CREDIT

Greek GREK

For more information about these courses, see the Department of Classics and Religion website: <https://clare.ucalgary.ca/>.

Note: For courses on Greek Literature in translation, Greek History, Art, Archaeology, etc., see Greek and Roman Studies (GRST).

Note on Course Sequence and Prerequisites: The normal sequence is Greek 201, 203, 301, 303, 401 and/or 403, 551.

Junior Courses

Greek 201 **3 units; (3-1T)**

Ancient Greek I

This course for beginners provides the first steps towards reading classical and New Testament Greek texts.

Greek 203 **3 units; (3-1T)**

Ancient Greek II

Continuation of Greek 201.

Prerequisite(s): Greek 201.

Senior Courses

Greek 301 **3 units; (3-0)**

Ancient Greek III

Completes the study of basic grammar, vocabulary and translation skills.

Prerequisite(s): Greek 203.

Greek 303 **3 units; (3-0)**

Intermediate Readings in Classical and New Testament Greek

Prerequisite(s): Greek 301.

Greek 401 **3 units; (3-0)**

Readings in Greek Prose

Readings will normally be selected according to genres, such as Historiography, Oratory, Philosophic and Didactic Prose, and the Novel.

Prerequisite(s): Greek 303.

MAY BE REPEATED FOR CREDIT

Greek 403 **3 units; (3-0)**

Readings in Greek Poetry

Readings will normally be selected according to genres, such as Epic, Tragedy, Comedy and Lyric.

Prerequisite(s): Greek 303.

MAY BE REPEATED FOR CREDIT

Greek 551 **3 units; (0-2T)**

Directed Studies in Greek

Readings may be selected from any genre of Greek text at an advanced level.

Prerequisite(s): Consent of the Department.

Note: Students in Greek and Roman Studies or Ancient and Medieval History are encouraged to pursue areas such as paleography, epigraphy, and Christian texts.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Greek 601 **3 units; (3S-0)**

Graduate Seminar

MAY BE REPEATED FOR CREDIT

Greek 602 **3 units; (3-1T)**

Introductory Ancient Greek for Graduate Students

Introduction to grammar, vocabulary and translation skills.

Greek 602.01 Ancient Greek I

Greek 602.02 Ancient Greek II

Prerequisite(s): Greek 602.01 must be taken before Greek 602.02.

Antirequisite(s): Credit for Greek 602 and either Greek 201 or 203 will not be allowed.

Greek 604 **3 units; (3-0)**

Intermediate Ancient Greek for Graduate Students

Consolidation of grammar, vocabulary and translation skills.

MAY BE REPEATED FOR CREDIT

Greek 607 1.5 units; (0-1T)

Directed Studies

MAY BE REPEATED FOR CREDIT

**Greek and Roman Studies
GRST**

For more information about these courses, see the Department of Classics and Religion website: <https://clare.ucalgary.ca/>.

For courses in the ancient Greek and Latin languages see listings under Greek and Latin.

Note: Undergraduate courses under this heading do not require any knowledge of Greek or Latin. Courses at both the 200-level (designed for first-year students) and 300-level are survey courses with no prerequisites. The research topics courses Greek and Roman Studies 413-457 (except Greek and Roman Studies 431) do not have specific prerequisites, but students are strongly advised to have taken at least two 300-level Greek and Roman Studies courses with grades of at least "C-" before enrolling in them.

Junior Courses

Greek and Roman Studies 205 3 units; (3-0)

Introduction to Greece and Rome

A historical survey from the eighth century BCE to the fourth century CE.

Greek and Roman Studies 209 3 units; (3-0)

Classical Mythology and Literature

An introduction to Greek and Roman myths as presented in classical literature and art, and to their cultural context.

Greek and Roman Studies 211 3 units; (1-2)

Technical Terms of Medicine and the Life Sciences

The Greek and Latin elements of modern medical and life-sciences terminology, with a brief introduction to their history and cultural background.

Senior Courses

Greek and Roman Studies 305 3 units; (3-0)
(Religious Studies 305)

Greek Religion

A survey of religious beliefs and practices in the pre-Christian Greek world.

Prerequisite(s): One of Greek and Roman Studies 205, 209, Religious Studies 201, 205, or 273.

Greek and Roman Studies 306 3 units; (3-0)

Roman Religion

A survey of religious beliefs and practices in the pre-Christian Roman world.

Prerequisite(s): One of Greek and Roman Studies 205, 209, Religious Studies 201, 205, or 273.

Greek and Roman Studies 309 3 units; (3-0)

Comparative Mythology

An examination of Greek and Roman myths in comparison with myths of other cultures and societies.

Greek and Roman Studies 311 3 units; (3-0)

Sport in Ancient Greece and Rome

A survey of sports practised in Greece and Rome and the role of sport as a cultural, political and historical phenomenon.

Greek and Roman Studies 313 3 units; (3-0)

The Ancient Novel and Its Predecessors

A survey of ancient Greek and Roman 'novels' or romances, with reference to their roots in epic poetry and New Comedy.

Greek and Roman Studies 315 3 units; (3-0)

Women and the Family in the Greek and Roman World

A survey of the lives, social roles and representations of women based on documentary evidence, literature and art. Emphases may vary from term-to-term.

Note: This course is acceptable for credit towards a Major in History (subject to History program regulations).

Greek and Roman Studies 317 3 units; (3-0)

Humorous Prose: From Rome to the Renaissance

A survey of ancient, medieval and Renaissance humorous prose, with reference to their roots in classical literature.

Greek and Roman Studies 321 3 units; (3-0)

Ancient Technology

A survey of major technologies in antiquity (metallurgy, agriculture, hydraulics, pottery, textiles, transportation, writing, construction) with special emphasis on the technological achievements of the Bronze Age and the cultures of Greece and Rome.

Greek and Roman Studies 323 3 units; (3-0)

Ancient Medicine and the Mind

A survey of ancient science and medicine, with special emphasis on early conceptions of the human mind, thought and knowledge.

Greek and Roman Studies 325 3 units; (3-0)

Greek Art and Architecture

A survey of Greek art and architecture from the Bronze Age to the Hellenistic period.

Greek and Roman Studies 327 3 units; (3-0)

Roman Art and Architecture

A survey of Roman art and architecture from the Etruscans to the beginning of the Christian Empire.

Greek and Roman Studies 335 3 units; (3-0)

The Ancient Near East to Alexander the Great

History of the Near East from the tenth to the fourth century BCE.

Greek and Roman Studies 337 3 units; (3-0)

Early Greece

Early Greece from the late Bronze Age to the Persian Wars.

Note: This course is acceptable for credit towards a Major in History (subject to History program regulations).

Greek and Roman Studies 339 3 units; (3-0)

History of Classical Greece

History of the Greek world from the Persian Wars to the conquests of Alexander the Great.

Note: This course is acceptable for credit towards a Major in History (subject to History program regulations).

Greek and Roman Studies 341 3 units; (3-0)

History of Rome's Expansion into the Mediterranean to 30 BCE

The expansion of Rome into an empire to the time of Augustus.

Note: This course is acceptable for credit towards a Major in History (subject to History program regulations).

Greek and Roman Studies 345 3 units; (3-0)

Rome: The Late Republic and Early Empire

History of Rome from 133 BCE to 180 CE.

Note: This course is acceptable for credit towards a Major in History (subject to History program regulations).

Greek and Roman Studies 347 3 units; (3-0)

Late Roman Antiquity

History of the Roman and Byzantine world from 180 to 565 CE.

Note: This course is acceptable for credit towards a Major in History (subject to History program regulations).

Greek and Roman Studies 355 3 units; (3-0)

Warriors and Lovers: Greek Literature in Translation

An introduction to Greek literature from Homer to the Hellenistic Period.

Greek and Roman Studies 357 3 units; (3-0)

Myths, Slaves and Heroes: Roman Literature in Translation

An introduction to Roman literature from its beginnings to the second century CE.

Greek and Roman Studies 413 3 units; (3-0)

Topics in Early and Classical Greek History

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 415 3 units; (3-0)

Topics in Hellenistic and Roman Republican History

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 417 3 units; (3-0)

Topics in the History of the Roman Empire

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 419 3 units; (3-0)

Topics in Late Antiquity

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 421 3 units; (3-0)

Topics in Greek and Roman Political and Military History

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 423 3 units; (3-0)

Topics in Greek and Roman Social and Economic History

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 425 3 units; (3-0)

Greeks, Romans and Other Cultures: Selected Topics

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

Note: This course is acceptable for credit towards a Major in History (subject to History program regulations).

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 431 3 units; (3-0)

Studies in Ancient Myths

Studies in the nature and functions of myth in ancient Greek and Roman culture and society. Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

Prerequisite(s): Greek and Roman Studies 209.

Greek and Roman Studies 433 3 units; (3-0)

Topics in Greek and Roman Religion, Intellectual and Cultural History

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

Note: This course is acceptable for credit towards a Major in History (subject to History program regulations).

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 445 3 units; (3-0)

Topics in Greek Art and Archaeology

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 447 3 units; (3-0)

Topics in Roman Art and Archaeology

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 455 3 units; (3-0)

Topics in Greek Literature in Translation

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 457 3 units; (3-0)

Topics in Latin Literature in Translation

Topics will reflect developments in current research, will vary from term-to-term, and will be announced in advance.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 459 3 units; (2-3)

Topics in Ancient Greece and Rome on Film

The reception of ancient Greek and Roman mythology and history through selected films.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 483 3 units; (0-2)

Practicum

Provides students with program-related experiential learning through practical activities such as teaching, editing, publishing, translating, performances, exhibitions, museum work, conferences, information and website development, and campus, school and community programs. Projects must be designed in consultation with a departmental advisor. A written report and oral presentation are normally required.

Prerequisite(s): Consent of the Department.

NOT INCLUDED IN GPA

Greek and Roman Studies 491 3 units; (0-6)

Field Work

Provides credit, when transfer credit is not available of program-related study or field work in Europe or the Mediterranean area. Preliminary readings and a substantial report are normally required.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 494 6 units; (0-12)

Field Work

Similar to Greek and Roman Studies 491 but provides 6 units of credit for appropriate projects.

Prerequisite(s): Consent of the Department.

NOT INCLUDED IN GPA

Greek and Roman Studies 499 3 units; (3-0)

Topics in Ancient and Medieval Historiography

Topics will include the analyses of the methods, sources, and key themes of major ancient and medieval historians.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 501 3 units; (3-0)

Majors' Special Topic

Interdisciplinary course to link knowledge and skills learned throughout the student's undergraduate career.

Prerequisite(s): Admission to one of Greek and Roman Studies or Ancient and Medieval History majors and completion of 90 units and consent of the Department.

Greek and Roman Studies 504 6 units; (3-0) (formerly Greek and Roman Studies 503)

Honours Thesis

The Honours essay for Honours students in their fourth year.

Prerequisite(s): Admission to the Honours programs in Greek and Roman Studies or Ancient and Medieval History and completion of 90 units and consent of the Department.

Greek and Roman Studies 525 3 units; (3S-0)

Research Seminar

Research topics in Greek and Roman history, literature, art, and archaeology. Seminar discussions will require a high level of student participation.

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 551 3 units; (0-2T)

Directed Research

Qualified students will undertake supervised research projects individually or in small groups.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Greek and Roman Studies 601 3 units; (3S-0)

Graduate Seminar

MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 603 3 units; (1S-0)

Research and Professional Training

NOT INCLUDED IN GPA

Greek and Roman Studies 651 3 units; (0-2T)

Directed Studies

Qualified students will undertake supervised research projects individually or in small groups.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Health and Society HSOC

For more information about these courses, see the Bachelor of Health Sciences in the Cumming School of Medicine: <https://cumming.ucalgary.ca/bhsc/>.

Junior Course

Health and Society 201 3 units; (3-0)

Introduction to Health and Society

Introduction to public health, emphasizing the contributions of social research from several disciplinary traditions (anthropology, economics, epidemiology, geography, political science, psychology, and sociology) Students practice and refine several skill sets, including: library research, public speaking, teamwork, leadership and academic writing.

Senior Courses

Health and Society 301 3 units; (3-0)

Determinants of Health

A broad-based, interdisciplinary overview of models of the determinants of health. Includes an analysis of evidence of the relative influence of environmental factors, health services, lifestyles and health behaviours, social and economic factors, biological predispositions, and the mechanisms involved in the societal uptake of various conceptions.

Prerequisite(s): Health and Society 201 or consent of the Department.

Health and Society 311 3 units; (3-0)

Health Services and Health Systems

Introduction to the Canadian health system, the health policy process, institutions and providers in the health system, health care insurance, financing and delivery of health care, population and public health, a systems approach to health in a national and international perspective

Prerequisite(s): Health and Society 201 or consent of the Department.

Health and Society 401 3 units; (3-0)

Foundations of Social Science Method

An examination of some philosophical principles underlying and debates involving methodology in the social sciences. Consideration will be given to features both common to the social sciences as well as to those which distinguish them. Where

appropriate, applications to health phenomena will be emphasized.

Prerequisite(s): Health and Society 201 and third year or higher in the BHSc Honours or Health and Society minor program or consent of the Department.

Health and Society 403 3 units; (3-0)

Advanced Topics in Social Determinants of Health

Social determinants of health are key to understanding and intervening on health and disease in populations. This course builds on the understanding of the social determinants of health by exploring a few of these in greater depth. Topics will vary, but may include racism, sexism and gender identity, Indigenous health inequities, or the built environment. Students will engage with research from a number of social science disciplines to explore the complexities and nuances that shape health inequities in a variety of environments in which people live and work. Case studies and contemporary events will be used to illustrate the interplay between a select few social determinants and health inequities each semester.

Prerequisite(s): Health and Society 301.

Health and Society 408 6 units; (6-0)

Health Research Methods and Research field practicum

An introduction to the research methods utilized in the Health Sciences. Students will begin to develop the knowledge and skills necessary to conduct research in the Health and Society field. The importance of research design, qualitative, quantitative and mixed methods and the theoretical constructs that inform these approaches will be emphasized.

Prerequisite(s): Medical Science 308 and admission to the BHSc Honours program.

Health and Society 591 3 units; (3S-0)

Advanced Seminar in Health and Society

An advanced seminar involving critical analysis of contemporary health issues. Topics vary from year-to-year, but are always drawn from the current academic literature, from the public policy arena, and/or from the popular media.

Prerequisite(s): Health and Society 401 and registration in the BHSc Honours Health and Society major.

History HTST

For more information about these courses see the Department of History website: hist.ucalgary.ca/.

Junior Courses

History 200 3 units; (3-0)

Events and Ideas that Shook the World

Designed for non-history majors, this course introduces students to the historical craft through a series of short lecture sequences that focus on specific events, ideas, and individuals that changed the course of world history.

History 201 3 units; (3-0)

The History of Europe

Selected topics may include formation and breakdown of political structures: cultural, social, and technological continuity and change; development of religious and secular belief systems; interactions among cultures. Course content will vary each session. Please consult the History Department for more specific information.

History 202 3 units; (3-0)

An Introduction to Military History

Significant events and themes in military history.

History 203 (formerly History 301) 3 units; (3-0)

The World to 1500

The development and rise of civilizations, their divergent and interacting patterns of belief, social and political organization and material and cultural life.

History 204 3 units; (3-0)

The World, 1500-1800

The political, economic, cultural, ecological and social connections among world regions.

Antirequisite(s): Credit for History 204 and 205 will not be allowed.

History 209 3 units; (3-0)

The History of China

A survey of thought in China from the cultural heroes to the present, with emphasis on philosophy, religion, and ideology. Topics covered include Shang religion, Confucianism, Taoism, Mohism, minor schools of thought, Legalism, Buddhism, Neo-Confucianism, Qing textual studies, republican ideologies, nationalism, Marxism-Leninism Mao Zedong Thought, and late twentieth-century reformist movements.

History 211 3 units; (3-0)

Canada: Origins to 1867

An introduction to the dynamic themes in early Canadian history. Special attention will be devoted to social, economic, and political development, White-Aboriginal relations and the settlement of the Maritimes and the Canadas, and the opening of the West.

History 213 3 units; (3-0)

Canada Since 1867

Themes in the development of the Canadian nation from Confederation to the present, with particular attention to federal-provincial relations, economic development, social movements, and western political protest.

Senior Courses

History 300 3 units; (3-0)

The Practice of History

Provides a grounding in the methods and practice of history.

Prerequisite(s): 3 units in courses labelled History, excluding History 200.

History 303 3 units; (3-0)

Great Explorations

The concept of exploration from the time of Columbus to the space voyages, based on the reading of primary sources. Topics include the idea of conquest, views of different races and religions, and myths and realities of explorers and discovered lands.

History 305 3 units; (3-0)

Slavery in the Americas

History of the enslavement of Africans and their descendants in the New World from 1492 to 1888. Themes may include the slave trade, labor, culture and religion, resistance and rebellion, abolition, and slavery's legacy.

Antirequisite(s): Credit for History 305 and 207 will not be allowed.

History 307 3 units; (3-0)

The Contemporary World

The contemporary world from the nineteenth century era of industrialism and empire, through to twentieth century struggles of underdeveloped countries for independence. Focus on growing global interdependency and the rise and the erosion of western cultural, economic, and political hegemony.

History 308 3 units; (3-0)

Gender History

A global history of the construction of gender and sexual identities. Examines how changing ideas about what it means to be male and female have influenced family structures, sexual mores, work life, military ideals, politics and culture.

History 317 3 units; (3-0)

East Asia from 1800

The modern histories of China, Japan and Korea beginning with the Mid-Qing dynasty in China and the Late Tokugawa period in Japan.

History 319 3 units; (3-0)

Early Medieval Europe, 410-1076

The sack of Rome to the eve of the Investiture Controversy. The economic, social and institutional features of Western Europe, including the origins and rise of the church, monasticism, barbarian kingdoms, feudalism and the agrarian economy.

History 321 3 units; (3-0)

High and Late Medieval Europe, 1076-1418

Western Europe from the emergence of national states to the end of the Great Schism. The evolution of the economic, social, religious and cultural structures of Medieval Europe: the revival of agrarian, commercial and urban economies, the development of religious divisions, and the rise of church and state powers.

History 326 3 units; (3-0)

Europe in the Age of the Renaissance and Reformation, 1400-1559

Political, social, cultural, intellectual and religious developments that transformed Europe at the end of the middle ages; roots of religious schism and its impact on politics, diplomacy and society.

Antirequisite(s): Credit for History 326 and either 323 or 325 will not be allowed.

History 327 3 units; (3-0)

Europe in the Era of Religious War, 1559-1715

The clash of Protestant and Catholic forces, the eventual decline in religious passions, and the general crisis of the seventeenth century.

History 332 3 units; (3-0)

Topics in Early Modern England

Topics may include culture and society, religion and ideas, monarchy and constitution, and empire and global relations.

Antirequisite(s): Credit for History 332 and 336 will not be allowed.

MAY BE REPEATED FOR CREDIT

History 333 3 units; (3-0)

The Age of Totalitarianism

Europe from 1900 to the Cold War. Emphasis will be placed on totalitarian regimes in Italy, Germany, and the Soviet Union; war and society in the two world wars; the Holocaust; and the Cold War.

History 337 3 units; (3-0)

Twentieth-Century Canada

Explores major themes in the emergence of modern Canada, with emphasis on the rise of a national consciousness, military and diplomatic involvements, the role of the state, socio-economic developments and national unity.

History 338 3 units; (3-0)

Modern Britain 1714 to Present

The Industrial Revolution; nationalism and imperialism; the rise of the middle and working classes; the social welfare state; emergence of modern British society, economy, politics, and constitution.

History 340 3 units; (3-0)

Ethnicity, Race, and Immigration in Canada

Examines developments in and challenges to diversity in Canada from the eighteenth to twenty-first centuries with emphasis on ethnic and immigrant cultures in rural communities and urban centres.

History 341 3 units; (3-0)

History of Popular Culture in Canada, 1850-Present

Selected themes in the historical development of popular culture in Canada. Topics include: leisure and recreation, sports and games, the arts, popular entertainment, travel and tourism, national heroes and icons, consumerism and the mass media.

Antirequisite(s): Credit for History 341 and 449 will not be allowed.

History 345 3 units; (3-0)

Canadian Indigenous History

Aboriginal Canada, from the beginnings of contact with Europeans in the sixteenth century, to the present, with particular emphasis on Indigenous-Settler relations.

History 347 3 units; (3-0)

Western Canada

An exploration of Western Canadian history, including themes such as: the Indigenous peoples, European exploration, settlement, rural and urban society, social and political reform, the New West, and culture.

History 349 3 units; (3-0)

Canadian Military History

Survey of the history of the Canadian military in peace and war from 1867 to the present. Emphasis will be placed on Canada's role in World War I and World War II and on the development of the Canadian military in the Cold War era.

History 351 3 units; (3-0)

A History of Canadian Politics

The historical development of Canadian politics and political culture since Confederation. Major themes will include the emergence and changing role of parties, the impact of federalism, political insurgency and reform, and leadership.

History 354 3 units; (3-0)

Cities in Global History

History of the making of urban, landscapes in a global context. Topics may include the development of economic centres, urban technological and infrastructural innovations, and the complex relationships developing between the metropolis and its rural and wild hinterlands.

History 357 3 units; (3-0)

Wild West/Mild West?: Comparative History of the U.S. and Canadian Wests

The similarities and differences in the histories of the Canadian and U.S. Wests from the pre-colonial periods to the present. Topics may include the place of frontier and the West in national historical narratives, myths, and imaginations; aboriginal peoples; immigration and settlement; land policy and land use; and the social relationships and economies that characterize the U.S. and Canadian Wests.

History 359 3 units; (3-0)

The United States to 1877

A history of the United States from colonial settlement through the era of Reconstruction.

History 361 3 units; (3-0)

The United States since 1877

A history of the American people since the era of Reconstruction.

History 365 3 units; (3-0)

Latin America before Independence

The history of colonial Latin America with particular reference to political, social and economic themes such as race relations, imperial rivalries and the struggle for national independence.

History 367 3 units; (3-0)

Latin America since Independence

A history of the Latin American nations since independence with special attention devoted to political change, economic dependency and modernization, social and economic revolution, and inter-American relations.

History 372 3 units; (3-0)

Ways of Knowing: Science, Technology, and Medicine

A transnational examination of the relationships among these traditions in historical and cultural context. Topics may include: the scientific revolution; the early modern period; nineteenth-century technology and medicine; the emergence of the modern life sciences and neurosciences; changing scientific paradigms and research traditions.

Antirequisite(s): Credit for History 372 and either 371 and 373 will not be allowed.

History 376 3 units; (3-0)

History of Death in Western Culture

Examines the social, cultural, political, intellectual and religious developments from the Roman Empire to the contemporary period that transformed western concepts of death.

History 381 3 units; (3-0)

Military History: The Era of Revolutionary War and Total War

Significant events and themes in military history from the early modern period to the end of the Second World War.

History 383 3 units; (3-0)

Military History: The Cold War Era and Beyond

Significant events and themes in military history from the Cold War through to recent post-Cold War history.

History 395 3 units; (3-0)

History of Energy: From Fire to Fossil Fuels and Beyond

Transnational examination of the sources and uses of energy through history and their social, political, economic, and environmental impacts.

History 397 3 units; (3-0)

Topics in World History

397.01 African History
397.02 History of the Middle East
397.03 South Asian History

Antirequisite(s): Students may not have credit for History 397.01 and 309; History 397.02 and 390; and History 397.03 and 403.

History 398 3 units; (3-0)

Topics in History

Exploration of select regional, thematic or methodological issues in history.

MAY BE REPEATED FOR CREDIT

History 402 3 units; (3-0)

Military History of Africa

Explores the history of warfare and military structures in Africa from earliest times to the present. Informed by what is often called the "New Military History," discussion takes place within the context of broader social, cultural, economic and political developments.

History 404 (formerly History 385) 3 units; (3-0)

The History of Taiwan

Survey of Taiwan history from ca. 1550 to the present, emphasizing pre-Chinese aboriginal history, migration to the island, government, society, inter-communal relations, Taiwan's international status, and recent democratization.

History 406 3 units; (3-0)

The Mongol World Empire

The rise of Chinggis Khaghan (Genghis Khan) in early thirteenth-century Eurasia, the growth and conquests of the Mongol world empire, and the individual khanates of Yuan dynasty China, the Golden Horde in Russia, the Il Khanate in the Middle East, and the Chagadai Khanate in Inner Asia.

History 408 3 units; (3-0)

The Global 1960s

Examines social, cultural, and political change in "the long 1960s" from a global perspective.

History 410 3 units; (3-0)

Topics in Great Cities of the World

An augmented experiential learning course where students integrate their own observations and experience with scholarly readings in a "Great City." The regional and theoretical focus of the class will vary with the subject city.

Prerequisite(s): Consent of the Department.

Note: Course is normally offered as a study abroad in Summer Term (Spring/Summer). A supplementary fee will be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

History 412 3 units; (3-0)

Russia and the Soviet Union

A short introduction to pre-nineteenth-century Russian history and a survey of the history of Russia and the Soviet Union in the nineteenth

and twentieth centuries, finishing with a brief examination of post-Soviet Russia.

Prerequisite(s): One 300 level History course or Russian 317.

Antirequisite(s): Credit for History 412 and 411.02 will not be allowed.

History 413 **3 units; (3-0)**

Modern Germany

German political, social, and cultural history from the late nineteenth century to the present. Topics will include unification, both world wars, Nazism, the Holocaust, the division of Germany, society and politics in the Cold War, and reunification.

Antirequisite(s): Credit for History 413 and 413.02 will not be allowed.

History 422 **3 units; (3-0)**

Societies and Cultures in the Middle Ages

Explores the development and characteristics of Western medieval societies with regard to the social fabric, economic, religious, and intellectual life.

History 425 **3 units; (3-0)**

History of the Atlantic World

The history of the Atlantic Ocean world as a zone of contact, conflict, and co-operation between and among Europeans, indigenous peoples of the Americas, and Africans, circa 1450-1800.

History 426 **3 units; (3-0)**

The European Reformations of the Sixteenth Century

The origins, course, and impact of the religious reformations (Protestant and Catholic) of the sixteenth century, including changes to institutional structures, theology, and popular belief.

History 427 **3 units; (3-0)**

Ideas and Events that Shaped Modern Europe

Topics will vary to address major ideas and events that helped to shape modern Europe.

History 431 **3 units; (3-0)**

Canada During the World Wars

The nature, course and impact of Canada's involvement in the two world wars, with emphasis on home front developments.

History 435 **3 units; (3-0)**

History of Religion in Canada

A historical analysis of the pluralistic character of Canadian religions. Themes will include missions, Indigenous religions, awakenings, revivalism and social reform, fundamentalism and modernism, secularization and belief.

History 436 **3 units; (3-0)**

History of the University in Canada and the Western World

The development, ideas, and meanings of the university in Canada since the mid-nineteenth century. The rise of Canadian universities will be contextualized within the larger history of higher education institutions in the western world over the past one-thousand years.

History 437 **3 units; (3-0)**

Canadian Environmental History

Historical development of Canadian attitudes towards nature, from the First Nations and the first European settlers to the present day.

History 438 **3 units; (3-0)**
(formerly History 343)

History of Women in Canadian Society

Topics may include the role of women in the economy, politics, social reform, the law, health care, the domestic sphere, life course experiences, and culture.

History 439 **3 units; (3-0)**

The Canadian West

Thematic treatment of topics in Western Canadian history.

Antirequisite(s): Credit for History 439 and 441 will not be allowed.

MAY BE REPEATED FOR CREDIT

History 442 **3 units; (3-0)**
(formerly History 339)

Activism and Protest in Canada, 1867-Present

Examines cultures, ideas, and practices of activism and protest since Confederation. Topics include historical forms of political, ethnic, gender, religious, legal, and class-based meanings of equality and social justice.

History 443 **3 units; (3-0)**
(formerly Canadian Studies 419)

The Métis People of Canada

An interdisciplinary study of the Métis people of Canada, with special emphasis on the historical, social, economic, and political factors influencing their emergence and continued survival as a distinct indigenous group in Canada.

History 447 **3 units; (3-0)**
(formerly History 352)

Northern Horizons: Subarctic and Arctic Canadian History

Historical development of the region from the beginnings of European exploration to the present day. Themes include: the indigenous peoples, Arctic exploration, Canadian sovereignty, and the politics of northern development.

History 450 **3 units; (3-0)**

History of Social Policy in Canada

A historical analysis of the development of social policy in Canada from the colonial period to the present. Themes may include the relationship between citizens and government, changing perceptions on the role of the state, grassroots demands for government intervention, and the relationship between private and public programs.

History 458 **3 units; (3-0)**

The United States in the Era of Depression and WWII, 1900 to 1945

The history of the United States from the dawn of the twentieth century through World War II, a turbulent period of wars and economic depression at the end of which the U.S. had emerged as a global superpower. Major themes include the rise of liberal reform; the experience of the U.S. in two world wars; the interplay of race, class, and gender in shaping American identity; and the economics of boom and bust culminating in the Great Depression and wartime boom of the 1940s.

History 460 **3 units; (3-0)**

The United States Civil War Era

The political, economic and social history of the United States in the decades leading up to the Civil War, the military conflict itself and the aftermath of war.

History 461 **3 units; (3-0)**

From the Pueblo Uprising to Wounded Knee: A History of American-Indian Conflicts

Military and political clashes between tribal groups, colonial governments, and the U.S. government from the late 1400s to the late twentieth century, focusing on causal factors and eventual socio-political consequences.

History 462 **3 units; (3-0)**

United States Political History

Aspects of the history of American politics from the Revolution to the twentieth century. Emphasis on the process of governing; elections and party politics; legal and constitutional affairs.

History 463 **3 units; (3-0)**

The United States Since 1945

The political, social, economic, and cultural dimensions of the United States from 1945 to the present. Major themes include the role of U.S. as a global superpower during the Cold War and after; the contest between liberalism and conservatism in American politics; the social movements of the 1960s and 1970s and their lasting impact; suburbanization and consumer culture; and the transition to a post-industrial economy.

History 464 **3 units; (3-0)**

From Colonies to Nation: Making the United States

Explores the creation of the United States from its colonial origins through the Early National Period. Topics may include the political, military, diplomatic, legal, cultural and socio-economic challenges faced by the new nation.

History 467 **3 units; (3-0)**

Mexican History

Themes of Mexican history from the founding of Spain's most important colony, New Spain, to the present.

Antirequisite(s): Credit for History 467 and 467.02 will not be allowed.

History 471 **3 units; (3-0)**

The Military in Latin America

The history of warfare and the armed forces in Latin America from colonial times to the present. Emphasis upon modern wars, militarism, the rise of caudillos, and the impact of the military on society.

History 472 **3 units; (3-0)**

Latin American Revolutions

Thematic treatment of social revolutions in twentieth-century Latin America.

History 473 **3 units; (3-0)**

History of Crime and Criminal Justice in England

Crime and the development of the criminal courts and jurisdictions, the police, punishments, and correctional institutions, from medieval to modern times. Attention will be given to the relationship of criminality to moral attitudes and socio-economic conditions, and to the historic role of crime and punishment in local communities, society and the state.

History 476 **3 units; (3-0)**
(formerly known as History 477)

A Cultural History of Biomedical Sciences

Explores changing concepts about life, biology, and medicine from the European Renaissance to the twentieth century. Topics may include the rise

of natural history, genetics, molecular biology, and neuroscience.

History 483 **3 units; (3-0)**

World War I

An examination of the nature and course of the First World War (1914-1918), with an emphasis on the Western Front. Topics will include the historiography of the war, strategy and tactics, the impact of technology, and the effect of the war on the nations involved.

History 485 **3 units; (3-0)**

World War II

The nature, course and short-term results up to 1950 of the Second World War in its global dimensions. The political as well as the military side of the Allied/Axis conflict will be studied.

History 486 **3 units; (3-0)**

History of Air Power

An examination of the nature and development of air power across the world. Topics may include: technology; tactics; doctrine; the relationship between air power, weapons of mass destruction and precise attacks; the limits to air power and its role in war, peace, and deterrence.

History 487 **3 units; (3-0)**

Brazilian History since 1500

Economic development, political institutions, social and cultural trends, and the interaction between men and women and the environment.

History 488 **3 units; (3-0)**

Great Britain as a Great Power, 1690 - 1970

A study of British military, diplomatic and imperial history between 1690 and 1970, with a focus on the roots of Britain's power.

History 489 **3 units; (3-0)**

Espionage and the State, 500 BCE - 1939

The rise of modern intelligence services in the West. Changes in the role, importance and technology of intelligence will be assessed. The contribution of intelligence to political and military strategy in selected conflicts will be examined.

History 490 **3 units; (3-0)**

Espionage and the State, 1939 to the Present

Intelligence during the Second World War, the Cold War, and afterward. Changes in the role, importance and technology of attention will be assessed. The contribution of intelligence to political systems, international relations and military operations will be assessed.

Antirequisite(s): Credit for History 490 and 489.02 will not be allowed.

History 491 **3 units; (3-0)**

Diplomatic History

A history of international relations and foreign policies of states in Europe and the world.

491.01. Diplomatic History, 1793-1918

491.02. Diplomatic History Since 1919

History 493 **3 units; (3-0)**

Topics in History

Selected topics in social, cultural, political, or military history. Previous topics have included the Vietnam War, the North American Petroleum Industry.

MAY BE REPEATED FOR CREDIT

History 494 **3 units; (3-0)**

International History of Energy

Twentieth-century history of energy in an international context. Topics may include international relations and political economy focusing on governments, international institutions, and multinational corporations and the role of energy in international conflict and co-operation.

History 495 **3 units; (2-3)**

Film and History

Film as a historical document, in particular as a source of social and intellectual history. Topics include: the role of film at moments of decisive historical change; the content and dissemination of political ideologies and social values; film as a source of propaganda; changing attitudes to minority groups; preservation of historical detail.

History 496 **3 units; (3S-0)**

(formerly History 498)

Historical Methods and Philosophies of History

A seminar for honours students on the interrelationship between the philosophies of history and historical methodology.

Prerequisite(s): History 300 and admission to Honours degree program.

500-Level Courses

History 510 **3 units; (3S-0)**

(formerly History 509)

Religion, Politics, and Culture in Early Modern Europe

Examines the nature of late medieval religion, the social impact of the Reformations, religious violence and co-existence, and the nature and practice of royal absolutism.

Prerequisite(s): History 300 and one of 326, 327 or 426.

History 511 **3 units; (3S-0)**

(formerly History 501)

Topics in Gender and Sexuality in History

An examination of gender theory and history with an emphasis on issues of sexuality. Topics and geographic concentrations will vary.

MAY BE REPEATED FOR CREDIT

History 514 **3 units; (3S-0)**

(formerly History 504)

Topics in Britain and the Wider World, 1500-1800

Topics in British imperial and global history.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 517 **3 units; (3S-0)**

Social and Political History of Modern Britain

Topics in social, cultural and political history in early modern and modern times: e.g., the rise of the gentry and the middle class, working class identity, radical ideology and two-party politics.

Prerequisite(s): History 300.

History 518 **3 units; (3S-0)**

(formerly History 508)

Topics in Twentieth-Century German History

Topics may include: thematic explorations and/or comparisons of dictatorial regimes (Nazi Germany and the German Democratic Republic); the history of the GDR; the two Germanies during the Cold War; memory and memorialization in popular culture; the contested formation of a multicultural society; and social protest in the post-WWII

period. For further information on specific topics to be offered in any year, consult the History Department.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 520 **3 units; (3S-0)**

Canada and the First World War

Discussion topics will focus on the major themes in Canada's Great War military experience, including the Canadian Expeditionary Force's recruitment and training, leadership, tactical doctrine, and integration within the British Expeditionary Force, as well as developments in civil-military relations, conscription politics and the country's post-war military legacy.

Prerequisite(s): History 300.

History 521 **3 units; (3S-0)**

Canadian Biography

A thematic approach to Canadian personalities, emphasizing the biographer's method and changing interpretations of major Canadian figures, e.g., the prime ministers, prominent women, radicals, prophets, scientists, explorers, entrepreneurs, journalists and artists.

Prerequisite(s): History 300.

History 523 **3 units; (3S-0)**

Topics in Alberta History

Selected topics in Alberta history with emphasis upon the use of local archival sources.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 526 **3 units; (3S-0)**

The Canadian Military in the Second World War

Examination of the political parameters imposed by the Canadian government on the military, the quality of Canadian leadership, and the "fit" between British forms of military organization and the fighting quality of Canadian soldiers, sailors and aircrew during the Second World War.

Prerequisite(s): History 300 and 349 or 431.

History 528 **3 units; (3S-0)**

Exchange, Trade, and Cultural Encounter in North America

The history of cross-cultural contact in North America from the late sixteenth through nineteenth centuries, examining cultures, economies, trading institutions and views of New and Old World people.

Prerequisite(s): History 300.

Antirequisite(s): Credit for History 528 and either 593.10 or 593.18 will not be allowed.

History 529 **3 units; (3S-0)**

Topics in Indigenous History

A history of the Indigenous peoples of Canada: the First Nations, Inuit and Métis.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 530 3 units; (3S-0)
(formerly History 527)

Topics in Canadian Foreign and Defence Policy from 1919 to the Cold War Era

Selected topics in the history of Canadian foreign policy and defence policy from the end of World War I to the 1980's.

Prerequisite(s): History 300 and one course in Canadian History.

MAY BE REPEATED FOR CREDIT

History 535 3 units; (3S-0)

Topics in American History

Selected topics in the history of the United States from the colonial period to the present.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 537 3 units; (3S-0)

American Memories

Introduces students to the broad subject of historical memory, with a focus on the United States. Considers ways that historians have grappled with constructions of collective memory, personal memory, commemoration, and remembrance. Focuses on publicly controversial topics like remembering slavery, the Civil War, and the use of the Atomic Bomb in World War II.

Prerequisite(s): History 300.

Antirequisite(s): Credit for History 537 and 535.08 will not be allowed.

History 539 3 units; (3-0)

Oral History

Introduces students to the theory and practice of oral history. Topics include ethics, methodology, memory, and community-based research. Students will conduct oral histories as one of their assessments.

Prerequisite(s): History 300.

History 540 3 units; (3-0)

Topics in Medieval History

Selected topics in Medieval History. Subjects may include: the history of medieval families; collective and individual identities, the social fabric; economic, religious and intellectual life.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 541 3 units; (3S-0)

Topics in the History of Science

Selected aspects of the history of science, e.g., the scientific revolution, science and religion in the seventeenth century, history of scientific methods, studies of individual scientists such as Galileo, Boyle, Newton, or Darwin.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 544 3 units; (3S-0)
(formerly History 543)

Topics in Great Power Diplomacy and Intelligence

An exploration of selected themes in the history of modern statecraft. Topics may include: theories of international relations, war origins, treaty-making, Fascist diplomacy, appeasement, wartime alliances, intelligence and policy, cold war diplomacy. A seminar in which primary sources will be used.

Prerequisite(s): History 300 and one of 483, 485, 489, 491.01, 491.02.

MAY BE REPEATED FOR CREDIT

History 545 3 units; (3S-0)

Topics in Military History

An examination of selected problems in modern military history. Topics may include: military theory; guerrilla warfare from the eighteenth century to the twentieth century; evolution of tactics in World War I; development of military medicine; innovation in European armies; colonial wars.

Prerequisite(s): History 300 and one of 349, 379, 381, 383, 431, 471, 481, 483, 485, 489, 491.

MAY BE REPEATED FOR CREDIT

History 547 3 units; (3S-0)

Chinese Strategic Thought

The history of Chinese strategic thought from antiquity through modernity, with emphasis on the Seven Military Classics, Chinese military history, and recent scholarship on the extent of the connection between historical and modern Chinese strategic thought.

Prerequisite(s): History 300.

History 551 3 units; (3-0)
(Political Science 551)

Women in Canadian Politics

A political history of women in the twentieth and twenty-first centuries. Topics include campaigns for suffrage, legal personhood and equality rights, women's political activism, the evolution of public policy concerning women, and the participation of women in public life.

Prerequisite(s): History 300 and one of 343 or 438.

History 565 3 units; (3S-0)

Slavery in Latin America and the Caribbean, 1492-1888

Themes may include the slave trade, plantation and urban slavery, resistance and rebellion, women, culture and religion, abolition, free people of colour in slave societies, and the post-abolition legacy.

Prerequisite(s): History 300.

History 569 3 units; (3S-0)

Latin America and the Outside World

The Latin American nations in world affairs with special reference to their intellectual, economic, and political relations with Europe, North America, Africa, and the Pacific Rim. Themes will be drawn from the sixteenth to the twentieth centuries.

Prerequisite(s): History 300.

History 573 3 units; (3S-0)

Topics in African History

Selected topics in African history from pre-colonial times to the present. Topics may include the "Scramble for Africa," Africa and the World Wars, decolonization and African nationalism, and mass violence and genocide.

MAY BE REPEATED FOR CREDIT

History 591 3 units; (3S-0)

Directed Reading and Research

The analysis of historical problems and the use of primary sources.

Prerequisite(s): History 300 and consent of the Department.

MAY BE REPEATED FOR CREDIT

History 593 3 units; (3-0)

Selected Topics in History

Exploration of select regional, thematic, or methodological issues in history.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 597 3 units; (3-0)

Honours Directed Reading

Directed readings for Honours students in their third or fourth year.

Prerequisite(s): History 300 and consent of the Department.

Antirequisite(s): Credit for History 597 and 596 will not be allowed.

History 598 6 units; (3-0)

Honours Writing Seminar

The Honours Thesis for Honours students in their fourth year.

Prerequisite(s): History 300 and consent of the Department.

Note: Students will work under the supervision of a faculty member and participate in sessions throughout the year that will normally be facilitated by the Honours Advisor.

Graduate Courses

Note: Only a limited number of these 600-level courses will be offered in any one year. Students may obtain further information from the Department.

Graduate students outside of the department are required to have department approval to register for any of the following courses:

History 601 3 units; (3-0)

Topics in Imperial History

MAY BE REPEATED FOR CREDIT

History 603 3 units; (3-0)

Topics in Religious History

MAY BE REPEATED FOR CREDIT

History 607 3 units; (3-0)

Topics in Western Canadian History

MAY BE REPEATED FOR CREDIT

History 623 3 units; (3-0)

Topics in Canadian History

An examination of crucial issues in Canada's political, economic, social and cultural history.

MAY BE REPEATED FOR CREDIT

History 633 3 units; (3-0)

Topics in Modern European History

MAY BE REPEATED FOR CREDIT

History 637 3 units; (3-0)

Topics in Military History

MAY BE REPEATED FOR CREDIT

History 639 3 units; (3-0)

Topics in History of Science

Topics may include the scientific revolution, science and religion, and the reception of scientific ideas.

MAY BE REPEATED FOR CREDIT

History 641 3 units; (3-0)

Topics in Medieval or Early Modern European History

MAY BE REPEATED FOR CREDIT

History 645 3 units; (3-0)

Topics in U.S. History

MAY BE REPEATED FOR CREDIT

History 647 3 units; (3-0)

Topics in Latin American History

MAY BE REPEATED FOR CREDIT

History 651 3 units; (3S-0)

Research Essay I

Provides course-based students an opportunity to propose their MRE projects to the other students, critique as a group their methods, sources and bibliographies, and present drafts of their projects for peer comment.

NOT INCLUDED IN GPA

History 653 3 units; (3S-0)

Research Essay II

In consultation with their supervisor, the student completes an essay modelled on a scholarly research article, to be evaluated on use of primary sources, historiographical framing, and argumentation.

History 655 3 units; (3-0)

(Strategic Studies 655)

Classics of Strategy

Strategic thought from Sun Tzu to Clausewitz, Mahan to Corbett. Analyzes the writings of classic strategic thinkers, and then by way of case studies examines their theories as they pertain to military and political planners from the Peloponnesian War to the present.

History 673 3 units; (3-0)

Topics in Legal History

MAY BE REPEATED FOR CREDIT

History 675 3 units; (3-0)

Selected Topics in History

MAY BE REPEATED FOR CREDIT

History 690 3 units; (3-0)

Historiography and the Theories of History

History 691 3 units; (3-0)

Conference Course in Special Topics

Note: Open only to graduate students.

MAY BE REPEATED FOR CREDIT

History 791 3 units; (3S-0)

Conference Course in Special Topics (Advanced Level)

Note: Open only to graduate students.

MAY BE REPEATED FOR CREDIT

History 795 3 units; (3S-0)

Advanced Seminar in Historiographical Interpretations

Indigenous Languages INDL

For more information see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ualgary.ca/.

Senior Courses

Indigenous Languages 301 3 units; (3-0)

Indigenous Language I

Primary emphasis on the acquisition of conversational skills and vocabulary.

MAY BE REPEATED FOR CREDIT

Indigenous Languages 303 3 units; (3-0)

Indigenous Language II

Continuation of Indigenous Languages 301, with special attention to grammatical structures and written materials.

Prerequisite(s): Indigenous Languages 301.

MAY BE REPEATED FOR CREDIT

Indigenous Studies INDG

For more information about these courses see the Department of Political Science website: poli.ualgary.ca/.

Junior Course

Indigenous Studies 201 3 units; (3-0)

Introduction to Indigenous Studies

A multi-disciplinary, theoretical and empirical overview of the situations, perspectives, and aspirations of selected Indigenous peoples with a focus on the Canadian context.

Senior Courses

Indigenous Studies 303 3 units; (3-0)

Indigenous Ways of Knowing I

An introduction to various Indigenous peoples ways of knowing (epistemology) with a special emphasis on the contextualization of knowledge-building. Deals with various aspects of building knowledge, such as listening, reflection, protocol, and experience.

Antirequisite(s): Credit for Indigenous Studies 303 and any of Indigenous Studies 203, Social Work 203, Social Work 553.30 or Social Work 553.33 will not be allowed.

Note: Normally offered during Block Week. Field trip(s) and pre-term study are normally required. A supplementary fee may be assessed to cover additional costs associated with this course.

Indigenous Studies 305 3 units; (3-0)

Indigenous Ways of Knowing II

An examination of the nature and relations of being (ontology) and specific responsibilities in cultural context. Integration of components of Indigenous ways of knowing. International comparison of Indigenous ways of knowing.

Prerequisite(s): One of Social Work 201, Indigenous Studies 203, Social Work 203, Indigenous Studies 303, Social Work 553.30, Social Work 553.33 or admission to the BSW Post-Diploma.

Antirequisite(s): Credit for Indigenous Studies 305 and any of Indigenous Studies 205, Social Work 205, Social Work 553.31 or Social Work 553.34 will not be allowed.

Note: Normally offered during Block Week. Field trip(s) and pre-term study are normally required. A supplementary fee may be assessed to cover additional costs associated with this course.

Indigenous Studies 312 3 units; (3-0)
(formerly Indigenous Studies 311 and 313)

Cultural Immersion Field Course

Experience of ceremonial and cultural activities, with a focus on four themes: living values; spirituality; health and healing; and roles, responsibilities, and respect.

Prerequisite(s): One of Indigenous Studies 217, 303 or 317.

Note: Normally offered during Block Week in Spring/Summer Intersession. Field trip(s) and pre-term study are normally required. Field trips may involve rugged field conditions and varying weather for which students must be prepared and equipped. A supplementary fee may be assessed to cover additional costs associated with this course.

Indigenous Studies 317 3 units; (3-0)
(formerly Indigenous Studies 217)

Ecological Knowledge

Experiential exploration, consideration, and application of Indigenous ecological knowledge, philosophies, and contemporary issues.

Note: Some field trip(s) are normally required. A supplementary fee may be assessed to cover additional costs associated with this course.

Indigenous Studies 343 3 units; (3-0)

Indigenous Law in Canada

Examination of the special legal and constitutional principles, provisions and instruments that have an impact on Indigenous individuals, governments and organizations. Topics covered may include aboriginal rights, treaty rights, self-government, fiduciary duties, the Royal Proclamation of 1763, the Indian Act, the 1982 Constitution, and pivotal court decisions.

Indigenous Studies 395 3 units; (3-0)

Topics in Indigenous Gender, Sexuality and Feminism

Selected topics that engage the history, politics, and contemporary contexts of Indigenous feminisms, queer studies, two-spirit studies, maternity, and masculinities in Canada and throughout Indigenous North America.

MAY BE REPEATED FOR CREDIT

Indigenous Studies 397 3 units; (3-0)

Topics in Canadian Indigenous Studies

Selected themes in Canadian Indigenous studies.

MAY BE REPEATED FOR CREDIT

Indigenous Studies 399 3 units; (3-0)

Topics in International Indigenous Studies

Selected themes in International Indigenous studies. May focus on Indigenous peoples of only one country.

MAY BE REPEATED FOR CREDIT

Indigenous Studies 400 3 units; (3-0)

Directed Research in International Indigenous Studies

Supervised study of a theme in the area of International Indigenous Studies.

MAY BE REPEATED FOR CREDIT

Indigenous Studies 407 3 units; (3-0)**Comparative International Indigenous Communities**

Social, economic, and political comparisons between selected Indigenous communities throughout the world.

Prerequisite(s): 6 units from Indigenous Studies 303, 305, 399.

Indigenous Studies 415 3 units; (3-0)
(formerly Indigenous Studies 315)**Indigenous Ethics and Protocol**

Examines principles underlying Indigenous ethics and academic and local research protocols, including indigenous ways of knowing, indigenous methodologies, notions of relationship, spirituality, community, and responsibility in academic research, teaching and learning when collaborating with Indigenous peoples.

Prerequisite(s): Indigenous Studies 201 and an additional 3 units from the Core Courses in the Field of International Indigenous Studies (Anthropology 210, English 376, History 345, 443, Indigenous Studies 303, 305, 407, 415, Indigenous Languages 301, Political Science 345, Sociology 307).

Indigenous Studies 492 3 units; (3-0)
(Psychology 492)**Indigenous Psychology**

An in-depth examination of research in psychology related to Indigenous populations, including the history of research, major topics, appropriate approaches to conducting research, and new directions.

Prerequisite(s): Psychology 200, 201, and admission to the International Indigenous Studies major.

Indigenous Studies 502 3 units; (3-0)**Advanced Topics in Canadian Indigenous Studies**

Investigation of selected topics in Indigenous issues in Canada.

Prerequisite(s): 60 units, including 3 units in courses labelled Indigenous Studies at the 300 level or above.

Antirequisite(s): Credit for Indigenous Studies 502 and 501 will not be allowed.

MAY BE REPEATED FOR CREDIT

Indigenous Studies 503 3 units; (3-0)**Advanced Topics in International Indigenous Studies**

In-depth investigation of selected topics in international Indigenous issues.

Prerequisite(s): 60 units, including 3 units in courses labelled Indigenous Studies at the 300 level.

MAY BE REPEATED FOR CREDIT

Information Security ISEC

For more information about these courses, see the Department of Computer Science: ucalgary.ca/cpsc/.

Registration in all courses requires admission to the Graduate Certificate in Network Security or the Graduate Certificate in Software Security, or the approval of the Department of Computer Science.

Graduate Courses**Information Security 601** 3 units; (3-0)**Applied Cryptography**

The basics of cryptographic algorithms and protocols including encryption and authentication algorithms and key establishment protocols. Security evaluation in computational and information theoretic settings, and attacks on cryptographic applications and systems.

Prerequisite(s): Admission to the Graduate Certificate in Network Security.

Information Security 603 3 units; (3-0)**Network Security**

Review of cryptographic algorithms and protocols used in network security. Network security protocols. Network security architecture. Web and Internet security. Wireless security. Approaches and tools for network intrusion detection and prevention. Traffic analysis and privacy enhancing systems. Applications of artificial intelligence and data analytics. Network system virtualization.

Prerequisite(s): Admission to the Graduate Certificate in Network Security.

Information Security 605 3 units; (3-0)**System and Application Security**

Operating systems security. Software vulnerabilities and their exploits. Malware. Computer system virtualization. Application-level security. Access control models. Identity and access management.

Prerequisite(s): Admission to the Graduate Certificate in Software Security.

Information Security 621 3 units; (1-3-2T)**Ethical Hacking Laboratory**

Offensive security, including technical and social methods. Legal and ethical frameworks as well as best practices. Automation and tool use, and defensive techniques.

Prerequisite(s): Admission to the Graduate Certificate in Network Security.

Information Security 623 3 units; (1-3-2T)**Software Security Laboratory**

Practices and tools for preventing vulnerabilities in the software development life cycle, including threat modelling, secure coding idioms and secure design patterns, static analyzers for detecting vulnerabilities, fuzzing and other quality assurance practices.

Prerequisite(s): Admission to the Graduate Certificate in Software Security.

Information Security 625 3 units; (1-3-2T)**Mobile and Smart Device Security Laboratory**

Security architecture of common smartphone platforms and Internet-of-Things environments. Selected topics on threat modelling, penetration testing, and security-aware design for smartphones, home automation, wearables, vehicles and industrial control systems.

Prerequisite(s): Admission to the Graduate Certificate in Software Security.

Information Security 641 3 units; (3-0)**Governance and Risk Management**

Information security strategy and its alignment with business goals. Business cases for information security investment. Legal and regulatory requirements. Roles and responsibilities in information

security management. Security risk assessment and management.

Prerequisite(s): Admission to the Graduate Certificate in Network Security or the Graduate Certificate in Software Security.

Information Security 643 3 units; (3-0)**Policies, Standards and Programs**

Development of security policies. Policy compliance and enforcement. Policy considerations for social engineering and insider attacks. Information security standards. Security awareness and training programs. Privacy policies and compliance. Privacy Impact Assessment.

Prerequisite(s): Admission to the Graduate Certificate in Network Security or the Graduate Certificate in Software Security.

Information Security 645 3 units; (3-0)**Incident Management and Forensics**

Design and implementation of process for identifying, analyzing and responding to information security incidents. Computer forensics. Organization and management of the incident response and forensics team. Tools and best practices.

Prerequisite(s): Admission to the Graduate Certificate in Network Security or the Graduate Certificate in Software Security.

Innovation INNO

Instruction offered by members of the Faculties of Arts and Science, Haskayne School of Business and the Schulich School of Engineering.

Senior Courses**Innovation 321** 3 units; (3-0)**Principles of Innovation**

Innovation is a process through which knowledge and new ideas are applied to create new economic and social benefits. Students are introduced to definitions, contexts, language, dynamics, historical and contemporary examples, issues, aspects, outcomes, pitfalls, and impacts of the innovation process from a multidisciplinary perspective. Literature on innovation is explored. Seeks to develop in students the intuitive and imaginative skills necessary for inventive processes, and to investigate the impact of the innovation process. Blend of face-to-face and web-based instruction.

Note: Open to students from all programs.

Innovation 323 3 units; (3-0)**The Practice of Innovation**

Provides experience in the innovation process, to aid students to understand the nature of this creative process in different contexts, and to nurture innovative thinking. Hands-on project in multidisciplinary teams of students and professors. Student projects will take the form of case studies of and/or involvement in actual innovation processes in different contexts. Seeks to teach through experience and peer-based interaction the processes of invention. Term will end with an "innovation fair" of teams' presentations. Blend of face-to-face and web-based instruction.

International Foundations Program IFPX

Students must be admitted into the IFP program or receive consent of the IFP office to enrol in these courses.

International Foundations Program 150
6 units; (4-0)

Foundational Academic Writing and Grammar I

Develop basic writing and grammar skills of standard written English. The focus is placed on the development of simple and compound sentences. Students will also learn appropriate use of modifiers, noun phrases, past and future verb tenses, repositions, comparatives, articles, spelling, punctuation and work on expanding their range of academic vocabulary.

Prerequisite(s): Admission to IFP Bridging Qatar campus.

Corequisite(s): International Foundations Program 153 and 157.

NOT INCLUDED IN GPA

International Foundations Program 153
3 units; (4-0)

Foundational Reading Comprehension and Proficiency I

The development of academic literacy skills. Topics covered are reading for comprehension, improvement in reading speed, and vocabulary expansion. Development of dictionary and thesaurus skills via use of monolingual English dictionaries and thesauri will also be an essential aspect of the course. Other sub-topics covered will be word forms, determining meaning for words in context, and the use of basic affixes in the prediction of meaning.

Prerequisite(s): Admission to IFP Bridging Qatar campus.

Corequisite(s): International Foundations Program 150 and 157.

NOT INCLUDED IN GPA

International Foundations Program 157
3 units; (4-0)

Foundational Listening Comprehension and Oral Fluency I

Continues the development of basic listening comprehension and speaking skills. Listening strategies and exercises will focus on comprehension of live or recorded audio instructions. Students will focus on comprehension and identification of vocabulary, argument development, main ideas and other specific details during listening practice. Speaking will focus on oral grammar, pronunciation, and basic rules of Canadian English discourse.

Prerequisite(s): Admission to IFP Bridging Qatar campus.

Corequisite(s): International Foundations Program 150 and 153.

NOT INCLUDED IN GPA

International Foundations Program 160
6 units; (4-0)

Foundational Academic Writing and Grammar II

Develop writing fluency through study and practice of compound and complex sentence patterns used in standard written English. The main focus will be the process of paragraph analysis and composition. A also integrates aspects of complex grammar structures and their appropriate usage.

Prerequisite(s): International Foundations Program 150, 153, and 157 or admission to IFP Bridging Qatar campus.

Corequisite(s): International Foundations Program 163 and 167.

NOT INCLUDED IN GPA

International Foundations Program 163
3 units; (4-0)

Foundational Reading Comprehension and Proficiency II

Emphasizes the development of academic literacy skills. Instruction will be focused on recognition of word pair analogies, common idiomatic expressions, and higher-level vocabulary. Students will also learn about inference, context clues, and predicting meaning from their readings, as well as multiple genres of reading materials in fiction and non-fiction.

Prerequisite(s): International Foundations Program 150, 153, and 157 or admission to IFP Bridging Qatar campus.

Corequisite(s): International Foundations Program 160 and 167.

NOT INCLUDED IN GPA

International Foundations Program 167
3 units; (4-0)

Foundational Listening Comprehension and Oral Fluency II

A continuation of the development of listening comprehension and speaking skills. Focus will be placed on the development of pronunciation skills, public speaking, formal class presentations, appropriate use of verbal and non-verbal communication techniques, and development of interviewing strategies. Listening strategies and exercises will focus on comprehension of live or recorded audio instructions and stories.

Prerequisite(s): International Foundations Program 150, 153, and 157 or admission to IFP Bridging Qatar campus.

Corequisite(s): International Foundations Program 160 and 163.

NOT INCLUDED IN GPA

International Foundations Program 230
1.5 units; (3-0)

Foundational Academic Reading and Writing for Business Studies

Develop academic skills in reading and writing pertinent to business studies. Facilitate the acquisition of reading comprehension skills in order to extract meaning from a specific context. Focus on skills to structure ideas and produce short texts.

Prerequisite(s): Admission to IFP Pathways with Haskayne School of Business.

NOT INCLUDED IN GPA

International Foundations Program 235
1.5 units; (3-0)

Foundational Academic Listening and Speaking Skills for Business Studies

Develop academic skills in listening and speaking pertinent to business studies. Facilitate the acquisition of listening comprehension skills in order to extract meaning from academic listening events. Focus on speaking skills to communicate and report ideas in academic business settings.

Prerequisite(s): Admission to IFP Pathways with Haskayne School of Business.

NOT INCLUDED IN GPA

International Foundations Program 236
1.5 units; (3-0)

Academic Reading and Writing for Business Studies

Foster academic skills in reading and writing pertinent to business studies. Develop reading comprehension skills to evaluate and incorporate

meaning. Focus on skills to communicate ideas and arguments through conventional texts.

Prerequisite(s): International Foundations Program 230.

NOT INCLUDED IN GPA

International Foundations Program 237
1.5 units; (3-0)

Academic Listening and Speaking Skills for Business Studies

Develop academic skills in listening and speaking pertinent to business studies. Facilitate the acquisition of listening comprehension skills in order to extract meaning from academic listening events. Focus on speaking skills to communicate and report ideas in academic business settings. Foster academic skills in listening and speaking pertinent to business studies. Develop listening comprehension skills to construct meaning through integrated and multimodal academic listening events. Focus on speaking skills for persuasion through meaning-driven interaction in academic business settings.

Prerequisite(s): International Foundations Program 235.

NOT INCLUDED IN GPA

International Foundations Program 240
3 units; (3-0)

Introduction to Academic Writing for STEM

Focuses on skills required for progressing from academic paragraphs to essays, requiring more precise language use for description, opinion and explanation. Critical thinking skills are developed through analysis and evaluation of STEM topics. Issues of academic integrity are explored.

Prerequisite(s): Admission to IFP Pathways with the Faculty of Science.

NOT INCLUDED IN GPA

International Foundations Program 242
3 units; (3-0)

Intermediate Language and Skills Development

Develops academic reading, listening and speaking abilities through practice and use. Complementing this, a continuing focus on the development of critical thinking and logical argumentation skills as well as study and learning strategy development.

Prerequisite(s): Admission to IFP Pathways with the Faculty of Science.

NOT INCLUDED IN GPA

International Foundations Program 246
3 units; (3-0)

Intermediate Academic Writing for STEM

Focuses on refining essay structure and mastering chronological, comparison and contrast essays. Includes development of personal style, coherence and cohesion in writing on STEM topics. Principles of citation and referencing will be reinforced to further develop understanding of academic integrity.

Prerequisite(s): International Foundations Program 240.

NOT INCLUDED IN GPA

International Foundations Program 248
3 units; (3-0)

Academic Success in STEM

Assists new students in understanding university study requirements, and establishing beneficial study techniques. Through STEM language and educational tasks, students will develop approaches to academic success including critical thinking,

logical argumentation, time management, goal setting, and self-reflection.

Prerequisite(s): Admission to IFP Pathways with the Faculty of Science.

NOT INCLUDED IN GPA

International Foundations Program 250

3 units; (3-0)

Introduction to Academic Written Communication for Engineering

Introductory scientific writing skills including reading in scientific texts to develop research skills, sense of audience, tone, register, organization patterns, grammar and mechanical concepts, and vocabulary, with a focus on lab reports.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

NOT INCLUDED IN GPA

International Foundations Program 257

3 units; (3-0)

Introduction to Academic Oral Communication for Engineering

Academic oral language skills in technical/scientific contexts including presentations, group problem solving, creating lecture notes, and pronunciation, as well as effective study skills and habits.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

NOT INCLUDED IN GPA

International Foundations Program 270

6 units; (4-0)

Academic Writing and Grammar I

Designed for low to high intermediate students of English as an additional language. A focus on skills required for writing academic paragraphs, from brainstorming ideas to the final written product. The paragraph writing will progress to essay writing through the course requiring a more precise use of language for description, opinion and explanation. Writers will practice their critical thinking skills as they analyze and evaluate the topic-related issues and develop their own ideas and ways to express them.

Prerequisite(s): International Foundations Program 160 or program placement.

NOT INCLUDED IN GPA

International Foundations Program 273

3 units; (4-0)

Reading Comprehension and Proficiency I

Designed for low to high intermediate students of English as an additional language. Students will use a variety of strategies to read academic and non-academic text to build vocabulary in context, and to understand how authors structure language to communicate information and opinion in different types of compositions. Students will practice their critical thinking skills as they analyze and evaluate the readings and express their own ideas.

Prerequisite(s): International Foundations Program 163 or program placement.

NOT INCLUDED IN GPA

International Foundations Program 277

3 units; (4-0)

Listening Comprehension and Oral Fluency I

Designed for mid-level to high intermediate English as a second language students. Students will practice and develop their listening skills covering a wide range of academic topics in a variety of presentation styles. Improving pronunciation and

practicing communication skills for a variety of settings along with the development of critical thinking.

Prerequisite(s): International Foundations Program 167 or program placement.

NOT INCLUDED IN GPA

International Foundations Program 280

6 units; (4-0)

Academic Writing and Grammar II

To improve high intermediate to low advanced students' academic writing skills. Refine the essay structure with a focus on mastering the chronological, comparison and contrast essays. Emphasis will be placed upon the sequence of steps in the writing process. Students will learn varied sentence types, more sophisticated writing techniques, advanced grammar, research topics, and documenting academic references

Prerequisite(s): International Foundations Program 270 or program placement.

NOT INCLUDED IN GPA

International Foundations Program 283

3 units; (4-0)

Reading Comprehension and Proficiency II

For high intermediate to low advanced students to continue to refine their reading skills within theme-based chapters. Students will build academic vocabulary, study word derivatives, and will increase their ability to use an advanced English dictionary. Students will learn and use critical thinking strategies to respond to texts and articles through discussion, debate and written assignments. In addition, students will begin to explore academic journals of interest to their future studies.

Prerequisite(s): International Foundations Program 273 or program placement.

NOT INCLUDED IN GPA

International Foundations Program 287

3 units; (4-0)

Listening Comprehension and Oral Fluency II

High intermediate to low advanced students continue to develop their academic listening and speaking skills. Students will hone critical thinking skills, academic vocabulary and practice pronunciation. Students will also attend on-campus lectures of their choice to practice note-taking.

Prerequisite(s): International Foundations Program 277 or program placement.

NOT INCLUDED IN GPA

International Foundations Program 290

6 units; (4-0)

Academic Writing and Grammar III

Develop advanced writing skills while reviewing the various organizational patterns for multi-disciplinary academic essays. Advanced grammatical and mechanical concepts are fostered. Students will develop an understanding of the process approach to writing, appropriate referencing, documenting, paraphrasing and summarizing. Critical thinking strategies will be promoted in order for students to create individual conclusions about issues.

Prerequisite(s): International Foundations Program 280 or program placement.

NOT INCLUDED IN GPA

International Foundations Program 293

3 units; (4-0)

Reading Comprehension and Proficiency III

Develop advanced reading skills and effective reading strategies for the genres of text found at the undergraduate level. These texts will be used for obtaining information and building vocabulary. Students will employ critical thinking strategies in order to reach independent conclusions and respond analytically.

Prerequisite(s): International Foundations Program 283 or program placement.

NOT INCLUDED IN GPA

International Foundations Program 297

3 units; (4-0)

Listening Comprehension and Oral Fluency III

Master the listening and speaking skills necessary for undergraduate study. Lectures from a variety of disciplines will be analyzed so that students can develop valuable comprehension strategies, including preparing for a lecture and taking effective notes. Academic discussions about complex, abstract and detailed topics covered in the lectures will be held in order to analyze, problem-solve and make decisions. Oral presentation techniques, pronunciation and critical thinking strategies will be further explored by the students.

Prerequisite(s): International Foundations Program 287 or program placement.

NOT INCLUDED IN GPA

International Foundations Program 332

3 units; (3-0)

Advanced Academic English for Business Studies

Facilitate the synthesis of written discourse adhering to the characteristics of academic language in business studies. Focus on language analysis skill to produce coherent written discourse and ease the processing for the receiver.

Prerequisite(s): International Foundations Program 236 and 237.

Note: May be used to fulfill the junior English requirement in the BComm program. See the Haskayne School of Business for more information.

NOT INCLUDED IN GPA

International Foundations Program 334

3 units; (3-0)

English for Professional Business Purposes

Facilitate applied language skills for further studies and professional communication in business studies. Focus on persuasive communication skills required for both oral and written discourses in professional business settings.

Prerequisite(s): International Foundations Program 332.

NOT INCLUDED IN GPA

International Foundations Program 340

3 units; (3-0)

Advanced Academic Writing for STEM

Develops advanced writing skills while reviewing organizational patterns common in STEM genres. Focuses on a process approach to writing, appropriate referencing, documenting, paraphrasing, summarizing and research skills. Critical thinking strategies are promoted to develop individual conclusions about issues.

Prerequisite(s): International Foundations Program 246.

NOT INCLUDED IN GPA

International Foundations Program 342
3 units; (3-0)

Advanced Language and Skills Development

Continues to develop academic reading, listening and speaking abilities through practice and use. Complimenting this, a continuing focus on advanced critical thinking and logical argumentation skills as well as consolidation of effective study and learning strategy development skills.

Prerequisite(s): International Foundations Program 242.

NOT INCLUDED IN GPA

International Foundations Program 346
3 units; (3-0)

Technical Writing

Focuses on strengthening ability to write clearly and concisely in science disciplines, including documenting processes, steps and procedures, descriptions and discussions of results with visuals such as tables and graphs. Special attention paid to written coherence and proofreading skills.

Prerequisite(s): International Foundations Program 340.

NOT INCLUDED IN GPA

International Foundations Program 350
3 units; (3-0)

Advanced Academic Written Communication for Engineering

Advanced scientific and technical communication for extensive writing tasks in the Schulich School of Engineering. Participants will read scientific and technical writing, develop research skills and information literacy, critically analyze data, enrich vocabulary focused on scientific contexts, and foster rhetorical understanding and synthesis of information.

Prerequisite(s): International Foundations Program 250.

Note: May be used in lieu of Communications Studies 363. See Schulich School of Engineering Program Details for further information.

NOT INCLUDED IN GPA

International Foundations Program 357
3 units; (3-0)

Advanced Academic Oral Communication Skills for Engineering

Advanced academic oral language and academic communication skills for use in the Schulich School of Engineering. Participants will learn skills for communication in technical contexts, and develop fluency, accuracy and clarity. Tasks will include note taking on extended lectures, research and critical thinking, presentations, discussion leading and group problem-solving.

Prerequisite(s): International Foundations Program 257.

NOT INCLUDED IN GPA

International Foundations Program 451
3 units; (3-0)

Introduction to Academic Written Communication for Engineering

Basic scientific writing skills and written academic communication expectations for use in engineering contexts. Focus will include how to read scientific texts, developing research skills, written communication contexts, grammar and mechanical concepts, and audience, as well as developing academic and scientific vocabulary.

Prerequisite(s): Consent of the Department.

NOT INCLUDED IN GPA

International Foundations Program 455
3 units; (3-0)

Introduction to Academic Oral Communication Skills for Engineering

Participants will develop their English speaking and listening skills for use in engineering contexts through participation in academic presentations, note-taking, and group problem solving scenarios.

Prerequisite(s): Consent of the Department.

NOT INCLUDED IN GPA

International Foundations Program 459
3 units; (3-0)

Introduction to Academic Culture and Communication

An introduction to the academic culture and communication expectations for study including physical and online infrastructure, as well as improve language skills necessary to navigate university entrance and commence studies.

Prerequisite(s): Consent of the Department.

NOT INCLUDED IN GPA

International Foundations Program 559
3 units; (3-0)

Advanced Academic Communication for Engineering

Participants will develop writing for scientific reports, technical writing, and applications, and develop reading skills for identifying bias, synthesizing information, vocabulary acquisition and researching. Presentation skills, as well as note-taking and questioning strategies, will also be practiced.

Prerequisite(s): Consent of the Department.

NOT INCLUDED IN GPA

Graduate Courses

International Foundations Program 651
3 units; (3-0)

Advanced Academic Written Communication for Engineering

Facilitate the synthesis of written discourse adhering to the characteristics of academic language in the Master of Engineering program. Focus on writing and research skills required for graduate level academic studies.

Prerequisite(s): Admission to IFP Pathways Master of Engineering program, or consent of the program.

NOT INCLUDED IN GPA

International Foundations Program 655
3 units; (3-0)

Advanced Academic Oral Communication for Engineering

Facilitate applied language skills for communication in the Master of Engineering program. Focus on oral communication skills required for graduate level academic studies.

Prerequisite(s): Admission to IFP Pathways Master of Engineering program, or consent of the program.

NOT INCLUDED IN GPA

International Foundations Program Business IFPB

Students must be admitted into the IFP Pathways with Haskayne School of Business or receive consent of the IFP office to enrol in these courses.

International Foundations Program Business 201 1 unit; (1-0)

Language Enrichment for Economics 201

English language support for IFP Pathways students taking Economics 201. Facilitate the development of language and academic skills in conjunction with the course outcomes of Economics 201.

Prerequisite(s): Admission to IFP Pathways with Haskayne School of Business.

Corequisite(s): Economics 201.

NOT INCLUDED IN GPA

International Foundations Program Business 203 1 unit; (1-0)

Language Enrichment for Economics 203

English language support for IFP Pathways students taking Economics 203. Facilitate the development of language and academic skills in conjunction with the course outcomes of Economics 203.

Prerequisite(s): Admission to IFP Pathways with Haskayne School of Business.

Corequisite(s): Economics 203.

NOT INCLUDED IN GPA

International Foundations Program Business 213 1 unit; (1-0)

Language Enrichment for Statistics 213

English language support for IFP Pathways students taking Statistics 213. Facilitate the development of language and academic skills in conjunction with the course outcomes of Statistics 213.

Prerequisite(s): Admission to IFP Pathways with Haskayne School of Business.

Corequisite(s): Statistics 213.

NOT INCLUDED IN GPA

International Foundations Program Business 217 1 unit; (1-0)

Language Enrichment for Management Studies 217

English language support for IFP Pathways students taking Management Studies 217. Facilitate the development of language and academic skills in conjunction with the course outcomes of Management Studies 217.

Prerequisite(s): Admission to IFP Pathways with Haskayne School of Business.

Corequisite(s): Management Studies 217.

NOT INCLUDED IN GPA

International Foundations Program Business 227 1 unit; (1-0)

Language Enrichment for Strategy and Global Management 217

English language support for IFP Pathways students taking Strategy and Global Management 217. Facilitate the development of language and academic skills in conjunction with the course outcomes of Strategy and Global Management 217.

Prerequisite(s): Admission to IFP Pathways with Haskayne School of Business.

Corequisite(s): Strategy and Global Management 217.

NOT INCLUDED IN GPA

International Foundations Program Business 231 1 unit; (1-0)

Fundamental Academic Communication

Introduction of academic culture and communication expectations for the study in the

Haskayne School of Business, including physical and online infrastructure, as well as, improving language skills necessary to navigate university entrance and commence studies.

Prerequisite(s): Admission to IFP Pathways with Haskayne School of Business.

NOT INCLUDED IN GPA

International Foundations Program Engineering IFPE

Students must be admitted into the IFP Pathways with Schulich School of Engineering or receive consent of the IFP office to enrol in these courses.

International Foundations Program Engineering 200 1 unit; (1-0)

Adjunct for Engineering 200

English language support for IFP Pathway students taking Engineering 200. Focus on language and study skills for the successful completion of Engineering 200. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Engineering 200.

NOT INCLUDED IN GPA

International Foundations Program Engineering 201 1 unit; (1-0)

Adjunct for Engineering 201

English language support for IFP Pathway students taking Engineering 201. Focus on language and study skills for the successful completion of Engineering 201. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Engineering 201.

NOT INCLUDED IN GPA

International Foundations Program Engineering 202 1 unit; (1-0)

Adjunct for Engineering 202

English language support for IFP Pathway students taking Engineering 202. Focus on language and study skills for the successful completion of Engineering 202. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Engineering 202.

NOT INCLUDED IN GPA

International Foundations Program Engineering 209 1 unit; (1-0)

Adjunct for Chemistry 209

English language support for IFP Pathway students taking Chemistry 209. Focus on language and study skills for the successful completion of Chemistry 209. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Chemistry 209.

NOT INCLUDED IN GPA

International Foundations Program Engineering 211 1 unit; (1-0)

Adjunct for Mathematics 211

English language support for IFP Pathway students taking Mathematics 211. Focus on language and study skills for the successful completion of Mathematics 211. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Mathematics 211.

NOT INCLUDED IN GPA

International Foundations Program Engineering 225 1 unit; (1-0)

Adjunct for Engineering 225

English language support for IFP Pathway students taking Engineering 225. Focus on language and study skills for the successful completion of Engineering 225. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Engineering 225.

NOT INCLUDED IN GPA

International Foundations Program Engineering 233 1 unit; (1-0)

Adjunct for Engineering 233

English language support for IFP Pathway students taking Engineering 233. Focus on language and study skills for the successful completion of Engineering 233. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Engineering 233.

NOT INCLUDED IN GPA

International Foundations Program Engineering 259 1 unit; (1-0)

Adjunct for Physics 259

English language support only IFP Pathway students taking Physics 259. Focus on language and study skills for the successful completion of Physics 259. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Physics 259.

NOT INCLUDED IN GPA

International Foundations Program Engineering 275 1 unit; (1-0)

Adjunct for Mathematics 275

English language support for IFP Pathway students taking Mathematics 275. Focus on language and study skills for the successful completion of Mathematics 275. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Mathematics 275.

NOT INCLUDED IN GPA

International Foundations Program Engineering 277 1 unit; (1-0)

Adjunct for Mathematics 277

English language support for IFP Pathway students taking Mathematics 277. Focus on language and study skills for the successful completion of Mathematics 277. Simplifying and personalizing class notes; and developing skills to critically analyze and synthesize content of the above course.

Prerequisite(s): Admission to IFP Pathways with Schulich School of Engineering.

Corequisite(s): Mathematics 277.

NOT INCLUDED IN GPA

Graduate Courses

International Foundations Program Engineering 621 1 unit; (1-0)

Language Enrichment for Petroleum Engineering 621

English language support for IFP Pathways students taking Petroleum Engineering 621. Facilitate the development of language and academic skills in conjunction with the course outcomes of Petroleum Engineering 621.

Prerequisite(s): Admission to IFP Pathways in the Master of Engineering program, or consent of the program.

Corequisite(s): Petroleum Engineering 621.

NOT INCLUDED IN GPA

International Foundations Program Engineering 682 1 unit; (1-0)

Language Enrichment for Engineering 682

English language support for IFP Pathways students taking Engineering 682. Facilitate the development of language and academic skills in conjunction with the course outcomes of Engineering 682.

Prerequisite(s): Admission to IFP Pathways in the Master of Engineering program, or consent of the program.

Corequisite(s): Engineering 682.

NOT INCLUDED IN GPA

International Foundations Program Engineering 683 1 unit; (1-0)

Language Enrichment for Engineering 683

English language support for IFP Pathways students taking Engineering 683. Facilitate the development of language and academic skills in conjunction with the course outcomes of Engineering 683.

Prerequisite(s): Admission to IFP Pathways in the Master of Engineering program, or consent of the program.

Corequisite(s): Engineering 683.

NOT INCLUDED IN GPA

International Foundations Program Engineering 684 1 unit; (1-0)

Language Enrichment for Engineering 684

English language support for IFP Pathways students taking Engineering 684. Facilitate the development of language and academic skills in conjunction with the course outcomes of Engineering 684.

Prerequisite(s): Admission to IFP Pathways in the Master of Engineering program, or consent of the program.

Corequisite(s): Engineering 684.

NOT INCLUDED IN GPA

International Relations INTR

For more information about these courses see the Department of Political Science website: poli.ucalgary.ca/.

Senior Courses

International Relations 301 **3 units; (3-0)**

A Multidisciplinary Survey of International Relations

A survey of International Relations integrating the approaches applied in various Social Sciences disciplines.

Prerequisite(s): Admission to the International Relations program.

International Relations 501 **3 units; (3-0)**

Advanced Seminar in International Relations

An integrative seminar on selected themes from the International Relations field.

Prerequisite(s): International Relations 301 and third- or fourth-year, admission to the International Relations program and completion of at least 60 units.

International Relations 597 **3 units; (3-0)**

Directed Study in International Relations

Study of a particular topic under the direct supervision of a faculty member.

Prerequisite(s): Admission to the International Relations program, completion of at least 60 units, and consent of the Program Co-ordinator.

Note: Students wishing to register in this course must submit to the Program Co-ordinator a detailed statement by the instructor of the work to be carried out.

MAY BE REPEATED FOR CREDIT

Internship INTE

Senior Courses

Internship 503 **15 units; (4 months)**

Internship in Computer Science

- 503.01. Internship in Computer Science I
- 503.02. Internship in Computer Science II
- 503.03. Internship in Computer Science III
- 503.04. Internship in Computer Science IV

NOT INCLUDED IN GPA

Internship 513 **15 units; (4 months)**

Internship in Engineering

- 513.01. Internship in Engineering I
- 513.02. Internship in Engineering II
- 513.03. Internship in Engineering III
- 513.04. Internship in Engineering IV

NOT INCLUDED IN GPA

Internship 591 **15 units; (4 months)**

Professional Theatre Internship

Internship experience with a local professional theatre organization.

- 591.01. Professional Theatre Internship I
- 591.02. Professional Theatre Internship II

Prerequisite(s): Admission to BFA Drama, 90 units and consent of the Division Chair, Drama.

Antirequisite(s): Credit for Internship 591 or any of Drama 590, 591 or 593 will not be allowed.

NOT INCLUDED IN GPA

Graduate Courses

Internship 601 **1.5 units**

Graduate Internship (Thesis-based, full-time)

Students registered full-time in a thesis-based master's or doctoral program who undertake an approved full-time internship (of 21 hours/week or more) should register in this course during all terms that coincide with the internship. This course cannot be used to substitute for other course requirements for a graduate degree program. Not available to students enrolled in programs with their own internship or co-op course. To comply with Canada Immigration regulations, this course is not available to international students unless their proposed internship is outside Canada or is a Mitacs internship.

601.01 Graduate Internship I

601.02 Graduate Internship II

601.03 Graduate Internship III

Prerequisite(s): Consent of the Faculty of Graduate Studies.

NOT INCLUDED IN GPA

Internship 602 **1.5 units**

Graduate Internship (Thesis-based, part-time)

Students registered in a thesis-based master's program who undertake an approved part-time internship (of 20 hours/week or less) should register in this course during the term that coincides with the internship. This course cannot be used to substitute for other course requirements for a graduate degree program. Not available to students enrolled in programs with their own internship or co-op course.

602.01 Graduate Internship I

602.02 Graduate Internship II

602.03 Graduate Internship III

Prerequisite(s): Consent of the Faculty of Graduate Studies.

NOT INCLUDED IN GPA

Internship 603 **1.5 units**

Graduate Internship (Course-based, full-time)

Students registered in a course-based master's program who undertake an approved full-time internship (of 21 hours/week or more) should register in this course during the term that coincides with the internship. This course cannot be used to substitute for other course requirements for a graduate degree program. Not available to students enrolled in programs with their own internship or co-op course. To comply with Canada Immigration regulations, this course is not available to international students unless their proposed internship is outside Canada or is a Mitacs internship.

603.01 Graduate Internship I

603.02 Graduate Internship II

603.03 Graduate Internship III

Prerequisite(s): Consent of the Faculty of Graduate Studies.

NOT INCLUDED IN GPA

Internship 604 **1.5 units**

Graduate Internship (Course-based, part-time)

Students registered in a course-based master's program who undertake an approved part-time internship (of 20 hours/week or less) should register in this course during the term that coincides with the internship. This course cannot be used to substitute for other course requirements for a graduate degree program. Not available to students enrolled

in programs with their own internship or co-op course.

604.01 Graduate Internship I

604.02 Graduate Internship II

604.03 Graduate Internship III

Prerequisite(s): Consent of the Faculty of Graduate Studies.

NOT INCLUDED IN GPA

Interprofessional Health Education IPHE

Senior Courses

Interprofessional Health Education 501
3 units; (3-0)
(Interprofessional Health Education 601)

Interprofessional Practice in Mental Health

Students from different helping professions come together to examine selected issues of interprofessional practice in the area of mental health and co-occurring addictive disorders, focusing on the experience of mental illness, treatment alternatives, practice implications, advocacy and policy issues, and future challenges and change. Incorporates in-class and field experiences with consumers and families, employers and professionals, services and organizations.

Prerequisite(s): One of Community Rehabilitation 209, 435, Kinesiology 355, Nursing 303, 305, Psychology 203, 205, Social Work 300, 302, 304, 306, 363 or consent of the instructor(s).

Interprofessional Health Education 503
3 units; (3-0)
(Interprofessional Health Education 603)

Interprofessional Practice in Addictions

Students from different helping professions come together to examine aspects of addictions assessment, treatment and recovery and issues of co-occurring mental health disorders in an interprofessional context. Studies include the complex array of treatments, programs and supports available in a Canadian context, and critical examination of the ancillary issues of community care, and other support services that are required for successful recovery and relapse prevention for those with addictive disorders and co-occurring mental health issues.

Prerequisite(s): One of Community Rehabilitation 209, 435, Kinesiology 355, Nursing 303, 305, Psychology 203, 205, Social Work 300, 302, 304, 306, 363 or consent of the instructor(s).

Interprofessional Health Education 598
3 units; (3-0)

Selected Topics in Interprofessional Health Education

Course topics focusing on interprofessional practice amongst health science professions.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Interprofessional Health Education 601
3 units; (3-0)
(Interprofessional Health Education 501)

Interprofessional Practice in Mental Health

Students from different helping professions come together to examine selected issues of interprofessional practice in the area of mental health and co-occurring addictive disorders, focusing on the experience of mental illness, treatment alternatives, practice implications,

advocacy and policy issues, and future challenges and change. Incorporates in-class and field experiences with consumers and families, employers and professionals, services and organizations.

Prerequisite(s): Consent of the instructor(s).

Interprofessional Health Education 603
3 units; (3-0)
(Interprofessional Health Education 503)

Interprofessional Practice in Addictions

Students from different helping professions come together to examine aspects of addictions assessment, treatment and recovery, and issues of co-occurring mental health disorders in an interprofessional context. Studies include the complex array of treatments, programs and supports available in a Canadian context, and critical examination of the ancillary issues of community care, and other support services that are required for successful recovery and relapse prevention for those with addictive disorders and co-occurring mental health issues.

Prerequisite(s): Consent of the instructor(s).

Interprofessional Health Education 605
3 units; (3-2)

Interprofessional Approaches to Assessment, Diagnosis and Treatment in Mental Health and Addictions: The Major Disorders - Part A

Complex facets of assessment and diagnosis (using DSM classification system) of depressive, anxiety, psychotic and alcohol disorders. Team investigation of treatment programs and supports available within a Canadian context.

Prerequisite(s): Consent of the instructor(s).

Interprofessional Health Education 607
3 units; (3-2)

Interprofessional Approaches to Assessment, Diagnosis and Treatment in Mental Health and Addictions: Personality Disorders and Special Populations - Part B

Complex facets of assessment and diagnosis of personality disorders, developmental disorders, special populations and addictive disorders. Team investigation of treatment programs and supports available within a Canadian context.

Prerequisite(s): Consent of the instructor(s).

Interprofessional Health Education 609
3 units; (3-2)

Psychiatric, Psychosocial and Recovery Approaches in Mental Health and Addictions

Interprofessional approaches to culture, relationships, teams and roles in the delivery of mental health and addictions care.

Prerequisite(s): Consent of the instructor(s).

Interprofessional Health Education 611
3 units; (3-1)

Special Topics in Interprofessional Mental Health Addictions

Topics such as age or special populations, methods and systems will be added from existing faculty offerings or will be created as needed through interfaculty collaboration.

Prerequisite(s): Consent of the instructor(s).

MAY BE REPEATED FOR CREDIT

Italian ITAL

For more information about these courses, see the School of Languages, Linguistics, Literatures and Cultures website: slllc.ucalgary.ca/.

Language Placement information see 4.59 Placement in Language Courses.

Junior Courses

Italian 201 3 units; (3-1)

Beginners' Italian I

This course, designed for students with no previous knowledge of the language, provides training in the comprehension, speaking, reading and writing of Italian.

Antirequisite(s): Credit for Italian 201 and 30 will not be allowed.

Note: Students must complete an online placement form before classes begin. For information, consult <https://slllc.ucalgary.ca/> placement.

Italian 203 3 units; (3-1)

Beginners' Italian II

A continuation of Italian 201.

Prerequisite(s): Italian 30, Italian 201 or equivalent.

Senior Courses

Italian 301 3 units; (3-1T)

Second-Year Italian I

An intensive course in reading, writing and oral practice.

Prerequisite(s): Italian 203.

Italian 303 3 units; (3-1T)

Second-Year Italian II

Further development of communication skills in Italian (listening, speaking, writing, reading), as well as the study of cultural issues in the Italian world with emphasis on reading.

Prerequisite(s): Italian 301.

Italian 305 3 units; (3-1)

Introduction to Textual Analysis

Development of critical thinking and communicative skills through the analysis of selected literary and non literary texts.

Prerequisite(s): Italian 301.

Italian 307 3 units; (3-1)

Communication

Study of different types of communication (print and electronic media, correspondence, business). Analysis of relevant aspects of Italian contemporary life.

Prerequisite(s): Italian 301.

Italian 309 3 units; (3-1)

Civilization: Culture and the Arts

Aspects of Italian civilization and contemporary cultural issues in Italian Studies.

Prerequisite(s): Italian 203.

Italian 317 3 units; (3-0)

Italian Culture and Literature

A survey of Italian culture, inclusive of literary and non-literary texts, film, and popular culture. Topics such as Italian history and immigration, Italian cities, Italian food and fashion, and Italian Canadian

literature and traditions, in Calgary and elsewhere are covered.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

Italian 401 3 units; (3-1T)

Third-Year Italian I

A course in composition and conversation for advanced students in Italian. Selected readings from literary texts.

Prerequisite(s): Italian 303 and 3 units of Italian at the senior level.

Italian 403 3 units; (3-1T)

Third-Year Italian II

Intensive study of Italian grammar with the goal of attaining greater proficiency in written and oral communication. Grammatical analysis, vocabulary enrichment and development of conversation skills dealing with cultural issues.

Prerequisite(s): Italian 303 and 3 units of Italian at the senior level.

Italian 405 3 units; (3-0)

Selected Works in Italian Literature

Introduction to Italian literature with particular emphasis on the novel and poetry.

Prerequisite(s): Italian 303 and 3 units of Italian at the senior level.

MAY BE REPEATED FOR CREDIT

Italian 407 3 units; (3-0)

Performance as Cultural Expression

Study of Italian theatre, opera and drama as well as popular forms of cultural expression such as festival, music and figurative art.

Prerequisite(s): Italian 303 and 3 units of Italian at the senior level.

Italian 409 3 units; (3-2)

Italian Culture through Cinema

Significant social, cultural and historical issues in Italian society through the medium of film.

Prerequisite(s): Italian 303 and 3 units at the senior level.

Italian 499 3 units; (3-0)

Topics in Italian Studies I

Selected topics in Italian language, literature or civilization.

Prerequisite(s): Italian 303 and 3 units at the senior level.

MAY BE REPEATED FOR CREDIT

Italian 501 3 units; (3-0)

Interdisciplinary Study of Italian Culture

Capstone project in Italian studies. Analytical discussion of selected topics each related to students' field of concentration.

Prerequisite(s): Italian 303 and 3 units at the senior level and consent of the instructor.

Italian 502 3 units; (3-0)
(formerly Italian 503)

Advanced Textual Analysis

Discussion of selected topics in Italian language, literature or culture. Course designed to develop writing skills. Review of writing strategies, spelling, punctuation, expository and argumentative techniques, using various original sources taken from

journalistic, scientific, and literary texts as well as from other media.

Prerequisite(s): Italian 303 and 3 units at the senior level.

MAY BE REPEATED FOR CREDIT

Italian 597 **3 units; (0-3T)**

Directed Reading

Directed reading for students in their third or fourth year. Qualified students will undertake research projects in their specified field of interest under the supervision of a faculty member.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

MAY BE REPEATED FOR CREDIT

Italian 599 **3 units; (3S-0)**

Topics in Italian Studies II

A seminar course for advanced students.

Prerequisite(s): Italian 303 and 3 units at the senior level.

MAY BE REPEATED FOR CREDIT

Japanese JPNS

For more information see the School of Languages, Linguistics, Literatures and Cultures website: slllc.ualgary.ca/.

Language Placement information see 4.59 Placement in Language Courses.

Junior Courses

Japanese 201 **3 units; (3-0)**

Introduction to Japanese Popular Culture

An introduction to the major forms of popular visual and material culture from Japan in the twentieth and twenty-first centuries.

Note: Taught in English.

Japanese 205 **3 units; (4-1)**

Beginners' Japanese I

Basic concepts of modern Japanese. Reading and writing of characters, essentials of grammar, basic vocabulary, and oral drills on normal speech patterns.

Antirequisite(s): Credit for Japanese 205 and 30 will not be allowed

Note: Students must complete an online placement form before classes begin. For information, consult <https://slllc.ualgary.ca/> placement.

Japanese 207 **3 units; (4-1)**

Beginners' Japanese II

Continuation of Japanese 205.

Prerequisite(s): Japanese 30 or Japanese 205.

Senior Courses

Japanese 301 **3 units; (3-1)**

Continuing Japanese I

Further acquisition of Japanese characters, and the development of conversational skills through reading and discussion of selected Japanese texts. Structural analysis of normal speech patterns. Preparation of written assignments. A continuation of Japanese 207.

Prerequisite(s): Japanese 207.

Japanese 303 **3 units; (3-1)**

Continuing Japanese II

Continuation of Japanese 301.

Prerequisite(s): Japanese 301.

Japanese 309 **3 units; (3-2)**

Topics in Japanese Culture in an Immersion Setting

Introduction to contemporary Japanese culture through research projects and life experience.

309.01. Wisdom, Imagination, and Creation

309.02. Longing, Memory, and Inheritance

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: This course is given during Spring/Summer Intersession in Japan. A supplementary fee will be assessed to cover additional costs associated with this course.

Japanese 311 **3 units; (3-1)**

Japanese Language in an Immersion Setting I

Stresses oral skills and cultural understanding in an immersion setting. While the focus will be on speaking and aural comprehension, reading and writing will also be introduced.

Prerequisite(s): Japanese 207 and consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: This course is given during Spring/Summer Intersession in Japan. A supplementary fee will be assessed to cover additional costs associated with this course.

Japanese 313 **3 units; (3-1)**

Japanese Language in an Immersion Setting II

A continuation of Japanese 311.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: This course is given during Spring/Summer Intersession in Japan. A supplementary fee will be assessed to cover additional costs associated with this course.

Japanese 317 **3 units; (3-0)**

Topics in Japanese Civilization

Distinctive features of Japanese civilization within the Asian context.

317.01. Japanese Civilization

317.02. Japanese Cinema

317.03. Japanese Cultural History in the Present Day

Note: Taught in English.

Japanese 323 **3 units; (3-0)**

Critical Approaches to Manga and Anime

A critical introduction to Japanese manga (print comics) and anime (animation) in the twentieth and twenty-first centuries.

Note: Taught in English.

Japanese 325 **3 units; (3-0)**

Japanese Video Games and Gaming Culture

A critical introduction to the history, analysis, and social impact of video games from Japan and Japanese gaming culture worldwide.

Note: Taught in English.

Japanese 327 **3 units; (3-0)**

Modern Japanese Literature in Translation

An introduction to the literature and literary history of modern Japan, with readings drawn from various literary genres, from 1868 to the present.

Note: Taught in English.

Japanese 331 **3 units; (3-0)**

Intermediate Japanese I

An intermediate course giving emphasis to both writing and oral skills. Some of the more difficult aspects of modern Japanese grammar will be studied.

Prerequisite(s): Japanese 303.

Japanese 333 **3 units; (3-0)**

Intermediate Japanese II

A continuation of Japanese 331.

Prerequisite(s): Japanese 331.

Japanese 341 **3 units; (3-0)**

Introduction to Japanese Literature

Reading and discussion of selected works of modern Japanese literature.

Prerequisite(s): Japanese 303.

Japanese 441 **3 units; (3-0)**

Advanced Conversational Japanese

Intensive development of Japanese oral communication skills through a variety of authentic materials.

Prerequisite(s): Japanese 331.

Japanese 451 **3 units; (3-0)**

Japanese Through Contemporary Texts

Language practice and cultural analysis through the study of contemporary Japanese texts. Authentic material will be selected from documents and textbooks. Students will be able to improve their reading skills while enhancing their knowledge of Japanese culture.

Prerequisite(s): Japanese 331.

Japanese 461 **3 units; (3-0)**

(Chinese 461)

Japanese-Chinese Cultural Relations

Discussion of cultural relations and influences between Japan and China. Topics may include cultural identities and cross-influences, literary and artistic traditions, and writing systems.

Prerequisite(s): Japanese 303 or higher (excluding Japanese 317).

Note: Knowledge of Chinese would be beneficial.

Japanese 471 **3 units; (3-0)**

Introduction to Classical Japanese

Basic introduction to classical Japanese language, including core grammar structures, sample masterpieces, and handwriting.

Prerequisite(s): Japanese 331.

Kinesiology KNES

For more information about these courses, see the Faculty of Kinesiology: ualgary.ca/knes.

Junior Courses

Kinesiology 201 **3 units; (2-3)**

Activity: Essence and Experience

Participate in various activities and movement patterns and the study of the fundamental factors

that influence the activities we choose and the way we move.

Prerequisite(s): Biology 30.

Kinesiology 203 **3 units; (2-2)**

Activity: Health, Fitness, and Performance

Fundamentals of exercise physiology are used in a variety of theoretically supported activities to experience the benefits of exercise and an understanding of exercise prescription and evaluation.

Prerequisite(s): Biology 30 and Chemistry 30.

Note: Students are responsible for completing a Get Active Questionnaire (GAQ – formerly PAR-Q) and obtain medical clearance if required.

Kinesiology 213 **3 units; (2-1)**

Introduction to Research in Kinesiology

An introduction to research in kinesiology with an emphasis on understanding the research process, including basic statistical knowledge, and its relationship to critical thinking. Practical application of concepts through direct involvement in individual and group projects.

Prerequisite(s): Biology 30, Chemistry 30, and Mathematics 30-1.

Kinesiology 237 **3 units; (3-0)**

Introduction to Nutrition

Provides students with a basic understanding of the role of nutrition in health and fitness.

Prerequisite(s): Kinesiology 259.

Kinesiology 244 **3 units; (2-1)**
(formerly Kinesiology 245)

Introduction to Socio-Cultural Aspects of Sport

An introduction to thinking critically about the relationship between sport and the larger social context, with an emphasis on social norms, politics, ethics, and historical perspectives.

Antirequisite(s): Credit for Kinesiology 244 and either Kinesiology 303.44 or Sociology 399 will not be allowed.

Kinesiology 251 **3 units; (3-1/3)**

Introduction to Human Motor Control and Learning

An introduction to principles underlying motor control and learning.

Prerequisite(s): Biology 30.

Kinesiology 253 **3 units; (3-1/3)**

Introduction to Exercise and Sport Psychology

An introduction to the psycho-social concepts underlying an understanding of human behaviour in physical activity, sport, and health.

Kinesiology 259 **3 units; (3-2)**

Human Anatomy and Physiology I

The instructional approach is a combination of systematic and regional anatomy and physiology with some surface anatomy and radiologic considerations. General cell physiology, bone anatomy, neurophysiology and muscular physiology, as well as skeletal structure, types of connective tissues, structure of joints and muscles of the axial and appendicular skeleton will be covered. Laboratories utilize human tissue materials, anatomical models, charts, and prosected cadavers and cadaver specimens.

Prerequisite(s): Biology 30, Chemistry 30, and Mathematics 30-1 or 30-2.

Antirequisite(s): Credit for Kinesiology 259 and any of Biology 305, Medical Science 404, Nursing 221, Zoology 269, 461 or 463 will not be allowed.

Kinesiology 260 **3 units; (3-2)**

Human Anatomy and Physiology II

The instructional approach is a combination of systematic and regional anatomy and physiology with some surface anatomy and radiologic considerations. Physiology and anatomy of the cardiovascular, pulmonary, endocrine, renal and gastrointestinal systems as well as anatomy of the reproductive and integumentary systems and special senses will be covered. Laboratories utilize human tissue materials, anatomical models, charts, and prosected cadavers and cadaver specimens.

Prerequisite(s): Kinesiology 259.

Antirequisite(s): Credit for Kinesiology 260 and any of Biology 305, Medical Science 404, Nursing 222, Zoology 269, 461 or 463 will not be allowed.

Kinesiology 263 **3 units; (3-1T)**

Quantitative Biomechanics

Basic principles of force system analysis, impulse-momentum, work-energy and particle kinematics applied to biological structures, including extensive mathematical analyses.

Prerequisite(s): Kinesiology 259.

Corequisite(s): Prerequisite or Corequisite: Kinesiology 201 and 260.

Senior Courses

Kinesiology 303 **3 units; (3-0)**

Special Topics in Kinesiology
MAY BE REPEATED FOR CREDIT

Kinesiology 311 **3 units; (2-1)**

Leadership Foundations

Contemporary leadership best practices with a focus on physical activity, pedagogy and sport coaching. Linking leadership theory with critical reflection.

Prerequisite(s): Admission to the Faculty of Kinesiology.

Antirequisite(s): Credit for Kinesiology 311 and 211 will not be allowed.

Kinesiology 321 **3 units; (3-0)**

Foundations of Instruction

The fundamental principles of creating an effective learning environment in an instructional activity setting.

Prerequisite(s): Kinesiology 201 and admission to the Leadership in Pedagogy and Coaching major.

Kinesiology 323 **3 units; (3-2)**

Integrative Human Physiology

This course builds upon fundamental principles of human systems physiology, with a focus on how the integration of these physiological systems provides the means by which our bodies maintain homeostasis from the systemic down to the cellular level.

Prerequisite(s): Kinesiology 260 and admission to the Faculty of Kinesiology.

Antirequisite(s): Credit for Kinesiology 323 and any of Biology 305, Medical Science 404, Zoology 269, 461, or 463 will not be allowed.

Kinesiology 330 **3 units; (2-2)**

Flexibility and Relaxation Techniques

Study of joint flexibility, relaxation techniques, and stress management and their importance to physical fitness, human performance, wellness, and health.

Prerequisite(s): Kinesiology 260 or Zoology 269.

Kinesiology 331 **3 units; (3-0)**

Foundations of Coaching

The fundamental principles of creating an effective training environment for the developing athlete.

Prerequisite(s): Kinesiology 201.

Kinesiology 335 **3 units; (2-2)**

Active Living Outdoors

Emphasizing a "fit-for-life" philosophy, this course explores the health providing benefits of selected self-propelled outdoor activities. Students are required to participate in activity experiences on campus.

Prerequisite(s): Kinesiology 203.

Note: Students may incur additional costs for equipment rental.

Kinesiology 339 **3 units; (3-0)**

Natural Environments, Wellness, and Health

An exploration of how physical activity in natural, outdoor environments leads to enhanced physical fitness, wellness, and health. Safe practices in these environments will be examined in conjunction with practices that help maintain the ecological integrity of natural and wild environments.

Prerequisite(s): Kinesiology 201.

Kinesiology 343 **3 units; (3-0)**

Canadian Sport History

The sources and development of sporting activity in Canadian society.

Prerequisite(s): One of Kinesiology 244, 245 or 303.44.

Kinesiology 344 **3 units; (3-0)**

Gender, Sexuality, and Sport

Informed by feminist theoretical perspectives, exploring the different ways that sport functions to reproduce and challenge dominant ideas about gender and sexuality.

Prerequisite(s): One of Kinesiology 244, 245 or 303.44 and admission to the Faculty of Kinesiology.

Kinesiology 351 **3 units; (3-0)**

Foundations of Neural Control of Movement

An examination of the nervous system and its role in controlling movement. Emphasis is placed on understanding the basic anatomy and neurophysiology of the central and peripheral nervous systems. Topics include the properties of individual neurons and neural circuits that support human movement. This basic understanding is supplemented by discussion of neurological injuries, diseases and disorders that compromise human movement.

Prerequisite(s): Kinesiology 251 and 260.

Kinesiology 355 **3 units; (3-0)**

Human Growth and Development

The physiological, anatomical, emotional and social changes in human growth and development, with a view to the planning and selection of appropriate programs in physical education, sport, and dance.

Prerequisite(s): Kinesiology 260.

Corequisite(s): Prerequisite or Corequisite: Kinesiology 323.

Kinesiology 363 **3 units; (3-1/4)**

Biomechanics of Biological Materials

Functional characteristics of muscle, bone, cartilage, tendon, ligament, and joints as they relate to movement and loading of the locomotor system.

Prerequisite(s): Kinesiology 263 and Statistics 205 or 213.

Kinesiology 365 **3 units; (3-0)**

Sensorimotor Neuroscience

An examination of how human movement is coordinated by the nervous system, beginning with a review of relevant neuroanatomy and neurophysiology. An emphasis is placed on contemporary scientific techniques throughout.

Prerequisite(s): Kinesiology 251 and 260.

Antirequisite(s): Credit for Kinesiology 365 and 503.44 will not be allowed.

Kinesiology 367 **3 units; (2-1T-1)**

Adapted Physical Activity

An examination of specific problems within the psychomotor domain and the related delivery systems for their identification and amelioration.

Prerequisite(s): Kinesiology 260.

Note: Laboratory consists of a required practicum.

Kinesiology 369 **3 units; (3-0)**

Physical Activity, Health, and Aging

Aging and its impact on neuromotor performance, fitness, health, and patterns of participation in physical activity and recreational pursuits.

Corequisite(s): Prerequisite or Corequisite: Kinesiology 355.

Kinesiology 371 **3 units; (3-2)**

Scientific Basis of Prevention and Care of Athletic Injuries

Responsibilities of physical educators with respect to their role in the prevention and care of athletic injuries.

Prerequisite(s): Kinesiology 260 and admission to the Faculty of Kinesiology.

Antirequisite(s): Credit for Kinesiology 371 and 372 will not be allowed.

Kinesiology 372 **3 units; (3-1/3)**

Foundations of Sport Medicine

An introduction to the common medical issues and injuries that affects the athlete related to sport and exercise.

Prerequisite(s): Kinesiology 260 and admission to the Faculty of Kinesiology.

Antirequisite(s): Credit for Kinesiology 372 and 371 will not be allowed.

Kinesiology 373 **3 units; (3-3)**
(formerly Kinesiology 473)

Exercise Physiology

The physiology of muscular exercise, physical conditioning, and training. The course will cover aspects of the nervous, muscular, cardiovascular, and respiratory systems and also present the material in the context of the effects of exercise on an integrated system. Short- and long-term adaptations to exercise will be examined relative to health and human activity.

Prerequisite(s): Kinesiology 203, 213, 323 and admission to the Faculty of Kinesiology.

Note: Students are responsible for completing a Get Active Questionnaire (GAQ – formerly PAR-Q) and obtaining a medical clearance if required.

Kinesiology 375 **3 units; (2-2/2)**

Tests and Measurements in Kinesiology

Establishment of tests, criteria for selection of tests, measurement devices used to evaluate physiological status, human growth, and skill levels in physical activity programs.

Prerequisite(s): Kinesiology 203 and 213 and admission to the Faculty of Kinesiology.

Note: Students are responsible for completing a Get Active Questionnaire (GAQ – formerly PAR-Q) and obtain medical clearance if required.

Kinesiology 377 **3 units; (3-0)**

Sport Injury Prevention

Concepts of sport injury prevention, basic research design and methods used in prevention research, multifactorial nature of sport injury and development and plan to apply the fundamentals of sport injury including primary, secondary and tertiary prevention.

Prerequisite(s): Kinesiology 371 or 372.

Antirequisite(s): Credit for Kinesiology 377 and 503.55 will not be allowed.

Kinesiology 381 **3 units; (2-2)**

Computer Applications in Kinesiology

An introduction to the use of the computer in kinesiology which involves hands-on experiences with selected software packages.

Kinesiology 391 **3 units; (1-3)**

Practicum I

Practical experiences with children and youth in instructional programs of physical activity.

Prerequisite(s): Kinesiology 321 and admission to the Leadership in Pedagogy and Coaching program.

Note: Students must consult with the Leadership in Pedagogy and Coaching Co-ordinator in order to obtain required documentation to comply with the legal requirements for placement in schools.

NOT INCLUDED IN GPA

Kinesiology 393 **1.5 units; (2-2)**

Research Seminar I

Students attend, discuss, and critique a series of research seminars in the Human Performance Laboratory.

Prerequisite(s): Kinesiology 213 and 263 and admission to the Faculty of Kinesiology.

NOT INCLUDED IN GPA

Kinesiology 395 **1.5 units; (2-2)**

Research Seminar II

Students attend, discuss, and critique a series of research seminars in the Human Performance Laboratory.

Prerequisite(s): Kinesiology 393.

NOT INCLUDED IN GPA

Kinesiology 397 **3 units; (3-0)**

Health and Exercise Psychology

An examination of psychological issues related to health, exercise, and physical activity.

Prerequisite(s): Kinesiology 253.

Kinesiology 399 **3 units; (3-0)**

Sport Psychology

An analysis of personality and social psychological variables affecting the athlete/coach in the context of sport.

Prerequisite(s): Kinesiology 253.

Kinesiology 403 **3 units; (3-0)**

Health Promotion

Exploration of the relationships between health, disease, and the benefits associated with physical activity and the various factors that can promote and maintain healthy lifestyle change.

Prerequisite(s): Kinesiology 321 and admission to the Leadership in Pedagogy and Coaching program.

Kinesiology 413 **3 units; (3-0)**

Motivation in Physical Activity, Exercise and Sport

Concepts related to motivation in physical activity, sport, and exercise settings. Antecedents, consequences, and processes of motivated behaviour are examined from theoretical, empirical, and applied perspectives.

Prerequisite(s): Kinesiology 397 or 399.

Antirequisite(s): Credit for Kinesiology 413 and 503.41 will not be allowed.

Kinesiology 420 **15 units**

Work Term in Kinesiology

Extensive unpaid work term focused on experiential learning in the field of kinesiology. Students must spend a total of 35-40 hours per week for 12-13 weeks in a workplace setting.

Prerequisite(s): 84 units and consent of the Faculty.

Note: This course carries a weight of 15 units.

NOT INCLUDED IN GPA

Kinesiology 431 **3 units; (2-2)**

The Art of Coaching

Advanced principles of the art of effective coaching.

Prerequisite(s): Kinesiology 331 and admission to the Leadership in Pedagogy and Coaching program.

Kinesiology 433 **3 units; (3-0)**

Health and Physical Activity

Exploration of the relationships between health, disease, and the benefits associated with physical activity and the various factors that can promote and maintain lifestyle change. Students will be required to complete a personal health report based on the following laboratory components: (1) blood lipid profile (a fasting blood draw), (2) nutritional record (dietary record analyzed), (3) health risk analysis (an online risk assessment) and risk factor concept (summary 1 - 3 with the inclusion of family/genetic background).

Prerequisite(s): Kinesiology 323.

Kinesiology 435 **3 units; (3-0)**

Volleyball Coaching Theory

Prerequisite(s): Kinesiology 331 and consent of the Faculty.

Kinesiology 437 **3 units; (3-0)**

Advanced Nutrition

An examination of current nutritional strategies for sport performance and diet-related chronic diseases. Critical analysis of a wide variety of dietary supplements will be included.

Prerequisite(s): Kinesiology 237 and 373.

Kinesiology 441 **3 units; (0-4)**

Practicum A

Unpaid practicum placement focused on experiential learning in the field of kinesiology. Students are required to complete 60 to 72 hours

in a workplace setting, distributed evenly over the duration of the term.

Prerequisite(s): 60 units, admission to and consent of the Faculty of Kinesiology.

NOT INCLUDED IN GPA

Kinesiology 443 3 units; (0-4)

Practicum B

Practicum placement in kinesiology or related field.

Prerequisite(s): Kinesiology 441 and consent of the Faculty.

NOT INCLUDED IN GPA

Kinesiology 444 3 units; (3-0)

Critical Perspectives on the Body

Critical considerations of the relationship between the body and historical, cultural, and political context.

Prerequisite(s): Kinesiology 344.

Kinesiology 445 3 units; (0-4)

Practicum C

Practicum placement in kinesiology or related field.

Prerequisite(s): Kinesiology 443 and consent of the Faculty.

NOT INCLUDED IN GPA

Kinesiology 451 3 units; (3-0)

Advanced Topics in Human Motor Control and Learning

A comprehensive examination of the nervous system and its role in learning and controlling movements. Topics include the properties of individual neurons and neural circuits and how their function is altered by motor learning. The course also covers contemporary methods and theories used to understand how humans learn and perform motor actions.

Prerequisite(s): Kinesiology 351.

Kinesiology 460 3 units; (0-2-2T)

Laboratory Practicum: Anatomy

Detailed planning and anatomical dissection of human cadavers.

Prerequisite(s): Kinesiology 260, admission to and consent of the Faculty of Kinesiology.

Antirequisite(s): Credit for Kinesiology 460 and 593.61 will not be allowed.

NOT INCLUDED IN GPA

Kinesiology 463 3 units; (3-1)

Advanced Techniques in Biomechanics

Exploring basic concepts of analysis and modelling in biomechanics, including numerical implementation and solution.

Prerequisite(s): Kinesiology 363 and admission to the Faculty of Kinesiology.

Kinesiology 465 3 units; (3-0)

Adaptation to Environmental Stress

Physiological effects of temperature and humidity fluctuations; principles of heat generation, conservation and transfer; acute and chronic effects of hypo and hyperbarometric pressures; special dietary considerations; and associated physio-psychological implications will be examined.

Corequisite(s): Prerequisite or Corequisite: Kinesiology 323.

Kinesiology 466 6 units; (0-6)

Biomechanics Research Project

A capstone course where students assimilate their knowledge by designing and conducting a biomechanics research project.

Prerequisite(s): Kinesiology 363 and 393 and admission to the Biomechanics major.

Corequisite(s): Prerequisites or Corequisites: Kinesiology 395 and 463.

Kinesiology 469 3 units; (3S-0)

Topics in Sport Medicine

An examination of current medical topics in sport medicine as they relate to the athlete. The topics will include common medical problems and drugs in sport.

Prerequisite(s): Kinesiology 323 and one of 371 or 372.

Kinesiology 475 3 units; (3-0)

Physiology of Athletic Performance

The physiological factors and principles of training affecting performance will be reviewed and challenged on the scientific basis of experimental evidence.

Prerequisite(s): Kinesiology 373.

Kinesiology 479 3 units; (3-3)

Advanced Fitness Appraisal and Exercise Prescription

Advanced knowledge and skills necessary to assess physical fitness status of apparently healthy individuals, including cardiorespiratory fitness, muscular strength and endurance, body composition, and flexibility. Interpretation of fitness test results, development of appropriate exercise prescriptions, and communication skills necessary for effective counselling.

Prerequisite(s): Kinesiology 373 and consent of the Faculty.

Note: Students are responsible for completing a Get Active Questionnaire (GAQ – formerly PAR-Q) and obtain medical clearance if required.

Kinesiology 485 3 units; (3-0)

Skeletal Muscle Properties

The structural organization, neural control, contractile consequences, and determinants of energy cost of contraction of skeletal muscle will be studied in detail.

Prerequisite(s): Kinesiology 373.

Kinesiology 487 3 units; (3-0)

The Olympic Games

A critical analysis of the modern Olympic Games.

Kinesiology 490 6 units; (3-0)

Interpretation of Research and Research Project

Instruction in critical enquiry, critical appraisal, research design, and includes the successful completion of an independent research project in publication format.

Prerequisite(s): Statistics 205 or 213, admission to the Kinesiology Honours program and consent of the Faculty.

Kinesiology 491 3 units; (1-3)

Practicum II

Additional practical experiences with children and youth in instructional programs of physical activity.

Prerequisite(s): Kinesiology 391 and admission to the Leadership in Pedagogy and Coaching program and consent of Pedagogy Co-ordinator.

Note: Students must consult with the Leadership in Pedagogy and Coaching Co-ordinator in order to obtain required documentation to comply with the legal requirements for placement in schools.

NOT INCLUDED IN GPA

Kinesiology 493 3 units; (3-0)

Epidemiology of Health and Physical Activity

An examination of physical activity/disease relationships through application of population-based methods including research design and interpretation of studies. The content will assist the student in identifying the quality and extent of research supporting the relationships between health, disease, and habitual physical activity and fitness.

Prerequisite(s): Kinesiology 433 and 373.

Kinesiology 495 3 units; (3-0)

Physiological Aspects of Aging, Disease, and Physical Activity

An examination of the interaction between aging, age-associated disease (e.g., cardiovascular disease) and physical activity. The major emphasis will be on the physiological processes involved.

Prerequisite(s): Kinesiology 355 and 373.

Kinesiology 497 3 units; (3-0)

Cancer and Exercise Research and Reviews

Examination of current literature and issues in cancer and exercise research.

Prerequisite(s): Kinesiology 397.

Antirequisite(s): Credit for Kinesiology 497 and 503.07 will not be allowed.

Kinesiology 499 3 units; (3-0)

Applied Sport Psychology

Focus on applied sport psychology techniques and strategies to optimize performance, with the intent to bridge sport psychology related research with professional practice.

Prerequisite(s): Kinesiology 399.

Kinesiology 503 3 units; (3-0)

Special Topics in Kinesiology

An examination of selected special topics in kinesiology and related subjects.

Prerequisite(s): Admission to and consent of the Faculty of Kinesiology.

MAY BE REPEATED FOR CREDIT

Kinesiology 504 3 units; (0-3)

Directed Study

Intensive self-directed study of selected topics in Kinesiology.

Prerequisite(s): Admission to and consent of the Faculty of Kinesiology.

MAY BE REPEATED FOR CREDIT

Kinesiology 569 3 units; (3-1)

Rehabilitation Through Recreational Activities

Issues of planning and implementing recreation, health, and wellness programs for persons with

disability including advocacy, planning principles, creativity, learning techniques, and teamwork.

Prerequisite(s): Kinesiology 367 or admission to the BCR program.

Kinesiology 593 **3 units; (0-4)**

Senior Practicum

An opportunity for students to gain personalized, applied research and/or work experience in kinesiology or related fields.

Prerequisite(s): Admission to and consent of the Faculty of Kinesiology.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Graduate Courses

Kinesiology 603 **3 units; (3-0)**

Special Topics

Intensive study of selected topics in human physical activity and related subjects as follows: Applied Sport Psychology; Biomechanics; Cognitive Science: Vision and Motor Behaviour; Exercise and Health Physiology; Health and Exercise Psychology; Motor Learning; Multi-Media Applications in Learning; Neuro-Motor Psychology; Nutrition, Metabolism and Genetics; Sport and Exercise Psychology; Sport History; Sport Medicine; Sport Sociology.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

MAY BE REPEATED FOR CREDIT

Kinesiology 604 **3 units; (0-3)**

Directed Study

Intensive self-directed study of selected topics in Kinesiology.

Prerequisite(s): Admission to and consent of the Kinesiology graduate program.

MAY BE REPEATED FOR CREDIT

Kinesiology 605 **1.5 units; (2S-0)**

Nutrition for Performance and Active Living

Nutritional requirements for sport performance and active living, including an overview of basic nutritional principles. Designed to use current research findings as a basis to examine the role of nutrition in sport performance. Nutrition for an active lifestyle will also be examined.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Kinesiology 606 **6 units; (3T-3)**

Practical Skills for Applied Exercise Physiology

To develop practical skill and techniques associated with applied exercise physiological measurement vs. measurements in the areas of body composition, cardiorespiratory and musculoskeletal fitness.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Kinesiology 609 **3 units; (3-1T)**

Statistical Techniques in Kinesiology

Basic concepts of statistical analysis as they apply to research methods used in various disciplines in kinesiology.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Antirequisite(s): Credit for Kinesiology 609 and 603.84 will not be allowed.

Kinesiology 610 **3 units; (3-0)**

Qualitative Research Analysis

An introduction to qualitative research. Emphasis will be placed on critically evaluating qualitative literature, designing and conducting qualitative research, and qualitative analysis.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Antirequisite(s): Credit for Kinesiology 610 and 603.39 will not be allowed.

Kinesiology 611 **3 units; (3-0)**

Research Methods in Kinesiology

An overview of research methods including study design, data collection, measurement, interpretation of data, scientific writing, and critical appraisal of the literature relevant to kinesiology.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Kinesiology 615 **1.5 units; (2S-0)**

Seminar in Applied Exercise Physiology I

Lectures and seminar presentations, discussion and critique of current research in applied exercise physiology and related subjects.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

NOT INCLUDED IN GPA

Kinesiology 617 **1.5 units; (2S-0)**

Seminar in Applied Exercise Physiology II

Lectures and seminar presentations, discussion and critique of current research in applied exercise physiology and related subjects. Focus on chronic disease.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

NOT INCLUDED IN GPA

Kinesiology 637 **3 units; (3-0)**

Nutrition for Physically Active Populations

The nutritional requirements of specific athletic and/or physically active groups such as cardiac rehabilitation patients and child athletes.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Kinesiology 663 **3 units; (3-0)**
(Mechanical Engineering 663) (Medical Science 663)

Advanced Muscle Mechanics and Physiology

A look at problems associated within muscle mechanics and contractility. Also the use of muscle mechanics as a scientific discipline to critically learn and evaluate the scientific process. Basic anatomy and physiology of muscle contraction including the cross-bridge theory, and the force-length, force-velocity and force-time relationships of actively and passively contracting muscles will also be covered.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Kinesiology 664 **3 units; (3-0)**

Bone and Joint Biomechanics

An examination of bone and joint biomechanics as they relate to bone fracture, joint injuries, and diseases with an emphasis on osteoarthritis. Basic bone, ligament, cartilage, and muscle structure and function will be discussed in the context of

healthy tissues and in aging, disease, and post-trauma. Animal models of disease are explored.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Antirequisite(s): Credit for Kinesiology 664 and 603.22 will not be allowed.

Kinesiology 673 **3 units; (3-3)**

Exercise Physiology

Topics in exercise physiology will include the effects of exercise on muscle, metabolism, hormones, respiration, and the cardiovascular system. Nutrition, body composition, ergogenic aids, and environmental factors will also be examined.

Prerequisite(s): Kinesiology 373 and admission to a Graduate Program in Kinesiology.

Kinesiology 691 **3 units; (1T-8)**
(formerly Kinesiology 690)

Practicum I

The practicum will consist of multiple experiences in applied physiology environments.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

NOT INCLUDED IN GPA

Kinesiology 692 **3 units; (1T-8)**
(formerly Kinesiology 690)

Practicum II

The practicum will consist of multiple experiences in applied physiology environments.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

NOT INCLUDED IN GPA

Kinesiology 697 **1.5 units; (2S-0)**

Exercise and Sport Psychology

Addresses the determinants and consequences of exercise and sport engagement within clinical and athletic populations. The focus will be on the translation of research to practice, with hands-on skills and effective practice guidelines shared with the students.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Kinesiology 703 **3 units; (3-0)**

Special Topics

Intensive study of selected topics in Kinesiology as follows: Applied Sport Psychology; Biomechanics; Exercise and Health Physiology; Health and Exercise Psychology; Motor Learning; Multi-Media Applications in Learning; Neuro-Motor Psychology; Nutrition, Metabolism and Genetics; Physiology of Skeletal Muscle; Sport and Exercise Psychology; Sport History; Sport Medicine; Sport Sociology.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

MAY BE REPEATED FOR CREDIT

Kinesiology 704 **3 units; (0-3)**

Directed Study

Intensive self-directed study of selected topics in Kinesiology.

Prerequisite(s): Admission to a Graduate Program in the Faculty of Kinesiology and consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Kinesiology 715 1.5 units; (2S-0)

Seminar in Applied Exercise Physiology III

An advanced level of presentation and critical appraisal of research in applied physiology. Students will assume a leadership role in a seminar setting.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

NOT INCLUDED IN GPA

Kinesiology 717 1.5 units; (2S-0)

Seminar in Applied Exercise Physiology IV

An advanced level of presentation and critical appraisal of research in applied physiology. Students will assume a leadership role in a seminar setting.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

NOT INCLUDED IN GPA

Kinesiology 773 3 units; (3-3)

Integrative Exercise Physiology

The effects of exercise on the complex physiological interactions between different systems in the human body.

Prerequisite(s): Kinesiology 673 and admission to a Graduate Program in Kinesiology.

Kinesiology 775 3 units; (3-3)

Clinical Exercise Physiology

Exercise for clinical populations: exercise assessment and prescription for disease modification.

Prerequisite(s): Kinesiology 773 and admission to a Graduate Program in Kinesiology.

Kinesiology 785 3 units; (3-3)

Training Strategies for Health and Sport

The science of improving health and athletic performance with appropriate periodized stress and recovery.

Prerequisite(s): Kinesiology 773 and admission to a Graduate Program in Kinesiology.

Language LANG

For more information about these courses, see the School of Languages, Linguistics, Literatures and Cultures website: slllc.ucalgary.ca/.

Language 200 3 units; (3-0)

Introduction to Second Language Learning

Introduction to the process of language learning with a focus on the development of learning strategies. Specific examples will be drawn from ancient and modern languages offered at the University of Calgary.

Senior Course

Language 300 3 units; (3-0)

Introduction to Translation Studies

Basics of translation theory and practice for students with sufficient second language background. Establishes a common critical vocabulary to discuss issues in translation.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: This course is intended for students with intermediate proficiency in the target language.

Language 400 3 units; (3-0)

Advanced Translation Studies

An in-depth study of the field of translation with a focus on the notions of aesthetics, comparative stylistics, grammar, and literary forms. The applied focus of the course will be on a high-quality translation along with a critical reflection on its production.

Prerequisite(s): Language 300.

Language 451 3 units; (3-0)

Cross-Cultural and Cross-Linguistic Explorations

Cross-cultural and cross-linguistic comparisons of events, cultural patterns or phenomena, historical periods, or social movements with parallels in multi-cultural traditions.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Language 500 3 units; (3-0)

Cross-Cultural and Cross-Linguistic Research Projects

Cross-linguistic and -cultural analysis through group projects focusing on case studies.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Language 599 3 units; (3-0)

Topics in the Study of Language

Topics will reflect developments in current research in second language acquisition and learning.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Language 605 3 units; (3-0)

Second Language Learning and Pedagogy

Theoretical and practical overview of the processes involved in acquiring a second language, with a focus on naturalistic language acquisition and on classroom strategies and classroom language learning.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Language 615 3 units; (3-0)

Second Language Learning and Technology

Theoretical and practical aspects of incorporating technology into the language classroom. A general overview in the context of theories of second language acquisition of using the web, electronic mail, online chat discussion, and videoconferencing as tools in language teaching/learning; students will also learn to create their own websites and web activities for teaching.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Language 625 3 units; (3-0)

Second Language Learning and Cultural Understanding

An introduction to the interdisciplinary nature of "culture" as it pertains to second language teaching and learning.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Language 699 3 units; (3-0)

Research Seminar in Second Language Learning

Centred round a professor's current research project, the course will engage students as members of a collaborative research team that will serve as a practical exposure to research methods in the area of second language learning and acquisition.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

MAY BE REPEATED FOR CREDIT

Languages, Literatures and Cultures LLAC

For more information about these courses, see the School of Languages, Linguistics, Literatures and Cultures website: slllc.ucalgary.ca/.

Languages, Literatures and Cultures 600 3 units; (3-0)

Introduction to Graduate Studies in Languages, Literatures and Cultures

An introduction to research and professional skills. Students will learn about and apply skills in research information sources, including the library; source citation; grant and conference proposal writing; presenting research in a range of venues; and preparing for a diversified job market.

Prerequisite(s): Admission to the LLAC graduate program.

NOT INCLUDED IN GPA

Languages, Literatures and Cultures 601 3 units; (3-0)

Additional Language Pedagogy

An introduction to the field of second language teaching and learning with a historical overview of the field. Presents concepts from the related fields of applied linguistics, psychology and education. Students will have the opportunity to observe university language courses, analyze language textbooks, and develop a statement of teaching philosophy.

Prerequisite(s): Admission to the LLAC graduate program.

Languages, Literatures and Cultures 602 3 units; (3-0)

Research Methods in Applied Linguistics

An overview of theory and research methods with a focus on empirical research in the field of applied linguistics. Students will read and critique recent studies, develop research questions, and explore ways in which to answer their questions.

Prerequisite(s): Admission to the LLAC graduate program.

Languages, Literatures and Cultures 603 3 units; (3-0)

Theory and Methods of Literary and Cultural Studies

Examines theories and approaches in literary, cultural and film criticism. Students will develop research questions and explore ways in which to answer these questions as they relate to cultural artefacts (literary and filmic) in languages other than English.

Prerequisite(s): Admission to the LLAC graduate program.

Languages, Literatures and Cultures 612

3 units; (3-0)

Topics in Applied Linguistics

An introduction to research in a specific area of applied linguistics.

Prerequisite(s): Admission to the LLAC graduate program.

MAY BE REPEATED FOR CREDIT

Languages, Literatures and Cultures 614

3 units; (3-0)

Topics in Transcultural Studies

An introduction to research in a specific area of transcultural studies.

Prerequisite(s): Admission to the LLAC graduate program.

MAY BE REPEATED FOR CREDIT

Latin LATI

For more information about these courses, see the Department of Classics and Religion website: <https://clare.ucalgary.ca/>.

Note: For courses in Latin Literature in translation, Roman History, Art, Archaeology, etc., see Greek and Roman Studies.

Note on Sequence and Prerequisites: The normal sequence is Latin 201, 203, 301, 303, 401 and/or 403, 551. Latin 205, 207 are alternatives to Latin 201, 203, and are designed primarily for Science and Engineering students.

Junior Courses

Latin 201

3 units; (3-1T)

Latin I

This course for beginners provides the first steps towards reading Latin texts.

Latin 203

3 units; (3-1T)

Latin II

Continuation of Latin 201.

Prerequisite(s): Latin 201 or 205.

Latin 205

3 units; (4-0)

The Latin of Science I

An introduction to Latin through ancient, medieval and modern scientific texts, designed for students in the Sciences and Engineering.

Note: Credit for Latin 205 and 201 will not be allowed.

Latin 207

3 units; (4-0)

The Latin of Science II

Continuation of Latin 205.

Prerequisite(s): Latin 205 or 201.

Note: Credit for Latin 207 and 203 will not be allowed.

Senior Courses

Latin 301

3 units; (3-0)

Latin III

Completes the study of basic grammar, vocabulary and translation skills.

Prerequisite(s): Latin 203 or 207.

Latin 303

3 units; (3-0)

Intermediate Readings in Classical and Post-Classical Texts

Prerequisite(s): Latin 301.

Latin 401

3 units; (3-0)

Readings in Latin Prose

Readings will normally be selected according to genres, such as Historiography, Oratory, Philosophic and Didactic Prose, the Novel, Epigraphy.

Prerequisite(s): Latin 303.

MAY BE REPEATED FOR CREDIT

Latin 403

3 units; (3-0)

Readings in Latin Poetry

Readings will normally be selected according to genres, such as Epic, Drama, Lyric, and Satire.

Prerequisite(s): Latin 303.

MAY BE REPEATED FOR CREDIT

Latin 551

3 units; (0-2T)

Directed Studies in Latin

Readings may be selected from any genre of Latin at an advanced level.

Prerequisite(s): Consent of the Department.

Note: Students in Greek and Roman Studies or Ancient and Medieval History are encouraged to pursue areas such as paleography, epigraphy, and Christian texts.

MAY BE REPEATED FOR CREDIT

Graduate Course

Latin 601

3 units; (3S-0)

Graduate Seminar

MAY BE REPEATED FOR CREDIT

Latin 602

3 units; (4-1)

Introductory Language Class for Graduate Students

Introduction to grammar, vocabulary and translation skills.

MAY BE REPEATED FOR CREDIT

Latin 604

3 units; (3-0)

Intermediate Language Class for Graduate Students

Consolidation of grammar, vocabulary and translation skills.

MAY BE REPEATED FOR CREDIT

Latin 607

1.5 units; (0-1T)

Directed Studies

MAY BE REPEATED FOR CREDIT

Latin American Studies LAST

For more information about these courses, see the Department of History website: hist.ucalgary.ca/.

Junior Courses

Latin American Studies 211

3 units; (3-0)

Latin America: People, Places and Popular Culture

An introduction to Latin America, one of the most diverse and dynamic regions in the world. What is the origin of this diversity? How does this diversity manifest itself in today's places and cultures? An interdisciplinary approach is taken to answering these questions, as the course material integrates archaeology, history, political science, economics, geography, anthropology, and cultural studies to introduce students to the region.

Antirequisite(s): Credit for Latin American Studies 211 and 201 will not be allowed.

Senior Courses

Latin American Studies 301

3 units; (0-3)

Field Study in Latin America

An experiential learning course, designed to provide a framework for the student's empirical learning experience during the Latin American Studies Field School. Provides a forum for the sharing of cross-cultural experiences among the students, as they analyze and reflect on the realities of life in Latin America. Students will be expected to live with a local family during the Field School, to take an active part in discussions, and to participate in events and field trips.

Prerequisite(s): Consent of the Program Co-ordinator.

Note: Normally offered during the Spring or Summer Intersession.

NOT INCLUDED IN GPA

Latin American Studies 303

3 units; (3-0)

Latin American Field Research

In a Latin American field setting, this course guides students in integrating their own observations and experiences with scholarly readings on themes of relevance and importance to the particular setting. Attention is paid to the archaeological and historical contexts as well as present day economic, political, and social issues of Latin America. The regional and theoretical focus of the material will vary according to the location at which the course is given.

Prerequisite(s): Consent of the Program Co-ordinator.

Note: Normally offered during the Spring or Summer Intersession.

Latin American Studies 311

3 units; (3-0)

Critical Contemporary Issues in Latin America

An analysis of critical issues that provides students with a framework for understanding Latin America today. Examines themes of contemporary importance, which may include human rights, indigenous issues, energy, the environment, democratization, poverty and inequality, social movements, migration, and the region's relationship with the United States.

Antirequisite(s): Credit for Latin American Studies 311 and 203 will not be allowed.

Latin American Studies 401

3 units; (3S-0)

Integrative Seminar in Latin American Studies

An advanced seminar involving research on a special Latin American topic integrating a variety of disciplinary and interdisciplinary perspectives (e.g. political science, anthropology, geography, cultural studies).

Prerequisite(s): Latin American Studies 201 or 211; and 203 or 311, and 48 units.

MAY BE REPEATED FOR CREDIT

Latin American Studies 501

3 units; (3-0)

Directed Study in Latin American Studies

Students devise a research question and carry out a program of independent research with a specialist on a topic in the area of Latin American Studies.

Prerequisite(s): 48 units and consent of the Program Co-ordinator.

Note: Students must contact the Program Co-ordinator well in advance of the first day of classes to arrange an independent study course.

MAY BE REPEATED FOR CREDIT

Law LAW

For more information on course descriptions, consult the Faculty of Law's website at law.ucalgary.ca/.

First Year Curriculum

All courses are compulsory.

Law 400 5 units; (3-0)**Constitutional Law**

The basic elements of Canadian constitutional law. The nature of constitutions and constitutional processes; principles of constitutional interpretation; constitutional amendment; Federal-Provincial distribution of legislative powers including the federal general power, natural resources and public property, provincial property and civil rights, trade and commerce, provincial taxation, transportation, communications, and criminal law; the Canadian Charter of Rights and Freedoms including principles of limitation, remedies, interpretation, application, fundamental freedoms, democratic and language rights, mobility rights, legal rights, equality rights, and aboriginal people's rights.

Law 402 5 units; (3-0)**Contracts**

A legal and policy analysis of the basic principles and fundamental concepts of the law of contracts as they relate to commercial and consumer transactions. The formation of contracts including offer and acceptance, and consideration; estoppel; privity; terms of contract, including exemption clauses; standard form contracts; bailment; mistake, misrepresentation and unconscionability; termination, including the doctrine of frustration; breach and remedies for breach; dispute resolution processes. Emphasis is placed not only on a knowledge of rules and principles, their historical derivation, rationale, efficacy and social validity, but also upon their creative use to both avoid and resolve disputes.

Law 403 3 units; (3-0)**Legislation**

The fundamentals of the legislative process: policy development, legislative drafting, public bill processes, statutory interpretation. The interaction of law and policy in the development of legislation and statutory interpretation. Substantive law connections are made with other first year courses. The functions of the lawyer within these processes are examined, including issues of professional responsibility. The course is taught through performance-based learning methods with emphasis on drafting.

Law 404 5 units; (3-0)**Property**

An examination of the fundamental concepts of property law and the types of property interests recognized by Anglo-Canadian law. The historical evolution of property concepts; the basic concepts of possession, ownership and title; estates and other interests in land such as joint and concurrent ownership, easements, covenants, licences, mortgages, future interests and perpetuities; the landlord and tenant relationship; the land titles system of registration of title to land; the social constraints upon property use and disposition; and property rights of aboriginal peoples.

Law 406 5 units; (3-0)**Torts**

An analysis and critique of the law of torts, primarily the law of negligence, with personal injury as the main focus, although other torts will

also be introduced. The nature of tort law and its process; an anatomy of the law of negligence - the nature and extent of liability, defences, remedies, and the assessment of damages; intentional torts; economic torts; strict liability; bailment; the impact of private insurance on the tort system; alternative forms of compensation.

Law 407 4 units; (3-0)**Foundations in Law and Justice I**

An introduction to: legal methods, systems and institutions; sources of law; legal and judicial reasoning; legal analysis, including case analysis and problem-solving skills; critical perspectives on the law, including legal theory and history; the role of the lawyer in system(s) of laws; access to justice. The course is taught on an intensive basis in the first three weeks of law school to provide students with foundational analytical and critical skills for the subsequent curriculum, and using performance-based learning methods.

Note: This course is graded CR, D or F.

Law 408 4 units; (3-0)**Foundations in Law and Justice II**

The fundamentals of legal research, writing, communication and advocacy, including: developing research strategies; identification and assessment of legal and non-legal information appropriate to a legal problem or issue; drafting of memorandum and/or facta; oral advocacy, including mootings; legal communication, including client interviewing and counselling. This course is taught on an intensive basis in the first three weeks of Winter Term using performance-based learning methods.

Law 410 5 units; (3-0)**Crime: Law and Procedure**

An anatomy of criminal conduct and the law's treatment of it utilizing a limited range of criminal offences. The designation of human conduct as criminal and a consideration of the social, cultural and political forces involved; the development of the criminal process in English common law, its translation to Canada and embodiment in the Criminal Code; the substantive elements of a criminal offence including both the physical and mental elements; the common law and code defences; procedural, tactical, ethical and evidential problems associated with criminal prosecution at both the pre-trial and trial stages; the sentencing process; the position at law of the victim.

Second and Third Year Curricula

Full-time students must take a minimum of 31 units to a maximum of 36 in each of their second and third years, including a minimum of 12 units to a maximum of 18 per session.

500-Level Courses**Law 503 3 units; (3-0)****Administrative Law**

This course introduces students to the general structure of administrative decision-making in Canada: how public administrators obtain power and how that power is exercised both at the level of individual adjudication and at the level of the establishment of public policy. It also introduces students to the checks which courts place on the exercise of administrative power. The course discusses the procedures that courts require of administrative agencies and public officials as well as the substantive grounds on which courts may review the decisions of administrative agencies and public officials.

Law 505 3 units; (3-0)**Civil Procedure**

A detailed examination of issues which arise in the progress of a civil action from first meeting the client through to judgment in the Alberta Court of Queen's Bench. The Alberta Rules of Court are set in the context of the values underlying them. What sort of civil litigation system do we want? What sort of system do we in fact have? Particular attention is paid to the linkages between the apparently discrete components of the process as set out in the Rules, linkages at the levels of both the underlying values and of actual practice. The use of procedures under the Rules to anticipate and resolve evidence problems that might arise at trial is stressed. Interprovincial and international aspect of the civil litigation process are also considered.

Law 507 3 units; (3-0)**Evidence**

An examination of the fundamental concept of evidence law, including the traditional rules as compared to the emerging principled approach, and such core and primary topics as: the adversary system; relevance and discretionary exclusion; privilege; burdens of proof; character evidence; judicial notice; competence and compellability; examination of witnesses; hearsay; opinion evidence.

Law 508 4 units; (3-0)**Negotiation**

Instruction in dispute resolution theory and practice with a focus on negotiation, mediation and topics such as collaborative law and judicial dispute resolution, and application of those processes to a substantive area of law. Taught in a three week intensive format through performance-based learning methods. Evaluation will include a mock negotiation and written exercises such as the preparation of a client-advising memo in the substantive area.

Note: This course is graded CR, D or F.

MAY BE REPEATED FOR CREDIT**Law 509 3 units; (3-0)****Business Associations**

The common forms of business organization, including the law of agency, partnerships, limited partnerships, and societies and corporations, with a focus on the corporation and the rights and responsibilities of shareholders and directors. Topics will include fiduciary relationships in a commercial context.

Law 510 3 units; (3-0)**Ethical Lawyering**

An introduction to issues of legal ethics and professional responsibility. Students should become competent at ethical reasoning in the context of legal practice. To achieve this goal the course covers selected topic in the "law of lawyering" (e.g. the Law Society of Alberta's Code of Professional Conduct) but also address the general question of what it means to be an ethical lawyer. Students are expected to develop their awareness of the various moral values underlying the legal system, and to practice how to weigh and apply those values, and the law of lawyering, to ethical problems. The course also covers selected topics relating to the regulation of lawyers' ethics.

Law 511 3 units; (3-0)**Criminal Process**

A survey and critical examination of core aspects of criminal process law. A focus on legislation relating to jurisdiction and modes of trial including

obligations of and options available to prosecution and accused. Other topics include arrest, search and seizure, investigative detention, and right to counsel and silence, all within the context of the Charter of Rights and Freedoms.

Law 515 **3 units; (3-0)**

Family Law

An analysis of the legal principles affecting the rights and responsibilities of the members of the family. Topics include constitutional issues, marriage, marriage contracts, common law marriage, child neglect and abuse, custody and access, guardianship, adoption, separation, divorce, nullity, spousal and child maintenance, and matrimonial property. Stress is placed on the process of family law and the appropriate role for lawyers and judges.

Law 519 **3 units; (3-0)**

Jurisprudence

A critical inquiry into the nature and functions of law and justice, including natural law, legal positivism, sociological jurisprudence, legal realism, and contemporary theorists.

Law 521 **3 units; (3-0)**

Real Estate Transactions

An examination of the estate transactions. Topics include the purchase and sale of property, mortgaging and other ways to finance land transactions, commercial leasing arrangements, and the Land Titles Act as it relates to land development.

Law 525 **3 units; (3-0)**

Bankruptcy and Restructuring Law

Receivership, consumer and commercial arrangements and bankruptcy under the Bankruptcy Act and the Company Creditors Arrangements Act.

Law 527 **3 units; (3-0)**

Basic Tax Law

The basic language and concepts of taxation and identification of taxation issues. Topics include the unit of taxation, the meaning and taxation of income, taxation of benefits, the type and scope of deductions available for business income, and the taxation of capital gains including gains (and losses) on taxpayer assets.

Law 529 **3 units; (3-0)**

Biotechnology and the Law

The legal, ethical, and policy issues relating to biotechnology. Topics include genetically modified foods, animals and plants, synthetic genomics, animal-human combinations, xenotransplantation, human cloning, pharmacogenetics, biofuels, assisted human reproduction, stem cells, tissue engineering, genetic therapy, and genetic enhancement.

Law 530 **3 units; (3-0)**

Mining Law

The law governing the exploration, financing and development of minerals in Canada. Topics include mining legislation; title; aboriginal rights, including the duty to consult; environmental obligations; mining agreements; and, international transactions

Law 531 **3 units; (3-0)**

Environmental Law

Legal theories, concepts, principles, and processes relevant to environmental protection. Topics include ecological and ethical dimensions, jurisdictional issues, common law rights and

remedies, environmental assessment, public participation, contaminated sites, enforcement and compliance, economic approaches, endangered species and protected spaces, land use planning, and environmental dispute resolution.

Law 533 **3 units; (3-0)**

Wills and Estates

The preparation, execution, interpretation, and administration of wills; testamentary capacity; alteration, revocation and republication of wills; intestate succession; dependants' relief; and estate administration.

Law 535 **3 units; (3-0)**

Secured Transactions

The modern law of secured transactions and the financing of personal property, with a focus on Alberta's Personal Property Security Act. Other topics include Bank Act security, the Farm Implement Act, and the Fair Trading Act.

Law 536 **3 units; (3-0)**

International Criminal Law

The law related to international and transnational crimes. Topics may include crimes against humanity, war crimes, genocide, aggression, extradition, terrorism, human trafficking, drug trafficking, cybercrime, state sovereignty and impunity, money laundering, and organized crime.

Law 537 **3 units; (3-0)**

Sale of Goods

The sale and supply of goods, including an examination of the provincial Sale of Goods Act, consumer protection issues, and the Vienna International Sales Convention.

Law 543 **3 units; (3-0)**

Intellectual Property Law

Intellectual property, including the law of patents, copyrights, and trade-marks.

Law 547 **3 units; (3-0)**

Human Rights Law

A survey of national and provincial human rights laws and practice as distinct from the Charter of Rights and Freedoms, and an introduction to the main international and transnational human rights instruments and standards.

Law 549 **3 units; (3-0)**

International Law

The elements of public international law, including sources, the role of customary law, the law of treaties, recognition, state responsibility, and the roles and powers of international organizations.

Law 551 **3 units; (3-0)**

Unjust Enrichment

Unjust enrichment as an independent source of legal obligation. Topics include elements of the right of action and defences; restitution as the remedy, with particular emphasis on personal versus proprietary restitution; and disgorgement of wrongful gain, distinguished from restitution using breach of fiduciary obligation as the primary example.

Law 553 **3 units; (3-0)**

Insurance Law

The various types of insurance (e.g. fire, life, sickness and accident, motor vehicle, and liability). Topics include the nature and formation of the insurance contract, the role of insurance agents, insurable interest, misrepresentation and non-

disclosure, and the rights of third parties against the insurer.

Law 557 **3 units; (3-0)**

Commercial Arbitration Law

Private (between individuals) and mixed (investor/state) arbitration. Coverage includes domestic and international arbitration rules, including UNCITRAL and International Centre for the Settlement of Investment Disputes (ICSID) rules.

Law 559 **3 units; (3-0)**

Critical Legal Theories

An examination of critical theoretical perspectives on the nature and functions of law, and of the possibilities and limitations of law as a strategy for social change. Perspectives may include feminist legal theories, critical race theories, post-colonial theories, Aboriginal legal theories, critical disability theories, queer theories, and post-modernism.

Law 561 **3 units; (3-0)**

Employment Law

The law governing non-unionized workplaces in Canada. Topics include constitutional jurisdiction, defining the employment relationship and employer/employee status, the employment contract, implied rights and obligations, termination, reasonable notice of dismissal, constructive dismissal, cause for summary dismissal, human rights, and employment standards legislation.

Law 563 **3 units; (3-0)**

International Human Rights and Humanitarian Law

International human rights law, covering the main global instruments (such as the International Covenants, as well as the regional human rights systems of the Americas and Europe), with an introduction to the principles and concepts of International Humanitarian Law. Topics include women's human rights, death penalty, massive human rights violations, human rights and counter-terrorism, the rights of the child, the rights of indigenous peoples and minorities, and the role of non-state actors.

Law 565 **3 units; (3-0)**

Internet Law

The Internet as a technology, a place for social interaction, and a marketplace. Topics include Internet governance, network neutrality, end to end and layered principles, the domain name system, peer production and distribution, information security and privacy, ISP regulation, regulation of Internet content, electronic commerce, VOIP regulation, and anti-circumvention law.

Law 567 **3 units; (3-0)**

Law and Economics

An examination of the practical and theoretical implications arising from the application of economic reasoning to law. Topics include the economic method of legal analysis, the scope of its application, and the major critical responses in both traditional legal fields of economic influence (such as tort, contract and corporate law) and more novel areas (such as family and criminal law).

Law 569 **3 units; (3-0)**

Law and Literature

The ways in which literary studies inform law and legal analysis, and the ways in which law and legal themes have informed literature.

Law 571 **3 units; (3-0)**

Oil and Gas Law

The upstream oil and gas industry. Topics include ownership of oil and gas and split estates; coalbed methane; the legal character of the private oil and gas lease; the anatomy of the various clauses of the oil and gas lease; and Crown disposition systems, including the Alberta (conventional and oil sands) and federal legislation and related policy question.

Law 573 **3 units; (3-0)**

Public Lands and Natural Resources Law

The protection, exploitation, and management of Crown-owned lands and renewable and non-renewable natural resources (other than oil and gas, and including forestry, rangeland, minerals, wildlife, fisheries, wilderness, recreational, and heritage). Discussion of the nature of public ownership, public and private values, economic approaches, and inter-jurisdictional management.

Law 575 **3 units; (3-0)**

Remedies

Judicial remedies at common law and equity for tort and breach of contract, including personal injury and property damage. Themes include compensating loss, disgorging gain, and punishing civil wrong; prohibiting and compelling defendant behaviour; loss-based, gain-based, and punitive damages; and injunctions and specific performance.

Law 577 **3 units; (3-0)**

Tax Policy

Principles of tax policy (efficiency, equity, and simplicity) and applications related to income, sales, and payroll taxes. Topics include the economic and distributive effects of taxes, auditing and legal compliance, and political economy.

Law 579 **3 units; (3-0)**

Legal Theory, Selected Topics

Critical examination of the main theoretical writings in a major doctrinal area or group of doctrinal areas, such as private law (tort, contract and unjust enrichment); public law (criminal, Constitutional and administrative law); tort; contract; evidence; property; Constitutional; or criminal law.

MAY BE REPEATED FOR CREDIT

Law 581 **3 units; (3-0)**

Unsecured Creditors' Remedies

The remedies available to the unsecured creditor for the collection of debts and the protections offered to debtors, including prejudgment remedies, garnishment, execution against real and personal property, fraudulent preferences and conveyances, and the regulation of collection and credit agencies.

Law 583 **3 units; (3-0)**

Water Law

Water resources and management, including the historical and current legal and policy frameworks governing surface and groundwater rights. Topics include responses to scarcity, alternative water management models and plans, industrial use and re-use of water, wetlands, protection of aquatic resources, aboriginal water rights, economic instruments, water as a human right, watershed approaches, and inter-jurisdictional or international issues.

Law 585 **3 units; (3-0)**

Alberta Court of Appeal Moots

The development of appellate advocacy and other lawyering skills in the context of preparation for and participation in the Alberta Court of Appeal Moot, in the areas of criminal law; civil law (contract, property or tort law); and constitutional law.

Prerequisite(s): Consent of the Faculty.

Law 587 **3 units; (3-0)**

Kawaskimhon National Aboriginal Moot

The development of advocacy, consensus building, and other lawyering skills in the context of a non-competitive moot conducted in a circle arrangement and using a moot problem based on contemporary issues in Aboriginal-Government relations. Includes a writing requirement.

Prerequisite(s): Consent of the Faculty.

Law 589 **3 units; (3-0)**

Labour Arbitration Moot

The development of advocacy and other lawyering skills in the context of preparation for and participation in an arbitration conducted under a collective agreement. Includes a writing requirement.

Prerequisite(s): Consent of the Faculty.

Law 591 **3 units; (3-0)**

Provincial Court Clerkships

Placements in the Provincial Court performing research, preparing memoranda, and meeting and discussing with a supervising Judge.

Prerequisite(s): Consent of the Faculty.

Note: This course is graded CR, D or F.

Law 593 **3 units; (3-0)**

Health Law

The regulation, structure, and financing of the health care system. Topics include licensing and regulation of health care professionals (including medical malpractice claims as a form of regulation); regulation of biomedical research; approval processes for drugs; complementary therapies and medical devices; resource allocation and access to health care; market considerations; privatization and deregulation of health care; and consent and confidentiality.

Law 594 **3 units; (3-0)**

Indigenous Peoples and the Law

The law governing the relationship between indigenous peoples and settler society. Topics include recognition of aboriginal laws and custom, self-determination and other applicable principles of international law, self-government, common law recognition of aboriginal title, treaties, the honour of the Crown, the fiduciary duty of the Crown, the Crown's duty of consultation and accommodation, constitutional protection of aboriginal and treaty rights, application of provincial laws, the Indian Act, land surrenders, and exemptions from seizure and taxation.

Law 595 **3 units; (3-0)**

Canadian Legal History

Migration of European law in the colonial context and its impact in pre-Confederation Canada (settled and conquered colonies); the role of trading companies, particularly the Hudson's Bay Company; the impact of the United States both before and after Confederation; Confederation and the development of Canadian legal culture and law. Jurisdictions may include British Columbia, Alberta, Ontario, Quebec, and Nova Scotia.

Law 596 **3 units; (3-0)**

Feminist Legal Theory

A critical inquiry into the nature and function of law from a variety of different perspectives within feminist legal theory. Topics include the role of rights and of legal discourse, and the possibilities and limitations of law as a strategy for social transformation.

Law 597 **3 units; (3-0)**

International Trade Law

The public law framework for international trade, with emphasis on the WTO and NAFTA. Topics include national treatment, most favoured nation treatment, anti-dumping and countervail actions, and dispute resolution.

Law 598 **3 units; (3-0)**

Trusts

The concept of the trust and its development in equity and its relationship to other legal concepts. Topics include the various types of trusts; constituting, administering and terminating the trust; trustee duties and powers; variation of trusts; breach of trust; and the doctrine of tracing.

Law 599 **3 units; (3-0)**

Legal Practice, Selected Topics

A variety of subject matters related to the practice of law.

MAY BE REPEATED FOR CREDIT

600-Level Courses

Law 601 **3 units; (3-0)**

Advanced Criminal Law

An in-depth examination of case authorities, primarily through an examination of case authorities, certain concepts in criminal law the understanding of which is essential for a criminal practitioner. Topics covered may include mens rea, sexual offences, assault, sentencing, conspiracy, driving offences, and identification.

Law 602 **4 units; (3-0)**

Advocacy

A development of core competencies through the practice of advocacy. Each student will apply legal knowledge, critical analysis, communication and resolution skills as well as ethical understanding, to trial fundamentals situated in real trial scenarios. Participants will choose to represent parties in either a civil or criminal trial.

Note: This course is graded CR, D or F.

MAY BE REPEATED FOR CREDIT

Law 605 **3 units; (3-0)**

Oil and Gas Contracts

Selected problems in oil and gas law including industry contracts (pooling, farmout, joint operating, purchase and sale and royalty agreements); fiduciary duties; and title review.

Corequisite(s): Prerequisite or Corequisite: Law 571.

Law 607 **3 units; (3-0)**

Advanced Legal Research

This course builds on legal research instruction in the first year of the program and affords further opportunities to learn and practice research skills. The course provides instruction in research methodology, citation, print and electronic research/databases, covering case law, statute law, texts, periodicals and web-based materials.

Law 612 **3 units; (3-0)**

Advanced Private Law

Advanced issues in private law (property, contract, tort, unjust enrichment and equity), including contemporary controversies over appropriate rights and remedies when different causes of action either converge or intersect.

Corequisite(s): Prerequisite or Corequisite: Law 402, 406 and 551.

Law 613 **3 units; (3-0)**

Conflict of Laws

The doctrines and rules governing legal disputes cutting across provincial or national boundaries. Topics include jurisdiction, distinctions between substantive and procedural rules, the recognition and enforcement of foreign judgments, domicile, proof of foreign law, and the choice of law rules relating to private law (torts, contracts, property, succession and family law).

Law 615 **3 units; (3-0)**

Advanced Civil Procedure

The strategic use of the Alberta Rules of Court in civil proceedings with reference to related legislation and ethical requirements. Topics include commencement of proceedings, interlocutory and ex parte applications, discovery of persons and records, trial preparation, and the roles of the court.

Corequisite(s): Prerequisite or Corequisite: Law 505.

Law 617 **3 units; (3-0)**

Alternative Energy Law: Renewable Energy and Energy Efficiency

The renewable energy and energy efficiency sectors. Topics include federalism, wind, small hydro, solar, biomass etc., energy conservation and demand side management, and access to energy infrastructure.

Corequisite(s): Prerequisite or Corequisite: Law 503.

Law 618 **3 units; (3-0)**

Corporate Finance Law

Legal aspects of corporate finance transactions, including applicable regulatory frameworks. Topics may include equity and debt financing, secured transactions, assess and/or share purchase and sale agreements, and takeover bids.

Corequisite(s): Prerequisite or Corequisite: Law 509.

Law 619 **3 units; (3-0)**

Estate Planning

Personal dispositions of property, both inter vivos and on death, to achieve estate and succession planning objectives. Topics include trusts, corporations, wills, life insurance, buy-sell arrangements, income splitting, estate freezing, and tax deferral plans.

Corequisite(s): Prerequisite or Corequisite: Law 527.

Law 621 **3 units; (3-0)**

Corporate Governance and Litigation

The principal concepts in corporate governance and their evolution in Canada; the Sarbanes-Oxley Act of 2002 and the related rules of the U.S. Securities and Exchange Commission and the New York Stock Exchange; the securities regulatory response of Canada to the adoption of Sarbanes-

Oxley in the United States; and other current topics in corporate governance.

Corequisite(s): Prerequisite or Corequisite: Law 505 and 509.

Law 623 **3 units; (3-0)**

Environmental Impact Assessment Law

Environmental impact assessment (EIA) law and practice in Canada. Topics include the role of EIA in the regulatory process and as a planning tool, federalism, triggers, equivalency, harmonization, joint assessment, implementation of assessment decisions, adaptive management, strategic environmental assessment, the role of traditional knowledge, and public participation.

Corequisite(s): Prerequisite or Corequisite: Law 503.

Law 624 **3 units; (3-0)**

Environmental Law and Ethics

The ethical underpinning of environmental law, with a consideration of various views, including the land ethic, deep and shallow ecology, instrumental and utilitarian approaches, and inherent value.

Law 625 **3 units; (3-0)**

Intellectual Property Transactions

Intellectual property transactions and strategies in a variety of industries in energy, information technology, and life sciences. Topics include open source IP, IP governance, management and best practices, valuation, ownership, improvements, co-ownership and collaboration, patent pools and standard setting organizations, software licensing and IT transactions, licensing, infringement management, and warranties.

Corequisite(s): Prerequisite or Corequisite: Law 543.

Law 626 **3 units; (3-0)**

International Development Law

The role of law in promoting social and economic growth, with a focus on the rule of law as an instrument of development and the dialogue between the developed and less developed worlds through international agreements. Topics include the rules of international trade and finance, intellectual property, the environment and natural resources, and the war on terrorism.

Corequisite(s): Prerequisite or Corequisite: One of Law 549, 597 or 563.

Law 627 **3 units; (3-0)**

International Environmental Law

The customary and treaty law rules applicable to global and transboundary environmental issues. Topics include air pollution, climate change, international wildlife law and trade, the international chemicals agreements liability regimes, and shared resources.

Law 628 **3 units; (3-0)**

International Investment Law

Investor protection in customary law and treaties, in particular NAFTA Chapter 11, bilateral investment treaties (BITs), and the Energy Charter; the main disciplines, including national treatment, most favoured nation treatment, fair and equitable treatment, and the rules pertaining to expropriation; soft law norms pertaining to investment; and relevant domestic law, including the Investment Canada Act.

Corequisite(s): Prerequisite or Corequisite: Law 549 or 597.

Law 630 **3 units; (3-0)**

International Petroleum Transactions

International business transactions in the context of the petroleum industry, including the various forms of state agreements; confidentiality agreements; study and bidding agreements; international joint operating agreements; agency agreements; and participation agreements; with attention to the key legal, business and ethical issues raised in negotiations.

Law 631 **3 units; (3-0)**

International Tax Law

The tax implications of both inbound and outbound investment and implications for structuring affiliates, with consideration of international tax treaties and foreign tax credit mechanisms.

Corequisite(s): Prerequisite or Corequisite: Law 527.

Law 634 **3 units; (3-0)**

Law of Species and Spaces

The principal federal and provincial laws governing the management of biological diversity, including protected area legislation and endangered species legislation. Explores the constitutional and common law fundamentals of wildlife law as well as contemporary disputes about species protection, ecosystem-level land management, and game ranch operations.

Corequisite(s): Prerequisite or Corequisite: Law 503.

Law 636 **3 units; (3-0)**

Municipal Law

The legal position of local governments, including cities and regional governments. Topics include the powers of Municipal Councils and Districts, the duties and responsibilities of elected and appointed municipal officials, conflicts of interest, elections, the regulation and licensing of businesses, proprietary and contractual powers, tort and the public body, subdivision, land use planning, and the role of the courts.

Corequisite(s): Prerequisite or Corequisite: Law 503.

Law 637 **3 units; (3-0)**

Energy Law

An overview of energy regulation, focusing on competition and pricing. Topics include the theory and process of energy regulation, regulatory jurisdiction, judicial review of energy regulation, regulation of natural gas and electricity prices, market restructuring, and deregulation. The course will familiarize students with the legal issues that arise when the legislature and regulators respond to market failures, and/or protect the public interest, in the provision of natural gas and electricity services.

Corequisite(s): Prerequisite or Corequisite: Law 503.

Law 641 **3 units; (3-0)**

Oil and Gas and Mining Taxation

The resource regime rules of the Income Tax Act as applied to the oil and gas and mining sectors. Topics include: operations subject to the resource regime; the treatment of property costs and common industry expenditures (i.e. applicable "tax pools" and their characteristics); resource industry "subsidies" (e.g. flow-through share financing, investment tax credits); the avoidance provisions (e.g. the successor rules); and the treatment of foreign operations of a Canadian resident taxpayer.

Corequisite(s): Prerequisite or Corequisite: Law 697.

Law 645 **3 units; (3-0)****Pollution Control and Waste Management Law**

The provincial and federal pollution control regimes for air and water pollution and for the handling, storage, treatment, and disposal of hazardous and non-hazardous wastes. Topics include federalism; regulatory and non-regulatory approaches to pollution from "point" and "non-point" sources; cumulative pollutant loads; the "precautionary" and "polluter pays" principles; and liability for contaminated sites.

Corequisite(s): Prerequisite or Corequisite: Law 503 and 531.

Law 647 **3 units; (3-0)****Regulatory Theory and the Law**

The main theories that explain or justify government regulation, including correction for market failure, political economy or public choice, and deliberative democracy. The relationship between those theories and the development and implementation of regulatory legislation, regulation, and public policy.

Corequisite(s): Prerequisite or Corequisite: Law 503.

Law 648 **3 units; (3-0)****Securities Law**

The regulation of capital market participants; the issuance of, and trades in, securities of companies, with an emphasis on Alberta and the National Instruments enacted by the Canadian securities regulator; the theory of securities regulation; as well as enforcement and compliance.

Law 650 **3 units; (3-0)****Business Skills for Lawyers**

The non-legal skills required by lawyers working in-house or with business clients. Topics may include reading and analyzing financial statements; understanding cash flow models; business valuation; negotiation; capital markets; crisis management; project management.

Law 653 **3 units; (0-3)****Directed Research**

A supervised research project involving the in-depth examination of a legal problem or area of concern not normally covered in a substantive or procedural course and which provides the basis for an article, research paper, brief, memorial, draft legislation, etc. Admission to this course depends on the availability of supervising faculty.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT**Law 656** **3 units; (3-0)****Mergers and Acquisitions**

Key legal and financial concepts for mergers and acquisitions. Topics may include structuring transactions, the required legal documentation, securities legislation, director and officer responsibilities, negotiations, financing, defensive tactics, due diligence, employment and other issues.

Law 663 **3 units; (3-0)****Dispute Resolution Clinical**

Interest-based, consensus-building dispute resolution processes to enhance understanding of dispute resolution theory, which will be applied through placements drawing on the mentorship of lawyers and dispute resolution practitioners

engaged in court-annexed or private mediation, facilitation, collaborative law, and other processes.

Corequisite(s): Prerequisite or Corequisite: Law 508.

Note: This course is graded CR, D or F.

Law 667 **3 units; (3-0)****Advanced Public Law**

Selected issues in constitutional law at the advanced level. Topics may include constitutional amendment, comparative approaches to rights, comparative federalism, the role of international law in constitutional interpretation, the legitimacy of judicial review, evidentiary issues in constitutional litigation, the role of social movements, and strategic litigation in securing constitutional rights.

Prerequisite(s): Law 400.

Law 673 **3 units; (3-0)****Jessup Moot**

Preparation for and participation in the Philip C. Jessup International Law Moot Court Competition.

Prerequisite(s): Consent of the Faculty.

Law 674 **3 units; (3-0)****Business Venture Clinic**

A clinical seminar where students work with startup companies and entrepreneurs. Students may prepare memos and drafts of business agreements. Students receive feedback on their written work from practicing lawyers.

Note: This course is graded CR, D or F.

Law 677 **3 units; (3-0)****Canadian Corporate/Securities Law Moot**

The development of appellate advocacy and other lawyering skills in the context of corporate and securities law in Canada.

Prerequisite(s): Consent of the Faculty.

Law 678 **3 units; (3-0)****The Gale Cup Moot**

The development of appellate advocacy and other lawyering skills in the context of preparation for and participation in the national Gale Cup Moot.

Prerequisite(s): Consent of the Faculty.

Law 683 **3 units; (3-0)****Advanced Family Law**

Selected topics in family law, including matrimonial property; division of pensions; international family law; and the law relating to children, including regulatory aspects (e.g. child welfare).

Corequisite(s): Prerequisite or Corequisite: Law 515.

Law 685 **3 units; (3-0)****Business Clinical**

The skills employed by a corporate solicitor in the context of one or more transactions. Skills covered may include drafting, negotiating, research, advocacy, and transaction management, in simulated or real transactions.

Corequisite(s): Prerequisite or Corequisite: Law 509.

Note: This course is graded CR, D or F.

Law 686 **3 units; (3-0)****Clinical Theory**

An opportunity to explore and reflect on what it means to be a good lawyer. Topics include the

formation of professional identity and legal, ethical and practical issues in poverty law.

Corequisite(s): Law 688.

Law 687 **3 units; (3-0)****Criminal Justice Clinical**

A clinical seminar in elements of criminal law covering topical, practical, and ethical issues in the practice of criminal law. Three short placements with Crown and defence lawyers and a provincial court judge.

Corequisite(s): Prerequisite or Corequisite: Law 511.

Note: This course is graded CR, D or F.

Law 688 **3 units; (3-0)****Clinical Practice**

Advanced experiential learning in a clinic setting. Students learn how to effectively manage clients and files while developing interviewing, counselling and advocacy skills in a variety of areas.

Corequisite(s): Law 686.

Note: This course is graded CR, D or F.

Law 689 **3 units; (3-0)****Family Law Clinical Seminar**

A clinical seminar in elements of family law practice. The clinical experience may be obtained through simulated exercises, supervised handling of files and/or placements. Topics include Chambers advocacy, marital dispute consultations and drafting of a settlement.

Corequisite(s): Prerequisite or Corequisite: Law 515.

Note: This course is graded CR, D or F.

Law 690 **3 units; (3-0)****Western Canada MacIntyre Cup Trial Competition**

The development of trial advocacy and other lawyering skills in the context of preparation for and participation in the Western Canada Trial Competition. Credit for this competition does not preclude credit for the Sopinka Cup.

Prerequisite(s): Consent of the Faculty.

Law 691 **3 units; (3-0)****Natural Resources, Energy and Environmental Law Clinical**

A clinical seminar involving placements in any one of the following practice areas: energy law, resources law, water law, and environmental law.

Corequisite(s): Prerequisite or Corequisite: One of Law 531, 571, 573, 583 or 637.

Note: This course is graded CR, D or F.

Law 692 **2 units; (2-0)****Selected Topics I**

A variety of subject areas, either doctrinal or theoretical.

MAY BE REPEATED FOR CREDIT**Law 693** **3 units; (3-0)****Selected Topics II**

A variety of subject areas, either doctrinal or theoretical.

MAY BE REPEATED FOR CREDIT

Law 694 4 units; (4-0)

Selected Topics III

A variety of subject areas, either doctrinal or theoretical.

MAY BE REPEATED FOR CREDIT

Law 695 3 units; (3-0)

External Competitions

The development of advocacy and other lawyering skills in the context of preparation for and participation in an external competition not otherwise the subject of a course. A written component is generally required.

Prerequisite(s): Consent of the Faculty.

Law 696 3 units; (3-0)

Clinical Studies

Participation in a clinical experience not otherwise the subject of a clinical course.

Prerequisite(s): Consent of the Faculty.

Note: This course is graded CR, D or F.

MAY BE REPEATED FOR CREDIT

Law 697 3 units; (3-0)

Corporate Tax

The provisions of the Income Tax Act applicable to corporations and their shareholders. Topics include the classification of corporations for tax purposes, the taxation of corporate income, the taxation of corporate distributions, and the taxation of various types of corporate reorganizations.

Corequisite(s): Prerequisite or Corequisite: Law 509 and 527.

Law 698 3 units; (3-0)

Immigration and Refugee Law

Basic principles, policies, and procedures governing immigration and refugee law. Topics include refugee law and status; selection and admission of immigrants; inadmissible and removable classes; exemptions and minister's permits; and appeals and judicial review in the federal court, including Charter issues.

Corequisite(s): Prerequisite or Corequisite: Law 503.

Law 699 3 units; (3-0)

Labour Law

The law governing unionized workplaces in Canada. Topics include freedom of association, the status of participants, union organization and certification, unfair labour practices, collective bargaining, the collective agreement and arbitration, industrial conflict, the duty of fair representation, and interaction between the labour law regime and the common-law of employment.

Corequisite(s): Prerequisite or Corequisite: Law 503.

700-Level Courses

Law 703 3 units; (3-0)

Graduate Seminar in Legal Research and Methodology

Preparation for developing, researching and writing a thesis or major research paper. The distinctive nature of legal scholarship and its professional context will be explored. Students will be introduced to specific research techniques and to the challenges of comparative and cross-cultural work.

Prerequisite(s): Admission to the LLM program or consent of the Graduate Director.

Law 705 3 units; (3-0)

Graduate Seminar in Legal Theory

An exploration of schools of legal theory, with the goal of helping students situate their graduate research within one or more of those approaches to legal scholarship. The seminar is structured around a series of readings describing different theoretical approaches and applying these approaches to areas of research.

Prerequisite(s): Admission to the LLM program or consent of the Graduate Director.

Law 706 5 units; (0-5)

Major Research Paper

Under the supervision of a member of the Faculty of Law or other suitable person appointed by the Graduate Co-ordinator, students will complete a major research paper, approximately 50 to 60 pages (15,000 – 18,000 words) in length. The paper must reflect extensive research on a topic in natural resources, energy or environmental law, and it must propose a solution to a problem or present a critical evaluation of an issue in this area of law. The paper will be evaluated on a Pass/Fail basis by the supervisor and one other person appointed by the Graduate Co-ordinator. In the event of disagreement between the supervisor and the other appointee, the Graduate Co-ordinator shall determine whether the paper is a pass or fail after reading the paper and then consulting with the supervisor and other appointee.

Prerequisite(s): Admission to the LLM program or consent of the Graduate Director.

Law and Society LWSO

For more information about these courses see the Department of Sociology website: soci.ucalgary.ca/.

Junior Courses

Law and Society 201 3 units; (3-0)

Introduction to Legal Studies

Overview of the role of law in society. Examination of different concepts of law. Study of legal rules, institutions, processes and personnel in social context. Discussion of construction and exercise of the power of law. Emphasis on Canadian law and legal system.

Law and Society 203 3 units; (3-0)

Introduction to Legal Knowledge

Examination of the philosophy and science of law as tools of social engineering. Students will be introduced to tort, contract, property and criminal law and will review different schools of thought and legal movements specific to these areas of law. Current legal developments (including decided Canadian cases) will be covered to illustrate how concepts such as risk, negligence, neighbour principle, contractual obligations, offer and acceptance, consideration, remedies and punishment play out in contemporary Canadian society.

Senior Courses

Law and Society 313 3 units; (3-0)

Research Methods in Law and Society

Research and writing methods including legal research basics, legal analysis, qualitative strategies in socio-legal studies, academic writing, and academic methodology.

Prerequisite(s): Law and Society 201.

Law and Society 335 3 units; (3-0)

Equality Issues

An examination of the ability of the law to guarantee equality. Issues of gender, racial and class equality will be explored. Topics may include employment law, civil law, criminal law, reproductive rights and family law. All material is studied as it pertains to the Canadian legal culture.

Law and Society 337 3 units; (3-0)

Self-Regulation

Examines how individuals and groups create, maintain, and follow non-legal codes of conduct and, in turn, regulate themselves and society. Students will be introduced to concepts of self-governance and moral regulation found in social manners, community standards, religious beliefs, as well as, consciously "legislated" group mechanisms such as professional codes of conduct, mission statements, and corporate governance practices.

Prerequisite(s): Law and Society 201.

Law and Society 401 3 units; (3-0)

Topics in Law and Society

An examination of selected topics in Law and Society.

MAY BE REPEATED FOR CREDIT

Law and Society 413 3 units; (3-0)

Liberalism

An examination of the fundamental conceptions of rights and freedoms in the works of J.S. Mill and twentieth- and twenty-first-century philosophers. The treatment of these concepts in contemporary law and their role in contemporary legal and social issues are explored as well.

Prerequisite(s): Law and Society 201, 60 units and admission to the Law and Society program.

Antirequisite(s): Credit for Law and Society 413 and 412 will not be allowed.

Note: Preference in enrolment is given to students who have completed at least 90 units. Registration for students who have completed fewer than 90 units but more than 60 units will open on a date specified by Enrolment Services.

Law and Society 415 3 units; (3-0)

Socio-legal Issues in Contemporary Liberal Societies

An examination of the ways in which fundamental premises of legal liberalism, such as fairness, equality, and individual liberty, intersect with each other and with other key social values and premises. May include privacy, the nature of the rights attached to property, the different understandings of democracy operating in different countries, and the extent to which the state should support religion.

Prerequisite(s): Law and Society 413, 60 units and admission to the Law and Society program.

Antirequisite(s): Credit for Law and Society 415 and 412 will not be allowed.

Note: Registration for students who have completed fewer than 90 units but more than 60 units will open on a date specified by Enrolment Services.

Law and Society 425 3 units; (3-0)

Law and Technology

Examines the relationship between law and legal institutions on the one hand, and science and technology on the other. Through close readings of texts and in-depth class discussion, students will investigate thematic issues such as the role of law

in regulating science and technology; challenges to law raised by scientific discoveries and new technologies; and the influence of science and technology on law and legal institutions.

Prerequisite(s): 48 units.

Law and Society 501 3 units; (0-3T)

Directed Reading

Supervised individual study of a special topic.

Prerequisite(s): Consent of the Department.

Note: Students should contact the Department of Sociology at least two weeks prior to the first day of classes to arrange an independent study course. May be counted only twice towards the major field requirements in Law and Society.

MAY BE REPEATED FOR CREDIT

Law and Society 590 6 units; (3S-0)

Law and Society Honours Thesis and Seminar

Students will conduct an independent research project under the direction of a supervisor. In the seminar, students will discuss and present their projects and other topics relevant to conducting research.

Prerequisite(s): 3 units from the list of Research Methods Courses within Courses Constituting the Field of Law and Society; admission to the Law and Society Honours program; and consent of the Department.

Law and Society 591 3 units; (3S-0)

Integrative Seminar

An advanced seminar integrating philosophical, theoretical, social, and legal approaches to understanding the relationship between law and society.

Prerequisite(s): Law and Society 413 and 415, 90 units and admission to the Law and Society major.

Note: Students may be required to attend court proceedings outside of class time.

Linguistics LING

For more information about these courses, see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

Junior Courses

Linguistics 201 3 units; (3-0)

Introduction to Linguistics I

Introduction to the scientific study of language, including the analysis of word, sentence, and sound structure, and the exploration of language as a human, biological, social, and historical phenomenon.

Antirequisite(s): Credit for Linguistics 201 and either 205 or 207 will not be allowed.

Linguistics 202 3 units; (3-0)

Introduction to Linguistics II

Scientific study of language, focusing on language in historical and social contexts. Topics include: writing systems, language change, language acquisition, language families and areas, sociolinguistics, psycholinguistics, and bilingualism.

Prerequisite(s): Linguistics 201.

Antirequisite(s): Credit for Linguistics 203 and 205 or 207 will not be allowed.

Linguistics 221 3 units; (3-0)
(formerly Linguistics 321)

Modern English Grammar

A comprehensive exploration of contemporary English, based on modern linguistic analysis, but

also includes traditional grammatical terminology, as well as language change, attitudes to language varieties and problems in usage.

Linguistics 223 3 units; (3-0)

Language and Advertising

An investigation of the nature of persuasive messages from the perspective of linguistic theory. Topics may include truth and falsity, implication, ambiguity, and context-dependence.

Linguistics 225 3 units; (3-0)

Varieties of English

Survey and analysis of the varieties of English currently spoken in the world, including various dialects, especially Canadian and American, and English-based pidgins and creoles.

Linguistics 227 3 units; (3-0)

Rap Linguistics

The leading music genre known as rap is dominated by language. How this creatively flourishing art-form relates to language science. An examination of the manipulation of sounds, words, grammar, and meaning in rap, and what it reveals about language in the mind and in society.

Senior Courses

Linguistics 301 3 units; (3-0)

Syntax I

Introduction to syntax. Emphasis on tree-drawing and basic argumentation skills. Topics may include: syntactic categories; grammatical, thematic, and structural relations; syntactic movement.

Prerequisite(s): Linguistics 201.

Linguistics 303 3 units; (3-0)

Phonology I

Theory and practice of phonological analysis: the classical phoneme; distinctive features and their organization; methods of analysis; underlying and surface representations; rules and derivations.

Prerequisite(s): Linguistics 201.

Note: Linguistics 341 should be taken either before or concurrently with Linguistics 303.

Linguistics 309 3 units; (3-0)

Language and Power

The nature of the linguistic resources used to create, enhance and justify positions of dominance or subordination, or to influence and persuade populations. Examples drawn from the discourse of gender and ethnic relations, government and business.

Linguistics 316 3 units; (3-0)

Language Acquisition I

Introduction to basic ideas and issues in first- and second-language acquisition. Adopts a linguistic approach, viewing language acquisition as the acquisition of a "mental grammar", looking at examples from sound, sentence structure, word learning and meaning. Focus on defining the essential properties of an explanatory theory of language acquisition.

Prerequisite(s): Linguistics 201.

Linguistics 319 3 units; (3-0)

Introduction to Semantics

Introduction to the study of conventional meaning. Topics may include: word meaning, propositional and predicate logic, properties of quantifiers, definite and indefinite descriptions, and pragmatics.

Prerequisite(s): Linguistics 201.

Linguistics 337 3 units; (3-0)

Introduction to Speech-Language Pathology

A comprehensive overview of the subject including: basic components of speech and language, normal language development, communication disorders, and current professional issues.

Prerequisite(s): Linguistics 201.

Antirequisite(s): Credit for Linguistics 337 and 437 will not be allowed.

Linguistics 341 3 units; (3-0)

Phonetics I

Intensive practice in the perception, production and transcription of speech sounds accompanied by an introduction to the physiology and acoustics of speech.

Prerequisite(s): Linguistics 201.

Note: Preference in enrolment is given to students who have declared a Major in Linguistics. Registration information can be found on the Enrolment Services website: <http://ucalgary.ca/registrar/>. Linguistics 341 should be taken either before or concurrently with Linguistics 303.

Linguistics 349 3 units; (3-0)

Language and Mind

An overview of central issues in the study of language and its relationship to the human mind. Topics may include the nature/nurture debate, human specialization for language, and theories of mental representation.

Prerequisite(s): Linguistics 201.

Linguistics 353 3 units; (3-0)

Historical Linguistics I

Central topics in the study of language change including: principles and methods of linguistic reconstruction; universals, typologies, and the explanation of language change; sources of language change with a consideration of acquisitional and sociolinguistic factors.

Prerequisite(s): Linguistics 201.

Linguistics 373 3 units; (3-0)

Introduction to Sociolinguistics

Social differentiation of language in terms of the gender, socio-economic status and geographical distribution of speakers.

Prerequisite(s): Linguistics 201.

Linguistics 377 3 units; (3-0)

Introduction to Pragmatics

An introduction to the study of context-dependent meaning. Topics may include: deixis, reference, implicature, presupposition, speech acts, and information structure.

Prerequisite(s): Linguistics 201.

Linguistics 381 3 units; (3-0)
(English 381)

The History of English

An introduction to important changes and stages in the history of English including its Indo-European and Germanic origins and a consideration of Modern English grammar and orthography from a historical perspective.

Prerequisite(s): Linguistics 201.

Linguistics 401 3 units; (3-0)

Syntax II

A theoretically grounded approach to syntax using data from a variety of languages. Constructing and evaluating syntactic hypotheses. May involve

collecting data from a native speaker of a foreign language.

Prerequisite(s): Linguistics 301.

Linguistics 403 **3 units; (3-0)**

Phonology II

Recent issues in phonological theory.

Prerequisite(s): Linguistics 303.

Linguistics 407 **3 units; (3-0)**

Morphology I

An introduction to the study of word-structure, inflectional and word-formation morphology, morphological processes, morphological organization, interfaces with phonology and syntax. Practical problems in word analysis.

Corequisite(s): Prerequisite or Corequisite: Linguistics 303.

Linguistics 416 **3 units; (3-0)**

Language Acquisition II

In-depth investigation of issues in language acquisition. Topics include differentiating populations of learners (monolingual, bilingual and delayed first-language learners, child and adult second-language learners, heritage language learners) and the exploration of different kinds of research tasks and methods.

Prerequisite(s): Linguistics 316.

Linguistics 419 **3 units; (3-0)**

Advanced Semantics

Continuing study of conventional meaning accompanied by an introduction to some technical tools used in the field of semantics. Topics may include: compositionality, sets and functions, tense, aspect, modality, and event semantics.

Prerequisite(s): Linguistics 319.

Linguistics 441 **3 units; (3-0)**

Phonetics II

Continuing study of the anatomy, physiology, and acoustics of speech and related issues in speech research, paralleled by laboratory work in the acoustic and physiological analysis of speech.

Prerequisite(s): Linguistics 341.

Linguistics 451 **3 units; (3-0)**

History of Linguistic Thought

A survey of major schools of linguistic thought. Focus on the origin and development of concepts central to contemporary linguistic theory.

Prerequisite(s): Linguistics 301 or 303.

Linguistics 453 **3 units; (3-0)**

Historical Linguistics II

Theoretical approaches to current topics in the field of historical linguistics. Research methods and practical skills in data collection and analysis.

Prerequisite(s): Linguistics 353.

Linguistics 455 **3 units; (3-0)**

Typology

Study of the unity and diversity of the world's languages. How do the grammars of individual languages differ from each other, and in what ways are they all alike? Which characteristics are common across languages, and which are rare? An overview of the methodology and main results of typological research. Students work with data from unfamiliar languages.

Prerequisite(s): Linguistics 201 and 301.

Linguistics 467 **3 units; (3-2)**
(Psychology 467) (formerly Linguistics 439)

Experimental Psycholinguistics

Exploration of the cognitive, neuropsychological, and social processes that underlie language abilities, with reference to linguistic theory. A laboratory component provides experience with methodologies used to study language behaviour.

Prerequisite(s): Linguistics 201.

Linguistics 505 **3 units; (3-0)**

Field Methods for Indigenous Languages

Principles and techniques of collecting, editing and analyzing elicited linguistic data and associated problems. Practical experience with language consultant(s).

Prerequisite(s): Linguistics 301 and 303.

Linguistics 507 **3 units; (3-0)**

Morphology II

A survey of issues in morphological theory.

Prerequisite(s): Linguistics 401 and 407.

Antirequisite(s): Credit for Linguistics 507 and either 551.02 or 599.13 will not be allowed.

Linguistics 511 **3 units; (3-0)**

Advanced Syntactic Analysis

A survey of current work in syntactic theory.

Prerequisite(s): Linguistics 401.

Linguistics 512 **3 units; (3-0)**

Advanced Phonological Analysis

An advanced course on current work in phonological theory.

Prerequisite(s): Linguistics 403.

Linguistics 516 **3 units; (3-0)**

Topics in Language Acquisition

Exploration of a selected topic related to current research in language acquisition. Topics may include current research on a specific population of learners, a particular research methodology, and the acquisition of a specific learning problem (e.g., phonotactics, intonation, binding, quantification).

Prerequisite(s): Linguistics 416.

MAY BE REPEATED FOR CREDIT

Linguistics 519 **3 units; (3-0)**
(Philosophy 519)

Formal Semantics of Natural Language

Central issues in the logical semantics of natural language, focusing on topics such as quantification, scope, and the interpretation of pronouns.

Prerequisite(s): Philosophy 279 or 377. Philosophy 371 or Linguistics 319 recommended.

Antirequisite(s): Credit for Linguistics 509 will not be allowed.

Linguistics 531 **3 units; (3-0)**

Survey of Indigenous Languages of the Americas

A survey of the indigenous languages of the Americas, including classifications of language families and structural analysis of selected languages.

Prerequisite(s): Linguistics 301 or 303.

Linguistics 551 **3 units; (3-0)**

Linguistic Analysis

Linguistic analysis of a language or language family.

Prerequisite(s): Linguistics 301 or 303.

MAY BE REPEATED FOR CREDIT

Linguistics 553 **3 units; (3-0)**

Topics in Historical Linguistics

An advanced course in the theory of historical linguistics.

Prerequisite(s): Linguistics 453.

MAY BE REPEATED FOR CREDIT

Linguistics 560 **3 units; (3-0)**

Statistics for Linguistic Research

Introduction to basic statistical concepts, methods of analysis, and quantitative modelling techniques, with a focus on their application to the unique properties of language research and linguistic data.

Prerequisite(s): Consent of the Linguistics Division of the School of Languages, Linguistics, Literatures and Cultures.

Linguistics 571 **3 units; (3-0)**

Corpus and Experimental Methods for Syntax and Semantics

Introduction to programming methods for the development and searching of text corpora, as well as the design and implementation of studies using open source software. Study design will be introduced through critical reading of studies covering a range of syntactic and semantic phenomena.

Prerequisite(s): Linguistics 319 and 401.

Linguistics 598 **6 units; (3S-0)**

Independent Research

Students carry out a specific research project under the supervision of a staff member and submit a thesis acceptable to the Linguistics Division of the School of Languages, Linguistics, Literatures and Cultures.

Prerequisite(s): Admission to the Linguistics Honours degree program.

Linguistics 599 **3 units; (3S-0)**

Conference Course

Directed research in areas of special interest to advanced students.

Prerequisite(s): Consent of the Linguistics Division of the School of Languages, Linguistics, Literatures and Cultures.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599. Admission to all 600-level courses is with consent of the School of Languages, Linguistics, Literatures and Cultures in addition to any other prerequisites which may be stated.

Linguistics 600 **1.5 units; (2-0)**

Introduction to Graduate Studies in Linguistics

This course provides an introduction to areas of research and theoretical orientations in which faculty in this department specialize, as well as to research and professional skills.

NOT INCLUDED IN GPA

Linguistics 605 **3 units; (3-0)****Field Methods**

Prerequisite(s): Consent of the program.

MAY BE REPEATED FOR CREDIT

Linguistics 611 **3 units; (3-0)****Advanced Syntactic Analysis**

An advanced course in syntactic theory with focus on analytical and critical skills required for conducting syntactic research.

Prerequisite(s): Consent of the program.

Linguistics 613 **3 units; (3-0)****Advanced Phonological Analysis**

An advanced course in phonological theory with focus on analytical and critical skills required for conducting phonological research.

Prerequisite(s): Linguistics 403 and consent of the program.

Linguistics 631 **3 units; (3-0)****Topics in Linguistic Theory**

Seminar in any area of theoretical linguistics, including phonetics, phonology, morphology, syntax, and semantics.

631.01. Phonetics

631.02. Phonology

631.03. Morphology

631.04. Syntax

631.05. Semantics

Prerequisite(s): Consent of the program.

Note: Consult the program regarding topics offered in any given year as topics vary. Not offered every year.

Linguistics 633 **3 units; (3-0)****Topics in Language Acquisition**

Seminar in language acquisition.

633.01. First Language Acquisition

633.02. Second Language Acquisition

Prerequisite(s): Consent of the program.

Note: Consult the program regarding topics offered in any given year as topics vary. Not offered every year.

Linguistics 635 **3 units; (3-0)****Analysis of a Language or Language Family**

Seminar in the analysis of a selected language or language family

Prerequisite(s): Consent of the program.

Note: Consult the program regarding topics offered in any given year as topics vary. Not offered every year.

MAY BE REPEATED FOR CREDIT

Linguistics 651 **3 units; (3-0)****Topics in Historical Linguistics**

Seminar in historical linguistics.

Note: Consult the program regarding topics offered in any given year as topics vary. Not offered every year.

MAY BE REPEATED FOR CREDIT

Linguistics 660 **3 units; (3-0)****Quantitative Modelling of Linguistic Data**

Introduction to basic statistical concepts, methods of analysis, and quantitative modelling techniques, with a focus on their application to the unique

properties of language research and linguistics data.

Prerequisite(s): Consent of the program.

Linguistics 671 **3 units; (3-0)****Methods for Corpus and Experimental Studies in Syntax and Semantics**

Introduction to programming methods for the development and searching of text corpora, as well as the design and implementation of studies using open source software. Study design will be introduced through critical reading of studies covering a range of syntactic and semantic phenomena. Programming skills to convert experiment software output into a format suitable for statistical analysis will also be covered.

Prerequisite(s): Consent of the program.

Antirequisite(s): Credit for Linguistics 671 and 699.07 will not be allowed.

Linguistics 697 **3 units; (3-0)****Thesis Research Development****Linguistics 699** **3 units; (3S-0)****Conference and Reading Course**

MAY BE REPEATED FOR CREDIT

Linguistics 797 **1.5 units; (2-0)****Senior Doctoral Seminar**

A forum for discussing and presenting candidacy paper research, thesis research, and conference presentations/publications in preparation.

NOT INCLUDED IN GPA

Management Studies MGST

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Junior Course**Management Studies 217** **3 units; (3-0)****Introduction to Business Analytics**

Introduction to data representation and analysis. Students will think critically about business problems, gather, evaluate, analyze and synthesize relevant data, and create insightful models to improve the quality of decisions. Communicating and presenting quantitative analysis to lead managerial decision making will be emphasized while continuing to advance both individual and group leadership skills.

Prerequisite(s): Admission to the Haskayne School of Business.

Antirequisite(s): Credit for Management Studies 217 and Business and Environment 291 will not be allowed.

Senior Courses**Management Studies 301** **3 units; (3-0)****Research Methodologies**

Introduction to how research is being done in the field of business, through critical exploration of research language, ethics and approaches. Quantitative, qualitative and mixed methods approaches presented by faculty researchers. Students experiment with various research methods, identify problems, develop hypotheses and research questions, specify variables and choose from various research

design tools such as experiments, survey, content analysis, focus groups and in-depth interviews.

Prerequisite(s): Admission to the Haskayne School of Business Bachelor of Commerce (Honours) program.

Management Studies 359 **3 units; (3-0)****Selected Topics in Management**

Examination of selected topics in management.

Prerequisite(s): 24 units. For certain topics consent of the Haskayne School of Business and/or admission to the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Management Studies 391 **3 units; (3-3T) or (3-1.5T)****Business Analytics**

Business Analytics uses data, information technology, statistical analysis, and quantitative methods to build models that help managers gain improved insight about their business processes and make better, fact-based decisions. Analysis of complex business problems and application of higher-level modelling techniques including optimization, simulation, decision analysis, queuing theory and forecasting.

Prerequisite(s): Admission to the Haskayne School of Business, Mathematics 249 or 251 or 265 or 281, Statistics 217, Management Studies 217 and Strategy and Global Management 217.

Management Studies 451 **3 units; (3-0)****Corporate Governance and Ethical Decision-Making**

Develop an increased awareness of the importance of corporate governance systems and strong financial decision making systems in developing effective business enterprises. Specific emphasis on the resolution of agency problems, the role of the board of directors, compensation systems and financial modelling.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units including Finance 317.

Antirequisite(s): Credit for Management Studies 451 and any of Business and Environment 291, Management Studies 491, 493 or 495 will not be allowed.

Management Studies 453 **3 units; (3-0)****Ethical Leadership**

Apply a variety of different leadership frameworks to problems and develop an understanding of when various frameworks are most applicable. Critical thinking skills will be honed using film, short cases, readings, class discussions, and written opinion. Identify components of leadership behaviours and explore the complex interaction between leaders and members in the context of different ethical quandaries. Witness, experience, and "consume" leadership as it progresses from individual to team to organizational to community levels.

Prerequisite(s): Admission to the Haskayne School of Business and 84 units, including Organizational Behaviour and Human Resources 317.

Antirequisite(s): Credit for Management Studies 453 and any of Business and Environment 291, Management Studies 491, 493 or 495 will not be allowed.

Management Studies 501 **3 units; (3-0)**

Capstone Applied Research Project I

Preparation for conducting an applied research project. Focus is on practical research issues such as choosing appropriate applied research topics, designing a research question, and applying the appropriate research methods. Development of the applied research project through identification of a potential client or organization and a field expert to work with.

Prerequisite(s): Admission to the Haskayne School of Business Bachelor of Commerce (Honours) program and Management Studies 301.

Management Studies 503 **3 units; (3-0)**

Capstone Applied Research Project II

Continuation of work on the applied research project. Knowledge production and dissemination of insights from research. Analysis of data and communication of results to business and university stakeholders. Preliminary development of insights using collected data, critical evaluation of the project limitations and contribution, and delivery of results in an Honours undergraduate thesis.

Prerequisite(s): Admission to the Haskayne School of Business Bachelor of Commerce (Honours) program, Management Studies 301 and 501.

Management Studies 511 **3 units; (3-0)**

Leadership Skills: Student Business Start-up

Provides general management skills through hands-on facilitation of a new business start-up. Teaching business basics to elementary school students and guiding them through the start-up, running and shut-down phases of a fundraising business.

Prerequisite(s): Admission to the Haskayne School of Business, consent of the Haskayne School of Business and 90 units.

Management Studies 559 **3 units; (3-0)**

Selected Topics in Management

Examination of selected topics in management.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Management Studies 571 **3 units; (3-3T)**

Management of International Trade

Concepts and skills required to conduct international transactions in goods and services, including contracts, transportation, financing, insurance, customs clearance, compliance with import/export regulations and dispute resolution.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Management Studies 597 **3 units; (3-0)**

Directed Study in Management Studies

In-depth study in one of the functional areas of business.

Prerequisite(s): Admission to and consent of the Haskayne School of Business.

Note: May be repeated once for credit.

Graduate Courses

Management Studies 611 **3 units; (3-0)**

Managerial Economics

Introduction to economic models for business decision making. Models from microeconomics are applied to provide insight in understanding costs, pricing, industry structure, and competitive interaction. Information economics is used to illustrate principal-agent problems that commonly arise in a business context. Macroeconomic models of supply and demand are applied to illustrate how government policy affects inflation and exchange rates.

Management Studies 613 **3 units; (3-0)**

Managerial Decision Modelling

The transformation of raw data into useful information for decision-making. Quantitative models are implemented with spreadsheets to develop skills in generating managerial insight from data and in dealing with uncertainty. Topics covered include basic probability and statistics, decision trees, regression analysis, optimization, and simulation.

Management Studies 672 **3 units; (3-0)**

Introduction to Business

Introduces the functional areas of business and their integration for the effective and efficient operation of organizations. Provides the foundation for the discipline based courses.

Prerequisite(s): Admission to the Master of Management program.

Management Studies 674 **3 units; (3-0)**

Integrated Decision Making

Integrative capstone course that challenges students to effectively respond to multi-functional problems.

Prerequisite(s): Admission to the Master of Management program.

Management Studies 676 **1.5 units; (3-1T)**

Business Analytics

Analytical tools and techniques for managerial decision, and their application to decision scenarios that parallel common business decisions.

Prerequisite(s): Admission to the Master of Management program.

Management Studies 703 **3 units; (3-0)**

Philosophy of Science for Business Administration

Examines processes of development and discussion of theories, with a focus on business management research. Exploration of three main questions: (i) what is the role of theory in science; (ii) what makes good management theories; and (iii) how can theories in management or related disciplines be developed and tested. Classical philosophy of science, management research papers focused on scientific theory and explanation, and prescriptive studies with strategies or methods for theory development in management and related disciplines, are reviewed.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Management Studies 705 **3 units; (3-0)**

Critical Research Assessment

Development of skills associated with the evaluation and use of extant research. Emphasis is on the critical reading of methods and results sections of experimental and non-experimental

research papers. Discussions regarding the appropriateness and limitations of the methodologies utilized, and statistical treatment of the data, will facilitate an understanding of research contributions. Studies using experimental and non-experimental design are included.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Management Studies 709 **3 units; (3-0)**

Qualitative Research Methods

Development of skills to conduct qualitative research in the context of business. Focus on research design and the processes of collecting and analyzing qualitative data as well as drawing conclusions and reporting research findings. Specific emphasis is given to case study research, ethnographic, and focus group research. Grounded theory, action research, narrative, and discursive research is also introduced.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Management Studies 711 **3 units; (3-0)**

Quantitative Design and Analysis

Development of skills associated with the design and implementation of experimental and non-experimental research. Specific emphasis on questionnaire design and psychometric properties, multiple regression, logistic regression, discriminant function analysis, factor analysis and structural equation modelling. Focus is on building capacity to conduct quantitative research.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Management Studies 713 **3 units; (3-0)**

Seminars in Advanced Business Management

Introduces to advanced topics in business management research. Consisting of a series of 3-hour lectures on different topics, given by different senior faculty members, students will gain insights into the broad perspectives of issues being studied. Course material will be based on the instructors' selection of top research in the fields of human resources, organizational dynamics, global strategy, international business, entrepreneurship, operations management, marketing, finance and governance.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Management Studies 715 **3 units; (3-0)**
(formerly Management Studies 615)

Strategic Business Analysis

Introduction to strategic analysis. Integration of learning from various management disciplines through a "field experience" study of a business firm.

Prerequisite(s): Strategy and Global Management 601.

Antirequisite(s): Credit for Management Studies 715 and 615 will not be allowed.

Management Studies 741 **3 units; (3-0)**

Business Process Improvement and Creative Problem Solving

Business process improvement and creative problem solving as critical components of competitiveness. The adjective "business" is used to indicate that the course emphasizes improvements in non-manufacturing processes (of relevance to all organizations) in such areas as development, distribution, financial accounting/planning, order entry, personnel, and purchasing. Topics covered include the relationship to Total Quality Management and Time-Based Competition, incremental

versus radical improvement, selection of key processes for study (including bench-marking and the role of capacity constraints), process flow diagramming, Pareto analysis, cause-and-effect analysis, statistical control charts, affinity diagrams, and steps in creative problem solving. Team exercises and projects make up a substantial portion of the course.

Prerequisite(s): Operations Management 601.

Management Studies 743 3 units; (3-0)

International Logistics

The topic of logistics is concerned with managing the activities along a supply chain, from procuring materials to delivering goods that satisfy customers. In today's global economy, both suppliers and customers can be dispersed around the world. In this course students learn the processes required to manage the flow of materials and products from suppliers to customers in order to achieve a competitive advantage. They will study theoretical concepts and evaluate through practical cases how physical distribution, procurement and production can become effective key business supporters.

Prerequisite(s): Operations Management 601.

Management Studies 745 3 units; (3-0)

Knowledge Dissemination to Enhance Managerial Practice

Focuses on how to properly place and convey knowledge through appropriate outlets so that it is utilized and valued by the management community. Results in the dissemination of one or two research papers (qualitative or quantitative) through different media.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Management Studies 747 3 units; (3-0)

Business Economics in the Global Context

Examines long-term economic trends; trends that are guided by considerations such as the changing demographics of developing countries, rising nationalism, religion-based conflicts, climate change, and growing tensions between old and aspiring superpowers; and the implications of these trends for the world economy and the multi-national enterprises that operate in it.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Management Studies 751 3 units; (3-0)

Global Energy Finance and Accounting

Problems related to evaluating and financing energy enterprises. Financial and accounting principles applied to valuing and financing energy projects. Financial reporting, managerial control systems, theory of financing, valuation, and deal structuring. Focus on private sector energy enterprises.

Prerequisite(s): Accounting 603 and Finance 601.

Management Studies 770 1.5 units; (3-0)

Topics in Leadership

Students near graduation must prepare for the transition from individual contributor to team and organization leader. This course is a comprehensive assessment of leadership from the dimensions of creating a leadership mindset and managing relationships (subordinates, peers, superiors and stakeholders). The topics may be addressed through theory development, simulation, case and experiential methods to provide to a full awareness and appreciation of the corporate responsibility, ethical dilemmas, and societal impacts of decision-making within

business, not-for-profit, and institutional leadership environments.

Prerequisite(s): Management Studies 601.

Antirequisite(s): Credit for Management Studies 770 and 790.02 will not be allowed.

Management Studies 773 3 units; (3-0)

Multivariate Analysis in Management

Multivariate Analysis in Management is concerned with the study of association among sets of measurements. This multivariate statistics course is intended primarily for PhD students in Management although MBA (Thesis) students pursuing an empirical-based thesis can also benefit. The objective of this course is to introduce graduate students to a variety of multivariate statistical techniques and methods to enable them to effectively carry out an empirical research study in management including the business, public, and not-for-profit sectors. Topics include: introduction to research design and multivariate methods, linear regression, logistic regression, analysis of variance and covariance, multivariate analysis of variance, discriminant analysis, principal components analysis, common factor analysis, and additional multivariate topics if time permits. The technical level of treatment would require basic understanding of matrix and linear algebra and at least one first level course in statistics. Such preliminary technical understanding will be helpful to appreciate the theory and intuition behind the multivariate techniques. A good blend of technical, conceptual, and practical aspects (using SPSS software) of the course will be maintained.

Prerequisite(s): Consent of the Haskayne School of Business.

Management Studies 781 3 units; (3-0)

Philosophy of Science in Management Studies

Historical and critical perspectives of classical issues in philosophy of science, nature of scientific explanation, confirmation of scientific theories, theories of truth, distinctions between science and non-science.

Prerequisite(s): Consent of the Haskayne School of Business.

Management Studies 783 3 units; (3-0)

Advanced Research Methodology and Methods

Research methodology relevant to examination and testing of theoretical and applied issues in management. The development and testing of research concepts; research operations, designs and analysis.

Prerequisite(s): Consent of the Haskayne School of Business.

Management Studies 789 3 units; (3S-0)

Seminar in Management Studies

Intensive study and discussion of current literature and research with respect to selected topics in Management Studies.

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Management Studies 791 3 units; (3-0)

Management Education Seminar

Curricular and course design, instructional techniques, instructional tools, teaching styles, career planning and professional ethics. Nature, role and

function of universities, and business schools, business school relations.

Prerequisite(s): Consent of the Haskayne School of Business.

Note: Doctoral students whose supervisors are members of the Haskayne School of Business are required to register in this seminar in the second year of doctoral studies.

NOT INCLUDED IN GPA

Management Studies 793 3 units; (3S-0)

Conceptual Frameworks of the Enterprise

Advanced, comparative institutional analysis to explain the choice of the firm's boundaries, the governance mechanisms to manage the interface with the external environment and the internal organizational design, so as to reduce transaction costs and facilitate value creation.

Prerequisite(s): Consent of the Haskayne School of Business.

Management Studies 794 3 units; (3S-0)

Theory Development

Processes of building, testing, and disseminating business management theories. Focus on the elements that constitute a theory, requirements for theory validation, and the role of theory in business management research. Analysis of mainstream theories in business management research. Readings include philosophy of science and management research materials on theory development and dissemination.

Prerequisite(s): Consent of the Haskayne School of Business.

Management Studies 795 3 units; (1-0) (formerly Management Studies 792)

Research Development

Development of research skills through participation in a well-defined project under the direct supervision of an experienced researcher.

Prerequisite(s): Management Studies 781 or 783.

Management Studies 797 3 units; (3-0)

Directed Graduate Study in Management

Coverage of various topics on the basis of student and faculty interest.

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Management Studies 799 3 units; (3-0)

Topics in Management Studies

Coverage of various topics on the basis of student and faculty interests.

Prerequisite(s): Consent of the Haskayne School of Business

MAY BE REPEATED FOR CREDIT

Manufacturing Engineering ENMF

For more information about these courses, see the Department of Mechanical and Manufacturing Engineering: <https://schulich.ucalgary.ca/mechanical-manufacturing> in the Schulich School of Engineering.

Senior Courses

Manufacturing Engineering 417 3 units; (3-3)

Manufacturing and Production Processes

The role and characterization of manufacturing technology within the manufacturing enterprise. Overview of deformation processes, joining processes, consolidation processes, material-removal processes, and material alteration processes. Process selection and planning.

Prerequisite(s): Engineering 200.

Manufacturing Engineering 501 3 units; (3-2)

Modelling and Simulation of Manufacturing Systems

General modelling of production systems. Spreadsheet modelling for capacity analysis. Fundamentals of discrete-event simulation including: key concepts; simulation world views; the simulation study life cycle. Modelling and programming aspects of discrete-event simulation including: verification and validation; simulation animation; interfacing simulation software with other systems. Statistical aspects of discrete-event simulation including: random number and random variate generation; input process modelling; output analysis; variance reduction techniques. Applications of discrete-event simulation to the design and analysis of manufacturing systems.

Prerequisite(s): Engineering 319.

Manufacturing Engineering 503 3 units; (3-2)

Computer-Aided Design and Manufacturing

Hardware and software for computer-aided design and manufacturing (CAD/CAM) systems. Geometric modelling, transformation and visualization. Modelling of freeform curves and surfaces. Programming for computer numerically controlled (CNC) machining. Integration of CAD/CAM systems. Applications in motion analysis, structure analysis, optimization, rapid prototyping, reverse engineering and virtual engineering.

Prerequisite(s): Manufacturing Engineering 417 and Mechanical Engineering 337.

Antirequisite(s): Credit for Manufacturing Engineering 503 and 401 will not be allowed.

Manufacturing Engineering 509 3 units; (3-2)

Advanced Manufacturing Systems

Manufacturing strategy and competitive manufacturing. Queuing theory and its application to manufacturing systems analysis (including rapid modelling tools). Linear programming and its application to manufacturing systems problems. Scheduling problems in manufacturing. Supply chain modelling and integration. Enterprise resource planning systems.

Manufacturing Engineering 514 3 units; (3-2)

Integrated Manufacturing Systems

Fundamentals of integrated and competitive manufacturing. Manufacturing and operations strategy. Topics in production and operations management including: production planning and control systems; inventory management systems; process analysis and improvement; quality management systems.

Manufacturing Engineering 517 3 units; (3-2)

Experimental Design and Analysis

Introduction to statistical Design of Experiments (DOE) techniques for efficient data collection, analysis and interpretation. Analysis of Variance (ANOVA), including blocking and nesting, in full and fractional factorial designs to understand sources of variation in performance. Robust design, including classical response surface and Taguchi

techniques, to minimize effects of environmental factors on performance variability. Applications to product and process improvement.

Prerequisite(s): Engineering 319.

Manufacturing Engineering 527 3 units; (3-2/2)

Project Engineering

The project lifecycle. Project planning, scheduling, and control. Resource considerations. Cost estimating, planning, and performance. Project risk. Project personnel and organizational structures.

Antirequisite(s): Credit for Manufacturing Engineering 527 and Engineering 515 will not be allowed.

Manufacturing Engineering 529 3 units; (3-2)

Introduction to Microelectromechanical Systems

Microelectromechanical systems (MEMS) and devices including microsensors and microactuators. Principles of operation, material properties, fabrication techniques including surface and bulk micromachining, IC-derived microfabrication techniques, sensing and actuation principles, sensor dynamics issues, circuit and system issues, packaging, calibration and testing. Illustrative examples include (1) micromachined inertial sensors and actuators for manufacturing processes, (2) micro-actuator arrays for "smart surfaces," (3) biosensors for medical applications, and (4) transducers for aerospace applications.

Antirequisite(s): Credit for Manufacturing Engineering 529 and Mechanical Engineering 519.16 will not be allowed.

Manufacturing Engineering 533 3 units; (3-2/2)

Computer-Based Control for Industrial Automation

Concepts of digital control. Digital circuits. Logic Controller architecture, programming using digital logic concepts, and interfacing. I/O devices sensors and actuators. Applications to work cells and production lines.

Antirequisite(s): Credit for Manufacturing Engineering 533 and 515 will not be allowed.

Graduate Courses

Manufacturing Engineering 605 3 units; (3-0)

Planning and Control of Computer Integrated Manufacturing

Advanced techniques for the design, planning, and control of integrated manufacturing systems. Course elements include: a framework for manufacturing planning and control; data flow and structured modelling methodologies; hierarchical models of manufacturing; cellular manufacturing organization; databases and communications; forecasting, demand management, capacity planning and master production scheduling; materials requirements planning, manufacturing resource planning, Just-in-Time manufacture, and Optimized Production Technology; control of independent demand inventory items; production activity control, shop floor control, scheduling, order release and dispatching; simulation in planning and control.

Manufacturing Engineering 607 3 units; (3-0)

Total Quality Management

Statistical Process Control (SPC) for discrete and continuous manufacturing processes. Acceptance Sampling. Process capability analysis. Introduction to design of experiments (DOE). Overview of quality economics, quality standards and management philosophy.

Manufacturing Engineering 609 3 units; (3-0)

Design and Analysis of Experiments

Statistical Design of Experiments (DOE) techniques for efficient data collection, analysis and interpretation. Analysis of Variance (ANOVA), including blocking and nesting, in full and fractional factorial designs. Robust design, including classical response surface and Taguchi techniques. Applications to product and process improvement.

Manufacturing Engineering 618 3 units; (3-0)

Manufacturing Optimization

Application of operations research techniques in manufacturing engineering: linear manufacturing optimization problems; transportation, assignment and transshipment problems; dynamic manufacturing programming problems; network problems; manufacturing decision problems.

Antirequisite(s): Credit for Manufacturing Engineering 618 and 619.18 will not be allowed.

Manufacturing Engineering 619 3 units; (3-0)

Special Problems in Manufacturing Engineering

Designed to provide graduate students, especially at the PhD level, with the opportunity of pursuing advanced studies in particular areas under the direction of a faculty member. Students would be required to consider problems of an advanced nature.

MAY BE REPEATED FOR CREDIT

Manufacturing Engineering 621 3 units; (3-0)

Optimization Methods with Robotics Applications

Designed for graduate and senior undergraduate students interested in advanced topics in robotics. Based on the students' research topics, contents may vary. These include: fundamental theory in robotics, mathematical toolbox for optimization, differential kinematics, kinematics and actuation redundancy, optimal control, co-operating manipulators, redundancy in force sensing and sensor fusion.

Manufacturing Engineering 623 3 units; (3-0)

CAD/CAM/CAE

Components of CAD/CAM/CAE systems. Geometric modelling. Development of customized CAD systems. Complex shape modelling. Computer-aided process planning. CNC machining. Rapid prototyping. Finite element analysis and motion analysis. Engineering optimization. Virtual design and manufacturing.

Manufacturing Engineering 698 6 units; (0-4)

Graduate Project

Individual project in the student's area of specialization under the guidance of the student's supervisor. A written proposal, one or more written progress reports, and a final written report are required. An oral presentation is required upon completion of the course. Open only to students in the MEng (courses only) program.

Marine Science MRSC

Most formal courses in Marine Science are offered at the Bamfield Marine Sciences Centre that is owned by the Western Canadian Universities Marine Sciences Society. The Centre is situated in Bamfield on the Pacific Coast of Vancouver Island, B.C.

Students must apply to and be accepted by the Centre before they are permitted to register for the Marine Science courses at the University

of Calgary. Additional mandatory fees may be required and will be paid directly to the Bamfield Marine Sciences Centre. For further information students should consult the Department of Biological Sciences.

Senior Courses

Marine Science 321 3 units; (3-0)

Introduction to Marine Science

Exploring the ocean environment, marine organisms, marine ecosystems and the impact of humans on the sea.

Prerequisite(s): Biology 241 and 243.

Note: This course is offered on the main campus in Calgary.

Marine Science 420 6 units; (3-3)

Marine Phycology

A survey of the marine algae, with emphasis on the benthic forms in the vicinity of the Bamfield Marine Sciences Centre. Lectures, laboratory work, field collecting, identification and observation. The study of living specimens is emphasized both in the laboratory and in the field.

Prerequisite(s): Consent of the Department.

Marine Science 430 6 units; (3-3)

Marine Ecology

An analytical approach to biotic associations in the marine environment. Opportunities will be provided for study of the intertidal realm in exposed and protected areas and of beaches and estuaries in the vicinity of the Bamfield Marine Sciences Centre; plankton studies and investigations of the subtidal and benthic environments by diving and dredging are envisaged.

Prerequisite(s): Consent of the Department.

Marine Science 450 6 units; (3-3)

Introduction to Biological Oceanography

The biology of the oceans; supporting coverage of relevant physics and chemistry; plankton biology, community structure and life histories and influencing environmental factors. Collections will be made from sheltered inlets through Barkley Sound to offshore waters; field and laboratory studies of plankton organisms.

Prerequisite(s): Consent of the Department.

Marine Science 500 6 units; (0-6)

Directed Studies

Directed studies under the supervision of a member of the faculty. Involves a research project approved by the supervisor in the field of interest of the student, and will be designed to take maximum advantage of the laboratory and/or field opportunities offered by the Bamfield Marine Sciences Centre.

Prerequisite(s): Consent of the Department.

Marine Science 501 3 units; (3-3)

Special Topics in Marine Biology

This course will be offered, as opportunities arise, by distinguished scientists visiting at the Bamfield Marine Sciences Centre who are prepared to offer a course extending over a 3 week period.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Marine Science 502 6 units; (300 hours)

Special Topics in Marine Biology

This course will be offered, as opportunities arise, by distinguished scientists visiting at the Bamfield

Marine Sciences Centre who are prepared to offer a course extending over a 6-week period.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Marine Science 507 3 units; (0-6)

Directed Studies

Directed studies under the supervision of a member of the faculty. Involves a research project approved by the supervisor in the field of interest of the student, and will be designed to take maximum advantage of the laboratory and/or field opportunities offered by the Bamfield Marine Sciences Centre.

Prerequisite(s): Consent of the Department.

Marine Science 511 3 units; (3S-0)

Papers and Seminar in Marine Science

The purpose of this course is to provide a forum for students to integrate the knowledge they are obtaining from the other courses in this program. It will be a combination of presentations by resident and visiting researchers followed by discussion, discussion of original papers selected by the instructor(s), and short critiques of original papers by each student.

Prerequisite(s): Consent of the Department.

Marine Science 513 3 units; (3S-0)

Applied Data Analysis in Marine Science

Principles of study design and data analysis illustrated by lecture material, current research and research seminars. Students will acquire experience using the statistical computing language R.

Prerequisite(s): Consent of the Department. Students are expected to have completed at least 54 units of a Biology program.

Antirequisite(s): Credit for Marine Science 513 and 511 will not be allowed.

Marine Science 515 3 units; (3-3)

Structure and Function in Marine Animals

This course will use marine invertebrates and vertebrates to explore the structural plans of animals in a functional framework. Rather than providing a comprehensive survey of diversity in the animal kingdom, specific taxa will be chosen that exemplify specific systems (e.g., respiratory, skeletal, nervous, etc.). The major taxa will be discussed together with minor groups that have peculiarities that are of general biological importance. This course will combine the disciplines of classification, evolution, morphology, biomechanics, physiology and biochemistry. The emphasis placed on each discipline will depend on the interests of the instructor. Field work will be integrated with the laboratory exercises.

Prerequisite(s): Consent of the Department.

Marine Science 525 3 units; (3-3)

Ecological Adaptations of Seaweeds

An exploration of morphological, physiological, genetic and reproductive adaptations of seaweeds to their natural and man-altered environments. Daily lectures and laboratory exercises will complement frequent field observations.

Prerequisite(s): Consent of the Department. Students are expected to have completed at least 54 units of a Biology program and to have successfully completed courses in organismal diversity, introductory genetics, cell biology and/or biochemistry. Statistics is recommended.

Marine Science 537 3 units; (3-3)

Population and Community Ecology of Marine Organisms

An introduction to the concepts of marine plant, animal and community ecology. Emphasis will be on organism/physical and chemical environmental interactions, organismal interactions, and concepts of biological diversity. Daily lectures and laboratory exercises will be complemented by frequent field excursions.

Prerequisite(s): Consent of the Department. Students are expected to have completed at least 54 units of a Biology program. Statistics is recommended.

Marine Science 540 6 units; (3-3)

Biology of Marine Birds

A study of the interrelationship of birds and the marine environment. Lectures will emphasize the systematics and ecological relationships, behaviour, life histories, movements and conservation of marine birds. Census techniques and methods of study of marine birds in the field will be considered. Seabird identification, classification, morphology, plumage and moult will be examined in the laboratory.

Prerequisite(s): Zoology 403 and consent of the Department.

Marine Science 572 6 units; (3-3)
(Marine Science 410)

Marine Invertebrate Zoology

A survey of the marine phyla emphasizing natural history, morphology and systematics of the local invertebrate fauna. The course will include lectures, laboratory work, field collection, identification and observation. The study of living specimens is emphasized both in the laboratory and in the field.

Prerequisite(s): Consent of the Department.

Marine Science 574 6 units; (3-3)

Biology of Fishes

Classification, physiology, ecology, behaviour and zoogeography of fishes with particular emphasis on those in the marine environment of the British Columbia coast. Involves some field projects.

Prerequisite(s): Consent of the Department.

Graduate Courses

Enrolment in any graduate course requires consent of the Department.

600-level courses are available with permission to undergraduate students in the final year of their programs.

Special Graduate Courses: Each year the Western Canadian Universities Marine Biological Society offers short (one-week) intensive courses especially for graduate students interested in Marine Biology. Topics vary from year-to-year. Details are available from the Department of Biological Sciences.

Marine Science 600 6 units; (0-6)
(Marine Science 500)

Directed Studies

A course of directed studies under the supervision of a member of faculty, involving a research project approved by the supervisor. Each study will be designed to take maximum advantage of laboratory and/or field opportunities offered by the Bamfield Marine Sciences Centre.

Prerequisite(s): Consent of the Department.

Marine Science 601 3 units; (3-3)
(Marine Science 502)

Special Topics (3 weeks)

Courses of a specialized nature offered, as opportunities arise, by distinguished scientists visiting the Bamfield Marine Sciences Centre.

Prerequisite(s): Consent of the Department.

Marine Science 602 6 units; (3-3)
(Marine Science 501)

Special Topics (6 weeks)

Courses of a specialized nature offered, as opportunities arise, by distinguished scientists visiting the Bamfield Marine Sciences Centre.

Prerequisite(s): Consent of the Department.

Marketing MKTG

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses

Marketing 317 3 units; (3-0)

Foundations of Marketing

An introductory marketing course designed for management students to introduce the principles and practices of marketing. Topics will cover basic marketing concepts, societal issues, and the decision-making process of marketers in developing marketing strategies and plans. The focus of the course will be on the implementation of specific product, pricing, distribution and communication strategies for specific market situations.

Prerequisite(s): Admission to the Haskayne School of Business, and 30 units including Business and Environment 291 or Strategy and Global Management 217.

Antirequisite(s): Credit for Marketing 317 and 341 will not be allowed.

Marketing 341 3 units; (3-0)

Introduction to Marketing

An introductory marketing course designed for non-Management students to introduce the broad principles and practices of marketing from both an organizational and societal perspective. Topics will cover basic marketing concepts, societal issues, and the decision process of marketers in developing, pricing, promoting and distributing their products.

Antirequisite(s): Credit for Marketing 341 and 317 will not be allowed.

Note: Not available for credit towards the Bachelor of Commerce degree. Preference in enrolment is given to students who have declared a Management and Society Minor.

Marketing 431 3 units; (3-0)

Retail Management

A strategic approach to the retail industry. Managing the retail operation, including site selection, store design, consumer behaviour in retail situations, buying, inventory management, and visual merchandising. The role of retailing in the global economy.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Marketing 433 3 units; (3-0)

Business-To-Business Marketing

Marketing management and theory applied to the purchase of products and services by organizations. Topics include industrial market dynamics,

organizational buying behaviour, relationship development, technology, and the importance of innovation.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Marketing 435 3 units; (3-0)

Marketing Communications

Evaluations of the roles of various communication tools including advertising, sales promotion, personal selling and public relations.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Marketing 449 3 units; (3-0)

Sales Management

Strategic and managerial aspects of professional selling and sales force management. Topics include sales forecasting, recruitment, training, motivation, compensation and territory management, CRM, integration of technology, sales professionalism/ethics.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Marketing 465 3 units; (3-0)

Marketing Research

Understanding how to conduct and evaluate research for management decision making. Emphasis on research design, measurement concepts, sample design, field work, statistical concepts, data analysis and reporting research findings. Practical application by doing a field research study.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Marketing 467 3 units; (3-0)

International Marketing

A course on the environment and basic principles underlying the design and implementation of marketing strategies across national and cross-cultural boundaries. Topics will follow the decision process of international marketers in researching the environment, planning the entry strategy and designing their activities on product, distribution, promotion and pricing.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Marketing 475 3 units; (3-0)

Digital Marketing

Examination of specific digital strategies, tactics and platforms to understand the concepts of digital and interactive marketing. Topics include social media, user-generated content, mobile marketing and display advertising.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Antirequisite(s): Credit for Marketing 475 and 559.02 will not be allowed.

Marketing 477 3 units; (3-0)

Product Management

An in-depth examination of product management issues facing organizations. This includes strategic innovation, product portfolio, new product/service development, brand management, and diffusion of technology.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Marketing 483 3 units; (3-0)

Buyer Behaviour

Study of factors influencing buyer decision making and purchase behaviour. Topics include buyer motivation, personality, learning, and attitudes as well as the influence of culture, social class, groups, and situational contexts on buyers.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Marketing 487 3 units; (3-0)

Services Marketing

Application of the managerial practices and theory related to services marketing. Topics include management and measurement of service quality, service recovery. The linking of customer measurement to performance measurement, and cross-function issues through integration of marketing with disciplines such as operations and human resources.

Prerequisite(s): Admission to the Haskayne School of Business and Marketing 317.

Marketing 493 3 units; (3-0)

Strategic Marketing

Marketing strategy is explored in the context of overall corporate strategy. Integrates the aspects of the market mix into formal planning systems. The focus of the course is on strategic responses to changing customer needs and competitive activities.

Prerequisite(s): Admission to the Haskayne School of Business and 84 units including Marketing 317.

Corequisite(s): Marketing 465.

Marketing 559 3 units; (3-0)

Selected Topics in Marketing

Investigation of selected topics in Marketing.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units including Marketing 317. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Marketing 601 3 units; (3-0)

Marketing Management

An introductory course on marketing management with an emphasis on the marketing concept as the focus of business strategy. The decision variables as well as functional frameworks used by marketing managers are emphasized by concentrating on the relationship between business and consumers.

Marketing 672 1.5 units; (3-1T)

Strategic Marketing

Introduction to traditional marketing concepts such as segmentation, positioning, product development, and pricing. It also includes omnichannel marketing, permission and inbound marketing, personalization and customer relationship management, and content marketing.

Prerequisite(s): Admission to the Master of Management program.

Marketing 674 1.5 units; (3-1T)

Consumer Insights

Provides practical insights into all aspects of the marketing mix. Emphasizes measurement, testing, and interpretation of consumer responses in areas

such as perception, motivation, decision making, and consumer culture.

Prerequisite(s): Admission to the Master of Management program.

Marketing 735 3 units; (3-0)

Marketing Communications

Evaluation of strategic roles of a variety of communication disciplines - such as advertising, direct response advertising, sales promotion and public relations - and how companies combine those disciplines to provide clarity, consistency, and maximum impact.

Prerequisite(s): Marketing 601.

Marketing 741 3 units; (3-0)

Business-To-Business Marketing

Management issues in the marketing of products and services to business, government and industrial customers. Topics include organizational buying behaviour, industrial market segmentation, demand analysis and sales forecasting, development and implementation of an industrial marketing mix.

Prerequisite(s): Marketing 601.

Marketing 761 3 units; (3-0)

Buyer Behaviour

Study of factors influencing buyer decision-making processes and purchase behaviours, with implications for marketing practice.

Prerequisite(s): Marketing 601.

Marketing 763 3 units; (3-0)

Marketing Research

Study of research as a process for gathering market information to aid problem solving. Steps in the research process reviewed include problem definition, research design, data collection, data analysis and report preparation.

Prerequisite(s): Marketing 601.

Marketing 783 3 units; (3-0)

Services Marketing and Management

Study of processes and practices relevant to strategic firms using service for competitive advantage. Focuses on the integration of marketing, operations, and human resources from the consumer's perspective.

Prerequisite(s): Marketing 601.

Marketing 785 3 units; (3-0)

New Venture Marketing

Within the context of high-potential, high growth ventures, examines four pillars of new product/new business opportunity. How to create value for the customer, solve significant problems through product and service design, measure sustainable financial value, and assess fit of new ideas with entrepreneur/organization. Emphasis on discovering market opportunities and exploring product or service feasibility.

Prerequisite(s): Marketing 601.

Marketing 789 3 units; (3S-0)

Seminar in Marketing Management

Intensive study and discussion of current literature and research with respect to selected, advanced topics in marketing.

Prerequisite(s): Marketing 601 or consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Marketing 793 3 units; (3-0)

Strategic Marketing

Strategic market planning in a corporate context. Developing marketing strategies and understanding implementation. Examining the market management process.

Prerequisite(s): Marketing 601.

Marketing 795 3 units; (3-0)

International Marketing

Design and implementation of marketing strategies across countries. Focuses on the global marketing environment and decision issues on foreign market entry, local marketing and global management of marketing activities.

Prerequisite(s): Marketing 601.

Marketing 797 3 units; (3S-0)

Advanced Seminar in Marketing

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Marketing 799 3 units; (3S-0)

Doctoral Seminars in Marketing

MAY BE REPEATED FOR CREDIT

Mathematics MATH

For more information about these courses see the Department of Mathematics and Statistics math.ucalgary.ca/.

Notes:

- For listings of related courses, see Actuarial Science and Statistics.
- Effective Fall 2018, all Applied Mathematics and Pure Mathematics courses have been renamed as Mathematics with a change in course number in some cases. Please refer to the descriptions of the individual Mathematics courses for details. Students enrolled in any program that requires any Applied Mathematics or Pure Mathematics course should use the corresponding Mathematics course as replacement.

Mathematics 177 0.75 units; (16 hours)

Further Topics from Mathematics 277

An overview of the basic notions in multivariate calculus: vector functions and differentiation, curves and parametrization, functions of several variables, partial differentiation, differentiability, implicit functions, extreme values.

Prerequisite(s): Mathematics 211 and 267.

Note: This course covers topics to allow students with credit in Mathematics 267 to be permitted to register in Mathematics 375.

NOT INCLUDED IN GPA

Junior Courses

Mathematics 205 3 units; (3-1)

Mathematical Explorations

A mathematics appreciation course. Topics selected by the instructor to provide a contemporary mathematical perspective and experiences in mathematical thinking. May include historical material on the development of classical mathematical ideas as well as the evolution of recent mathematics.

Prerequisite(s): Mathematics 30-1, 30-2, or Mathematics 2 (offered by Continuing Education).

Note: Not included in the Field of Mathematics.

Mathematics 209 3 units; (3-2)

Applied and Computational Linear Algebra for Energy Engineers

An introduction to systems of linear equations, vectors in Euclidean space and matrix algebra. Geometrical applications and computing techniques will be emphasized. Students will complete a project using mathematical software.

Prerequisite(s): Admission to the Energy Engineering Program.

Mathematics 211 3 units; (3-1)

Linear Methods I

An introduction to systems of linear equations, vectors in Euclidean space and matrix algebra. Additional topics include linear transformations, determinants, complex numbers, eigenvalues, and applications.

Prerequisite(s): Mathematics 30-1 or Mathematics 2 (offered by Continuing Education).

Antirequisite(s): Credit for Mathematics 211 and 213 will not be allowed.

Mathematics 213 3 units; (3-1)

Linear Algebra I

A rigorous introduction to the theory of vector spaces, with an emphasis on proof writing and abstract reasoning. Topics include fields, subspaces, bases and dimension, linear transformations, determinants, eigenvalues and eigenvectors.

Prerequisite(s): A grade of 80 per cent or higher in Mathematics 30-1.

Antirequisite(s): Credit for Mathematics 213 and 211 will not be allowed.

Mathematics 249 3 units; (4-1)

Introductory Calculus

An introduction to single variable calculus. Limits, derivatives and integrals of algebraic, exponential, logarithmic and trigonometric functions play a central role. Additional topics include applications of differentiation; the fundamental theorem of calculus, improper integrals and applications of integration.

Prerequisite(s): Mathematics 30-1 or Mathematics 2 (offered by Continuing Education).

Antirequisite(s): Not open to students with 50 per cent or higher in Mathematics 31 or a grade of "C" or higher in Mathematics 3 offered through University of Calgary Continuing Education, except with special departmental permission. Credit for Mathematics 249 and either 265 or 275 will not be allowed.

Mathematics 265 3 units; (3-1)

University Calculus I

An introduction to single variable calculus intended for students with credit in high school calculus. Limits, derivatives, and integrals of algebraic, exponential, logarithmic and trigonometric functions play a central role. Additional topics include applications of differentiation; the fundamental theorem of calculus, improper integrals and applications of integration. Differential calculus in several variables will also be introduced.

Prerequisite(s): Mathematics 30-1 or Mathematics 2 (offered by Continuing Education); and Mathematics 31 or Mathematics 3 (offered by Continuing Education).

Antirequisite(s): Credit for Mathematics 265 and either 249 or 275 will not be allowed.

Mathematics 267 **3 units; (3-1)**

University Calculus II

A concluding treatment of single variable calculus and an introduction to calculus in several variables. Single variable calculus: techniques of integration, sequences, series, convergence tests, and Taylor series. Calculus of several variables: partial differentiation, multiple integration, parametric equations, and applications

Prerequisite(s): One of Mathematics 249, 265 or 275.

Antirequisite(s): Credit for Mathematics 267 and 277 will not be allowed.

Mathematics 271 **3 units; (3-1T-1)**

Discrete Mathematics

An introduction to proof techniques and abstract mathematical reasoning: sets and relations, induction, counting, prime numbers, divisibility and modular arithmetic, graphs and trees.

Prerequisite(s): Mathematics 211 or 213.

Mathematics 273 **3 units; (3-1T-1)**

Numbers and Proofs

A rigorous introduction to proof techniques and abstract mathematical reasoning with an emphasis on number systems. Topics include functions, sets and relations; the integers, prime numbers, divisibility and modular arithmetic; induction and recursion; real numbers; Cauchy sequences and completeness; complex numbers.

Prerequisite(s): A grade of 80 per cent or higher in Mathematics 30-1.

Mathematics 275 **3 units; (3-1T-1.5)**

Calculus for Engineers and Scientists

An extensive treatment of differential and integral calculus in a single variable, with an emphasis on applications. Differentiation: derivative laws, the mean value theorem, optimization, curve sketching and other applications. Integral calculus: the fundamental theorem of calculus, techniques of integration, improper integrals, and areas of planar regions. Infinite series: power series, Taylor's theorem and Taylor series.

Prerequisite(s): Mathematics 30-1 or Mathematics 2 (offered by Continuing Education); and Mathematics 31 or Mathematics 3 (offered by Continuing Education).

Antirequisite(s): Credit for Mathematics 275 and either 249 or 265 will not be allowed.

Mathematics 277 **3 units; (3-1T-1.5)**

Multivariable Calculus for Engineers and Scientists

An introduction to calculus of several real variables: curves and parametrizations, partial differentiation, the chain rule, implicit functions; integration in two and three variables and applications; optimization and Lagrange multipliers.

Prerequisite(s): Mathematics 211 and 275.

Antirequisite(s): Credit for Mathematics 277 and 267 will not be allowed.

Senior Courses

Mathematics 305 **3 units; (3-1T)**
(Education 305)

Inside Mathematics

An exploration of the usually tacit elements of mathematical concepts and processes, the course

focuses on strategies for unpacking concepts and for sustained engagement in inquiry.

Prerequisite(s): Mathematics 211 or 213; and 271 or 273.

Note: This course will be co-taught by scholars from the Faculty of Science and Werklund School of Education. This course is not in the Field of Mathematics.

Mathematics 307 **3 units; (3-1T)**
(formerly Mathematics 421)

Complex Analysis I

An initial treatment of complex analytic functions in a single variable. Topics include differentiation, Cauchy-Riemann equations, line integration, Cauchy's theorem and Cauchy's integral formula, Taylor's theorem, the residue theorem, and applications to definite integrals.

Prerequisite(s): Mathematics 267.

Antirequisite(s): Credit for Mathematics 307 and 423 will not be allowed.

Mathematics 311 **3 units; (3-1T)**

Linear Methods II

An introductory course in the theory of abstract vector spaces: linear independence, spanning sets, basis and dimension; linear transformations and the rank-nullity theorem; the Gram-Schmidt algorithm and orthogonal diagonalization; singular value decomposition and other applications.

Prerequisite(s): Mathematics 211 or 213.

Antirequisite(s): Credit for Mathematics 311 and 313 will not be allowed.

Mathematics 313 **3 units; (3-1T)**

Linear Algebra II

The theory of linear operators acting on finite dimensional vector spaces: invariant subspaces, diagonalization and triangulation; canonical forms; inner product spaces and orthogonalization; spectral theory; singular value decomposition and other applications.

Prerequisite(s): Mathematics 213.

Antirequisite(s): Credit for Mathematics 311 and 313 will not be allowed.

Mathematics 315 **3 units; (3-1T)**
(formerly Pure Mathematics 315)

Algebra I

A broad overview of the elementary theory of groups, rings and fields. Group theory: cyclic, symmetric, alternating, dihedral and classical matrix groups, cosets and Lagrange's theorem, group homomorphisms, normal subgroups, quotient groups and the isomorphism theorem. Rings and fields: the integers modulo n , polynomial rings, ring homomorphisms, ideals, quotient rings the isomorphism theorem, unique factorization domains, principal ideal domains, Euclidean domains and the construction of finite fields.

Prerequisite(s): Mathematics 271 or 273.

Antirequisite(s): Credit for Mathematics 315 and Pure Mathematics 317 will not be allowed.

Mathematics 318 **3 units; (3-0)**
(formerly Pure Mathematics 418)

Introduction to Cryptography

The basics of cryptography, with emphasis on attaining well-defined and practical notions of security. Symmetric and public-key cryptosystems; one-way and trapdoor functions; mechanisms for data integrity; digital signatures; key management; applications to the design of cryptographic systems. Assessment will primarily focus on mathematical theory and proof-oriented homework

problems; additional application programming exercises will be available for extra credit.

Prerequisite(s): Mathematics 271 or 273.

Antirequisite(s): Credit for Mathematics 318 and any of Pure Mathematics 329, Computer Science 418, 429, or 557 will not be allowed.

Mathematics 319 **3 units; (3-1T)**
(formerly Pure Mathematics 319)

Transformation Geometry

Geometric transformations in the Euclidean plane: Symmetry, Frieze, and Wallpaper groups.

Prerequisite(s): Mathematics 211 or 213; and one other 200-level course from the Field of Mathematics.

Mathematics 322 **3 units; (3-0)**
(formerly Pure Mathematics 423)

Differential Geometry

The fundamentals of differential geometry primarily with a focus on the theory of curves and surfaces in three dimensional space. The theory of curves studies global properties of curves such as the four vertex theorem. The theory of surfaces introduces the fundamental quadratic forms of a surface, intrinsic and extrinsic geometry of surfaces, and the Gauss-Bonnet theorem.

Prerequisite(s): Mathematics 271 or 273; Mathematics 367 or 377; Mathematics 375 or 376.

Mathematics 325 **3 units; (3-1T)**
(formerly Applied Mathematics 425)

Introduction to Optimization

An example driven overview of optimization problems: quadratic forms, minimum energy and distance, least squares, generalized inverses, location and classification of critical points, variational treatment of eigenvalues, Lagrange multipliers and linear programming.

Prerequisite(s): Mathematics 311 or 313; one of Mathematics 367, 377 or 331.

Mathematics 327 **3 units; (3-0)**
(formerly Pure Mathematics 427)

Number Theory

Divisibility and the Euclidean algorithm, modular arithmetic and congruences, quadratic reciprocity, arithmetic functions, distribution of primes.

Prerequisite(s): Mathematics 271 or 273.

Mathematics 331 **3 units; (3-1T)**

Advanced Calculus for the Natural Sciences

A broad treatment of differential and integral calculus with an emphasis on techniques used in the natural sciences. Differential equations: linear ordinary differential equations, and systems of ordinary differential equations. Calculus of several variables: partial differentiation, the chain rule, double and triple integrals. Introduction to vector analysis: theorems of Green, Gauss and Stokes. Additional topics: notions of probability and normal distribution; the Fourier transform.

Prerequisite(s): Mathematics 267 or 277; Mathematics 211 or 213.

Antirequisite(s): Credit for Mathematics 331 and either 367 or 377 will not be allowed.

Note: This course is not part of the Field of Mathematics.

Mathematics 335 **3 units; (3-1T)**

Analysis I

A rigorous treatment of the theory of functions of a single real variable: functions, countable and uncountable sets; the axioms and basic topology of the real numbers; convergence of

sequences; limits of functions, continuity and uniform continuity; differentiability and the mean value theorem; the Riemann integral and the fundamental theorem of calculus; series and convergence tests.

Prerequisite(s): Mathematics 267 or 277; Mathematics 271 or 273.

Antirequisite(s): Credit for Mathematics 335 and 355 will not be allowed.

Mathematics 355 **3 units; (3-1T)**

Enriched Analysis I

A rigorous treatment of the theory of functions of a single real variable: functions, countable and uncountable sets; the axioms and basic topology of the real numbers; convergence of sequences; limits of functions, continuity and uniform continuity; differentiability and the mean value theorem; the Riemann integral and the fundamental theorem of calculus; series and convergence tests. Mathematics 355 will contain more challenging and deeper assessment than Mathematics 335.

Prerequisite(s): Mathematics 267 or 277; Mathematics 271 or 273.

Antirequisite(s): Credit for Mathematics 355 and 335 will not be allowed.

Mathematics 361 **3 units; (3-1T)**
(formerly Mathematics 411)

Linear Spaces with Applications

Canonical forms. Inner product spaces, invariant subspaces and spectral theory. Quadratic forms.

Prerequisite(s): Mathematics 311 or a grade of "B+" or higher in Mathematics 213; Mathematics 267 or 277.

Antirequisite(s): Credit for Mathematics 361 and 313 will not be allowed.

Mathematics 367 **3 units; (3-1T)**

University Calculus III

An overview of differential calculus in several variables and vector calculus. Functions of several variables; limits, continuity, differentiability, partial differentiation, applications including optimization and Lagrange multipliers. Vector calculus: vector functions, line integrals and surface integrals, Green's theorem, Stokes' theorem, and the Divergence theorem.

Prerequisite(s): Mathematics 267 or 277; Mathematics 211 or 213.

Antirequisite(s): Credit for Mathematics 367 and either 331 or 377 will not be allowed.

Mathematics 371 **3 units; (3-0)**
(formerly Pure Mathematics 471)

Combinatorics and Graph Theory

Counting techniques, generating functions, inclusion-exclusion, introduction to graph theory.

Prerequisite(s): Mathematics 271 or 273; and one of Mathematics 249, 265 or 275.

Mathematics 375 **3 units; (3-1.5T)**

Differential Equations for Engineers and Scientists

Definition, existence and uniqueness of solutions; first order and higher order equations and applications; Homogeneous systems; Laplace transform; partial differential equations of mathematical physics.

Prerequisite(s): Mathematics 277 or both Mathematics 267 and 177.

Antirequisite(s): Credit for Mathematics 375 and either 376 or Applied Mathematics 311 will not be allowed.

Mathematics 376 **3 units; (3-1T)**
(formerly Applied Mathematics 311)

Differential Equations I

Classification of ordinary differential equations, first and second order equations with applications, series solutions about regular points and singular points, special functions, Laplace transform.

Prerequisite(s): Mathematics 267 or 277.

Antirequisite(s): Credit for Mathematics 376 and 375 or Applied Mathematics 307 will not be allowed.

Mathematics 377 **3 units; (3-1.5T)**

Vector Calculus for Engineers and Scientists

Review of calculus of functions of several variables. Vector fields, line integrals, independence of path, Green's theorem; Surface integrals, divergence theorem, Stokes' theorem; applications; curvilinear co-ordinates; Laplace, diffusion and wave equations in three dimensional space.

Prerequisite(s): Mathematics 375.

Antirequisite(s): Credit for Mathematics 377 and either 331 or 367 will not be allowed.

Mathematics 383 **3 units; (3-1T)**
(formerly Applied Mathematics 481)

Introduction to Mathematical Finance

An introduction to the fundamental concepts of mathematical finance in an elementary setting. Topics include: risk, return, no arbitrage principle; basic financial derivatives: options, forwards and future contracts; risk free assets, time value of money, zero coupon bonds; risky assets, binomial tree model, fundamental theorem of asset pricing; portfolio management and capital asset pricing model; no arbitrage pricing of financial derivatives; hedging.

Prerequisite(s): Statistics 321.

Mathematics 391 **3 units; (3-1T)**
(formerly Applied Mathematics 491)

Numerical Analysis I

Interpolation and approximation, numerical integration and differentiation, numerical methods for the solution of non-linear equations, systems of linear equations and the eigenvalue problem, introduction to a scientific computing software.

Prerequisite(s): Mathematics 211 or 213; Mathematics 267 or 277; and one of Computer Science 217, 231, 235 or Data Science 211.

Antirequisite(s): Credit for Mathematics 391 and Computer Science 491 will not be allowed.

Mathematics 401 **3 units; (3-0)**

Special Topics

Higher level topics which can be repeated for credit.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Mathematics 403 **3 units; (3-0)**

Topics in Mathematics for Economics

Techniques of integration. Multiple integrals. Analysis of functions. Continuity. Compact sets. Convex sets. Separating hyperplanes. Lower and upper semi-continuous correspondences. Fixed point theorems, Optimal control.

Prerequisite(s): Mathematics 211 or 213; Mathematics 267 or 277 or both Economics 387 and 389.

Note: This course is not part of the Field of Mathematics.

Mathematics 413 **3 units; (3-1T)**
(formerly Applied Mathematics 413)

Introduction to Partial Differential Equations

First order partial differential equations, Sturm-Liouville systems, Fourier series, Double Fourier series, Fourier integrals, Applications to boundary value problems in bounded and unbounded domains, Bessel function with applications.

Prerequisite(s): One of Mathematics 375, 376, 331 or Applied Mathematics 311; and Mathematics 331 or 367 or 377

Mathematics 415 **3 units; (3-1T)**
(formerly Applied Mathematics 415)

Mathematical Methods

Mathematical analysis of linear systems. Fourier and Laplace transforms, applications and numerical methods. Functions of a complex variable and applications.

Prerequisite(s): One of Mathematics 331, 367, 375, 376 or Applied Mathematics 311.

Note: This course is not part of the Field of Mathematics.

Mathematics 429 **3 units; (3-0)**
(formerly Pure Mathematics 429)

Cryptography: Design and Analysis of Cryptosystems

Review of basic algorithms and complexity. Designing and attacking public key cryptosystems based on number theory. Basic techniques for primality testing, factoring and extracting discrete logarithms. Elliptic curve cryptography. Additional topics may include knapsack systems, zero knowledge, attacks on hash functions, identity-based cryptography, and quantum cryptography.

Prerequisite(s): One of Mathematics 315, Pure Mathematics 315 or 317; one of Mathematics 318, Pure Mathematics 329, 418 or Computer Science 418.

Mathematics 431 **3 units; (3-0)**
(formerly Pure Mathematics 431)

Algebra II

An intermediate course in the theory of groups and fields. Group theory: group actions, Sylow theorems, solvable, nilpotent and p-groups, simplicity of alternating groups and PSL(n,q). Field theory: algebraic and transcendental extensions, separability and normality, Galois theory, insolvability of the general quintic equation, and computation of Galois groups over the rationals.

Prerequisite(s): Mathematics 311 or 313; one of Mathematics 315, Pure Mathematics 315 or 317.

Mathematics 433 **3 units; (3-1T)**
(formerly Applied Mathematics 433)

Mathematical Methods in Physics

Fourier analysis. Laplace Transforms. Partial differential equations. Complex analysis. Residue integrals. Extensive physical applications.

Prerequisite(s): One of Mathematics 375, 376 or Applied Mathematics 311; Mathematics 367 or 377; Mathematics 211 or 213.

Note: This course is not part of the Field of Mathematics.

Mathematics 445 **3 units; (3-0)**

Analysis II

An intermediate course in the theory of metric spaces and the continuous functions that act on them: metric spaces and normed vector spaces; complete metric spaces and the Baire category theorem; continuous functions on compact metric spaces and uniform convergence; the contraction mapping principle and applications;

theorems of Stone-Weierstrass and Arzel -Ascoli; differentiability on Euclidean spaces and the implicit function theorem.

Prerequisite(s): Mathematics 367 or 377; one of Mathematics 311, 313, 361 or 411; Mathematics 335 or 355.

Antirequisite(s): Credit for Mathematics 445 and 447 will not be allowed.

Mathematics 447 **3 units; (3-0)**

Enriched Analysis II

An intermediate course in the theory of metric spaces and the continuous functions that act on them: metric spaces and normed vector spaces; complete metric spaces and the Baire category theorem; continuous functions on compact metric spaces and uniform convergence; the contraction mapping principle and applications; theorems of Stone-Weierstrass and Arzel -Ascoli; differentiability on Euclidean spaces and the implicit function theorem. Mathematics 447 will contain more challenging and deeper assessment than Mathematics 445.

Prerequisite(s): Mathematics 367 or 377; Mathematics 313 or "B+" or higher in Mathematics 311; Mathematics 355 or "B+" or higher in Mathematics 335.

Antirequisite(s): Credit for Mathematics 447 and either Mathematics 445 or Pure Mathematics 545 will not be allowed.

Mathematics 476 **3 units; (3-1T)**
(formerly Applied Mathematics 411)

Differential Equations II

Existence and uniqueness theorems, comparison and oscillation theorems, Green's functions, Sturm-Liouville problems, systems of equations, phase portraits, stability.

Prerequisite(s): One of Mathematics 375, 376 or Applied Mathematics 311; one of Mathematics 367, 377 or 331; Mathematics 335 or 355.

Mathematics 493 **3 units; (3-1T)**
(formerly Applied Mathematics 493)

Numerical Analysis II

Numerical solution of ordinary differential equations, single and multi-step methods, numerical solution of boundary value problems, numerical solution of partial differential equations, stability analysis.

Prerequisite(s): One of Mathematics 331, 375, 376 or Applied Mathematics 311; and one of Mathematics 413, 375 or Applied Mathematics 413; and one of Mathematics 391, Applied Mathematics 491, Computer Science 491 or Geophysics 419.

Mathematics 501 **3 units; (3-0)**

Measure and Integration

Abstract measure theory, basic integration theorems, Fubini's theorem, Radon-Nikodym theorem, Lp Spaces, Riesz representation theorems.

Prerequisite(s): Mathematics 445 or 447; and 3 units of Mathematics in the Field of Mathematics at the 400 level or higher.

Antirequisite(s): Credit for Mathematics 501 and any one of Mathematics 601, Pure Mathematics 501 or 601 will not be allowed.

Mathematics 502 **3 units; (3-0)**
(formerly Pure Mathematics 503)

Topics in Mathematics

Topics will be chosen according to the interests of instructors and students.

Prerequisite(s): Any two Mathematics courses in the Field of Mathematics at the 400 level or above.

MAY BE REPEATED FOR CREDIT

Mathematics 503 **3 units; (3-0)**
(formerly Applied Mathematics 503)

The Mathematics of Wavelets, Signal and Image Processing

Continuous and discrete Fourier transforms, the Fast Fourier Transform, wavelet transforms, multiresolution analysis and orthogonal wavelet bases, and applications.

Prerequisite(s): One of Mathematics 391, Applied Mathematics 491, Computer Science 491 or Geophysics 419; 6 units of Mathematics in the Field of Mathematics at the 400 level or above.

Mathematics 505 **3 units; (3-0)**
(formerly Applied Mathematics 505)

Calculus on Manifolds

Integral and differential calculus on manifolds including tensor fields, covariant differentiation, Lie differentiation, differential forms, Frobenius' theorem, Stokes' theorem, flows of vector fields.

Prerequisite(s): Mathematics 445 or 447; and one of Mathematics 375, 376 or Applied Mathematics 311.

Mathematics 511 **3 units; (3-0)**
(formerly Pure Mathematics 511)

Algebra III

A sophisticated introduction to modules over rings, especially commutative rings with identity. Major topics include: snake lemma; free modules; tensor product; hom-tensor duality; finitely presented modules; invariant factors; free resolutions; and the classification of finitely generated modules over principal ideal domains. Adjoint functors play a large role. The course includes applications to linear algebra, including rational forms.

Prerequisite(s): Mathematics 313, 361 or 411; Mathematics 431 or Pure Mathematics 431; 3 units of Mathematics in the Field of Mathematics at the 400 level or higher.

Antirequisite(s): Credit for Mathematics 511 and either 607 or Pure Mathematics 611 will not be allowed.

Mathematics 515 **3 units; (3-0)**
(formerly Pure Mathematics 415)

Foundations

Set theory, mathematical logic, and category theory. Topics covered will vary based on interests of students and instructor.

Prerequisite(s): Mathematics 431 or Pure Mathematics 431; 3 units of Mathematics from the Field of Mathematics at the 400 level or above.

Mathematics 516 **3 units; (1.5-3)**

Senior Project

A capstone course intended for Mathematics students in the final year of study (excluding those in the honours program or the statistics concentration). Students will investigate scientific or social issues by applying mathematical methods acquired in previous mathematics courses. A final

project will be submitted at the end of the term and its contents summarized in a presentation.

Prerequisite(s): 6 units in the Field of Mathematics at the 400 level or above.

Antirequisite(s): Credit for Mathematics 516 and 518 will not be allowed.

Mathematics 518 **3 units; (1.5-3)**

Honours Thesis

A capstone course intended for Honours Mathematics students in their final year of study. Students will produce and present a substantial thesis under the supervision of a faculty member. The emphasis is on how to address theoretical or real world scientific or social issues by applying the various mathematical methods acquired in the earlier years in a unified and appropriate way.

Prerequisite(s): 6 units in the Field of Mathematics at the 400 level or above.

Antirequisite(s): Credit for Mathematics 518 and 516 will not be allowed.

Note: This course extends over the Fall and Winter Terms. Students will meet regularly with their thesis supervisors during the terms. Students submit a thesis, and the course culminates in a series of student presentations. A grade of "B" or higher is required for the Honours program. Students are advised to consult with the Undergraduate Director for information and advice before registration into the course. Students earning an Honours degree in Mathematics along with a concentration in Statistics must complete both Mathematics 518 and Statistics 517.

Mathematics 521 **3 units; (3-0)**

Complex Analysis II

A rigorous study of function of a single complex variable. Holomorphic function, Cauchy integral formula and its applications. Conformal mappings. Fractional linear transformations. Argument principle. Schwarz lemma. Conformal self-maps of the unit disk.

Prerequisite(s): One of Mathematics 307, 421 or 423; Mathematics 445 or 447; 3 units of Mathematics in the Field of Mathematics at the 400 level or above.

Mathematics 525 **3 units; (3-0)**

Introduction to Algebraic Topology

An introduction to the algebraic invariants that distinguish topological spaces. Specifically, the course focuses on the fundamental group and its applications, and homology. Students will be introduced to the basics of homological algebra.

Prerequisite(s): Mathematics 431 and one of Mathematics 445 or 447.

Mathematics 527 **3 units; (3-0)**
(formerly Pure Mathematics 527)

Computational Number Theory

An investigation of major problems in computational number theory, with emphasis on practical techniques and their computational complexity. Topics include basic integer arithmetic algorithms, finite fields, primality proving, factoring methods, algorithms in algebraic number fields.

Prerequisite(s): Mathematics 431 or Pure Mathematics 431; Mathematics 429 or Pure Mathematics 429 or Mathematics 327 or Pure Mathematics 427.

Antirequisite(s): Credit for Mathematics 527 and either Pure Mathematics 527 or 643 will not be allowed.

Mathematics 545 **3 units; (3-0)****Analysis III**

Sequences and series of functions; Lebesgue integration on the line, Fourier series and the Fourier transform, pointwise convergence theorems, distributions and generalized functions.

Prerequisite(s): Mathematics 445 or 447; 3 units of Mathematics in the Field of Mathematics at the 400 level or above.

Antirequisite(s): Credit for Mathematics 545 and 603 will not be allowed.

Mathematics 581 **3 units; (3-0)**
(formerly Applied Mathematics 581)**Stochastic Calculus for Finance**

Martingales in discrete and continuous time, risk-neutral valuations, discrete- and continuous-time (B,S)-security markets, Cox-Ross-Rubinstein formula, Wiener and Poisson processes, Ito formula, stochastic differential equations, Girsanov's theorem, Black-Scholes and Merton formulas, stopping times and American options, stochastic interest rates and their derivatives, energy and commodity models and derivatives, value-at-risk and risk management.

Prerequisite(s): Mathematics 383 or Applied Mathematics 481; 6 units of Mathematics in the Field of Mathematics at the 400 level or above.

Antirequisite(s): Credit for Mathematics 581 and Applied Mathematics 681 will not be allowed.

Mathematics 583 **3 units; (3-0)**
(formerly Applied Mathematics 583)**Computational Finance**

Review of financial asset price and option valuation models; model calibration; tree-based methods; finite-difference methods; Monte Carlo simulation; Fourier methods.

Prerequisite(s): Mathematics 381 or Applied Mathematics 481; Mathematics 413 or Applied Mathematics 413; Mathematics 493 or Applied Mathematics 493.

Antirequisite(s): Credit for Mathematics 583 and Applied Mathematics 683 will not be allowed.

Graduate Courses**Mathematics 600** **1.5 units; (3S-0)****Research Seminar**

A professional skills course, focusing on the development of technical proficiencies that are essential to succeed as practicing mathematicians in academia, government, or industry. The emphasis is on delivering professional presentations and using modern mathematical research tools. A high level of active student participation is required.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Mathematics 601 **3 units; (3-0)****Measure and Integration**

Abstract measure theory, basic integration theorems, Fubini's theorem, Radon-Nikodym theorem, L_p spaces, Riesz representation theorem.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 601 and either Mathematics 501 or Pure Mathematics 501 will not be allowed.

Mathematics 603 **3 units; (3-0)****Analysis III**

Sequences and series of functions; Lebesgue integration on the line, Fourier series and the Fourier transform, pointwise convergence theorems, distributions and generalized functions.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 603 and either Mathematics 545 or Pure Mathematics 545 will not be allowed.

Mathematics 605 **3 units; (3-0)****Differential Equations III**

Systems of ordinary differential equations. Existence and uniqueness. Introduction to partial differential equations.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 605 and Applied Mathematics 605 will not be allowed.

Mathematics 607 **3 units; (3-0)****Algebra III**

A sophisticated introduction to modules over rings, especially commutative rings with identity. Major topics include: snake lemma; free modules; tensor product; hom-tensor duality; finitely presented modules; invariant factors; free resolutions; and the classification of finitely generated modules over principal ideal domains. Adjoint functors play a large role. The course includes applications to linear algebra, including rational canonical form and Jordan canonical form.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 607 and any of Pure Mathematics 511, 607 or 611 will not be allowed.

Mathematics 617 **3 units; (3-0)****Functional Analysis**

Introduction to Hilbert and Banach spaces, linear operators, weak topologies, and the operator spectrum.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 617 and Applied Mathematics 617 will not be allowed.

Mathematics 621 **3 units; (3-0)****Complex Analysis**

A rigorous study of function of a single complex variable. Holomorphic function, Cauchy integral formula and its applications. Conformal mappings. Fractional linear transformations. Argument principle. Schwarz lemma. Conformal self-maps of the unit disk.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 621 and 521 will not be allowed.

Mathematics 625 **3 units; (3-0)****Introduction to Algebraic Topology**

Introduction to the algebraic invariants that distinguish topological spaces. Focuses on the funda-

mental group and its applications, and homology. Introduction to the basics of homological algebra.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 625 and either Mathematics 525 or Pure Mathematics 607 will not be allowed.

Mathematics 627 **3 units; (3-0)****Algebraic Geometry**

The objective of this course is to provide an introduction to modern algebraic geometry sufficient to allow students to read research papers in their fields which use the language of schemes. Topics will include Spectra of rings; the Zariski topology; affine schemes; sheaves; ringed spaces; schemes; morphisms of finite type; arithmetic schemes; varieties; projective varieties; finite morphisms, unramified morphisms; etale morphisms.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 631 **3 units; (3-0)****Discrete Mathematics**

Discrete Geometry: Euclidean, spherical and hyperbolic n -spaces, trigonometry, isometries, convex sets, convex polytopes, (mixed) volume(s), classical discrete groups, tilings, isoperimetric inequalities, packings, coverings. Graph Theory: connectivity; trees; Euler trails and tours; Hamilton cycles and paths; matchings; edge colourings; vertex colourings; homomorphisms; plane and planar graphs; extremal graph theory and Ramsey theory.

631.01. Discrete Geometry

631.03. Graph Theory

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 635 **3 units; (3-0)****Geometry of Numbers**

The interplay of the group-theoretic notion of lattice and the geometric concept of convex set, the lattices representing periodicity, the convex sets geometry. Topics include convex bodies and lattice points, the critical determinant, the covering constant and the inhomogeneous determinant of a set, Star bodies, methods related to the above, and homogeneous and inhomogeneous forms.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 637 **3 units; (3-0)****Infinite Combinatorics**

An excursion into the infinite world, from Ramsey Theory on the natural numbers, to applications in Number Theory and Banach Spaces, introduction to tools in Model Theory and Logic, fascinating homogeneous structures such as the rationals and the Rado graph, and possibly further explorations into the larger infinite world.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 641 **3 units; (3-0)****Number Theory**

Algebraic Number Theory: an introduction to number fields, rings of integers, ideals, unique factorization, the different and the discriminant. The main objective to the course will be to prove

the finiteness of the class number and Dirichlet's Unit Theorem.

Analytic Number Theory: students will learn tools to aid in the study of the average behaviour of arithmetic functions, including the use of zeta functions, to prove results about the distribution of prime numbers.

641.01. Algebraic Number Theory

641.03. Analytic Number Theory

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 643 **3 units; (3-0)**

Computational Number Theory

An investigation of major problems in computational number theory, with emphasis on practical techniques and their computational complexity. Topics include basic integer arithmetic algorithms, finite fields, primality proving, factoring methods, algorithms in algebraic number fields.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 643 and any of Mathematics 527, Pure Mathematics 527, or Pure Mathematics 627 will not be allowed.

Mathematics 647 **3 units; (3-0)**

Modular Forms

Modular forms and automorphic representations and their L-functions. Modularity Theorem from two perspectives.

Classical Perspective on Modular Forms: introduction to modular curves as moduli spaces for elliptic curves and as differential forms on modular curves. A study of L-functions attached to modular forms and the modularity theorem.

An Introduction to Automorphic Representations: introduction to the Langlands Programme. A study of partial L-functions attached to automorphic representations and known instances of the Langlands Correspondence.

647.01. Classical Perspective on Modular Forms

647.03. An Introduction to Automorphic Representations

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 651 **3 units; (3-0)**
(formerly Applied Mathematics 603)

Topics in Applied Mathematics

Topics will be chosen according to the interest of the instructors and students.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

MAY BE REPEATED FOR CREDIT

Mathematics 653 **3 units; (3-0)**
(formerly Pure Mathematics 603)

Topics in Pure Mathematics

Topics will be chosen according to the interest of the instructors and students.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

MAY BE REPEATED FOR CREDIT

Mathematics 661 **3 units; (3-0)**

Scientific Modelling and Computation I

The Convex Optimization: an introduction to modern convex optimization, including

basics of convex analysis and duality, linear conic programming, robust optimization, and applications.

Scientific Computation: an introduction to both the methodological and the implementation components underlying the modern scientific computations with the natural emphasis on linear algebra, including modern computing architecture and its implications for the numerical algorithms.

Numerical Differential Equations: fundamentals of solving DEs numerically addressing the existence, stability and efficiency of such methods.

661.01. Convex Optimization

661.03. Scientific Computation

661.05. Numerical Differential Equations

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 663 **3 units; (3-0)**

Applied Analysis

Interior Point Methods: exposes students to the modern IPM theory with some applications, to the extent that at the end of the course a student should be able to implement a basic IPM algorithm.

Theoretical Numerical Analysis: provides the theoretical underpinnings for the analysis of modern numerical methods, covering topics such as linear operators on normed spaces, approximation theory, nonlinear equations in Banach spaces, Fourier analysis, Sobolev spaces and weak formulations of elliptic boundary value problems, with applications to finite difference, finite element and wavelet methods.

Differential Equations: essential ideas relating to the analysis of differential equations from a functional analysis point of view. General topics include Hilbert spaces and the Lax-Milgram's theorem, variational formulation of boundary value problems, finite element methods, Sobolev spaces, distributions, and pseudo-differential operators.

663.01. Interior Point Methods

663.03. Theoretical Numerical Analysis

663.05. Differential Equations

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 667 **3 units; (3-0)**

Introduction to Quantum Information

Focus on the mathematical treatment of a broad range of topics in quantum Shannon theory.

Topics include quantum states, quantum channels, quantum measurements, completely positive maps, Neumark's theorem, Stinespring dilation theorem, Choi-Jamiolkowski isomorphism, the theory of majorization and entanglement, the Peres-Horodecki criterion for separability, Shannon's noiseless and noisy channel coding theorems, Lieb's theorem and the strong subadditivity of the von Neumann entropy, Schumacher's quantum noiseless channel coding theorem, and the Holevo-Schumacher-Westmoreland theorem.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 669 **3 units; (3-0)**

Scientific Modelling and Computation II

Wavelet Analysis: covers the design and implementation of wavelet methods for modern signal

processing, particularly for one- and two-dimensional signals (audio and images).

Mathematical Biology: introduction to discrete models of mathematical biology, including difference equations, models of population dynamics and the like. Topics include stability of models describe by difference equations, continuous spatially homogeneous processes and spatially distributed models.

669.01. Wavelet Analysis

669.03. Mathematical Biology

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 681 **3 units; (3-0)**
(formerly Applied Mathematics 681)

Stochastic Calculus for Finance

Martingales in discrete and continuous time, risk-neutral valuations, discrete- and continuous-time (B,S)-security markets, the Cox-Ross-Rubinstein formula, Wiener and Poisson processes, Itô's formula, stochastic differential equations, Girsanov's theorem, the Black-Scholes and Merton formulas, stopping times and American options, stochastic interest rates and their derivatives, energy and commodity models and derivatives, value-at-risk and risk management.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 681 and any one of Mathematics 581, Applied Mathematics 681, or Applied Mathematics 581 will not be allowed.

Mathematics 683 **3 units; (3-0)**
(formerly Applied Mathematics 683)

Computational Finance

Basic computational techniques required for expertise quantitative finance. Topics include basic econometric techniques (model calibration), tree-based methods, finite-difference methods, Fourier methods, Monte Carlo simulation and quasi-Monte Carlo methods.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 683 and any one of Mathematics 583, Applied Mathematics 683, or Applied Mathematics 583 will not be allowed.

Mathematics 685 **3 units; (3-0)**

Stochastic Processes

Stochastic processes are fundamental to the study of mathematical finance, but are also of vital importance in many other areas, from neuroscience to electrical engineering. Topics to be covered: Elements of stochastic processes, Markov chains and processes, Renewal processes, Martingales (discrete and continuous times), Brownian motion, Branching processes, Stationary processes, Diffusion processes, The Feynman-Kac formula, Kolmogorov backward/forward equations, Dynkin's formula.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Mathematics 685 and Statistics 761 will not be allowed.

Mathematics 691 3 units; (3-0)**Advanced Mathematical Finance I**

Topics include specific areas of mathematical finance and build on Mathematics 681.

Lévy Processes (LP): fundamental concepts associated with LP such as infinite divisibility, the Lévy-Khintchine formula, the Lévy-Itô decomposition, subordinators, LP as time-changed Brownian motions, and also dealing with semi-groups and generators of LP, the Itô formula for LP, the Girsanov theorem, stochastic differential equations driven by LP, the Feynman-Kac formula, applications of LP and numerical simulation of LP.

Credit Risk: corporate bond markets, modelling the bankruptcy risk of a firm, and understanding how corporate bonds are priced.

691.01. Lévy Processes

691.03. Credit Risk

Prerequisite(s): Mathematics 681 and admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mathematics 693 3 units; (3-0)**Advanced Mathematical Finance II**

Topics include specific areas of mathematical finance and build on Mathematics 681 and 683.

Monte Carlo Methods for Quantitative Finance: random number generation, simulation of stochastic differential equations, option valuation, variance reduction techniques, quasi-Monte Carlo methods, computing 'greeks', valuation of path-dependent and early-exercise options; applications to risk management; Markov Chain Monte Carlo methods.

Energy, Commodity and Environmental Finance: energy and commodity markets; spot, futures, forwards and swap contracts; the theory of storage; stochastic models for energy prices; model calibration; emissions market modelling; weather derivatives; energy risk management; energy option valuation.

693.01 Monte Carlo Methods for Quantitative Finance

693.03 Energy, Commodity and Environmental Finance

Prerequisite(s): Mathematics 681 and 683 and admission to a graduate program in Mathematics and Statistics or consent of the Department.

Mechanical Engineering ENME

For more information about these courses, see the Department of Mechanical and Manufacturing Engineering: <https://schulich.ualgary.ca/mechanical-manufacturing> in the Schulich School of Engineering.

Mechanical Engineering 101 3 units; (32 hours) (formerly Mechanical Engineering 001)**Mechanical and Manufacturing Engineering Block Course**

Special topics in Mechanical and Manufacturing Engineering. Research and industry presentations, software training, informational sessions, and field trips as resources permit.

Note: Presented during block week in the Fall Term. All Mechanical and Manufacturing Engineering students must complete this course prior to entry to their third year of studies.

NOT INCLUDED IN GPA

Senior Courses**Mechanical Engineering 317** 3 units; (3-1.5T-3/2)**Mechanics of Deformable Solids I**

Review of axial-force, shear-force, bending moment and torque diagrams. Review of vector and matrix algebra. Kinematics of deformation and strain. Concept of stress. Constitutive equations. The states of plane stress and plane strain. Solutions to elementary elasticity problems – axial force, torsion, bending, shear force. Deflection of beams. Euler buckling. Yield criteria.

Prerequisite(s): Engineering 202; and Mathematics 275 or Applied Mathematics 217.

Antirequisite(s): Credit for Mechanical Engineering 317 and Engineering 317 will not be allowed.

Mechanical Engineering 337 3 units; (3-2)**Computing Tools for Engineering Design**

Application of high-level software to the solution of design problems. Evaluation and validation of alternate solution approaches. Numeric and symbolic computation, visualization, data analysis, model-based analysis. Topics will be derived from real engineering problems.

Prerequisite(s): Engineering 233.

Mechanical Engineering 339 3 units; (3-2)**Engineering Graphics and CAD**

Technical sketching. Orthographic projections. Multiviews, auxiliary views and section views. Dimensions and tolerances. Working drawings. Design applications. Computer-Aided Design (CAD) software is used for 3D modelling and 2D drawing.

Prerequisite(s): Engineering 233.

Mechanical Engineering 341 3 units; (3-1.5T-2/2)**Fundamentals of Fluid Mechanics**

Basic principles of mechanics of fluids. Fluid statics: forces on surfaces, buoyancy, stability. Continuity, energy and momentum equations applied to control-volume analysis. Dimensional analysis and physical similarity. Introduction to external flows and flow through pipes. Applications to a variety of problems in mechanical engineering.

Prerequisite(s): Engineering 201 and 349; and one of Mathematics 277 or Applied Mathematics 219.

Mechanical Engineering 421 3 units; (3-1T-3/2)**Materials I**

Fundamentals of materials science with emphasis on the structure of materials and structure/property relationships: atomistic models; equilibrium phase diagrams; kinetics and non-equilibrium transformation diagrams; thermal-mechanical processing; microstructure formation and control; ductility mechanisms; material selection; and an introduction to fracture.

Prerequisite(s): Engineering 311.

Mechanical Engineering 461 3 units; (3-1T-3/2)**Foundations of Mechatronics**

Modelling, analysis, and design of dynamic systems, including mechanical, electrical, electromechanical, fluidic, thermal, and mixed systems. Transient and forced response of linear time-invariant systems. Performance analysis and design to meet specifications in the time and frequency domains. Application of feedback control to dynamic systems. Laboratory: programming and interfacing a microcontroller with sensors and actuators.

Prerequisite(s): Engineering 225 and 349.

Mechanical Engineering 471 3 units; (3-1T-2/2)**Heat Transfer**

Modes of heat transfer; conduction, convection, radiation. Conduction in plane walls and cylinders. Conduction-convection systems, fins. Principles of convection. Empirical and practical relations for forced convection heat transfer. Natural convection. Condensation and boiling heat transfer. Heat exchangers. The log-mean temperature difference method.

Prerequisite(s): Engineering 311; and one of Mechanical Engineering 341 or Energy Engineering 480.

Mechanical Engineering 473 3 units; (3-1T)**Fundamentals of Kinematics and Dynamics of Machines**

Basic mechanisms and linkages in machinery. Kinematics and kinetics of mechanisms. Cam design and dynamic analysis. Ordinary and planetary gear trains.

Prerequisite(s): Engineering 349.

Mechanical Engineering 479 3 units; (3-1T-2/2)**Mechanics of Deformable Solids II**

Review of stress and strain. Equilibrium and compatibility equations, and boundary conditions. Constitutive behaviour of materials. Solution to two-dimensional problems in elasticity. Failure criteria for ductile and brittle materials. Principle of virtual work and energy methods. The Rayleigh-Ritz and the finite element numerical methods in solid mechanics.

Prerequisite(s): Mechanical Engineering 317 or Engineering 317.

Mechanical Engineering 485 3 units; (3-1.5)**Mechanical Engineering Thermodynamics**

Review of fundamentals; thermodynamic properties; flow and non-flow processes; Carnot cycle; Rankine cycle including reheat and regeneration. Engine gas cycles including simple gas turbines; gas turbines with reheat, intercooling and heat exchange. Reciprocating air compressors and expanders. Applications of humidity considerations; heat-pump and refrigeration cycles and their performance criteria. Combustion processes, chemical equilibrium, dissociation.

Prerequisite(s): Engineering 311.

Mechanical Engineering 493 3 units; (3-1T)**Machine Component Design**

Introduction to the principles of machine component design. Design for stiffness, strength, and endurance. Surface contacts, wear, and lubrication. Tolerances and fits. Design and selection of mechanical elements such as shafts, bolted joints, welded joints, hydrodynamic bearings, ball and roller bearings, gears, belts, brakes, clutches, and springs.

Prerequisite(s): Engineering 349; and one of Mechanical Engineering 317 or Engineering 317.

Mechanical Engineering 495 3 units; (3-1.5T-1/2)**Fluid Mechanics**

Control volume methodology for multi-dimensional systems as applied to conservation principles (mass, linear and angular momentum); Navier-Stokes equations applied to pipe and boundary layer flows; basic principles of potential flow theory and aerodynamics and an introduction to compressible flow (convergent-divergent channels and normal shocks).

Prerequisite(s): Engineering 311 and Mechanical Engineering 341.

Mechanical Engineering 501 3 units; (0-4)

Mechanical Engineering Capstone Design Project I

A team-based project course with the focus on the design process associated with mechanical and manufacturing engineering. The design process consists of the stages of conceptual design, design development and verification. Project management, teamwork and communication are emphasized for professional development.

Prerequisite(s): Mechanical Engineering 421, 461, 471, 473, 479, 485, 493, 495 and Manufacturing Engineering 417.

Antirequisite(s): Credit for Mechanical Engineering 501 and 538 will not be allowed.

Note: Mechanical Engineering 501 and 502 are a required two-course sequence that must be completed in the same academic year. Concurrent enrolment in Mechanical Engineering 501 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Mechanical Engineering 502 3 units; (0-4)

Mechanical Engineering Capstone Design Project II

A continuation of the capstone design project, where student teams build on their design work in Part I.

Prerequisite(s): Mechanical Engineering 501.

Antirequisite(s): Credit for Mechanical Engineering 502 and 538 will not be allowed.

Note: Mechanical Engineering 501 and 502 are a required two-course sequence that must be completed in the same academic year. Concurrent enrolment in Mechanical Engineering 502 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Mechanical Engineering 505 3 units; (3-3/2)

Robotics

Kinematics, statics, dynamics and control of robot arms. Robot actuators, drives, sensors, and vision. Applications of robots.

Prerequisite(s): Mechanical Engineering 473 or Energy Engineering 460.

Mechanical Engineering 519 3 units; (3-2)

Special Topics in Mechanical Engineering

Advanced topics in Mechanical Engineering.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Mechanical Engineering 521 3 units; (3-3/2)

Materials II

Fundamentals and applications of materials science to engineering design: welding metallurgy; deformation and strength behaviour of real materials; failure analysis; fibre reinforced composites; fracture mechanics; fatigue; and creep.

Prerequisite(s): Mechanical Engineering 421.

Note: Completion of Mechanical Engineering 479 and 493 prior to this course will be of definite advantage.

Mechanical Engineering 547 3 units; (3-2)

Finite Element Method

Review of basic concepts in the Theory of Elasticity. Stress, strain, equilibrium. Stress-strain relations. The principle of virtual work and its use in deriving exact and approximate equilibrium equations. Example: beam theory. Matrix analysis of framed structures. The stiffness method. The finite element method and other discretization

procedures. The 4-node plane stress rectangular element. Shape functions. Derivation of stiffness matrix by means of the principle of virtual work. Isoparametric elements, completeness. Numerical integration of scheme. Programming Considerations. Solution of problems with the aid of a computer. Additional topics: Dynamics, heat transfer, fluid dynamics.

Prerequisite(s): Mechanical Engineering 479.

Mechanical Engineering 560 6 units; (1-3)

Mechatronics Design Laboratory

A hands-on laboratory experience in the design and analysis of microprocessor-controlled electro-mechanical components. Emphasis will be on laboratory projects in which teams of students will configure, design, and implement mechatronic systems. Laboratories cover topics such as aliasing, quantization, electronic feedback, power amplifiers, digital logic, encoder interfacing, and motor control leading to prototyping and design of commercially viable products. Lectures will cover comparative surveys, operational principles, and integrated design issues associated with the spectrum of mechanism, electronics, and control components.

Prerequisite(s): Mechanical Engineering 461.

Mechanical Engineering 583 3 units; (3-2)

Mechanical Systems in Buildings

Fundamentals of heating, ventilating, and air conditioning systems in buildings. Heating and cooling loads. Codes, regulations, and standards. System selection, generation equipment, heat exchangers, distribution and driving systems, terminal units, controls and accessories, and cost estimating. Energy efficiency and renewable energy applications. Elevators and escalators. Lifting devices. Sewage systems.

Prerequisite(s): Mechanical Engineering 471; and one of Mechanical Engineering 485 or Energy Engineering 560.

Mechanical Engineering 585 3 units; (3-1T-3/2)

Control Systems

Modelling of physical systems; feedback control; stability; performance specification in the time and frequency domains; root locus plots; Bode and Nyquist plots; Proportional/Integral/Derivative (PID) control and dynamic compensation.

Prerequisite(s): Mechanical Engineering 461.

Mechanical Engineering 587 3 units; (3-0)

Continuum Mechanics

Kinematics of deformation, concept of stress, balance of mass, linear momentum, angular momentum and energy. Thermodynamics of continua. Constitutive equations for viscous fluids and nonlinear elastic solids.

Prerequisite(s): Mechanical Engineering 479 and 495.

Antirequisite(s): Credit for Mechanical Engineering 587 and Mechanical Engineering 519.09 will not be allowed.

Mechanical Engineering 595 3 units; (3-1T-3/2)

Gas Dynamics

Fundamentals of one-dimensional gas dynamics. Isentropic and non-isentropic flows, applications of dynamical similarity to shock waves. Oblique shocks, supersonic nozzles, flows with friction or heat transfer. Introduction to computational fluid dynamics (CFD).

Prerequisite(s): Mechanical Engineering 495.

Mechanical Engineering 597 3 units; (3-1T-3/2)

Turbomachinery

Performance of turbomachines, machine selection, Reynolds number and scale effects. Two dimensional flow in turbomachines, degree of reaction and vector diagrams; flow irreversibilities and loss coefficients; pump, compressor and turbine efficiencies. Design of pumps, fans, centrifugal compressors, axial-flow compressors, and axial-flow turbines. Combination of machines with pipes or ducts.

Prerequisite(s): Mechanical Engineering 485 and 495.

Mechanical Engineering 599 3 units; (3-1T-3/2)

Vibrations and Machine Dynamics

Linear vibration theory: free and forced vibration of single- and multi-degree-of-freedom systems; damping in machines; vibration absorbers; experimental modal analysis. Balance of rotating machinery: sources of unbalance, rigid rotors, flexible rotors, critical speeds, balancing principles. Lagrange equations: application to mechanical systems.

Prerequisite(s): Mechanical Engineering 473 or Energy Engineering 460.

Graduate Courses

Mechanical Engineering 603 3 units; (3-0)

Physical Fluid Dynamics

Physical phenomena of incompressible fluid motion for a variety of flows, e.g. pipe and channel flow, flow past a cylinder, and convection in horizontal layers. The derivation of the basic equations of fluid mechanics using Cartesian tensor notation. High and low Reynolds number flows including some solutions of the viscous flow equations, inviscid flow, and elementary boundary layer theory. Thermal free convective flows.

Mechanical Engineering 605 3 units; (3-0)

Combustion Processes

Review of thermodynamics and chemical kinetics of combustion. Fluid mechanics, heat and mass transfer in combustion phenomena. Autoignition and source ignition, flames and detonation. Quenching and explosion hazards, flammability and detonation limits. Heterogeneous combustion, combustion practical systems, combustion as affecting pollution and efficiency, some experimental combustion methods.

Mechanical Engineering 607 3 units; (3-0)

Mechanics of Compressible Flow

One-dimensional steady and unsteady motion with application to the analysis of supersonic nozzles, diffusers, flow in conduits with friction, shock tubes. Two-dimensional flow of ideal fluid. Small perturbation theory, method of characteristics with application to design of supersonic nozzles. Waves in two-dimensional flow.

Mechanical Engineering 613 3 units; (3S-0)

Research Seminar I

Students will develop written and oral communication skills required to disseminate their technical research results and to receive formative feedback on performance.

NOT INCLUDED IN GPA

Mechanical Engineering 615 3 units; (3-0)

Instrumentation

Basic principles relating to measurement systems. Static and dynamic characteristics of signals. Measurement system behaviour. Application of probability and statistics to measurement systems.

Uncertainty analysis. Data acquisition and conversion, analog/digital signals and associated sampling theory. Application of theory to various measurement systems such as pressure, velocity, strain, concentration, and temperature.

Mechanical Engineering 616 3 units; (3-0)

Environmental Fluid Mechanics

Overview of fluid mechanics fundamentals; Boundary layer theory; Turbulence theory; Turbulent structures; Simulation of environmental flow and transportation of air pollutants; Dynamics of particulates dispersed in gases; Environmental applications (Two-phase flow and particulate removal; Turbulence and dispersion in low atmosphere).

Antirequisite(s): Credit for Mechanical Engineering 616 and any of Environmental Engineering 616, 619.11 or Mechanical Engineering 619.06 will not be allowed.

Mechanical Engineering 619 3 units; (3-0)

Special Problems

Designed to provide graduate students, especially at the PhD level, with the opportunity of pursuing advanced studies in particular areas under the direction of a faculty member. Students would be required to consider problems of an advanced nature.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Mechanical Engineering 620 3 units; (3-0)

Geomatics Engineering for Pipeline Systems

Provides both the classical basis to geomatics as a powerful tool in the design and management of pipelines as well as the cutting-edge view of the discipline as a digital technology.

Antirequisite(s): Credit for Mechanical Engineering 620 and 619.10 will not be allowed.

Mechanical Engineering 622 3 units; (3-0)

Pump and Compressor Stations

Basic role of pump and compressor stations on a pipeline. Design and performance of centrifugal, screw and reciprocating compressors and centrifugal and positive displacement pumps. Design and performance of drivers including gas turbines, engines and electric motors. Design and functions of auxiliary systems, including bearings and lubrication systems, seals and sealing systems and instrumentation and controls. Design studies for acoustic/mechanical and torsional analysis. Pump and compression station equipment and functions.

Antirequisite(s): Credit for Mechanical Engineering 622 and 619.11 will not be allowed.

Mechanical Engineering 624 3 units; (3-0)

Fundamentals of Pipeline Economics

Provides students with a fundamental understanding of engineering economics, including decision-making processes and life-cycle assessment in application to pipeline systems.

Antirequisite(s): Credit for Mechanical Engineering 624 and 619.12 will not be allowed.

Mechanical Engineering 626 3 units; (3-0)

Corrosion Science in the Pipelines Industry

Overview of corrosion in the pipeline industry with emphasis on the underlying science, including thermodynamics and kinetics of electrochemical processes, corrosion prevention and mitigation by materials selection, inhibition, coatings and

cathodic protection. Implications for integrity management will also be discussed.

Antirequisite(s): Credit for Mechanical Engineering 626 and 619.12 will not be allowed.

Mechanical Engineering 628 3 units; (3-0)

Pipeline Coatings

Introduction to the fundamental properties and structure of coatings, as well as applications in the pipeline industry. Applications of coating technology in integrity maintenance of the various structural facilities. Computer assisted coatings project management programs will be introduced.

Antirequisite(s): Credit for Mechanical Engineering 628 and 619.27 will not be allowed

Mechanical Engineering 630 3 units; (3-0)

Fundamentals of Liquid Hydraulics in Pipeline Systems

Introduction to the fundamentals of liquid hydraulics in pipeline systems. Topics include petroleum fluids, design elements and economics, mechanical design, fluid mechanics fundamentals, pipeline hydraulics, isothermal flow, pumping requirements, centrifugal and reciprocating pumps, operations and maintenance design, and design optimization.

Antirequisite(s): Credit for Mechanical Engineering 630 and 619.49 will not be allowed.

Mechanical Engineering 631 3 units; (3-0)

Numerical Methods for Engineers

Introduction, mathematical modelling, sources of errors in the process of numerical analysis and solution methodology; Elements of numerical analysis, Taylor series, round-off error, truncation error, concept of stability, consistency and convergence; Linear algebra, normal forms, Gauss elimination method, LU-decomposition, tridiagonal systems of equations; iterative methods, Jacobi, Gauss-Seidel, SOR, SSOR methods, conjugate gradient methods and preconditioning and principles of the multi-grid methods; Elliptic "equilibrium" equation, Laplace and Poisson equations, finite difference and finite control volume concepts and stability analysis; Parabolic equations: explicit, implicit and Crank-Nicolson methods, time-splitting method, method of lines, Stability analysis; Hyperbolic equations; Introduction to other methods; future challenging problems.

Antirequisite(s): Credit for Mechanical Engineering 631 and Environmental Engineering 625 will not be allowed.

Mechanical Engineering 632 3 units; (3-0)

Fundamentals of Gas Hydraulics in Pipeline Systems

Applications of fundamental fluid mechanics concepts to pipelines conveying compressible media (gases). Strategies for describing the gas-dynamics of pipeline systems and networks are developed, as well as the influence of gas properties and pipeline operating characteristics on component selection and operating parameters.

Antirequisite(s): Credit for Mechanical Engineering 632 and 619.40 will not be allowed.

Mechanical Engineering 633 3 units; (3-0)

Mathematical Techniques for Engineers

Application of mathematical techniques to the solution of ordinary and partial differential equations arising in engineering problems. Methods that will be considered are: separation of variables, method of characteristics, transform methods and complex variable methods.

Mechanical Engineering 634 3 units; (3-0)

Pipeline Geotechnical Engineering

Introduction to applications of geotechnical engineering in design and construction of oil and gas pipelines. Geohazard assessment and mitigation methods and issues around pipe/soil interaction will be discussed, as well as the relevant codes, standards and industry guidelines for pipelines.

Antirequisite(s): Credit for Mechanical Engineering 634 and 619.57 will not be allowed.

Mechanical Engineering 636 3 units; (3-0)

Structural Analysis of Buried Steel Pipeline Systems

An introduction to stress analysis of buried pipelines through hand calculations, spreadsheets, and stress analysis software. Pipeline code requirements are discussed. Individual practices and industry examples are used.

Antirequisite(s): Credit for Mechanical Engineering 636 and 619.67 will not be allowed.

Mechanical Engineering 637 3 units; (3-0)
(Environmental Engineering 673)

Thermal Systems Analysis

Fundamentals of thermodynamics, fluid mechanics, heat transfer and combustion; Modelling of thermophysical properties; Second law of thermodynamics, concept of entropy generation and exergy analysis; Minimizing environmental impact; Advanced design and analysis of heat exchangers, co-generation, renewable energy systems, and propulsion systems.

Mechanical Engineering 638 3 units; (3-0)

Failure and Fracture Mechanics in the Pipeline Industry

Covers the basic theory of failure and fracture mechanics in sufficient depth to allow its application to pipeline design, material requirements and integrity assessment. Overview of brittle and ductile fracture, fatigue and environmental processes, design basics, fracture mechanics theory, fracture mechanics testing, inspection issues, material issues, crack propagation and arrest, fitness for purpose methods, structural integrity assessment and material requirements.

Antirequisite(s): Credit for Mechanical Engineering 638 and 619.74 will not be allowed.

Mechanical Engineering 639 3 units; (3-0)

Numerical Methods for Computational Fluid Dynamics

Review of solution techniques for ordinary differential equations. Stability, consistency and convergence. Order of accuracy. Fourier methods for stability. Numerical techniques for one-, two- and three-dimensional linear parabolic problems. Courant condition. Implicit and semi-implicit schemes. Boundary conditions for parabolic problems. Techniques for linear hyperbolic problems. CFL condition. Characteristics, domain of dependence and domain of influence. Boundary conditions for hyperbolic problems. Non-linear conservation laws. The Burger's equation as a test problem. Strong and weak solutions. Conservative and integral forms. Conservative schemes. Entropy condition. Godunov theorem and flux limiters. Godunov, ENO and TVD schemes. Implementation in gas dynamics.

Mechanical Engineering 640 3 units; (3-0)

Stress Corrosion Cracking of Materials

Fundamentals of stress corrosion cracking (SCC) of materials and the factors contributing to SCC

from environmental, metallurgical and mechanical sources. Various testing techniques to study and/or evaluate SCC will also be discussed.

Antirequisite(s): Credit for Mechanical Engineering 640 and 619.90 will not be allowed.

Mechanical Engineering 641 3 units; (3-0)

Advanced Control Systems

Introduction to multivariable systems; state space models; analysis of linear systems; stability; Cayley-Hamilton theorem; controllability and observability; state feedback control; pole placement designs; introduction to linear optimal control and estimation; Kalman filtering; separation theorem and duality; performance specifications; controller reduction concepts; introduction to robust control.

Mechanical Engineering 643 3 units; (3-0)

Optimal and Adaptive Control

Discrete time and sampled-data system models and properties; discrete time domain controller design principles; system identification using least-squares analysis; self-tuning control; indirect adaptive control; model reference adaptive control; sliding mode control in continuous and discrete time; optimal design of sliding mode controllers; sensitivity functions and their role in control theoretic performance specification; robust stability and robust performance objectives; Kharitonov stability.

Mechanical Engineering 650 3 units; (3-0)

Mobile Robotics

Overview of unmanned vehicles, mobile robot locomotion systems, wheeled rovers, walking machines, mobile-manipulators, mobile robot sensors and actuators, simulation, modelling and analysis of mobile robot behaviour, robot-environment interaction analysis, 2D navigation techniques and localization, mobile robot simulation tools.

Mechanical Engineering 653 3 units; (3-0)

Advanced Continuum Mechanics

Review of linear algebra and tensor analysis; kinematics of the deformation; deformation and strain tensors; strain rates; balance equations and equations of motion; stress principle; stress power and conjugated stress-strain couples; stress rates; elements of Lagrangian and Hamiltonian Mechanics for discrete and continuum systems; thermomechanics and constitutive theory; isotropic and anisotropic hyperelasticity; composite materials.

Mechanical Engineering 660 6 units; (0-3)
(Mechanical Engineering 560)

Mechatronics Design Laboratory

A hands-on laboratory experience in the design and analysis of microprocessor-controlled electro-mechanical components. Laboratory projects in which teams will configure, design, and implement mechatronic systems. Aliasing, quantization, electronic feedback, power amplifiers, digital logic, encoder interfacing, and motor control leading to prototyping and design of commercially viable products. Lectures will cover comparative surveys, operational principles, and integrated design issues associated with mechanical, electrical and control components.

Mechanical Engineering 663 3 units; (3-0)
(Medical Science 663)(Kinesiology 663)

Advanced Muscle Mechanics and Physiology

A look at problems associated within muscle mechanics and contractility. Also the use of muscle mechanics as a scientific discipline to critically

learn and evaluate the scientific process. Basic anatomy and physiology of muscle contraction including the cross-bridge theory, and the force-length, force-velocity and force-time relationships of actively and passively contracting muscles will also be covered.

Prerequisite(s): Consent of the Faculty.

Mechanical Engineering 665 3 units; (3-0)

Elements of Materials Engineering

Covers a variety of material aspects and provides a fundamental understanding of Materials Science and Engineering. Emphasizes the understanding of advanced dislocation theory and its application in illustration of diffusion, deformation and fracture of metals. Fundamentals of material strengthening mechanisms are covered. Practical aspects that are relevant to material uses and failures, such as environmental-induced cracking, creep, fatigue, strain aging and corrosion, are discussed. Typical surface analysis techniques for material characterization are introduced.

Mechanical Engineering 667 3 units; (3-0)

Fracture Mechanics

Basic fracture theory, failure criteria, overview of fracture mechanics, brittle and ductile failure, crack tip parameters, geometric considerations, methods of analysis, fracture toughness and testing standards. Applications in design, fatigue subcritical crack growth, creep and impact.

Mechanical Engineering 669 3 units; (3-0)

Fatigue of Materials

History and origin of fatigue. Stress life, strain life and fracture mechanics approaches. Low and high cycle fatigue. Low and high temperature fatigue. Combined stresses, initiation, and propagation of cracks. Environmental and statistical effects. Testing techniques and variables. Design and specific material behaviour. Mechanisms of fatigue.

Mechanical Engineering 683 3 units; (3-0)

Applications of 3D Rigid Body Mechanics in Biomechanics

Applications of 3D motion analysis and rigid body mechanics to musculoskeletal system locomotion, and movement. Experimental, theoretical and numerical methods for optical motion imaging, 3D analysis of joint kinematics and kinetics, joint angle representations, prediction of joint forces, data analysis and filtering, error propagation, inverse and forward dynamics approaches, and applications to clinical and orthopaedic engineering.

Mechanical Engineering 685 3 units; (3-3)
(Medical Science 685)

Biomechanics of Human Movement

Introduction to the measuring methods (accelerometry, goniometry, film and film analysis, video systems) of biomechanical analysis of human movement (force and force distribution). Description of the mechanical properties of bone, tendon, ligaments, cartilage, muscles and soft tissues. The relation between structure and function of biomaterials. Introduction to descriptive analysis of human movement.

Prerequisite(s): Consent of the Faculty.

Antirequisite(s): Credit for Mechanical Engineering 685 and either Medical Science 685 and Kinesiology 685 will not be allowed.

Mechanical Engineering 698 6 units; (0-4)

Graduate Project

Individual project in the student's area of specialization under the guidance of the student's

supervisor. A written proposal, one or more written progress reports, and a final written report are required. An oral presentation is required upon completion of the course. Open only to students in the MEng (courses only) program.

Mechanical Engineering 708 3 units; (4-0)

Turbulence

Provides an overview of turbulence in incompressible flows of Newtonian fluids. Topics include: the nature of turbulence; classical methods of analysis (Reynolds-averaging, spectral representations); the concept of scales; a review of isotropic and homogeneous turbulence; the energy cascade and the role of vorticity in turbulence canonical flows: boundary layers, jets, wakes and mixing layers; modern views of turbulence including coherent motions and inter-scale energy transfer.

Mechanical Engineering 713 3 units; (3S-0)

Research Seminar II

Students will develop written and oral communication skills required to disseminate their technical research results and to receive formative feedback on performance.

NOT INCLUDED IN GPA

Medical Graduate Education MDGE

For more information about these courses, see Graduate Science Education cumming.ucalgary.ca/gse.

Graduate Courses

Medical Graduate Education 601
1 unit (12 hours)

Business Fundamentals

An overview of the primary business aspects involved in the health care product development industry, including company creation, intellectual property, financing, regulatory and clinical affairs, valuations and exit strategies. The principle objective is to develop a general understanding of how these different aspects integrate to form a functioning business.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the Program Director.

Medical Graduate Education 602
1 unit (12 hours)

Intellectual Property and Licensing

A hands-on look at intellectual property and licensing, including reviews of actual biotechnology patents, licenses, and term sheets. Following an overview discussion on intellectual property, a deeper dive into patent and license construction enables the students to craft their own simple patents and license term sheets.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the program.

Medical Graduate Education 603
1 unit (12 hours)

Project Management and Corporate Leadership

Presentation of project management tools and techniques and how to build a foundational project plan. Explanation of corporate, personal and team

leadership as well as principles applicable to larger organizations will be discussed.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the program.

Medical Graduate Education 604
1 unit (12 hours)

Finances in Biomedical Technology

Explores how the financial community views and values biotechnology business opportunities, and the concepts and skills required to do the financial analysis. Covers some of the issues surrounding the investment process and expectations when interacting with potential investors, reading and analyzing financial statements, estimating and forecasting cash flows, and value investment and financing proposals.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the program.

Medical Graduate Education 605
1 unit (12 hours)

Regulatory Affairs

Coverage of the key regulations necessary for biopharmaceutical and medical device manufacturing, how to apply to the regulatory agencies and the consequences of non-compliance in regulatory affairs.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the program.

Medical Graduate Education 606
1 unit (12 hours)

Clinical Trials

Review of clinical trials strategies and the regulations around them. An emphasis will be placed on regulatory obligations and current trends.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the program.

Medical Graduate Education 607
1 unit (12 hours)

Communication, Marketing and Sales

Introduction to effective strategies for communication to diverse audiences of investors, corporations and clients in the biomedical technology sector, plus consideration of optimal marketing and sales approaches with appropriate channel selection.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the program.

Medical Graduate Education 608
1 unit (12 hours)

Business Case Studies

Real life presentations by corporate executives with an emphasis on strategic planning at the highest level, with examples of successes, failures and works in progress. Critical evaluation of publicly traded biotechnology corporations.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the program.

Medical Graduate Education 609
1 unit (12 hours)

Business Integration

Integrating lessons learned in prior business modules and extrapolating to the corporate environment, plus business pitches.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the program.

Medical Graduate Education 621
1 unit (12 hours)

Anti-tumour Drug Discovery and Current Cancer Therapies

Understanding the effective use of molecular pathology to identify biomarkers and potential targets for modulation. Explore the concepts of targeting stem cells, identification of small molecular weight inhibitors (drug discovery) and the formulation of clinical trials. Major emphasis will be placed on formulating an effective hypothesis and to design preclinical studies that will include cutting-edge ideas on molecular cancer therapeutics.

Prerequisite(s): Consent of the program.

Medical Graduate Education 622
1 unit (12 hours)

Proteomics and Metabolomics and Cancer Biomarker Discovery

Proteomics and metabolomics will be covered including the objectives of these disciplines, the technologies, methods and informatics used in biological mass spectrometry as applied to the 'omics. Examples will be drawn from cancer-related disciplines (research or clinical).

Prerequisite(s): Consent of the program.

Medical Graduate Education 623
1 unit (12 hours)

Tumour Immunology and Immunotherapy

Introductory topics in tumour immunobiology and immunotherapy will be covered. Fundamental and translational topics including, tumour immunogenicity, tumour immune surveillance and editing, immune escape, active immunotherapy, passive immunotherapy, virotherapy and viral vaccines, therapies targeting immunosuppressive mechanisms, and personalized immunotherapy.

Prerequisite(s): Consent of the program.

Medical Graduate Education 624
1 unit (12 hours)

Cell Cycle Regulation in Cancer and Aging

The links between cancer and aging, the experimental definition of the cell cycle, major events in G0, G1, S, G2, M, drivers and regulators of the cell cycle including oncogenes and tumour suppressors, cyclins, CDKs, CDIs and links to the cell cycle through tumour suppressors will be covered. An overview of biological and replicative aging including recent developments regarding the role of epigenetic modifications in cancer and aging.

Prerequisite(s): Consent of the program.

Medical Graduate Education 625
1 unit (12 hours)

Epigenetics and Chromatin Dynamics

Fundamentals of eukaryotic chromatin assembly, dynamic chromatin regulation and post-translational modifications that comprise epigenetics. DNA methylation, histone post-translational modifications, histone variants, regulatory siRNA, nucleosome remodelling and higher-order chromatin organization. Cancer and

disease-associated epigenetic alterations will be discussed in detail.

Prerequisite(s): Consent of the program.

Medical Graduate Education 626
1 unit (12 hours)

DNA Damage Signalling and Repair

DNA repair pathways, highlighting the cellular responses to ionizing radiation will be covered, including: base excision repair, mismatch repair, nucleotide excision repair, and DNA single strand and double strand break repair. The relationship of replication stress and telomere maintenance to genomic instability in a cancer context will be covered.

Prerequisite(s): Consent of the program.

Medical Graduate Education 627
1 unit (12 hours)

Cancer Cell Biology - Fundamentals and Current Topics

An advanced discussion-based format featuring analysis of the current literature in cancer cell biology with an emphasis on developmental systems. Background in cancer cell biology and signal transduction is essential. Topics include stem cells, cell polarity and migration, endocytosis and mitochondrial biogenesis, and are selected based on the student's research project to enhance their learning experience.

Prerequisite(s): Consent of the program.

Medical Graduate Education 628
1 unit (12 hours)

Cancer Cell Invasion, Metastasis and Angiogenesis

Angiogenesis, cell invasion and metastasis will be discussed from molecular, cell biological and clinical perspectives. Methods of experimental modelling of metastatic behaviour and angiogenesis, as well as their respective advantages and limitations will be discussed. There will be lab demonstration of available in vitro and in vivo invasion/metastasis/angiogenesis models.

Prerequisite(s): Consent of the program.

Medical Graduate Education 629
1 unit (12 hours)

Signal Transduction Pathways and Cancer

Fundamental principles of receptor-mediated and intracellular signalling pathways that have implications in cancer biology. Topics focus on receptor tyrosine kinases, serine/threonine kinase receptors and G-protein-coupled receptors.

Prerequisite(s): Consent of the program.

Medical Graduate Education 630
1 unit (12 hours)

Ethics of Data Analysis and Clinically-Oriented Research

Issues of scientific ethics as it relates to cancer research. Students learn how clinical trials involving human subjects and tissues are designed to gain ethical approval, as well as issues surrounding genomic data analysis and use. The topics of unethical data manipulation, detecting falsified data, experimental replicates and typical cancer research assays will be covered.

Prerequisite(s): Consent of the program.

Medical Graduate Education 631
1 unit (12 hours)

Neural Development

Fundamental principles of central nervous system development. The course encompasses the first

unit of Medical Science 619.01, which is a core course for all Neuroscience graduate students. It will cover basic principles of neural induction and neurogenesis, regionalization of the neural tube, neuronal migration, circuit formation (axons and dendrites), neurodevelopmental disorders, and model organisms.

Prerequisite(s): Consent of the program.

Antirequisite(s): Credit for Medical Graduate Education 631 and Medical Science 619.01 will not be allowed.

Medical Graduate Education 632
1 unit (12 hours)

Principles of Light Microscopy

Fundamentals of standard wide-field fluorescence microscopy as well as confocal and multiphoton techniques. Key concepts such as the optical light path, spatial resolution, and sampling will be emphasized. In addition, students will have the opportunity to assemble basic bright-field and fluorescence microscopes using optical "lego".

Prerequisite(s): Consent of the program.

Medical Graduate Education 633 1 unit (12 hours)

Advanced Techniques in Optical Microscopy

Advanced techniques in optical microscopy covered through a combination of lectures and activities. Topics include total internal reflection (TIRF) microscopy, superresolution, light sheet techniques and other rapidly developing technologies. Also includes one or more selected topics in targeted illumination including fluorescence recovery after photo activation (FRAP).

Prerequisite(s): Medical Graduate Education 632 or consent of the program.

Medical Graduate Education 634
1 unit (12 hours)

Digital Imaging for Optical Microscopy

The concept of the digital image and its relevance to optical microscopy will be introduced. The workflow from image acquisition to image analysis and presentation of data for publication will be covered. Good practices and pitfalls will be emphasized at every step. Students will gain experience in image processing and analysis using the standard open source package FIJI.

Prerequisite(s): Medical Graduate Education 632 or consent of the program.

Medical Graduate Education 651
1 unit (12 hours)

Microbial Virulence Factors

Virulence factors used by microbial pathogens to cause disease. Topics include microbial adherence mechanisms, toxigenic infections, virulence factor secretion systems, microbial gene expression.

Prerequisite(s): Medical Science 611, Cellular, Molecular and Microbial Biology 431, or consent of the program.

Medical Graduate Education 652
1 unit (12 hours)

Microbial Interactions at Epithelial Surfaces

Strategies used by microbial pathogens to target mucosal surfaces, and their contribution to disease. Topics include microbial disruption of epithelial barrier function, interactions with the host microbiome, microbial adaptation to host defenses, and invasion and intracellular survival strategies.

Prerequisite(s): Medical Science 611, Cellular, Molecular and Microbial Biology 431, or consent of the program.

Medical Graduate Education 653
1 unit (12 hours)

Antimicrobials and Resistance

Mechanism of action of antimicrobials, and resistance genes. Topics will also include transmission of resistance and discovery of new antimicrobials.

Prerequisite(s): Medical Science 611, Cellular, Molecular and Microbial Biology 431, or consent of the program.

Medical Graduate Education 654
1 unit (12 hours)

Infection and Immunity

Interactions with microbial pathogens with the innate and adaptive immune systems. Topics include immune evasion, pathogen clearance, and vaccine development.

Prerequisite(s): Consent of the program.

Medical Graduate Education 655
1 unit (12 hours)

Autoimmunity and Immunodeficiency

Advanced course focusing on the cellular and molecular mechanisms of systemic and organ-specific autoimmunity, acquired immunodeficiencies including those in the context of organ transplantation, and immunomodulatory therapies.

Prerequisite(s): Consent of the program.

Medical Graduate Education 721
1 unit (12 hours)

Biochemistry and Molecular Biology: Scientific Method, Data Analysis and Communication

Covers landmark discoveries in biochemistry and molecular biology (BMB), new and evolving BMB technologies, and how these can be implemented into modern research programs. Application of the scientific method, technical and ethical considerations surrounding data analysis, and essential skills for communicating scientific discoveries in the realm of peer-reviewed publication, presentation and grant application contexts.

Prerequisite(s): Consent of the program.

Medical Graduate Education 722
1 unit (12 hours)

Nucleic Acids, DNA Replication, Transcription and RNA Signalling

Covers nucleic acid synthesis, utilization and degradation in cells. Understanding of structure-function relationships for nucleic acids, the enzymatic basis of DNA replication, how genes are read, how the transcribed RNA is processed, and how genes are regulated through a coordinated collaboration between proteins and nucleic acid sequences. Reviews emerging technologies in the study of nucleic acids and RNA at a molecular level.

Prerequisite(s): Consent of the program.

Medical Graduate Education 723
1 unit (12 hours)

Translation, Protein Folding and Post-Translational Modification

Covers cellular proteins synthesis, modification and degradation. Topics include structure-function relationships for amino acids, the enzymatic basis of protein translation, how ribosomes are synthesized and regulated, how proteins are folded and may be modified post-translationally by enzymatic and non-enzymatic means. Emerging technologies in the study of proteins and post-translational modifications at a molecular level are reviewed.

Prerequisite(s): Consent of the program.

Medical Graduate Education 724
1 unit (12 hours)

Introduction to Bioinformatics Resources

Covers key bioinformatics concepts and practices, as well as the basic knowledge of how to access resources for graduate-level biologists who are not bioinformatics specialists. Introduces essential bioinformatics terminologies, discusses the use of bioinformatics to infer information about an organism from its genome. Provides practical experience with bioinformatics tools and develop basic skills in the collection and presentation of bioinformatics data.

Prerequisite(s): Consent of the program.

Medical Graduate Education 725
1 unit (12 hours)

Applied Genomics

Covers high throughput DNA sequencing technologies and genome-wide association genetics. Provides an overview of the available genomics technologies and their applications for high throughput discovery in biology (model organisms) and medicine (cancer and Mendelian disease genomics). Discussions will also encompass research ethics considerations for collecting, storing and using human genomic data.

Prerequisite(s): Consent of the program.

Medical Graduate Education 726
1 unit (12 hours)

Applied Structural Biology

Students will learn how to describe structures of biological macromolecules and explain the most commonly occurring methods for determination and analysis of the three-dimensional structure of biomolecules. Provides an overview of biophysical and structural methods used to study the regulation and function of biomolecules, tutorials on commonly available structural visualization software and resources and how structure-guided drug design is being used for pre-clinical drug discovery.

Prerequisite(s): Consent of the program.

Medical Graduate Education 755
1 unit (12 hours)

Directed Studies

Lectures, seminars, term papers or training in theoretical and/or laboratory methods at the advanced level in the medical sciences.

Prerequisite(s): Consent of the program.

MAY BE REPEATED FOR CREDIT

Medical Graduate Education 799
1 unit (12 hours)

Topics in Medical Sciences

Prerequisite(s): Consent of the program.

MAY BE REPEATED FOR CREDIT

Medical Physics MDPH

For more information about these courses contact the Department of Physics and Astronomy phas.ucalgary.ca/.

Note: For listings of related courses, see Astronomy, Astrophysics, Physics, and Space Physics.

Graduate Courses

Medical Physics 623 3 units; (3-0)

Radiological Physics and Radiation Dosimetry

Photon and electron interactions, charged particle and radiation equilibrium, cavity theory, absolute and relative dosimetry, calibration protocols.

Prerequisite(s): Consent of the Department.

Medical Physics 625 3 units; (3-0)

Radiation Oncology Physics

Clinical photon and electron beams, brachytherapy, treatment planning, radiation therapy devices, special techniques.

Prerequisite(s): Medical Physics 623 and consent of the Department.

Medical Physics 632 1.5 units; (0-1.5)

Clinical Rotation in Radiation Oncology Physics

Clinical observation of radiotherapy for cancer. Students observe the treatment process, including immobilization, CT simulation and radiotherapy treatment. Treatments observed include conventional radiotherapy, intensity modulated radiotherapy, total body irradiation, stereotactic radiosurgery, brachytherapy.

Prerequisite(s): Medical Physics 623 and consent of the Department.

NOT INCLUDED IN GPA

Medical Physics 633 3 units; (1-3)

Radiation Oncology Physics Laboratory

Absorption dose determination, dose descriptors, photon beam modelling, quality control.

Prerequisite(s): Medical Physics 623 and consent of the Department.

Medical Physics 637 3 units; (3-0)

Anatomy and Statistics for Medical Physicists

Anatomy, physiology, probability, statistical inference, hypothesis testing, regression models, clinical trials, survival analysis.

Prerequisite(s): Consent of the Department.

Medical Physics 638 3 units; (3-0)

Imaging for Radiation Oncology Physics

An overview of the imaging modalities used for Radiation Oncology including: CT, MRI, planar X-ray, nuclear medicine and ultrasound. Course will cover basic physics, instrumentation and application.

Prerequisite(s): Consent of the Department.

Medical Physics 639 3 units; (3-0)

Radiobiology and Radiation Safety for Medical Physicists

Cell kinetics, cell survival curves, radiation pathology, fractionation, radiation safety, shielding calculations.

Prerequisite(s): Consent of the Department.

Medical Physics 711 3 units; (0-8)

Clinical Competency I

Consists of rotations through areas of clinical physics under the supervision of adjunct faculty. Objectives are set, in conjunction with the student, at the commencement of the three rotations comprising this course. Student performance is evaluated by the course mentors at the conclusion of each rotation and by a final oral examination.

Prerequisite(s): Consent of the Department.

Medical Physics 712 3 units; (0-8)

Clinical Competency II

Consists of rotations through more complex areas of clinical physics under the supervision of adjunct faculty. Objectives are set, in conjunction with the student, at the commencement of the three rotations comprising this course. Student performance is evaluated by the course mentors at the conclusion of each rotation and by a final oral examination.

Prerequisite(s): Medical Physics 711 and consent of the Department.

Medical Physics 721 3 units; (0-8)

Clinical Projects I

Includes completion of multiple clinical projects in the disciplines of external beam radiotherapy, stereotactic radiosurgery, brachytherapy, and treatment planning. These clinical projects aim to build the student's understanding of implementing advanced technologies in a radiotherapy clinic. Projects have clearly defined objectives established by mutual agreement between the student and project supervisor. The project culminates in written reports and oral presentations.

Prerequisite(s): Consent of the Department.

Medical Physics 722 3 units; (0-8)

Clinical Projects II

Includes completion of multiple clinical projects in the disciplines of external beam radiotherapy, stereotactic radiosurgery, brachytherapy, and treatment planning. These clinical projects aim to build the student's understanding of implementing advanced technologies in a radiotherapy clinic. Projects have clearly defined objectives established by mutual agreement between the student and project supervisor. The project culminates in written reports and oral presentations.

Prerequisite(s): Medical Physics 721 and consent of the Department.

Medical Physics 731 3 units; (2T-0)

Radiation Oncology Physics Tutorials

Requires the student to prepare written answers to pre-set questions published by the Canadian College of Physicists in Medicine as part of the certification process in Radiation Oncology Physics.

Prerequisite(s): Consent of the Department.

Medical Physics 741 3 units; (1-4)

Treatment Planning

Designed to nurture knowledgeable and clinically competent treatment planning physicists. Develops background understanding of the mechanisms of dose calculation and radiation deliverability. As well, site specific treatment planning is a focus to ensure students are ready to practice as clinically competent medical physicists. The practical component allows the resident to train under the direct supervision of physicists and dosimetrists.

Prerequisite(s): Consent of the Department.

Medical Science MDSC

For more information about these courses, see the Cumming School of Medicine website: <https://cumming.ucalgary.ca/>.

Students contemplating taking any of the undergraduate medical science courses are advised to contact the course co-ordinator(s) through the Undergraduate Sciences program

office. Students contemplating taking any of the graduate-level (600 and up) Medical Science courses are advised to contact the course co-ordinator through the Graduate Science Education office.

Junior Courses

Medical Science 203 3 units; (3-2T)

Developing Health Research Literacy I

Students will be introduced to the interdisciplinary scope of health research through reading and writing assignments. Students will learn the basics of academic research enquiry and practice academic writing and presentation skills through individual and team assignments.

Prerequisite(s): Admission to the BHSc Honours program.

Medical Science 205 3 units; (3-0)

Developing Health Research Literacy II

Students will develop their critical thinking skills and their ability to write logically, well-argued research papers. Students will learn the fundamentals of logical reasoning as well as how to analyze theoretical issues in science, medicine, and philosophy.

Prerequisite(s): Medical Science 203 and admission to the BHSc Honours program.

Senior Courses

Medical Science 307 3 units; (3-0)

Science, Philosophy and Society

A survey of underlying ideas concerning the objectives, methods, ambitions and responsibilities of the natural and social sciences.

Prerequisite(s): Second-year or higher in the BHSc Honours program or consent of the instructor.

Medical Science 308 6 units; (6-0)

Interdisciplinary Research Approaches

An introduction to the questions, methods and research techniques used across the different majors of Biomedical Sciences, Bioinformatics and Health and Society. Sessions will support the development of a broad perspective on health issues and introduce students to the history and the rules governing the ethical conduct of science and research on humans.

Prerequisite(s): Medical Science 205 and admission to the BHSc Honours program.

Medical Science 321 3 units; (3-0)

Introduction to Immunology

This introductory course is designed to expose students to the study of how the immune system encounters, recognizes, and responds to various infectious and pathogenic conditions. Emphasis will not solely focus on how components of the immune system interact with each other to generate an effective host response but also will be placed on how this immune response may be used to generate new therapies for human disease, how evolving and emerging pathogens interact with, and challenge the immune system, and how our knowledge of immunity has impacted society.

Prerequisite(s): Biology 241 and 243.

Medical Science 341 3 units; (3-3T)

Principles of Human Genetics

Introduction to principles in human genetics including Mendelian and chromosomal basis of inheritance, chromosomal abnormalities, pedigree analysis, mutations, and molecular, metabolic, population and clinical genetics. Studies of model

organisms and genomics will be included as required. Incorporates problem-based learning to establish analytical skills in genetics.

Prerequisite(s): Biology 241 and 243 or 231 and enrolment in the BHSc Honours program or consent of the instructor.

Antirequisite(s): Credit for Medical Science 341 and Biology 311 will not be allowed.

Medical Science 351 **3 units; (3-2T)**

Honours Cellular and Molecular Biology

Introduction to principles in cellular and molecular biology. Emphasizes how structure underlies and determines function in the cell and how complex processes are organized and regulated at the molecular level.

Prerequisite(s): Medical Science 341 and enrolment in the BHSc Honours program, or consent of the instructor.

Corequisite(s): Biochemistry 393.

Antirequisite(s): Credit for Medical Science 351 and Biology 331 will not be allowed.

Medical Science 397 **3 units; (0-4)**

Independent Studies in Health Sciences

Guided work fostering independent thought, practical research and the completion of written reports for first- and second-year BHSc students. After consultation with a Departmental faculty member who will supervise the chosen problem, an approval form obtained from the BHSc Office must be signed by the Associate Dean (UHSE) before a student can be registered.

Prerequisite(s): First- or second-year standing and consent of the BHSc program.

MAY BE REPEATED FOR CREDIT

Medical Science 401 **3 units; (3-0)**

Bioinformatics

This introductory course will familiarize students with algorithms and computational techniques for bioinformatics applications. Topics to be covered include algorithm and search engines for the analysis of nucleic acid and protein sequences and structures; machine learning techniques for biological data analysis; systems biology approaches for computational modelling.

Prerequisite(s): 6 units in Computer Science at the 300 level or Medical Science 341 and 351 or 6 units in Biological Sciences at the 300 level or consent of the instructor.

Medical Science 402 **6 units; (3-3)**

Organismal Biology

Organismal structure from the cellular to the organism level focusing on vertebrates with a particular emphasis on humans. Topics covered include cell biology, histology, vertebrate development and anatomy. This course is inquiry-based and will consist of lectures, small group sessions and interactive laboratory sessions.

Prerequisite(s): Enrolment in the BHSc Honours program, Biology 241 and 243, or 231, and Medical Science 351, or consent of the instructor.

Antirequisite(s): Credit for Medical Science 402 and 417 will not be allowed.

Note: Course cannot be taken concurrently with Medical Science 508.

Medical Science 403 **3 units; (3-0)**

Computation for Bioinformatics

This advanced course will focus on current computational methods in bioinformatics. Topics will shift as computational methods in bioinformatics shift. Currently, the course will

focus on in-depth usage of R and Bioconductor, including reproducible research. Lecture topics will include an introduction to fundamental and idiomatic R constructs and usage and creation of Bioconductor packages.

Prerequisite(s): Consent of the instructor.

Note: Usual requirements are 6 units in Computer Science at the 300 level and Medical Science 401.

Medical Science 404 **6 units; (3-3T)**

Integrative Human Physiology

Physiology is defined as the study of how living organisms function and encompasses the integration of processes from molecules to the whole-organism. Provides fundamental principles and concepts about the physiology of the major human organ systems.

Prerequisite(s): Enrolment in the BHSc Honours program or consent of the instructor.

Antirequisite(s): Credit for Medical Science 404 and any of Kinesiology 259, 260, 323, Zoology 269, 461, 463 or Biology 305 will not be allowed.

Medical Science 407 **3 units; (3-2)**

Statistics and Research Design in Health Sciences

An introduction to the study of research design and statistical analysis including a broad overview of the variety of methods for research in health sciences. Students will be introduced to a variety of research tools through lecture and tutorial components.

Prerequisite(s): Enrolment in the BHSc Honours program.

Medical Science 408 **6 units; (6-0)**

Research Design in Molecular Biology and Bioinformatics

An introduction to the research methods utilized in the Health Sciences. Students will begin to develop the knowledge and skills necessary to conduct research in their respective fields. The importance of research design, qualitative, quantitative and mixed methods and the theoretical constructs that inform these approaches will be emphasized.

Prerequisite(s): Medical Science 308 and admission to the BHSc Honours program.

Medical Science 409 **3 units; (3-0)**

Brain and Society

Topics will include neuronal mechanisms of addiction, neuronal mechanisms of learning and memory, aging in the human brain and behavioural consequences and mind/brain dichotomy.

Prerequisite(s): Enrolment in the BHSc Honours program.

Medical Science 415 **3 units; (3-0)**

Introduction to Epidemiology

An introduction to the basic concepts of epidemiology needed to understand and critically analyze research pertaining to health and disease in populations. Methods used in descriptive and analytic epidemiological studies, including the design, analysis and interpretation of results for observational studies and clinical trials will be discussed. Case studies and contemporary events will be used to illustrate epidemiology in action and to highlight the social aspects of applying epidemiology in public health.

Prerequisite(s): Medical Science 308 or consent of the instructor.

Medical Science 417 **3 units; (3-3)**

Integrated Research Course I

Provides students with the basic conceptual framework, knowledge and skill set to work and think independently in a medical science or life science research environment in their topic area. The course will include lectures in the various topic areas, group sessions and self-directed research project in the topic area.

417.01. Genetics I

417.02. Microbiology, Immunology and Infection I

417.03. Cardiovascular Sciences I

417.04. Cancer Biology I

417.05. Biochemistry and Molecular Biology I

417.06. Pharmacology and Physiology I

417.07. Neuroscience I

417.08. Special Topics I

Prerequisite(s): Medical Science 308 and enrolment in the BHSc Honours program, or consent of the instructor.

Antirequisite(s): Credit for Medical Science 417 and 402 will not be allowed.

Note: Course needs to be taken in combination with the corresponding Medical Science 419 integrated research course II in the same academic year. Course cannot be taken concurrently with Medical Science 508.

Medical Science 419 **3 units; (0-6)**

Integrated Research Course II

Provides students with the basic conceptual framework, knowledge and skill set to work and think independently in a medical science or life science research environment in their topic area. The course will be a continuation of the courses topic areas, and will for the most part consist of the self-directed laboratory research project started in the topic area in Medical Science 417.

419.01. Genetics II

419.02. Microbiology, Immunology and Infection II

419.03. Cardiovascular Sciences II

419.04. Cancer Biology II

419.05. Biochemistry and Molecular Biology II

419.06. Pharmacology and Physiology II

419.07. Neuroscience II

419.08. Special Topics II

Prerequisite(s): Medical Science 308, the appropriate 417 course and enrolment into to the BHSc Honours program or consent of the instructor.

Antirequisite(s): Credit for Medical Science 419 and 402 will not be allowed.

Note: Course needs to be taken in combination with the corresponding Medical Science 417 Integrated Research Course I in the same academic year.

Medical Science 501 (Biology 501) **3 units; (3-0)**

Principles and Mechanisms of Pharmacology

Basic principles of pharmacology, with specific emphasis on receptor signaling mechanisms. The application of pharmacological principles to the treatment of disease will also be explored.

Prerequisite(s): Enrolment in the BHSc Honours program, Biochemistry 393, and one of Zoology 463 or Medical Science 404, or consent of the BHSc program.

Medical Science 503 **3 units; (3-0)**
(Biology 503)

Pharmacology of Organ Systems

Through analysis and discussion of research literature, this course explores topics in pharmacology including the nervous, cardiovascular, renal, respiratory and immune systems, as well as anti-cancer therapies.

Prerequisite(s): Medical Science 501 (Biology 501) or consent of the BHSc program.

Medical Science 507 **3 units; (3-3)**

Special Problems in Medical Science

Lectures, seminars, term papers and training in theoretical and/or laboratory methods.

Prerequisite(s): Consent of the BHSc program.

Note: After consultation with a faculty member who will supervise the chosen problem, an approval form obtained from the BHSc Office must be signed by the Associate Dean (UHSE) before a student can be registered.

MAY BE REPEATED FOR CREDIT

Medical Science 508 **12 units; (0-6)**

Honours Thesis and Research Communication

Capstone research course in the BHSc to be conducted through any one of the basic research departments. Students would be expected to conduct research. Course also involves weekly small group sessions aimed at building research communication skills. Course culminates with submission of a written thesis that is presented and defended in front of a panel of faculty members in an oral examination.

Prerequisite(s): Enrolment in the BHSc Honours program and Health and Society 408 or Medical Science 408 and a minimum cumulative 3.30 GPA or consent of the director.

Note: This course is worth 12 units and is offered over two sessions. Course cannot be taken concurrently with Medical Science 402, 417 or 419.

Medical Science 509 **3 units; (3-3)**

Proteomics

An introductory course to familiarize students with techniques used for protein identification and proteome analysis, including one and two-dimensional gel electrophoresis, mass spectrometry and the databases and search engines used in the identification of expressed proteins.

Prerequisite(s): Biochemistry 443 and Medical Sciences 351 or Biology 331.

Medical Science 515 **3 units; (3-0)**
(Biology 515)

Cellular Mechanisms of Disease

The cellular and molecular mechanisms underlying basic human disease processes and how these can be influenced by lifestyle and environmental factors. The ways in which this knowledge can be used in the laboratory diagnosis of disease.

Prerequisite(s): Biochemistry 393 and one of Biology 331 or Medical Science 351.

Medical Science 517 **3 units; (3-1T)**

Introduction to Biotechnology Business and Profession

An overview of the biotechnology sector from several perspectives: product development, regulatory, intellectual property, market analysis, and finance. This course will include two modules. The first is a series of lectures by faculty and local entrepreneurs to provide the necessary background for the assignments in the second

module. The second module will include student-selected case studies and an analysis of a small biotechnology company.

Prerequisite(s): Medical Science 351 or consent of the instructor.

Medical Science 519 **3 units; (3-0)**

Advanced Bioinformatics

Designed to develop student ability to perform bioinformatics analyses of datasets and develop their knowledge of the current literature. The course will emphasize careful study of recent methodologies for chromatin immunoprecipitation followed by sequencing (ChIP-seq) dataset analysis. The course will include lectures, literature review sessions and a self-directed bioinformatics research project.

Prerequisite(s): Medical Science 401 and at least one of Computer Science 217, 219, 231 or 233; or consent of the instructor.

Medical Science 521 **3 units; (3-3)**

Human Anatomy

An inquiry-based exploration of clinically significant human anatomy. The course will follow a systems-based approach, and will make use of multiple learning formats. Each week, the instructor will lead classroom and laboratory sessions that explore an anatomical system from developmental, functional, and clinical perspectives.

Prerequisite(s): Fourth-year standing in the BHSc program or consent of the instructor.

Medical Science 528 **6 units; (0-6)**

Independent Studies in Medical Science

Original and independent thought, practical research and the completion of written and oral reports. After consultation with a faculty member who will supervise the chosen problem, an approval form obtained from the BHSc Office must be signed by the Associate Dean (UHSE) before a student can be registered.

Prerequisite(s): Consent of the BHSc program.

MAY BE REPEATED FOR CREDIT

Medical Science 535 **3 units; (3-0)**

Psychosocial Oncology

Focuses on developing the understanding in health care practitioners of the central concepts related to caring for cancer patients and their families.

Prerequisite(s): Consent of the instructor.

Antirequisite(s): Credit for Medical Science 535 and 635 will not be allowed.

Medical Science 541 **3 units; (3-1T)**

Advanced Genetics I

Historical papers will illustrate the foundations of modern genetic principles. Topics including the chromosomal theory of inheritance, the role of pairing and recombination for chromosomal disjunction during meiosis, cytogenetics, the nature of dominant mutations, genetic screens and genetics analysis of developmental pathways. Material covered is drawn from model organisms and humans.

Prerequisite(s): Medical Science 341 or Biology 311 or consent of the instructor.

Medical Science 543 **3 units; (3-0)**

Advanced Genetics II

An advanced course in molecular genetic analysis. Topics will vary from year-to-year, but may include identification of the structure, transmission, mutation and molecular pathology of human genes, the use of experimental organisms (chick,

fish, fly, mouse, worm) to model human genetic diseases, and molecular studies of human populations and evolution. The focus will be upon applied molecular genetics with recurring emphasis on the theme of relevance to issues in health and society.

Prerequisite(s): Medical Science 341 or Biology 311 or consent of the instructor.

Note: Previous completion of Medical Science 541 is suggested but not required.

Medical Science 545 **3 units; (3-0)**

Genomics

Examine the strategies and techniques, including massively parallel sequencing, used in genomic and genetic studies. Review how model systems and genome editing are used to establish the functional consequences of genomic variation. Students can expect to gain a comprehensive understanding and broad appreciation of the significance of genomic information in context of rare and common human diseases, and genome biology.

Prerequisite(s): Medical Science 408 or Cellular, Molecular and Microbial Biology 413 or consent of the instructor.

Medical Science 561 **3 units; (3-0)**
(Cellular, Molecular and Microbial Biology 561)

Cancer Biology

Advances in methodology and in theoretical concepts have permitted continuing breakthroughs in our understanding of the organismal, cellular and molecular biology of cancer cells, and in the development of novel strategies for cancer prevention, diagnosis and treatment. These advances will be presented in a comprehensive overview of cancer including issues of demographics and incidence, causation and detection, origins and progression and therapeutic approaches. Emphasis will be placed on the cell and molecular biology of cancer and on the interaction of the cancer cell with the host organism.

Prerequisite(s): Biochemistry 443, Medical Science 351 or Biology 331, and Cellular, Molecular and Microbial Biology 411.

Medical Science 565 **3 units; (3-0)**
(Cellular, Molecular and Microbial Biology 565)

Advanced Topics in Microbial Pathogenesis and the Microbiome

Provides a fuller understanding of bacterial diseases using a systems approach and illustrating key paradigms via the consideration of specific pathogens. Topics include: strategies for bacteria surviving host immune responses, bacterial invasion strategies, opportunistic infections, disease Pathogenesis, and antibiotic resistance, challenges of dealing with emerging infections. Lectures, small group interactive sessions, specified readings.

Prerequisite(s): Cellular, Molecular and Microbial Biology 343 and 431.

Medical Science 567 **3 units; (3-0)**
(Cellular, Molecular and Microbial Biology 567)

Advanced Topics in Immunology

New and emerging themes in immunology, with an emphasis on disease processes such as inflammation in the gut, kidney and lung. Topics include: innate immunity, the inflammasome, sterile inflammation, process and mechanism of immune cell recruitment in different tissues, T cell biology, B cell biology, regulatory immune cells, mucosal immunity, airways responses to virus, mechanisms of food allergies, inflammatory bowel disease.

Lectures, small group interactive sessions, specified readings.

Prerequisite(s): Cellular, Molecular and Microbial Biology 527 or Medical Science 321.

Medical Science 569 **3 units; (3-1T)**

Advanced Topics in Physiology

Designed for undergraduates with a general understanding of human physiology who wish to pursue advanced topics in a physiological system(s). The physiological system offered will vary from year-to-year and students should contact the instructor for more information prior to enrolling in the course. There will be a review and then build on basic physiological principles through a series of lectures and/or discussion groups. An examination of the specified area of physiology in-depth by introducing students to research methodologies and pathological processes.

Prerequisite(s): Medical Science 404 or Zoology 463 or consent of the instructor.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Medical Science 603 **3 units; (3-1)**
(Biology 603)

Biology of Laboratory Animals

Based on the Canadian Council of Animal Care Syllabus "Basic Principles of Laboratory Animal Science for Research Scientists." In addition to the study of common, research, farm and exotic animals, topics covered include ethical considerations, regulation and legislation, animal models, animal facilities and husbandry, hazard control, surgery, anaesthesiology, euthanasia and post-mortem examinations. Practical sessions will provide experience in handling and restraint of specific laboratory animals, injections, blood collection, anaesthesiology and surgery.

Prerequisite(s): Consent of the Faculty.

Note: Enrolment in this course is restricted to graduate students who will do research utilizing animals.

Medical Science 604 **6 units; (3-3)**

Integrative Human Physiology

Physiology is the study of how living organisms function and encompasses the integration of processes from molecules to the whole-organism. Designed to provide the student with fundamental principles and concepts about the normal function of the major human organ systems. At the end of this course, the student should be well equipped to apply their acquired knowledge to solve complex physiological problems related to integrative human physiology.

Prerequisite(s): Consent of the Faculty.

Medical Science 605 **3 units; (3-0)**
(Computer Science 605)

Information Storage and Processing in Biological Systems

Examination of complex biological systems; concepts and fundamentals of biological solutions to information storage and processing: modelling and computer simulation of biological systems; information storage in biological molecules; genetic networks; hierarchical organization of biological information processing in signal transduction, development, evolution, and ecology; biological control systems.

Prerequisite(s): Consent of the Faculty.

Medical Science 609 **3 units; (3-0)**

Gene Expression

Genetic control and cellular basis of development. Topics include an introduction to the major genetic model organisms, the regulation of gene expression and pattern formation by developmental signals, and the cellular basis of cell signalling, cell and tissue polarity, and morphogenesis.

609.02. Genes and Development

Prerequisite(s): Consent of the program. A strong background in undergraduate genetics and developmental biology is recommended.

Medical Science 611 **3 units; (3-0)**
(formerly Medical Science 612)

Medical Microbiology

The basic principles of medical microbiology and the pathogenesis of infectious disease and of clinically important microbial pathogens including bacteria, viruses, parasites and fungi. Recent concepts will be described and students will be expected to present and critically discuss research advances of their choosing from the current research literature.

Prerequisite(s): Cellular, Molecular and Microbial Biology 343 or consent of the Faculty.

Medical Science 613 **3 units; (3-0)**

Advanced Studies in Microbiology

Specialized topics including basic principles of infection; spread, prevention and control of infectious diseases; mechanisms of and approaches to study bacterial pathogenesis; mechanism, methodology and modelling of gene expression.

613.01. Epidemiology of Infectious Diseases

613.05. Regulation of Gene Expression in Bacteria

Prerequisite(s): Medical Science 612 or Cellular, Molecular and Microbial Biology 421 or 521 or consent of the Faculty.

Medical Science 619 **3 units; (4-2)**

Neurosciences

Introductory neuroscience courses covering aspects of cellular, molecular, and systems physiology, neuroanatomy, and neurodevelopment.

619.01. Cellular, Molecular and Developmental Neuroscience

619.02. Systems Neuroscience and Neuropathology

Prerequisite(s): Admission to the Neuroscience Graduate Program or consent of the instructor.

Medical Science 620 **3 units; (3-0)**

Topics in Systems Physiology

Designed for students undertaking research in physiology or related disciplines with only limited prior exposure to the discipline. Introduces and discusses fundamental and current issues in physiology ranging from the basic physiological systems through to translational clinical topics. Encompasses the basic physiological mechanisms with emphasis on the role of the autonomic nervous system. Subject areas will include basic physiology of the cardiovascular, respiratory, gastrointestinal, renal, endocrine and reproductive systems.

Prerequisite(s): Admission to the Master of Pathologists' Assistant program or consent of the instructor.

Medical Science 621 **3 units; (3-0)**

Principles of Drug Action

The action of chemicals and drugs on biological systems ranging from subcellular particles to the intact organism.

621.01. Basic Principles of Pharmacology

Prerequisite(s): Zoology 461, Medical Science 404 and Medical Science/Biology 501, or consent of the Faculty.

Medical Science 622 **3 units; (3S-0)**

Neurobiology of Mental Illness

Students are exposed to up-to-date research regarding the neurobiological theories of various mental illnesses (such as depression, anxiety disorders, schizophrenia, etc.). The seminar format will involve discussion in both research and review articles. The focus of discussion will be on both preclinical research and clinical studies that shed insight into the neurobiology of mental illnesses or their treatments.

Prerequisite(s): Medical Science 619.02 and admission to a Cumming School of Medicine graduate program or consent of the instructor.

Note: Open to Psychology graduate students and Psychiatry residents with consent of instructor.

Medical Science 623 **3 units; (3-1T)**

Respiratory Science and Critical Illness

Respiratory physiology; including topics such as cellular, morphology, mechanics, control of breathing, and respiratory muscles, necessary to an understanding of respiration and respiratory failure. As well, core physiology and molecular biology underlying critical illness.

623.01. Pulmonary Mechanics and Gas Exchange

623.02. Physiology of Respiration and Critical Illness

623.03. Respiratory Science: Basic

623.04. Respiratory Science: Applied

Prerequisite(s): Zoology 463 or 465 or consent of the Faculty.

Medical Science 624 **3 units; (2-2)**
(formerly Medical Science 751.42)

Neuroanatomy

Detailed introduction to neuroanatomy using Homo sapiens as the primary experimental species but relying on other vertebrates for additional details. Detailed anatomic aspects of each major brain region, along with major connections and functions related to those regions will be presented. Laboratories will examine gross specimens, virtual microscopic images, and other anatomic images.

Prerequisite(s): Medical Science 619.02 or consent of the instructor.

Medical Science 629 **3 units; (3-0)**

Cardiovascular Dynamics

Includes topics such as basic physiologic mechanisms including excitation-contraction coupling, mechanics, energetics, and cardiovascular control; major disease entities as a means of illustrating pathologic alterations in normal physiologic mechanisms; or a systematic in-depth examination of the chemicals that affect the cardiovascular system.

629.01. Cardiovascular Physiology

629.02. Cardiovascular Pathophysiology

629.03. Cardiovascular Pharmacology

Prerequisite(s): Consent of the Faculty.

Medical Science 631 **3 units; (3-0)****Muscle Physiology**

Contractile processes, excitation-contraction coupling, the control of contraction and energetics in smooth, cardiac and skeletal muscle. Molecular studies of the contractile process and of the process of excitation contraction coupling.

Prerequisite(s): Consent of the Faculty.

Medical Science 633 **3 units; (3-0)****The Kidney**

Advanced courses detailing the functional organization of the kidney at all levels, from cell to intact organism. Topics encompass basic physiological principles and their relevance to experimental medicine and therapeutics, as well as the study of disease processes, which impact kidney function.

633.01. Renal Physiology

633.02. Renal Pathophysiology

633.03. History of Renal Physiology

Prerequisite(s): Medical Science 604 or consent of the Faculty.

Medical Science 635 **3 units; (3-0)****Psychosocial Oncology**

A seminar-based course focusing on the possible causes of psychosocial problems in cancer patients and families (medical, psychological and social) and also on how patients and families are helped through the difficult transitions resulting from a cancer diagnosis, treatment, recurrent disease, and end of life care.

Prerequisite(s): Consent of the Faculty.

Antirequisite(s): Credit for Medical Science 635 and 535 will not be allowed.

Note: This course is open to health professionals and researchers, and to advanced undergraduate students in relevant disciplines.

Medical Science 636 **3 units; (3-1T)****Advanced Topics in Physiology**

Provides a general understanding in physiological systems and will present advanced topics in specified physiological system(s) for further depth of understanding. Review and build on basic physiological principles through a series of lectures and discussion groups and will examine a specified area of physiology in-depth by introducing students to research methodology and pathological processes in the system.

Prerequisite(s): Medical Science 404 or Zoology 463 or consent of the instructor.

Antirequisite(s): Credit for Medical Science 569 and Medical Science 636 will not be allowed.

Medical Science 637 **3 units; (3-0)****Gastrointestinal Physiology**

Physiology of the gastrointestinal (GI) tract at all levels from the cell to the intact system. Medical Science 637.01 has three components: 1) An introductory series of lectures covering the basic physiological principles of the regulation of the GI tract and the individual organs that comprise it or are associated with it; 2) Extended directed tutorials conducted online through D2L. Topics will be selected to reflect the needs and interests of the enrolled students; 3) A written term paper on a subject of the students' own choice and pre-approved by the course co-ordinator that will also be presented orally to the class.

637.01. Organization and Function of the GI Tract

Prerequisite(s): Consent of the Faculty.

Medical Science 638 **3 units; (4-0)****Mucosal Pathophysiology**

Focuses on the physiology and pathophysiology of the gastrointestinal tract, lung and other mucosal tissues. A particular emphasis will be placed on inflammatory processes in these tissues, and how they contribute to symptom generation and tissue dysfunction. Involves independent research on the part of the students, small group sessions, written assignments and class presentations

Prerequisite(s): Consent of the Faculty.

Medical Science 639 **3 units; (3-0)****Immunology**

Introductory and advanced courses in immunology that cover humoral and cellular immunity and the inflammatory response at the cellular, molecular, and whole organism level. Basic mechanisms that lead to immunity or to inflammatory responses. The contribution of immunological and inflammatory processes in the immunopathogenesis of disease.

639.02. Cellular and Molecular Immunology

639.04. Inflammation

Prerequisite(s): Cellular, Molecular and Microbial Biology 527 or consent of the Faculty.

Medical Science 640 **3 units; (3-1T)****Introduction to Immunology**

Introductory immunology for graduate students who have no background in immunology in their undergraduate studies. It provides a comprehensive overview of the immune responses: antibody-antigen interaction, antibody structure, genetics and synthesis, cellular immunology, MHC, phagocytosis, and tolerance. Using this basic understanding of fundamental immune processes the involvement of the immune response in autoimmunity, hypersensitivity, tissue rejection, tumor immunology, vaccine production, viral, bacterial, fungal and parasitic infections will be discussed. Additionally, methods for the study of immunology will be covered.

Prerequisite(s): Consent of the Faculty.

Antirequisite(s): Credit for Medical Science 640 and Cellular, Molecular and Microbial Biology 527 will not be allowed.

Note: This course will share lectures with Cellular, Molecular and Microbial Biology 527 with an additional separate tutorial.

Medical Science 641 **3 units; (3-0)****Genetics**

Advanced courses that provide in-depth coverage of the research discipline of genetics, including the areas of cytogenetics, genomics, metabolic genetics, mouse genetics, population genetics, and human and medical genetics.

641.01. Advanced Genetics I

641.02. Advanced Human Cytogenetics

641.03. Advanced Genetics II

641.04. Genomics

Prerequisite(s): Consent of the instructor.

Medical Science 663 **3 units; (3-0)**
(Kinesiology 663) (Mechanical Engineering 663)**Advanced Muscle Mechanics and Physiology**

A look at problems associated within muscle mechanics and contractility. Also the use of muscle mechanics as a scientific discipline to critically learn and evaluate the scientific process. Basic anatomy and physiology of muscle contraction including the cross-bridge theory, and the force-length, force-velocity and force-time relationships

of actively and passively contracting muscles will also be covered.

Prerequisite(s): Consent of the Faculty.

Medical Science 670 **6 units; (0-6)****Practicum in Biomedical Technology**

A six unit (full) course carried out in an academic or industrial setting for a period of at least twelve weeks. Students have an opportunity to apply the principles and methods of investigation learned during the Master of Biomedical Technology program and carry out related research. Practicum projects can be focused on any of the following aspects of the commercialization process: patent filing, research and development, business development, manufacturing to clinical trials, marketing and sales.

Prerequisite(s): Admission to the Biomedical Technology Graduate Program.

Note: Completion of all other course requirements in Master of Biomedical Technology program is normally required prior to registration for this course. Exceptions must be approved by the Graduate Director.

NOT INCLUDED IN GPA**Medical Science 671** **3 units; (0-6)****Techniques in Medical Science**

Introduction to the theory of operation of electronic devices commonly used in biophysical studies including principles of amplifiers and filters, micro- and patch electrode techniques and computer-laboratory interfacing.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT**Medical Science 673** **3 units; (3S-0)****Careers in Biotechnology**

A series of talks and workshops designed to provide students with practical knowledge of the biotechnology industry. In collaboration with the University of Calgary Career Services, the course covers personal and professional development planning, resume writing, networking, negotiation and interviewing skills and job search strategies specifically for the biotechnology field. This course runs during the fall and winter block weeks with additional retreat days throughout the year.

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the instructor.

NOT INCLUDED IN GPA**Medical Science 674** **6 units; (3-0)****Integrated Systems Course**

The principles of molecular and cell biology, pathology, physiology, pharmacology, microbiology and immunology as applied to new diagnostics, vaccines or therapeutics. Lectures in the two courses are in parallel and fully integrated. Both courses are required components of the MBT program. The goal of the course, with an emphasis on cellular and molecular mechanisms in health and disease, is to provide students with the skills to interface with individuals in these disciplines in the biotechnology industry. Complemented by special lectures that provide industry perspectives in these disciplines.

674.01. Physiological and Pharmacological Aspects of Therapeutics Development

674.02. Molecular, Cellular and Microbial Biology and Immunology

Prerequisite(s): Admission to the Master of Biomedical Technology program or consent of the instructor(s).

Medical Science 675 **3 units; (2-3T)**

Bioinformatics Resources for the Biologist

This introductory graduate level course will familiarize biologists with algorithms and search engines used to analyze nucleic acid and protein sequences and structures.

Prerequisite(s): Consent of the Faculty.

Medical Science 676 **3 units; (2.5-1)**

Scripting and Database Querying for Molecular Biologists

Intended for biologists who wish to improve their bioinformatics analysis capabilities by learning just a small amount of query and programming syntax. The focus is on practicality rather than programming theory. The course explores how to use existing tools (on the command-line and on the Web) to gather and process large datasets all at once, rather than doing many individual analyses manually.

Note: No prior programming experience is required.

Medical Science 677 **3 units; (1-6)**

Directed Study in Biomedical Technology

Lectures, seminars, term papers or training in theoretical and/or laboratory methods at the advanced level in biomedical technology or medical sciences.

Prerequisite(s): Consent of both the faculty member who will supervise and the MBT faculty member who will co-supervise the chosen study and must be registered in the Master of Biomedical Technology program.

MAY BE REPEATED FOR CREDIT

Medical Science 678 **3 units; (1-6-3T)**

Project in Biomedical Technology

Covers basic principles of project management as well as biotech lab theory and practical aspects. Includes commercial technology reviews, tours, demos and practical labs. Includes development of the scientific aspects of a project based on a disease, pharmaceutical, or device of current interest, culminating in a poster presentation and business pitch of the science and business aspects.

Prerequisite(s): Admission to the Biomedical Technology Graduate Program or consent of the instructor(s).

Medical Science 679 **3 units; (2-2)**

Fundamentals of Bioinformatics

Foundational techniques and current research in bioinformatics are explored. Topics covered will include large-scale programmatic data access via data-marts and genome browsers, visualization, statistical techniques, and analysis of sequence and 'omics datasets.

Prerequisite(s): Admission to the Bioinformatics specialization of the Biochemistry and Molecular Biology graduate program or consent of instructor.

Note: This course assumes some computational background including programming or scripting ability.

Medical Science 685 **3 units; (3-3)**
(Mechanical Engineering 685)

Biomechanics of Human Movement

Introduction to the measuring methods (accelerometry, goniometry, film and film analysis, video systems) of biomechanical analysis of human movement (force and force distribution). Description of the mechanical properties of bone, tendon, ligaments, cartilage, muscles, and soft tissues. The relation between structure and

function of biomaterials. Introduction in descriptive analysis of human movement.

Prerequisite(s): Consent of the Faculty.

Antirequisite(s): Credit for more than one of Medical Science 685, Mechanical Engineering 685 and Kinesiology 685 is not allowed.

Medical Science 689 **3 units; (3-0)**

Medical Imaging

Introduction to the theory and practical applications of medical imaging. Specific courses focus on an overview of modern diagnostic imaging techniques (689.01), as well as advanced study of specific techniques including magnetic resonance imaging (689.02) and medical image processing (689.03), and molecular imaging (689.04).

689.01. Medical Imaging Techniques

689.02. Advanced Magnetic Resonance Imaging

689.03. Advanced Medical Image Processing

689.04. Advanced Molecular Imaging

689.10. Medical Imaging Theory

689.11. Medical Imaging Applications

689.99. Medical Imaging Project

Prerequisite(s): Admission to a graduate program with specialization in Medical Imaging or consent of the instructor.

Medical Science 701 **3 units; (3-0)**
(Veterinary Medicine 701)

Advanced Topics in Reproductive Health

A series of topics, ranging from basic sciences to clinical topics (including ethical issues) to increase awareness and comprehension regarding current issues in reproductive health.

Prerequisite(s): Consent of course co-ordinator and student's supervisor, if applicable.

Note: Interest in reproductive health/reproductive biology is essential.

Medical Science 703 **3 units; (2-6)**

Human Anatomy: Concepts, Exploration and Teaching

Introductory course for graduate students with an interest in mammalian morphology to human cadaver dissection, human anatomy concepts and teaching strategies within the medical professional curriculum. Weekly lectures and discussions supplement a cadaver dissection-based course intended for students interested in pursuing an academic career in a medically related field.

Prerequisite(s): Should have some previous experience with dissection. Consent of the instructors.

Medical Science 706 **3 units; (3-0)**

Theory and Practice of Family Therapy

Overview of different family therapy approaches focusing on systemic assessment and systemic intervention through therapeutic interviewing. The development of student knowledge and skills in family therapy utilizing social constructionist, narrative, systemic, collaborative, and pro-feminist ideas while fostering the professional identity of the therapist.

706.01. Theory and Practice of Family Therapy I: Systemic Approaches

706.02. Theory and Practice of Family Therapy II: Postmodern Approaches

Prerequisite(s): Admission to a graduate program in the Cumming School of Medicine or consent of the instructor.

Medical Science 707 **3 units; (2S-12)**

Family Therapy Practicum

The development of conceptual and experiential expertise in working therapeutically with families.

707.01. Family Therapy I

707.02. Family Therapy II

Prerequisite(s): Consent of the Faculty.

NOT INCLUDED IN GPA

Medical Science 708 **3 units; (3-0)**

Theory and Practice of Interprofessional Psychosocial Oncology

Provides graduate students with a multidisciplinary introduction to the field of psychosocial oncology. Emphasis will be placed on understanding and interpreting the experience of cancer informed by theory, evidence and illness narratives. Case-based learning in small interprofessional groups will allow students to explore a variety of key learning themes relevant to psychosocial oncology including distress assessment, depression, anxiety, adjustment and coping, sexuality, loss and grief. Attention to diversity will be integrated throughout the course.

Prerequisite(s): Consent of the instructor.

Note: Must have an undergraduate degree in a relevant domain (including, but not limited to medicine, psychology, nursing, social work, spiritual care/theology). This is an online course.

Medical Science 710 **3 units; (3-0)**

Business and Careers in Biotechnology

An overview of the biotechnology sector from several perspectives: product development, regulatory, intellectual property, market analysis and finance. This course will include series of lectures and discussions to provide both the necessary background about the biotechnology industry and an understanding of careers in the biotechnology industry.

Prerequisite(s): Admission to a thesis-based Master's or Doctoral program in the Cumming School of Medicine.

Medical Science 713 **3 units; (0-3T)**

Topics in Mountain Medicine and High Altitude Physiology

A tutorial-based course focused on high altitude medicine and physiology. The aim of the course is to introduce the students to the physiological adaptations of, and pathophysiology associated with, the hypoxia of altitude. Students will be introduced to several diseases associated with the hypoxia of high altitude (i.e., Acute Mountain Sickness; High Altitude Pulmonary Edema, High Altitude Cerebral Edema), and the pathophysiology underlying these diseases.

Prerequisite(s): Consent of the instructor.

Medical Science 721 **3 units; (3-0)**

Biochemistry and Molecular Biology

Discussions and presentations in a small group format will highlight historical and recent developments in analysis of eukaryotic genomes and control of gene expression, chromosome structure, translation, protein structure, proteomics, regulatory networks and related technologies and their applications to the study of human diseases. Additional learning objectives relate to the critical assessment of published literature as well as the development of research proposal writing and presentation skills.

Prerequisite(s): Admission to the Biochemistry and Molecular Biology Graduate Program or consent of the instructor.

Medical Science 722 3 units; (4-0)**The Blood Vessel**

Modular course offering advanced knowledge at the cellular, molecular, and whole organism levels including the hormonal regulation of the vascular system, the interaction between endothelium and smooth muscle in the blood vessel, the molecular mechanisms underlying smooth muscle contraction and relaxation, differentiation and dedifferentiation, and the pathogenesis of vascular diseases including hypertension and atherosclerosis. Drug treatments for vascular diseases and their molecular mechanisms will also be covered.

722.01. Vascular Biology

722.02. Vascular Pharmacology

Prerequisite(s): Admission to a graduate program in the Cumming School of Medicine or consent of the instructor.

Antirequisite(s): Credit for Medical Science 722.01 and 722.02 will not be allowed.

Medical Science 740 6 units; (3T-0)**Smooth Muscle Structure Function**

An inquiry-based approach used to provide students with a broad background for the study of smooth muscle and to introduce students to current trends in the field. Students will also be introduced to the spectrum of research on smooth muscle ongoing at the University of Calgary. The subjects to be included range from the molecular biology and biochemistry of individual proteins to the function and regulation of integrated smooth muscle systems. A number of methodological approaches that are being used for the study of smooth muscle will also be discussed.

Prerequisite(s): Consent of the instructor.

Medical Science 744 6 units; (3-2)**Human Pathology**

The principles of basic pathology, including cellular responses to injury, inflammation, tissue reaction, hemodynamic, basic genetics, and neoplasia are taught through a series of interactive lectures and seminars which are applied to examine the human system and the diseases that affect it.

Prerequisite(s): Admission to the Master of Pathologist's Assistant graduate program or the Pathologists' Assistant specialization of the Medical Science graduate program, or consent of the instructor.

Medical Science 745 3 units; (3-0)**Human Histology**

Normal histology of the human body and how it relates to the pathologic mechanisms of function and disease will be discussed and presented in small group format.

Prerequisite(s): Admission to the Master of Pathologists' Assistant program or the Pathologists' Assistant specialization of the Medical Science graduate program, or consent of the instructor.

Medical Science 746 3 units; (3-0)**Integrated Pathologists' Assistant Skills**

A series of discussions and workshops to solidify the knowledge gained throughout the Pathologists' Assistant Master's program that will provide practical knowledge of the Pathologists' Assistant profession, in particular focusing on laboratory management skills, quality control and quality assurance, and the legal and accreditation requirements for medical laboratories.

Prerequisite(s): Admission to the Master of Pathologists' Assistant program or consent of the instructor.

Medical Science 747 3 units; (0-3)**Pediatric Pathology Practicum**

Practical training in the technical skills of grossing a surgical specimen from the pediatric population in a safe and appropriate manner, as well as grossing placentas and performing fetal autopsies. Skill development will include quality management, ancillary techniques, and medical photography.

Prerequisite(s): Admission to the Master of Pathologists' Assistant program or the Pathologists' Assistant specialization of the Medical Science graduate program, or consent of the instructor.

Medical Science 748 3 units; (0-3)**Surgical Pathology Practicum**

The primary goal is the technical skills of grossing a surgical specimen in a safe and appropriate manner. Secondary goals include skill development in quality management, ancillary techniques, frozen section cutting, and medical photography.

748.01. Surgical Pathology Practicum I

748.02. Surgical Pathology Practicum II

Prerequisite(s): Admission to the Master of Pathologists' Assistant program or the Pathologists' Assistant specialization of the Medical Science graduate program, or consent of the instructor.

Note: Students are required to take both Medical Science 748.01 and Medical Science 748.02.

Medical Science 749 3 units; (0-3)**Autopsy Pathology Practicum**

Hands on rotation that will train students how to perform autopsies under the supervision of a pathologist. Knowledge of anatomy, physiology, histology, and human pathology will be incorporated in the training.

749.01. Autopsy Pathology Practicum I

749.02. Autopsy Pathology Practicum II

Prerequisite(s): Admission to the Master of Pathologists' Assistant program or the Pathologists' Assistant specialization of the Medical Science graduate program or consent of the instructor.

Note: Students are required to take both Medical Science 749.01 and Medical Science 749.02.

Medical Science 750 3 units; (0-4)**Pathologists' Assistant Research Project**

Guided work with practical research, encouraging independent thought and collaboration with pathologists and clinical colleagues. Requires completion of written reports and oral presentation on research performed.

750.01. Pathologists' Assistant Research Project I

750.02. Pathologists' Assistant Research Project II

Prerequisite(s): Admission to the Master of Pathologists' Assistant program or consent of the instructor.

Note: Students are required to take both Medical Science 750.01 and Medical Science 750.02. After consultation with a Departmental faculty member who will supervise the chosen project, approval must be obtained from the Program Director before a student can register.

Medical Science 751 3 units; (3-0)**Topics in Medical Science**

751.07. The Physiological Development of the Fetus and Newborn

751.09. Ion Channel Diseases

751.31. Joint Injury and Disease Biomechanical Focus

751.43. Orientation and Clinical Rotations for Pathologists' Assistants

Prerequisite(s): Consent of the Faculty.

Note: Enrolment in Medical Science 751.43 is restricted to students registered in the Pathologists' Assistant Specialization in the Medical Science (Master's) graduate program.

Medical Science 755 3 units; (3-0)**Directed Study**

Lectures, seminars, term papers or training in theoretical and/or laboratory methods at the advanced level in the medical sciences.

Prerequisite(s): Consent of the Faculty.

Note: Submission of application is required to set up directed study topic. Forms available from the Graduate Science Education Office in the Cumming School of Medicine.

MAY BE REPEATED FOR CREDIT**Medicine MDCN**

For more information about these courses, see <https://www.ucalgary.ca/mdprogram/current-students>.

First Year Courses**Medicine 320** (126 hours)**Medical Skills**

The fundamental elements of history-taking and physical examinations, basic procedures (e.g., suturing), as well as other essential skills necessary for functioning as physicians, such as ethical analysis, social health issues, teamwork, and self-care.

NOT INCLUDED IN GPA**Medicine 330** (24 hours)**Family Medicine Clinical Experience**

A one-on-one student/preceptor experience in rural and urban community clinics in southern Alberta where family physicians deliver generalist care, diagnose and manage most presenting complaints and see patients over time.

NOT INCLUDED IN GPA**Medicine 340** (62 hours)**Population Health**

Concepts of health and disease as they apply to populations, communities and individual patients. The determinants of health and the distribution of disease within and between populations will be explored. The roles of health promotion, health protection and disease prevention will be presented. Students will learn about the evolution and function of the Canadian health-care system in the context of current and historic challenges and international alternatives. Basic epidemiology and biostatistics as they apply to the core concepts of the course will be covered. Community experience with individuals and social/medical agencies is a core part of this course.

NOT INCLUDED IN GPA

Medicine 345 (28 hours)

Applied Evidence-Based Medicine I

Critical appraisal of literature and application of evidence to practice. An introduction to evidence-based medicine concepts and applications. Options for electives include a research project, directed study project, or clinical experience where critical appraisal skills are used to address questions related to prognosis, diagnosis and/or treatment.

NOT INCLUDED IN GPA

Medicine 350 (219 hours)

Introduction to Medicine, Blood and Gastrointestinal Course

Integrated clinical presentations related to the blood and gastrointestinal systems. Students will learn how to diagnose, investigate and manage patients presenting with such clinical presentations as fever, anemia, bruising and bleeding, weight loss, difficulty swallowing, abdominal pain, jaundice, diarrhea, etc. General principles of medicine as a whole will be presented, including concepts of history and physical examination taking, as well as principles of investigations such as test sensitivity, specificity, positive and negative predictive value. This course will also introduce fundamental concepts of anatomy, histology, pathology and radiology. An approach to problems in infectious diseases and information regarding self-protection equipment and skills is provided.

NOT INCLUDED IN GPA

Medicine 360 (119 hours)

Integrated Musculoskeletal and Dermatology Course

Integrated clinical presentations related to the musculoskeletal system and dermatology. Students will learn musculoskeletal anatomy as well the principles of diagnosis, investigation and management of clinical presentations such as painful limb, joint pain, fractures and dislocations, skin lesions, etc.

NOT INCLUDED IN GPA

Medicine 370 (187 hours)

Integrated Cardiovascular and Respiratory Course

Integrated clinical presentations related to the cardiovascular and respiratory systems. Students will learn how to diagnose, investigate and manage clinical presentations such as chest pain, loss of consciousness, palpitations, shock, heart murmur, shortness of breath, cough, sore throat, etc.

NOT INCLUDED IN GPA

Second Year Courses

Medicine 402 (3 weeks)

Second Year Elective

The student selects an area of medicine of particular interest for more in-depth study. Studies may be done in centres other than Calgary. Students are encouraged to consider experiences in developing world nations through the International Electives Program. All experiences must be evaluated by a preceptor.

NOT INCLUDED IN GPA

Medicine 410 (193 hours)

Integrated Renal-Electrolyte and Endocrine-Metabolic Course

Integrated clinical presentations related to the renal and endocrine systems. Students will learn how to diagnose, investigate and manage clinical presentations such as acute and chronic renal failure, generalized edema, hypertension, abnormal

electrolytes, neck mass, abnormalities of blood lipids, diabetes, etc.

NOT INCLUDED IN GPA

Medicine 420 (82 hours)

Medical Skills

Extends and advances the basic knowledge and skills developed in Medicine 320 to help prepare students for clerkship and clinical practice.

NOT INCLUDED IN GPA

Medicine 430 (24 hours)

Family Medicine Clinical Experience

A clinical learning experience and continuation of Medicine 330. Students participate in the delivery of patient care in urban or rural community clinics throughout southern Alberta.

NOT INCLUDED IN GPA

Medicine 440 (92 hours)

Applied Evidence-Based Medicine

Provides an opportunity to explore in depth an area of particular interest to each student. Students under the supervision of a preceptor may complete a research project. Others may pursue a clinical experience utilizing critical appraisal skills to address questions related to prognosis, investigation and/or treatment. Alternatively, students may pursue supervised electives in such areas as History of Medicine, Pathology, Health Economics, Community Health, Palliative Care, Rehabilitation Medicine, etc. Concepts of clinical informatics and evidence-based medicine (including critical appraisal) will also be presented.

NOT INCLUDED IN GPA

Medicine 445 (30 hours)

Applied Evidence-Based Medicine II

Builds on the didactic teaching from Medicine 345 and provides an opportunity to explore an area of particular interest to each student. Options for electives include participation in research, a directed study project, or a clinical experience where critical appraisal skills are used to address questions related to prognosis, diagnosis and/or treatment.

NOT INCLUDED IN GPA

Medicine 450 (199 hours)

Integrated Neurosciences, Special Senses and Aging Course

Integrated clinical presentations related to the neuroscience system, special senses, pain, palliative care and aging. Students will learn how to diagnose, investigate and manage clinical presentations such as muscle weakness, head and spinal injuries, gait disturbance, dizziness, speech and language disturbance, seizures, acute confusion, headache, dementia, falls, acute and chronic pain, dying patient, visual loss, double vision, ear pain, hearing loss, etc.

NOT INCLUDED IN GPA

Medicine 460 (163 hours)

Children and Women's Health

Integrated clinical presentations related to reproductive medicine and paediatrics. Students will learn how to diagnose, investigate and manage pregnancy, contraception, pelvic pain and associated diseases, infertility, and breast concerns. An overview of paediatric topics are presented, including the well and unwell newborn, the pre-term infant, common childhood infectious diseases, typical paediatric ambulatory problems, develop-

mental disorders, paediatric emergency medicine, and an introduction to genetics.

NOT INCLUDED IN GPA

Medicine 470 (76 hours)

Psychiatry

Students will learn how to diagnose, investigate and manage clinical presentations such as substance abuse and drug addiction, suicidal behaviour, panic and anxiety, psychosis, mood disorders, personality disorders, etc.

NOT INCLUDED IN GPA

Medicine 480 (11 hours)

Integrative Course I

Students work in small groups with a tutor and standardized patients (actors), further improve skills in interviewing, communication, physical examination, diagnosing and patient management. Basic science and clinical information across organ systems are integrated with an emphasis on clinical problem-solving ability.

NOT INCLUDED IN GPA

Medicine 485 (11 hours)

Integrative Course II

A continuation from Medicine 480. Students continue to work in small groups with a tutor and standardized patients (actors) to further improve their skills in interviewing, communication, physical examination, diagnosing and patient management. Basic science and clinical information across organ systems are integrated with an emphasis on clinical problem-solving ability.

NOT INCLUDED IN GPA

Medicine 490 (20 hours)

Introduction to Clinical Practice I

Prepare for clinical rotations by learning and practicing knowledge, skills, and attitudes relevant to all specialties. Students are immersed in practical, hands-on sessions, where unique teaching methodologies such as simulation, role-playing, and gamification enhance student engagement and learning retention. Topics include acute care approaches, teamwork skills, patient safety, communication skills, and interpretation of diagnostic results.

NOT INCLUDED IN GPA

Medicine 495 (13 hours)

Introduction to Clinical Practice II

A continuation from Medicine 490. Prepare for clinical rotations by learning and practicing knowledge, skills, and attitudes relevant to all specialties. Students are immersed in practical, hands-on sessions, where unique teaching methodologies such as simulation, role-playing, and gamification enhance student engagement and learning retention. Topics including acute care approaches, teamwork skills, patient safety, communication skills, and interpretation of diagnostic results.

NOT INCLUDED IN GPA

Third Year Courses

The third and final year is called the Clinical Clerkship. The total period of studies in the Clinical Clerkship constitutes 58 weeks. During this time, students work on hospital wards, in ambulatory care clinics and doctors' offices as well as in the Emergency Room. All students will spend from 6 to 10 weeks in community hospitals in Southern Alberta learning Family Medicine as well as some specialties. During the clerkship stu-

dents rotate through a variety of specialties spending from 2-10 weeks in each. These specialties include: Family Medicine, Internal Medicine, Surgery, Psychiatry, Paediatrics, Emergency Medicine, Anaesthesia, and Obstetrics and Gynaecology. Students also have 12 weeks of elective experience chosen from the courses listed below (Medicine 514). During this time students will apply the knowledge learned in the first 2 years and their clinical skills toward the solution of the most common clinical presentations. Students will evaluate patients and properly manage their medical problems by conducting a comprehensive medical history and thorough physical examination, formulating accurate hypotheses as to the causes and solution of their clinical problems, formulating and implementing a management plan to deal effectively with the problems. Students will demonstrate the fundamental concepts of disease prevention and health promotion for individual patients and incorporate them into treatments plans as appropriate. Students will communicate and interact effectively with patients, families, medical staff and others involved in the delivery of health services. During this time students will accept increasing responsibility in patient care as the final year advances. Students will be working with multi-disciplinary clinical teams of nurses, physiotherapists, residents and faculty. Students will develop and apply high ethical principles and standards in all aspects of medical practice and will exhibit appropriate personal and interpersonal professional behaviours. In the clerkship, as in the whole of the curriculum, it will be clear that physicians can serve patients to the highest possible standards only if they continually acquire new knowledge and skills for as long as they practice medicine.

Participation in Outreach Rotations: The clerkship program includes several community centres such as Medicine Hat, Lethbridge, Red Deer, and rural sites such as Brooks, Fort Macleod and Pincher Creek, etc. Students should expect to do from 5–10 weeks of their clinical clerkship outside the city of Calgary except in unusual circumstances.

Notes:

- There are two weeks set aside in January of the third year for students to attend the National Resident Interview Period for their residency application within the process of the Canadian Residency Matching Service (CaRMS).
- Up to 30 students per year may have the opportunity to achieve the objectives and evaluation requirements of the above stated disciplines in the University of Calgary Longitudinal Integrated Clerkship (UCLIC) an experience consisting of:
 - 32 weeks in a longitudinal rural preceptorship
 - 12 weeks of urban medicine (4 weeks Internal Medicine, 4 weeks Paediatrics, 4 weeks Surgery)
 - 12 weeks electives.

Medicine 502 (8 weeks)

Family Medicine

A placement in an urban or rural community family medicine practice. Common clinical problems associated with family medicine are emphasized along with the diverse roles, as defined by Can-Meds-FM, that a family physician may play in their particular community and for their patients. Two experiential learning projects are completed during the block that explore specific topics relevant to family medicine.

502.01. Family Medicine

502.99. Family Medicine

NOT INCLUDED IN GPA

Medicine 504 (8 weeks)

Internal Medicine

Develop diagnostic, problem-solving, and management skills by participating in a variety of clinical experiences and formal teaching rounds. Students will have the opportunity to be at the front-lines of patient care, and will often be the primary representative of the medical team to their patients. The clinical experiences will consist of one of the following options:

1. One four-week Medical Teaching Unit rotation, and two two-week rotations on an outpatient/consultative subspecialty.
2. One four-week Medical Teaching Unit rotation and one four-week ICU rotation.

Formal teaching sessions include weekly bedside teaching, formal teaching sessions during protected time, and rotation-specific rounds.

504.01. Internal Medicine

504.99. Internal Medicine

NOT INCLUDED IN GPA

Medicine 506 (6 weeks)

Surgery

A wide-range of surgical problems and specialties. Students will rotate through one of the following:

1. One three-week General Surgery rotation and one three-week Orthopedic Surgery rotation;
2. One three-week General Surgery rotation and one two-week rotation in either Orthopedic Surgery, Plastic Surgery or Urological Surgery along with one one-week selective in either Urology, Vascular Surgery, Thoracic Surgery, Neurosurgery, Otolaryngology or Trauma Surgery.

506.01. Surgery

506.99. Surgery

NOT INCLUDED IN GPA

Medicine 508 (6 weeks)

Paediatrics

Experience in paediatric medicine, emphasizing clinical skills and problem-solving pertaining to common paediatric problems. Will build upon knowledge and skills (including history-taking and physical examination of newborns, infants, children, adolescents) previously gained in the first two years of the medical undergraduate curriculum, and will prepare the student for subsequent residency. The experiences shall be broad-based involving both ambulatory and hospital-based patients, and shall include newborn care, and care of children and adolescents up to the age of 18 years.

508.01. Paediatrics

508.99. Paediatrics

NOT INCLUDED IN GPA

Medicine 510 (6 weeks)

Psychiatry

Develop understanding of the psychiatric patient, the skills to perform a psychiatric assessment and the management of psychiatric clinical presentations with integration of basic knowledge obtained from the non-clinical setting. Clerks will perform a variety of assessments including: child and adolescent behavioural and learning assessments, elderly cognitive function, competency assessments, safety assessments for suicide, abuse, and mental status examinations. They will order appropriate investigations including: collateral information, diagnostic imaging, laboratory and psychological and other functional assessments, etc. Four weeks of the rotation are spent in adult psychiatry and two weeks in child psychiatry.

510.01. Psychiatry

510.99. Psychiatry

NOT INCLUDED IN GPA

Medicine 512 (6 weeks)

Obstetrics and Gynaecology

A broad exposure to women's health and focus on the practice of obstetrics and gynaecology. Develop history taking and physical examinations skills appropriate to obstetrics and gynaecology patients and participate in deliveries, fetal assessment, maternal fetal medicine, colposcopy, low risk obstetrics, infertility and urogynaecology in both outpatient and inpatient settings. Clerks will spend a five-week block at either a community hospital in Calgary or Medicine Hat Regional hospitals, or at a tertiary care hospital.

512.01. Obstetrics and Gynaecology

512.99. Obstetrics and Gynaecology

NOT INCLUDED IN GPA

Medicine 514 (14 weeks)

Clerkship Electives

During these mandatory 14 weeks of clerkship, clerks will choose electives from the range of potential medical domains. Twelve weeks of mandatory elective time must be completed during the clerkship year with a minimum of two weeks on any one elective block.

NOT INCLUDED IN GPA

Medicine 515 (up to 56 weeks)

Extended Clerkship Electives

During extended clerkship student are required to complete mandatory weeks of clerkship electives based on the decision by the Student Academic Review Committee (SARC). Clerks will choose electives from the range of potential medical discipline. Mandatory elective time must be completed during the extended clerkship year with a minimum of two weeks on any one elective block.

515.01. Clerkship Elective 2-20 weeks

515.02. Clerkship Elective 21-40 weeks

515.03. Clerkship Elective 41-54 weeks

NOT INCLUDED IN GPA

Medicine 516 (2 weeks)

Anaesthesia

Students work daily with a preceptor in the hospital setting. Four areas of anaesthesia will be covered: procedural skills, resuscitation, pharmacology as well as an overview of anaesthesia topics including: preoperative assessment, pain management and others. Clerks will practice intravenous cannulation, bag and mask ventilation, jaw thrust, laryngeal mask and airway insertion and

airway and endotracheal intubation in a controlled setting.

516.01. Anaesthesia

516.99. Anaesthesia

NOT INCLUDED IN GPA

Medicine 520 (60 hours)

Comprehensive Clinical Skills Curriculum for Clerkship

Integrate basic and clinical science, improve diagnostic reasoning, communication and clinical skills, and apply knowledge gained during the foundational courses in medicine to the clinical setting. Content covered using a variety of formats, including high-fidelity simulation, standardized patients, small group cases, didactic lectures, and procedural workshops. Content is delivered over a 48-week period spanning the duration of the clerkship year.

NOT INCLUDED IN GPA

Medicine 522 (2 weeks)

Emergency Medicine

Diagnostic and therapeutic challenges offered by emergency medicine, including the assessment and management of life-threatening illness. Access to all elements of health-care delivery, including discharge planning, outpatient care and referrals, direct interaction with consultants, ambulatory care and inpatient facilities, as well as diagnostic imaging. A minimum of six shifts in an urban emergency room at three teaching sites.

522.01 Emergency Medicine

522.99 Emergency Medicine

NOT INCLUDED IN GPA

Museum and Heritage Studies MHST

For more information see the Department of Art website: <https://art.ucalgary.ca/>.

Junior Course

Museum and Heritage Studies 201 3 units; (3-0)

Introduction to Museum and Heritage Studies

Introduces the field of Museum and Heritage Studies by examining heritage sites, museums, art galleries, zoos, natural parks and others. Traditional institutions will be examined along with new forms, including virtual museums.

Note: Students may be required to attend off-campus events outside of class time.

Senior Courses

Museum and Heritage Studies 331 3 units; (3-0)

Collections and Exhibitions in Museum and Heritage Institutions

Examines the nature of collecting, curating, exhibiting and interpreting material and non-material culture in museums and heritage institutions.

Prerequisite(s): Museum and Heritage Studies 201.

Note: Students may be required to attend off-campus events outside of class time. Enrolment preference is given to students registered in the Museum and Heritage Studies Minor program.

Museum and Heritage Studies 333 3 units; (3-0)

Ethics in Museum and Heritage Studies

Introduction to ethics in museums and heritage studies. An examination of some recent museums and heritage resources crises. Also museum/heritage processes including the acquisition of artifacts, exhibitions and the representation of indigenous and other minority peoples, interpretation, the appropriateness of conservation, and museum management.

Prerequisite(s): Museum and Heritage Studies 201.

Museum and Heritage Studies 401 3 units; (3-0)

Topics in Museum and Heritage Studies

An examination of selected topics in Museum and Heritage Studies.

Prerequisite(s): Museum and Heritage Studies 201 or consent of Program Co-ordinator.

MAY BE REPEATED FOR CREDIT

Museum and Heritage Studies 433 3 units; (0-3S)

Management and Planning in Museum and Heritage Institutions

Examines theoretical and practical issues relating to the management of museum and heritage resources. Topics may include: exhibition planning, human resources, ethics and social responsibility, fundraising, collections, and audience development etc.

Prerequisite(s): Museum and Heritage Studies 201.

Corequisite(s): Prerequisite or Corequisite: Museum and Heritage Studies 331.

Note: Students may be required to attend off-campus events outside of class time. Preference is given to students registered in the Museum and Heritage Studies Minor program.

Museum and Heritage Studies 501 3 units; (3-0)

Research in Selected Topics

Supervised individual study of a special topic.

Prerequisite(s): Consent of the Program Co-ordinator.

Note: Students should contact the Program Co-ordinator well in advance of the first day of classes to arrange an independent study course.

MAY BE REPEATED FOR CREDIT

Museum and Heritage Studies 533 3 units; (0-6)

Practicum

Placement at a museological or heritage institution.

Corequisite(s): Prerequisites or Corequisites: Museum and Heritage Studies 433 and consent of the Museum and Heritage Studies Program Co-ordinator.

Note: This should be the last course students take in the program, grounding their theoretical knowledge and helping to launch careers. Students must contact the Museum and Heritage Studies Program Co-ordinator at least three weeks prior to the start of classes to arrange for placement at a hosting institution.

NOT INCLUDED IN GPA

Music MUSI

For more information about these courses, see the Division of Music website: <https://arts.ucalgary.ca/schools/creative-performing-arts/music>.

BMUS students may count no more than 6 units from Music 301, 302, 304, 305, 401, 402 and 405 as Open Options toward their degree.

Music 105 0 units; (0-2)

Music Listening

Practical experience in music listening. Concert attendance, exposure to live music performances, and understanding music in its intended context. Music students must receive credit for all four courses in order to graduate.

105.01. Music Listening I

105.02. Music Listening II

105.03. Music Listening III

105.04. Music Listening IV

Prerequisite(s): Admission to a BMus program, the BA (Music) program or the BA Honours (Music) program.

NOT INCLUDED IN GPA

Music 127 3 units; (0-3)

Class Piano

Functional approach to the piano.

Prerequisite(s): Admission to a BMus program.

Antirequisite(s): Credit for Music 127 and Music Performance 271 will not be allowed.

Note: May not be used for credit towards any degree program.

NOT INCLUDED IN GPA

Junior Courses

Music 203 3 units; (3-0)

Jazz History

Directed listening and analysis of jazz forms from the early beginnings of jazz to the present. Styles examined range from Early Jazz to Jazz-Rock Fusion. Major figures considered include: Louis Armstrong, Duke Ellington, Count Basie, Lester Young, Charlie Parker, Miles Davis and John Coltrane.

Antirequisite(s): Credit for Music 203 and Music History and Literature 281 will not be allowed.

Music 209 3 units; (3-0)

Introduction to Music Theory for Non-Majors

Introduction to the materials of music through development of both aural and written skills.

Antirequisite(s): Credit for Music 209 and Music Theory and Composition 209 will not be allowed.

Note: Open to all students. Not available for credit toward BMus, BA (Music) and Music Minor programs.

NOT INCLUDED IN GPA

Music 211 3 units; (3-0)

Materials of Music

Investigation of the fundamental processes of music through analytical and written exercises.

Prerequisite(s): Successful completion of the Music Theory Diagnostic exam.

Antirequisite(s): Credit for Music 211 and Music Theory and Composition 201 will not be allowed.

Note: The diagnostic exam is given in March and during the Fall Block Week each year. Contact the School of Creative and Performing Arts for more information.

Music 213 3 units; (3-0)**Diatonic Harmony**

Part-writing and analysis with an emphasis on diatonic harmony and modulation in the music of the eighteenth century.

Prerequisite(s): Music 211 or Music Theory and Composition 201.

Antirequisite(s): Credit for Music 213 and Music Theory and Composition 203 will not be allowed.

Music 221 3 units; (1-3)**Performance Practicum I**

Applied instruction in instrument or voice.

Prerequisite(s): Admission to the BMus program.

Antirequisite(s): Credit for Music 221 and Music Performance 291 will not be allowed.

Note: Students not admitted to the BMus program may register with an audition and consent of the Division Chair, Music. A supplementary fee will be assessed to cover additional costs associated with this course.

Music 223 3 units; (1-3)**Performance Practicum II**

Continuation of applied instruction in instrument or voice.

Prerequisite(s): Music 221 or Music Performance 291 and admission to the BMus program.

Antirequisite(s): Credit for Music 223 and Music Performance 293 will not be allowed.

Note: Students not admitted to a BMus program may register with an audition and consent of the Division Chair, Music. A supplementary fee will be assessed to cover additional costs associated with this course.

Music 225 3 units; (0-6)
(formerly Music Theory and Composition 221)**Musicianship I**

Development of skills in rhythm, intonation and sight-singing. Performance of two-part contrapuntal exercises with diatonic modulation.

Prerequisite(s): Admission to the Music major or minor.

Note: Students not admitted to a Music major or minor may register by audition and consent of the Division Chair, Music. This course meets for three hours per week during the Fall and Winter Terms.

Music 255 3 units; (3-0)**Introduction to Music Technology**

An exploration of current technology for music making and appreciation including recording hardware and software, MIDI-based devices for integration with sound systems and interactive/media performance, audio file formats, score preparations and basic audition theory.

Senior Courses**Music 306** 3 units; (3-0)**Topics in Music and Popular Culture**

Selected topics examining popular music from a critical perspective. Examines the meaning and messages of popular music and its impact on present-day culture. Topics may include the examination of the work of specific creators or performers, the recording industry, the impact of specific instruments (e.g. guitar, percussion, electronic media, etc.), or cross-cultural influences.

Attendance at relevant musical concerts and lectures may be required.

Antirequisite(s): Credit for Music 306 and any of 301, 302, 304, 402 will not be allowed.

MAY BE REPEATED FOR CREDIT

Music 307 3 units; (3-0)**Topics in World Music**

Selected topics examining non-western musical traditions from a historical, sociological, analytical or performative perspective. Topics may include the study of particular musical traditions and repertoire or the study of an instrument or performance practice that appears among many traditions (e.g., hand-drumming). Attendance at relevant musical concerts and lectures may be required.

Antirequisite(s): Credit for Music 307 and either 303 or 403 will not be allowed.

MAY BE REPEATED FOR CREDIT

Music 308 3 units; (3-0)**Topics in Composers and Musical Culture**

In-depth study of selected composers, their music, and their relationship to intellectual history (e.g., Mozart and the French Revolution), and/or examination of specific western or non-western musical cultures (e.g., Music in India, Music in post-war Germany) and their impact.

Antirequisite(s): Credit for Music 308 and any of 304, 305, 401 or 405 will not be allowed.

Note: Attendance at relevant musical concerts and lectures may be required.

MAY BE REPEATED FOR CREDIT

Music 309 3 units; (3-0)
(formerly Music Theory and Composition 351)**The Art of Music Listening**

An introduction to the sensuous and structural elements of music, leading to a greater appreciation for the art of music in a global multi-cultural context.

Note: Music Majors and Minors (except Sonic Arts Minors) may not use the course for credit towards their programs.

Music 311 3 units; (3-0)
(formerly Music Theory and Composition 301)**Chromatic Harmony**

Part-writing and analysis with an emphasis on chromatic harmony and modulation in the music of the nineteenth century.

Prerequisite(s): Music 213 or Music Theory and Composition 203.

Music 313 3 units; (3-0)
(formerly Music Theory and Composition 303)**Materials of Twentieth-Century Music**

Compositional and analytical approaches to post-tonal music from the twentieth century to the present.

Prerequisite(s): Music 311 or Music Theory and Composition 301.

Music 321 3 units; (1-3)
(formerly Music Performance 391)**Performance Practicum III**

Continuation of applied instruction in instrument or voice.

Prerequisite(s): Music 223 or Music Performance 293 and admission to the BMus program. Students not admitted to a BMus program may register with an audition and consent of the Division Chair, Music.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 323 3 units; (1-3)
(formerly Music Performance 393)**Performance Practicum IV**

Continuation of applied instruction in instrument or voice.

Prerequisite(s): Music 321 or Music Performance 391 and admission to the BMus program. Students not admitted to a BMus program may register with an audition and consent of the Division Chair, Music.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 325 3 units; (0-6)
(formerly Music Theory and Composition 321)**Musicianship II**

Further development of skills in rhythm, intonation and sight-singing. Performance of two-part contrapuntal exercises with chromatic modulation. Introduction to atonal exercises.

Prerequisite(s): Music 225 or Music Theory and Composition 221.

Note: This course meets for three hours per week during the Fall and Winter Terms.

Music 327 3 units; (1-3)
(formerly Music Performance 395)**Second Instrument Study**

Applied instruction on second instrument or voice.

- 327.01 Second Instrument Study I
- 327.02 Second Instrument Study II
- 327.03 Second Instrument Study III
- 327.04 Second Instrument Study IV
- 327.05 Second Instrument Study V
- 327.06 Second Instrument Study VI
- 327.07 Second Instrument Study VII
- 327.08 Second Instrument Study VIII

Prerequisite(s): Open to Music Majors with consent of the Division Chair, Music.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 329 3 units; (0-3)
(formerly Music Theory and Composition 385)**Jazz Musicianship**

Musicianship in the jazz idiom, stressing the aural perception of jazz scales and modes, seventh-chord and harmonic extensions, common jazz progressions and jazz rhythms.

Prerequisite(s): Music 211 or Music Theory and Composition 201.

Note: Open to both Music Majors and Minors.

Music 334 3 units; (3-0)**Music History and Literature I**

Music from antiquity to 1789.

Prerequisite(s): School of Creative and Performing Arts 290.

Music 336 3 units; (3-0)

Music History and Literature II

Music from 1789 to the present.

Prerequisite(s): Music 334.

Music 341 3 units; (3-0)
(formerly Music Theory and Composition 391)

Composition I

Basic compositional techniques, and study of selected twentieth-century compositions.

Prerequisite(s): Music 213 or Music Theory and Composition 203.

Music 343 3 units; (3-0)
(formerly Music Theory and Composition 393)

Composition II

Continued study of compositional techniques and study of selected twentieth-century compositions.

Prerequisite(s): Music 341 or Music Theory and Composition 391.

Music 351 3 units; (3-0)
(formerly Music Theory and Composition 379)

Sonic Arts

An introduction to the creative use of computers and digital media in sonic arts.

Music 355 3 units; (3-0)
(formerly Music Theory and Composition 361)

Sound Recording

An introduction to the practice and theory of sound and music recording.

Music 415 3 units; (3-0)
(formerly Music Theory and Composition 471)

Form and Analysis

Investigations into hierarchical relations in music. Study of how various levels of musical structure relate in order to form a whole.

Prerequisite(s): Music 313 or Music Theory and Composition 303.

Music 417 3 units; (3-0)
(formerly Music Theory and Composition 473)

Advanced Harmonic Analysis

Investigation of the expanded harmonic resources and analytical systems used by composers from the late nineteenth century to the present.

Prerequisite(s): Music 313 or Music Theory and Composition 303.

Music 421 3 units; (1-3)
(formerly Music Performance 491)

Performance Practicum V

Continuation of applied instruction in instrument or voice.

Prerequisite(s): Music 323 or Music Performance 393 and admission to the BMus (Composition, Music History and Theory, or Integrated Studies) program. Students not admitted to the stated BMus programs may register with an audition and consent of the Division Chair, Music.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 423 3 units; (1-3)
(formerly Music Performance 493)

Performance Practicum VI

Continuation of applied instruction in instrument or voice.

Prerequisite(s): Music 421 or Music Performance 491 and admission to the BMus (Composition, Music History and Theory, or Integrated Studies) program. Students not admitted to the stated BMus programs may register with an audition and consent of the Division Chair, Music.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 427 3 units; (4S-0)
(formerly Music Performance 469)

Professional Seminar in Music Performance I

Practical experience in music performance in a team teaching master class format.

Prerequisite(s): Music 323 or Music Performance 393, and admission to the BMus (Performance) program.

Corequisite(s): Music 462.

Note: This course meets for two hours per week during the Fall and Winter Terms.

Music 429 3 units; (2-2)
(formerly Music Performance 481)

Jazz Improvisation

Topics in jazz improvisation, stressing improvisational tools, melody, rhythm, and ear development for the blues progression.

Prerequisite(s): Music 211 or Music Theory and Composition 201 and admission to the music major or minor.

Music 441 3 units; (1-2)
(formerly Music Theory and Composition 491)

Composition III

Advanced creative work with an emphasis upon either chamber music composition or studio composition.

Prerequisite(s): Music 343 or Music Theory and Composition 393 and consent of the Division Chair, Music.

Music 443 3 units; (1-2)
(formerly Music Theory and Composition 493)

Composition IV

Continued advanced creative work with an emphasis upon either chamber music composition or studio composition.

Prerequisite(s): Music 441 or Music Theory and Composition 491 and consent of the Division Chair, Music.

Music 445 3 units; (3-0)
(formerly Music Theory and Composition 475)

Counterpoint

Practical study of contrapuntal technique, including species counterpoint and eighteenth-century counterpoint.

Prerequisite(s): Music 313 or Music Theory and Composition 303.

Music 447 3 units; (3-0)
(formerly Music Theory and Composition 477)

Orchestration

Practical study of instrumentation and scoring, including orchestral and wind ensemble textures.

Prerequisite(s): Music 313 or Music Theory and Composition 303.

Music 451 3 units; (3-0)
(formerly Music Theory and Composition 479)

Electroacoustic Music

Practical study of electroacoustic and computer music with an emphasis on creative work in the medium.

Music 453 3 units; (3-0)
(formerly Music Theory and Composition 481)

Computer Applications in Music

Use of computers in music composition, performance, education and interdisciplinary media.

Music 462 6 units; (1-4)
(formerly Music Performance 498)

Junior Performance Project

Applied instruction in instrument or voice in connection with junior recital.

Prerequisite(s): Admission to the BMus (Performance) program.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 511 3 units; (3-0)
(formerly Music Theory and Composition 575)

Selected Topics in Theory and Composition

Advanced topics in music theory and composition selected from such subjects as: analysis of tonal or post-tonal music, rhythmic analysis, acoustics, critical approaches to music theory, electroacoustic music, orchestration, counterpoint and fugue.

Prerequisite(s): One of Music 415, 417, 445, 447, 451 or one of Music Theory and Composition 471, 473, 475, 477, 479.

MAY BE REPEATED FOR CREDIT

Music 513 3 units; (3S-0)
(formerly Music Theory and Composition 577)

Seminar in Theory and Composition

Creative and analytic approaches to the study of selected repertoire with an emphasis upon contemporary music.

Prerequisite(s): One of Music 415, 417, 445, 447, 451 or one 400-level Music Theory and Composition course.

MAY BE REPEATED FOR CREDIT

Music 521 3 units; (1-3)
(formerly Music Performance 591)

Performance Practicum VII

Continuation of applied instruction in instrument or voice.

Prerequisite(s): Music 423 or Music Performance 493 and admission to the BMus (Composition, Music History and Theory, or Integrated Studies) program. Students not admitted to the stated BMus programs may register with an audition and consent of the Division Chair, Music.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 523 3 units; (1-3)
(formerly Music Performance 593)

Performance Practicum VIII

Continuation of applied instruction in instrument or voice.

Prerequisite(s): Music 521 or Music Performance 591 and admission to the BMus (Composition, Music History and Theory, or Integrated Studies) program. Students not admitted to the stated BMus programs may register with an audition and consent of the Division Chair, Music.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 525 3 units; (3-0)
(formerly Music Performance 571)

Topics in Music Performance

Various topics such as applied music literature, piano, wind or string pedagogy, or vocal pedagogy, phonetics.

Prerequisite(s): Admission to the BMus or BA(Music) Program and consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 527 3 units; (4S-0)
(formerly Music Performance 569)

Professional Seminar in Music Performance II

Continued practical experience in music performance in a team teaching master class format.

Prerequisite(s): Music 427 or Music Performance 469, and admission to the BMus (Performance) program.

Corequisite(s): Music 562.

Note: This course meets for two hours per week during the Fall and Winter Terms.

Music 531 3 units; (3-0)
(formerly Music History and Literature 551)

Research Techniques and Bibliography of Music

Exploring the basic reference materials and techniques for musical research in all areas.

Prerequisite(s): Music 333 or 336 or Music History and Literature 305.

Music 533 3 units; (3-0)
(formerly Music History and Literature 571)

Selected Topics in Musicology

A specific musical medium or genre: may include chamber music literature, symphonic literature, dramatic literature and program music.

Prerequisite(s): Music 333 or 336 or Music History and Literature 305.

MAY BE REPEATED FOR CREDIT

Music 535 3 units; (3-0)
(formerly Music History and Literature 573)

Studies in the Music of Selected Composers

Specific composers or groups of composers; may include Beethoven, Debussy, the Second Viennese School, etc.

Prerequisite(s): Music 333 or 336 or Music History and Literature 305.

MAY BE REPEATED FOR CREDIT

Music 551 3 units; (3-0)
(formerly Music Theory and Composition 505)

Networked Music Performance

Investigation of music performance on high-speed networks.

Music 560 6 units; (1-4)
(formerly Music History and Literature 596, 598, Music Theory and Composition 596, 598)

Senior Project

Major research or creative project in an area of musical study.

Prerequisite(s): Consent of the Division Chair, Music.

Music 561 3 units; (3-0)
(formerly Music History and Literature 555, Music Theory and Composition 555, Music Performance 555)

Independent Study

Individual study in a selected area of music.

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 562 6 units; (1-4)
(formerly Music Performance 598)

Senior Performance Project

Applied instruction in instrument or voice in connection with a Senior Recital.

Prerequisite(s): Admission to the BMus (Performance) program, Music 313 or Music Theory and Composition 303, and Music 333 or 336 or Music History and Literature 305.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Graduate Courses

Music 611 3 units; (3-1)
(formerly Music Theory and Composition 673)

Selected Topics in Theory and Composition

Various topics (master's level).

Music 613 3 units; (3S-0)
(formerly Music Theory and Composition 671)

Seminar in Theory and Composition

Advanced creative and analytic approaches to the study of selected repertoire with an emphasis upon contemporary music.

MAY BE REPEATED FOR CREDIT

Music 615 3 units; (3-0)
(formerly Music Theory and Composition 675)

Pedagogy of Music Theory

Refining ideas about music theory and its teaching, while developing and strengthening teaching skills.

Note: Required course for all PhD (Composition) students.

Music 621 3 units; (2-3)
(formerly Music Performance 691)

Advanced Performance Practicum I

Applied instruction in instrument or voice.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 623 3 units; (2-3)
(formerly Music Performance 693)

Advanced Performance Practicum II

Continuation of Music 621.

Prerequisite(s): Music 621 or Music Performance 691.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music 625 3 units; (3-0)
(formerly Music Performance 671)

Topics in Music Performance

Various topics such as applied music literature, applied pedagogy, accompanying, phonetics and others.

MAY BE REPEATED FOR CREDIT

Music 629 3 units; (0-3)
(formerly Music Performance 657)

Studies at the Banff Centre

Advanced music studies.

Note: Although the Banff Centre does not provide credit course instruction, students with advanced experience in music at the Banff Centre may apply for graduate-level credit from the University of Calgary.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Music 631 3 units; (3-0)
(formerly Music History and Literature 651)

Research Techniques and Bibliography of Music

Exploring the basic reference materials and techniques for musical research at the graduate level.

Note: Required course for all MMus and MA (Musicology) students.

Music 633 3 units; (3-0)
(formerly Music History and Literature 671)

Selected Topics in Musicology

Various topics such as history of music theory, analysis, notation, or performance practice may be offered. Consult the timetable for current topic.

MAY BE REPEATED FOR CREDIT

Music 641 3 units; (2-2)
(formerly Music Theory and Composition 695)

Composition

MAY BE REPEATED FOR CREDIT

Music 645 3 units; (2S-2)
(formerly Music Theory and Composition 691)

Composition Seminar

Prerequisite(s): Consent of the Division Chair, Music.

Music 651 3 units; (3-0)
(formerly Music Theory and Composition 685)

Selected Topics in Electroacoustic Music

Advanced topics in computer music selected from such subjects as: analysis, theory and aesthetics of electroacoustic repertoire, computer programming and software design, interactivity, performance practice and interpretation, sound morphology, sound spatialization, sound synthesis, soundscape studies, tele-media.

MAY BE REPEATED FOR CREDIT

Music 653 3 units; (3-0)
(formerly Music Theory and Composition 681)

Projects in Computer Music

Individual and collaborative creative and research projects in computer music.

MAY BE REPEATED FOR CREDIT

Music 661 3 units; (3-0)
(formerly Music History and Literature 655, Music Theory and Composition 655, Music Performance 655)

Independent Study

Individual study in a selected area of music.

MAY BE REPEATED FOR CREDIT

Music 711 3 units; (3-0)
(formerly Music Theory and Composition 775)

Advanced Topics in Theory and Composition

Various topics (doctoral level).

MAY BE REPEATED FOR CREDIT

Music 733 3 units; (3-0)
(formerly Music History and Literature 771)

Selected Topics in Musicology

Various topics in the field of Musicology (doctoral level).

MAY BE REPEATED FOR CREDIT

Music 741 3 units; (3-0)
(formerly Music Theory and Composition 795)

Composition

Individual study in musical composition (doctoral level).

MAY BE REPEATED FOR CREDIT

Music 751 3 units; (3-0)
(formerly Music Theory and Composition 785)

Advanced Topics in Electroacoustic Music

Advanced topics in computer music selected from such subjects as: interactivity, tele-media, sound morphology, sound spatialization, analysis, theory and aesthetics, performance practice and interpretation, computer programming and software design, sound synthesis, soundscape studies.

MAY BE REPEATED FOR CREDIT

Music 753 3 units; (3-0)
(formerly Music Theory and Composition 781)

Advanced Projects in Computer Music

Individual and collaborative creative and research projects in computer music.

MAY BE REPEATED FOR CREDIT

Music 761 3 units; (3-0)
(formerly Music Theory and Composition 755)

Independent Study

Individual study in a selected area of music (doctoral level).

MAY BE REPEATED FOR CREDIT

Music Education MUED

For more information about these courses, see the Division of Music website: <https://arts.ucalgary.ca/schools/creative-performing-arts/music>.

Senior Courses

Music Education 331 3 units; (3-0)

Conducting I

Basic conducting techniques with the use of the baton; simple and condensed scores for selected choral and instrumental works.

Prerequisite(s): Music 211 and 225 or Music Theory and Composition 203 and 221.

Music Education 333 3 units; (3-0)

Conducting II

Continuation of Music Education 331; the full score and more difficult choral and instrumental works.

Prerequisite(s): Music Education 331.

Music Education 341 3 units; (3-2)

Popular Music Pedagogy

Strategies for integrating popular music into the curriculum, including popular music listening strategies, pedagogical approaches and hand-on experience with modern band instruments including guitar, bass, keyboard, drum set, vocals and technology.

Antirequisite(s): Credit for Music Education 341 and 417.04 will not be allowed.

Music Education 401 3 units; (3-2.5)

Instrumental and Band Techniques I

Performing and teaching techniques for instruments used in the schools.

Prerequisite(s): Music Education 331.

Note: A supplementary fee will be assessed to cover additional costs associated with this course.

Music Education 403 3 units; (3-2.5)

Instrumental and Band Techniques II

Continuation of Music Education 401. Musical and practical aspects of band conducting, including teaching skills, curriculum and appropriate teaching strategies.

Prerequisite(s): Music Education 401.

Music Education 413 3 units; (3-0)

Vocal Music in the School: Teaching Methods and Materials

Introduction to a comprehensive vocal program for elementary and secondary classrooms, including teaching methods and materials.

Prerequisite(s): Music Education 331.

Music Education 415 3 units; (3-0)

Vocal Music in the School: Curriculum and Teaching Strategies

Continuation of Music Education 413. Musical and practical aspects of vocal music in the classroom, including teaching skills, curriculum and appropriate teaching strategies.

Prerequisite(s): Music Education 331.

Music Education 417 3 units; (3-2) or (3-0)

Topics in Music Education

Various topics such as advanced band techniques and literature, choral techniques and literature, philosophy and foundation of music education or jazz for the classroom.

Prerequisite(s): Music 213 or Music Theory and Composition 203.

Antirequisite(s): Credit for Music Education 417.04 and 341 will not be allowed.

MAY BE REPEATED FOR CREDIT

Music Education 555 3 units; (3-0)

Independent Study

Individual study in a selected music education area.

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Music Education 655 3 units; (3-0)

Independent Study

Individual study in a selected music education area.

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music Education 671 3 units; (3-0)

Selected Topics in School Music

Selected topics with emphasis upon practical application relevant to the field of music education. Various topics are regularly offered under this title, such as early childhood, Kodaly pedagogy, administration of school music programs and techniques of school music supervision.

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music Education 695 3 units; (2-4)

Practicum in School Music I

Practical application of teaching techniques studied in graduate level school music courses. Will include various topics such as early childhood, Kodaly, choral and instrumental.

Music Education 697 3 units; (2-4)

Practicum in School Music II

Continuation of Music Education 695.

Music Education 755 3 units; (3-0)

Independent Study

Individual directed study in an area of Music Education (doctoral level).

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music Education 771 3 units; (3-0)

Selected Topics in Music Education

Selected topics with emphasis upon practical application relevant to the field of Music Education. Possible topics may include early childhood musical development, Kodaly pedagogy, folk music studies, choral and instrumental pedagogy and the role of new technologies within the discipline.

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music Performance MUPF

For more information about these courses, see the Division of Music website: <https://arts.ucalgary.ca/schools/creative-performing-arts/music>.

Students are cautioned that notwithstanding the given prerequisite, registration in any of the performing ensembles is subject to the approval of the ensemble director. Further information on ensembles is available at <https://arts.ucalgary.ca/schools/creative-performing-arts/music/music-ensembles>.

Junior Courses

Music Performance 201 3 units; (0-6)**Chamber Choir**

Performing experience in the Chamber Choir.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

NOT INCLUDED IN GPA

Music Performance 203 3 units; (0-6)**Women's Choir**

Performing experience in the Women's Choir.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

NOT INCLUDED IN GPA

Music Performance 205 3 units; (0-6)**University Chorus**

Performing experience in the University Chorus.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

NOT INCLUDED IN GPA

Music Performance 211 3 units; (0-6)**Symphonic Band**

Performing experience in the Symphonic Band.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

NOT INCLUDED IN GPA

Music Performance 213 3 units; (0-6)**Wind Ensemble**

Performing experience in the Wind Ensemble.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

NOT INCLUDED IN GPA

Music Performance 215 3 units; (0-6)**University Orchestra**

Performing experience in the University Orchestra.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

NOT INCLUDED IN GPA

Music Performance 221 3 units; (0-6)**Collegium Musicum**

Performance of instrumental and vocal music written before 1750.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

Music Performance 223 3 units; (0-6)**Vocal Jazz Ensemble**

Performance of popular vocal literature.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

Music Performance 225 3 units; (0-6)**Instrumental Jazz Ensemble**

Performance in a jazz combo or band.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

Music Performance 227 3 units; (0-6)**New Music Ensemble**

Performance of chamber music written since 1960.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

Music Performance 229 3 units; (0-6)**World Music Ensemble**

Performing experience of various world music traditions.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

Music Performance 241 3 units; (0-4)**Chamber Music**

Performance of music for small ensembles.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

Music Performance 245 3 units; (0-6)**Voice Lab**

Performance projects involving vocal music (opera, art song, music theatre, baroque, new music), and an exploration of interarts and interdisciplinary connections through performance creation.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

Senior Courses

Music Performance 301 3 units; (0-6)**Chamber Choir**

Performing experience in the Chamber Choir.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Music Performance 303 3 units; (0-6)**Women's Choir**

Performing experience in the Women's Choir.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Music Performance 305 3 units; (0-6)**University Chorus**

Performing experience in the University Chorus.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Music Performance 311 3 units; (0-6)**Symphonic Band**

Performing experience in the Symphonic Band.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Music Performance 313 3 units; (0-6)**Wind Ensemble**

Performing experience in the Wind Ensemble.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Music Performance 315 3 units; (0-6)**University Orchestra**

Performing experience in the University Orchestra.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Music Performance 321 3 units; (0-6)**Collegium Musicum**

Performance of instrumental and vocal music written before 1750.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

Music Performance 323 3 units; (0-6)**Vocal Jazz Ensemble**

Performing experience in the Vocal Jazz Ensemble.

Note: Students are required to audition during the first week of classes in September. Students who

are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

Music Performance 325 **3 units; (0-6)**

Instrumental Jazz Ensemble

Performing experience in the Instrumental Jazz Ensemble.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

Music Performance 327 **3 units; (0-6)**

New Music Ensemble

Performing experience in the New Music Ensemble.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

Music Performance 329 **3 units; (0-6)**

World Music Ensemble

Performing experience in the World Music Ensemble.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

Music Performance 341 **3 units; (0-4)**

Chamber Music

Performing of music for small ensembles.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

Music Performance 345 **3 units; (0-6)**

Voice Lab

Performance projects involving vocal music (opera, art song, music theatre, baroque, new music), and an exploration of interarts and interdisciplinary connections through performance creation.

Note: Students are required to audition during the first week of classes in September. Students who are unsuccessful will be removed from the course. This course normally meets for three hours per week during the Fall and Winter Terms.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Music Performance 632 **6 units; (2-3)**

Advanced Choral Conducting

Prerequisite(s): Consent of the Division Chair, Music.

Music Performance 634 **6 units; (2-3)**

Advanced Instrumental Conducting

Prerequisite(s): Consent of the Division Chair, Music.

Music Performance 641 **3 units; (0-4)**

Advanced Chamber Ensemble I

Intensive coaching in chamber ensembles.

Prerequisite(s): Consent of the Division Chair, Music.

Music Performance 643 **3 units; (0-4)**

Advanced Chamber Ensemble II

Continuation of Music Performance 641.

Prerequisite(s): Music Performance 641 or consent of the Division Chair, Music.

Music Performance 645 **3 units; (0-6)**

Voice Lab

Performance projects involving vocal music (opera, art song, music theatre, baroque, new music), and an exploration of interarts and interdisciplinary connections through performance creation.

Prerequisite(s): Consent of the Division Chair, Music.

Nanoscience NANS

For more information about these courses contact the Nanoscience Program ucalgary.ca/hanosci-ence/.

Senior Courses

Nanoscience 301 **3 units; (3-0)**

Introduction to Nanoscience and Nanotechnology

Functional definitions of nanoscience and nanotechnology. Understanding/predicting the behaviour of nanomaterials. Investigation of nanomaterials whose properties depend on size. Exploration of a building up approach to design and fabrication of functional nanomaterials. Examination of applications of nanoscience and nanotechnology in society.

Prerequisite(s): 18 units in courses offered by the Faculty of Science.

Nanoscience 401 **3 units; (3-3/2)**

Design in Nanoscience

The fundamental understanding of Nanoscience gained in Nanoscience 301 will be extended and applied to designing experiments and simulations to test hypotheses regarding Nanoscience.

Prerequisite(s): Nanoscience 301.

Nanoscience 443 **3 units; (3-0-1T)**

Quantum World of Nanoscience

Using nanotechnology examples, the fundamentals of quantum mechanics that are relevant to nanoscience and nanotechnology are covered.

Prerequisite(s): Applied Mathematics 217 or Mathematics 275 or Mathematics 249, 251 or 265 or 281 and Mathematics 211 or 213 and Physics 223 and 255.

Antirequisite(s): Credit for Nanoscience 443 and Physics 543 will not be allowed.

Note: Open only to Nanoscience Concentrators or Minors, or by consent of the Program Director. Prior or concurrent completion of Applied Mathematics 219 or Mathematics 253 or 283 is strongly recommended.

Nanoscience 502 **6 units; (0-6)**

Nanoscience Methods

This lab/tutorial course will place the students in a nanotechnology setting. Students will design

and execute self-directed projects and will present results to their peers.

Prerequisite(s): Nanoscience 401 and admission to the Nanoscience minor.

Nanoscience 511 **3 units; (3-0)**

Integration of Nanotechnology and Biology for Medical Applications

The use of nanoscience and nanotechnology principles for medical applications in diagnostics and therapy will be explored in lectures, student presentations and group projects.

Prerequisite(s): Nanoscience 401.

Nanoscience 599 **3 units; (3-0)**

Special Problems in Nanoscience and Nanotechnology

A discussion of current topics in Nanoscience and Nanotechnology. This seminar course will place the student in a setting where best practices of scientific presentation are imparted through giving presentations related to Nanoscience

Prerequisite(s): Nanoscience 401.

MAY BE REPEATED FOR CREDIT

Neuroscience NEUR

For more information about these courses contact the Neuroscience Program ucalgary.ca/bscneuro/.

Junior Course

Neuroscience 201 **3 units; (3-0)**

Introduction to Neuroscience

A survey of clinical, cognitive, behavioural, systems, cellular and molecular neuroscience, with emphasis on applied, translational, and basic research.

Prerequisite(s): Biology 30 and admission to the Neuroscience program.

Senior Courses

Nanoscience 301 **3 units; (136-160 hours)**

Neuroscience Field Course

Introductory ethology and behavioural neuroscience research. Hypothesis generation, experimental design, data collection and analysis, techniques, and experimentation.

Prerequisite(s): Biology 231 or 241 and Neuroscience 201 and admission to the Neuroscience program.

Note: Students are in residence at the Barrier Lake Field Station during Spring Intersession for a substantial part of the course. A supplementary fee will be assessed to cover additional costs associated with this course. Students will require consent of the department to drop this course.

Neuroscience 321 **3 units; (3-0)**

How the Brain Works

An introduction to the fundamentals of brain function for students outside of the Neuroscience program. Students completing this course will be able to describe the molecular, cellular and systems underpinnings of nervous systems. Students will be able to discuss the functioning of brain systems underlying sensation, cognition, behaviour, and disease.

Antirequisite(s): Not open to students in the Neuroscience program. Credit for Neuroscience 321 and Psychology 375 will not be allowed.

Neuroscience 401 3 units; (0-6)**Advanced Neuroscience Laboratory**

Advanced neurophysiological, behavioural, molecular biological, and histological techniques used to investigate nervous system function will be covered. The course is delivered in the form of hypothesis-driven research projects.

Prerequisite(s): Zoology 461 and admission to the Neuroscience program.

Neuroscience 411 3 units; (3-0)**Cellular and Systems Neuroscience**

Structure and function of the nervous system examined through neurochemistry, intracellular signal transduction, mechanisms of communication, and functional organization of the nervous system at the cellular and systems levels.

Prerequisite(s): Zoology 461 and admission to the Neuroscience program, or a minimum grade of "B+" in Zoology 461.

Note: This course is offered as part of an honours program.

Neuroscience 421 3 units; (3-0)**Neuroscience: History, Ethics and Society**

An exploration of topics in the history of neuroscience, aspects of ethics as they apply to studies of the brain and how neuroscience fits into society.

Prerequisite(s): 48 units and admission to the major in Neuroscience, Biological Sciences, Health Sciences or Psychology.

Neuroscience 474 3 units; (3-0)
(Psychology 474)**Neuroscience of Learning and Memory**

An examination of learning and memory from a neuroscience perspective. Molecular, cellular, systems level, and behavioural approaches will be applied to themes such as consolidation, amnesia, and pathological processes.

Prerequisite(s): Psychology 375; 301 or 312; and admission to the Neuroscience Honours program.

Neuroscience 475 3 units; (3-0)
(Psychology 475)**Drugs and Behaviour**

The behavioural effects of drugs specifically employed to affect the nervous system, as seen in the treatment of mental disorders, behavioural disorders, and other conditions such as Parkinson's, Huntington's and Alzheimer's diseases. Neuro-pharmacologic agents will be discussed as they relate to the biochemistry and physiology of putative neurotransmitters.

Prerequisite(s): Psychology 375; 301 or 312; and admission to the Neuroscience Program.

Neuroscience 477 3 units; (3-0)
(Psychology 477)**Sleep and Biological Rhythms**

Behaviours are temporally co-ordinated and occur in a rhythmic fashion. The most obvious rhythmic behaviour humans engage in is sleeping; we spend one-third of our lives asleep. This course will survey the behavioural, physiological, and clinical aspects of sleep and biological rhythms.

Prerequisite(s): Psychology 375; 301 or 312; and admission to the Neuroscience Honours program.

Neuroscience 478 3 units; (3-3)
(Psychology 478)**Behavioural Neuroscience**

An examination of the neural underpinnings of behaviour. Experimental approaches, neural

mechanisms, and health implications will be explored through both lecture material and laboratory exercises.

Prerequisite(s): Psychology 375; 301 or 312; and admission to the Neuroscience Program.

Neuroscience 479 3 units; (3-0)
(Psychology 479)**Human Neuropsychology**

Integration of the literature on human brain damage with the evidence from animal research. Topics include developmental neuropsychology; cognitive deficits associated with frontal, parieto-occipital, and temporal lobes; origins and mechanisms in the determination of cerebral dominance; disorders of learning and memory; long-term effects of cerebral lesions.

Prerequisite(s): Psychology 375; 301 or 312; and admission to the Neuroscience program.

Neuroscience 500 6 units; (1-8)**Honours Thesis in Neuroscience**

Research project undertaking critical assessment of data collected testing and hypothesis derived from the literature. To be conducted under the direction of one or more faculty members from departments participating in the Neuroscience program. Formal written and oral reports must be presented on completion of the course.

Prerequisite(s): 75 units and admission to the Neuroscience program.

Neuroscience 506 6 units; (0-6)**Special Topics in Neuroscience**

Lectures, seminars, term papers and training in theoretical and/or laboratory methods.

Prerequisite(s): 60 units and admission to the Neuroscience program.

MAY BE REPEATED FOR CREDIT**Neuroscience 507** 3 units; (0-6)**Special Topics in Neuroscience**

Lectures, seminars, term papers and training in theoretical and/or laboratory methods.

Prerequisite(s): 60 units and admission to the Neuroscience program.

MAY BE REPEATED FOR CREDIT**Neuroscience 511** 3 units; (2-1S)**Neuroscience Seminar**

Students will attend the weekly Hotchkiss Brain Institute seminars. Following each seminar, students will discuss the presentation under the tutelage of a moderator familiar with the field of enquiry.

Prerequisite(s): 75 units and admission to the Neuroscience program.

Neuroscience 521 3 units; (3-0)
(Psychology 521)**Cognitive and Clinical Neuroscience**

An examination of how the human central nervous system controls higher order, complex behaviours. Experimental and clinical evidence for the neurobiological regulation of memory, language, attention, perception and emotion will be evaluated.

Prerequisite(s): Psychology 375; 301 or 312; and admission to the Neuroscience program.

Neuroscience 531 3 units; (3-0)
(Psychology 531)**Nervous System Development**

This course covers the fundamental principles of the development of nervous systems, integrating anatomical, cellular, molecular, genetic and behavioural approaches.

Prerequisite(s): Psychology 475 or Neuroscience 475; and admission to the Neuroscience program.

Nursing NURS

For more information about these courses, see the Faculty of Nursing: <https://nursing.ucalgary.ca/>.

Courses are restricted to students admitted to the Faculty of Nursing.

Note: Where applicable, Clinical Practice courses must be taken concurrently with the theoretical components.

Junior Courses**Nursing 201** 3 units; (3-0)**Introduction to Nursing**

Basic concepts of nursing, individual, family, community, health, environment, and the relationships among them. Historical development of the nursing profession, its unique position within the health-care system, and the roles of various health-care providers.

Corequisite(s): Nursing 223 and 207.

Nursing 203 3 units; (0-3)**Foundations for Nursing Practice**

Development of skills applicable to nursing practice.

Note: Students must obtain a grade of "C" or better to proceed with program.

Nursing 205 3 units; (3-0)**Therapeutic Interventions**

Nursing therapeutics and pharmacology in wellness and illness states across the lifespan.

Corequisite(s): Nursing 209 and 211.

Nursing 207 3 units; (3-0)**Nursing Inquiry**

Continuing development of a conceptual framework for nursing practice. Development of a theoretical base for understanding various human responses to health experiences.

Corequisite(s): Nursing 201 and 223.

Nursing 209 3 units; (104 hours)**Nursing Practice**

Continuing development of skills for nursing practice with opportunity to apply assessment, psychomotor and communication skills in the helping relationship.

Prerequisite(s): Nursing 201, 203 and current CPR Basic Cardiac Life Support.

Corequisite(s): Nursing 205 and 211.

NOT INCLUDED IN GPA**Nursing 211** 3 units; (2-3)**Health Assessment**

Knowledge and basic skills needed to complete a health history and a holistic assessment of healthy

individuals. Students will practice health assessment skills on each other.

Prerequisite(s): Nursing 201, 207, 221, 223 and current CPR Basic Cardiac Life Support.

Corequisite(s): Nursing 222 and 224.

Note: Students must obtain a grade of "C" or better to proceed with program.

Nursing 213 **3 units; (80 hours in Spring Intersession)**

Consolidation Practicum I

Integration of learning and continuing development of professional relationships with individuals and families experiencing health challenges in selected settings.

Prerequisite(s): Nursing 211, 221, 222, 224 and current CPR Basic Cardiac Life Support.

Corequisite(s): Nursing 227.

NOT INCLUDED IN GPA

Nursing 221 **3 units; (3-2)**

Human Anatomy and Physiology I

The use of lecture and laboratory approaches to introduce students to the study of the human body. It begins with introductory concepts related to terminology and basic chemical processes, then examines cellular physiology and tissues, and subsequently reviews the integumentary, skeletal, muscular, and nervous systems.

Prerequisite(s): Biology 30.

Antirequisite(s): Credit for Nursing 221 and either Zoology 269 or Kinesiology 259 will not be allowed.

Note: The laboratory component of the course generally parallels and reinforces lecture concepts through the use of tutorials, models, histological slides and computer simulations. Open only to students in the Bachelor of Nursing Program offered by the Qatar Faculty.

Nursing 222 **3 units; (3-2)**

Human Anatomy and Physiology II

A review of some of the important concepts from Human Anatomy and Physiology I and then examines the endocrine, cardiovascular, respiratory, digestive, urinary and reproductive systems. Physiological processes that contribute to body defences (the immune system) as well as metabolism and temperature regulation are also covered.

Prerequisite(s): Nursing 221.

Antirequisite(s): Credit for Nursing 222 and either Zoology 269 or Kinesiology 260 will not be allowed.

Note: The laboratory component of the course generally parallels and reinforces lecture concepts through the use of tutorials, models, histological slides and computer simulations. Open only to students in the Bachelor of Nursing Program offered by the Qatar Faculty.

Nursing 223 **3 units; (3-2S-2)**

Foundational Concepts in Nursing Practice I

This theory and experiential course introduces health care concepts foundational to nursing practice. Students apply basic therapeutic nursing skills that support health in laboratory, simulation, and practice settings.

Prerequisite(s): Current CPR Basic Cardiac Life Support.

Corequisite(s): Nursing 201, 207 and 221.

Antirequisite(s): Credit for Nursing 223 and 203 will not be allowed.

Nursing 224 **3 units; (3-2S-2)**

Foundational Concepts in Nursing Practice II

This theory and experiential course builds on learning about health care concepts foundational to nursing practice from Nursing 223. Students build their basic therapeutic nursing skills that support health in laboratory, simulation, and practice settings.

Prerequisite(s): Nursing 223 and current CPR Basic Cardiac Life Support.

Corequisite(s): Nursing 211 and 222.

Antirequisite(s): Credit for Nursing 224 and 209 will not be allowed.

Nursing 227 **3 units; (3-2)**

Nursing Therapeutics for Alterations in Health I

This theory and experiential course provides an integrated view of the pathology of injury and disease and pharmacological interventions for the nurse. Foundational concepts of pathophysiology and pharmacology are introduced.

Prerequisite(s): Nursing 221 and 222.

Antirequisite(s): Credit for Nursing 227 and 205 will not be allowed.

Nursing 285 **3 units; (3-0)**

The Discipline and Profession of Nursing I: Foundational Professional Concepts

The study of concepts foundational to the profession and discipline of nursing. Exploration of concepts of complexity, transition, social justice, ethic of caring, health promotion and principles of population health. Emphasis on understanding the social commitments and contributions made by nursing within its professional scope of practice. Includes an overview of the Canadian health-care system.

Corequisite(s): Nursing 287, 288 and 289.

Nursing 287 **3 units; (3-0)**

The Science of Health I: Communities and Populations

Determinants of health, health indices, principles and methods of epidemiology, and population-based health management are emphasized. Conduct of health surveys and use of population-based health data to identify health risk are addressed. Integration of concepts of microbiology and risk elevation related to ages and stages of the lifespan. Basic tenets of the meaning of evidence-based practice will be introduced.

Corequisite(s): Nursing 285, 288 and 289.

Nursing 288 **3 units; (3-0)**

Supporting Health I: Communities and Populations

Focus on a broad understanding of health and the basic frameworks and principles of population health promotion, primary health care and upstream thinking. Explores how health can be created and supported in a society. Emphasis on developing communication and relationship building skills to work effectively in a group or a team. Strategies to assess protect and promote the health of groups and communities.

Corequisite(s): Nursing 285, 287 and 289.

Nursing 289 **6 units; (228 hours)**

Integrating Nursing Roles & Practices I: Learning, Praxis and Scholarship in the Practicum Setting

Integration and application of theoretic knowledge in simulated and nursing practice settings. Develop skills and competencies in nursing of groups, com-

munities, and populations within a collaborative practice model.

Prerequisite(s): Current CPR Health Care Provider Level (HCP).

Corequisite(s): Nursing 285, 287 and 288.

NOT INCLUDED IN GPA

Senior Courses

Nursing 301 **3 units; (3-0)**

Adult Health Theory

Focus on expanding the theoretical understanding of the adult experiencing complex acute and chronic illness.

Prerequisite(s): Nursing 213 (BNRT students only).

Corequisite(s): Nursing 302.

Nursing 302 6 units; (208 hours within one term)

Adult Health Practice

Managing care from a holistic and interdisciplinary perspective for more acutely and chronically ill patients with a primary focus on the adult in acute medical/surgical settings.

Prerequisite(s): Nursing 213 (BNRT students only), 327 and current CPR Basic Cardiac Life Support.

Corequisite(s): Nursing 301.

NOT INCLUDED IN GPA

Nursing 303 **3 units; (3-0)**

Psychiatric/Mental Health Theory

Exploration of concepts related to individuals and families experiencing mental health and illness.

Prerequisite(s): Nursing 213 (BNRT students only).

Corequisite(s): Nursing 305.

Nursing 305 3 units; (128 hours within one term)

Psychiatric/Mental Health Practice

Application of concepts, values, and skills with individuals, groups, and families experiencing mental health and illness.

Prerequisite(s): Nursing 213 (BNRT students only) and current CPR Basic Cardiac Life Support.

Corequisite(s): Nursing 303.

NOT INCLUDED IN GPA

Nursing 307 **3 units; (3-0)**

Nursing of Families

Exploration of family nursing theory, models, and relational nursing practices which involve and support families within a variety of nursing practice contexts.

Prerequisite(s): Nursing 213 (BNRT students only).

Nursing 309 **3 units; (3-0)**

Nursing Research

Overview of research methodologies with emphasis on the critique of research and its use in nursing practice.

Note: Completion of a statistics course is strongly recommended prior to taking Nursing 309.

Nursing 311 **3 units; (3-0)**

Pathophysiology

An overview of human pathophysiological concepts at the cellular, organ and systems level.

Prerequisite(s): Nursing 221 and 222.

Nursing 327 **3 units; (3-2)**

Nursing Therapeutics for Alterations in Health II

This theory and experiential course builds on an integrated view of pathophysiological and

pharmacological and the concepts from Nursing 227.

Prerequisite(s): Nursing 227.

Antirequisite(s): Credit for Nursing 327 and 311 will not be allowed.

Nursing 385 **3 units; (3-0)**

The Discipline and Profession of Nursing II: Inter-Professional Practice and Professional Accountability

Concepts of inter-professional practice and its core competencies are introduced. Examination of the contributions of nursing and nursing sensitive outcomes. Full scope nursing roles on intraprofessional and interprofessional teams are explored, in particular as pertains to the complex health-care needs of families in transition and at risk. Of primary focus is exploration of the scholarly and research foundations of the profession as the basis of the professional role of a Registered Nurse.

Prerequisite(s): Nursing 285, 287, 288 and 289.

Corequisite(s): Nursing 387, 388 and 389.

Nursing 387 **3 units; (3-0)**

The Science of Health II: Families in Transition

Holistic models addressing bio/psycho/social/spiritual/cultural dimensions of family health processes are addressed. Focus on the epidemiological, physiological, pathology, and mental health knowledge that underlies the assessments of key family transitional periods. Young and senior families are highlighted.

Prerequisite(s): Nursing 285, 287, 288 and 289.

Corequisite(s): Nursing 385, 388, and 389.

Nursing 388 **3 units; (3-0)**

Supporting Health II: Families in Transition

Focus on how health, inclusive of mental health and wellness, is created and supported in families. The study of how health can be enhanced or compromised in important transition periods across the lifespan - from young to senior families. Examination of the manner in which nursing practice and health education serve to enhance family health.

Prerequisite(s): Nursing 285, 287, 288 and 289.

Corequisite(s): Nursing 385, 387 and 389.

Nursing 389 **6 units; (160 or 192 hours)**

Integrating Nursing Roles and Practices II: Learning, Praxis and Scholarship in the Practicum Setting

Integration and application of theoretic knowledge in simulated and nursing practice settings. Develop skills and competencies in nursing families in transitional periods across the lifespan. Focus on optimizing family health and functioning while mitigating health risks to family members.

Prerequisite(s): Nursing 285, 287, 288 and 289 and current CPR Health Care Provider Level (HCP).

Corequisite(s): Nursing 385, 387, and 388.

NOT INCLUDED IN GPA

Nursing 401 **3 units; (3-0)**

Community Health Theory

Exploration of concepts related to the focus of the community as a client. Public health, populations at risk for physical and psychosocial disruptions in health, environmental health, cultural health patterns and beliefs, group dynamics and communications with groups.

Prerequisite(s): Nursing 213 (BNRT students only).

Corequisite(s): Nursing 402.

Nursing 402 **6 units; (208 hours)**

Community Health Practice

Application of concepts, values, and skills with the community as the focus of care. Experiences are drawn from a variety of rural and urban settings.

Prerequisite(s): Nursing 213 (BNRT students only) and current CPR Basic Cardiac Life Support.

Corequisite(s): Nursing 401.

NOT INCLUDED IN GPA

Nursing 403 **3 units; (5-0)**

Childbearing/Childrearing Families - Theory

Maternity and child health with family as context; the role of nursing pertinent to wellness patterns and alterations in health in these populations.

Prerequisite(s): Nursing 213 (BNRT students only) and 327.

Corequisite(s): Nursing 404.

Nursing 404 **6 units; (208 hours within one term)**

Childbearing/Childrearing Families - Practice

Facilitating and assisting childbearing and childrearing families to identify and respond to needs related to health promotion, health maintenance, and illness intervention in a variety of nursing practice settings.

Prerequisite(s): Nursing 213 (BNRT students only), 327 and current CPR Basic Cardiac Life Support.

Corequisite(s): Nursing 403.

NOT INCLUDED IN GPA

Nursing 405 **3 units; (3-0)**

Issues in Professional Practice

The nursing role related to the dynamics of the nursing profession and the health-care system; nursing and contemporary health issues.

Prerequisite(s): Nursing 301, 302, 303 and 305.

Nursing 406 **6 units; (160 hours within one term)**

Consolidation Practicum II

Consolidation experience which includes theory and practice opportunities, and prepares students for the final year and selected area of focus.

Prerequisite(s): All Nursing courses with the exception of Nursing 307, 309 or 405 and senior Nursing options, and current CPR Basic Cardiac Life Support.

NOT INCLUDED IN GPA

Nursing 411 **3 units; (3-0)**

Nursing Scholarship

An inquiry-based approach to issues and trends in nursing scholarship.

Nursing 421 **3 units; (3-0)**

Nursing of Families

Nursing of families in a variety of settings and clinical populations.

Nursing 441 **3 units; (3-3)**

Health Assessment

Assessment of individuals in health and illness including health history and physical examination. Students will be expected to practice assessment skills in a clinical/laboratory setting.

Prerequisite(s): A course in human anatomy and physiology, and current CPR Basic Rescuer Certificate.

Note: Students must obtain a grade of "C" or better to proceed with program.

Nursing 461 **3 units; (4-0)**

Pathophysiology

Selected pathophysiological concepts and their relationship to human systems with an opportunity to explore an area of pathophysiology in depth.

Prerequisite(s): A course in human anatomy and physiology.

Nursing 485 **3 units; (3-0)**

The Discipline and Profession of Nursing III: Furthering Inquiry and Scholarship in Nursing

Focus on strategies for the development of evidence-informed nursing practice. Examination of strategies to critique and facilitate the use of evidence for practice. Introduction to basic quantitative and qualitative methods used in nursing research.

Prerequisite(s): Nursing 385, 387, 388, 389.

Corequisite(s): Nursing 487, 488 and 489.

Nursing 487 **3 units; (3-0)**

The Science of Health III: People Experiencing Life-Threatening Health Challenges

Theoretic understanding of the holistic experience of acuity and life-threat for individuals and families is presented. Epidemiology, pathophysiology, diagnostic studies, complex physical and other nursing assessments relevant to common life-threatening health challenges, including mental health disorders.

Prerequisite(s): Nursing 385, 387, 388 and 389.

Corequisite(s): Nursing 485, 488, and 489.

Nursing 488 **3 units; (3-0)**

Supporting Health III: People with Life-Threatening Health Challenges

Addresses nursing practices in acute unstable illness, injury and disease. The study of application of nursing assessments, technological interventions and best evidence nursing practices in common major acute illnesses in individuals of all age groups, set within the context of their families and communities. Emphasis is on attaining knowledge of secondary and tertiary prevention strategies. Pharmacological applications to major acute disease conditions.

Prerequisite(s): Nursing 385, 387, 388, 389.

Corequisite(s): Nursing 485, 487 and 489.

Nursing 489 **6 units; (228 hours)**

Integrating Nursing Roles and Practices III: Learning, Praxis and Scholarship in the Practicum Setting

Integration and application of theoretic knowledge in simulated and nursing practice settings. The focus in this course is nursing care of clients and families experiencing life-threatening health challenges. Development of skills of complex communication and relationship building, high-level assessment and clinical reasoning, and nursing care planning and implementation.

Prerequisite(s): Nursing 385, 387, 388, 389 and current CPR Health Care Provider Level (HCP).

Corequisite(s): Nursing 485, 487, and 488.

NOT INCLUDED IN GPA

Nursing 495 **3 units; (3-0)**

The Discipline and Profession of Nursing IV: Understanding the Challenges of Leadership and Systems of Care

This course explores knowledge related to the current health-care system, systems of care responsive to the needs of clients with chronic health disruptions, and nursing roles of leadership and delegation. Evidence examining the efficacy

of systems of care and the efficacy of nursing roles, practices, and contributions are highlighted. Examination of selected approaches to nursing research.

Prerequisite(s): Nursing 485, 487, 488 and 489.

Corequisite(s): Nursing 497, 498 and 499.

Nursing 497 **3 units; (3-0)**

The Science of Health IV: People Experiencing Chronic Health Challenges

Experience of living with chronic health challenges, including common complications. Epidemiology, pathophysiology, diagnostic studies, complex physical and other nursing assessments relevant to common chronic health challenges, including mental health disorders. A holistic perspective is taken to examine the challenges of ongoing health management faced by populations of chronically ill individuals and their families.

Prerequisite(s): Nursing 485, 487, 488 and 489.

Corequisite(s): Nursing 495, 498, and 499.

Nursing 498 **3 units; (3-0)**

Supporting Health IV: People With Chronic Health Challenges

Nursing practices in caring for the chronically ill. A focus on practices to achieve healthful transitions and preservation of quality of life are emphasized. Common treatment modalities are presented including nursing therapeutics and pharmacological approaches to management of common chronic diseases. Tertiary prevention is emphasized and concepts and approaches to ongoing health assessment, health education, self-management, harm reduction, support, restoration, and palliation are addressed.

Prerequisite(s): Nursing 485, 487, 488 and 489.

Corequisite(s): Nursing 495, 497 and 499.

Nursing 499 **6 units; (228 hours)**

Integrating Nursing Roles and Practices IV: Learning, Praxis and Scholarship in the Practicum Setting

Integration and application of theoretic knowledge in simulated and nursing practice settings.

Long-term nursing care of individuals, families and populations with chronic health challenges. Implementation of effective therapeutic relationships, complex assessments, reasoned clinical decision-making, client and family health education, client self-management and collaborative practice models.

Prerequisite(s): Nursing 485, 487, 488 and 489 and current CPR Health Care Provider Level (HCP).

Corequisite(s): Nursing 495, 497 and 498.

NOT INCLUDED IN GPA

Nursing 501 **3 units; (3-0)**

Advanced Concepts in Nursing Practice

Leadership, management and change within the context of nursing and health care. Exploration of strategies for transition to the graduate role and responsibilities inherent in being a nursing professional.

Prerequisite(s): Nursing 301, 302, 303, 305, 401, 402, 403 and 404.

Nursing 502 **6 units; (328 hours within one term)**

Senior Clinical Practicum

Synthesis, application and further acquisition of knowledge, skills, and attitudes in a selected nursing practice setting. Emphasis on complexity of nursing care with clients (individuals, families

and/or aggregates). Selection of focus area will be made through consultation with faculty.

Prerequisite(s): All required Nursing courses except Nursing 501 (BNRT students only) and current CPR Basic Cardiac Life Support.

Corequisite(s): Prerequisite or Corequisite: Nursing 501.

NOT INCLUDED IN GPA

Nursing 503 **3 units; (3-0)**

Selected Topics in Nursing

Courses provide an in-depth exploration of nursing related to a clinical population and quality care topic.

MAY BE REPEATED FOR CREDIT

Nursing 517 **3 units; (3-0)**

Philosophy and Practice in Palliative Care

Examination of the philosophy of palliative/hospice care, taught by faculty from many disciplines. An important focus includes the students' self-exploration of their own beliefs, values, and attitudes about life, illness, death, and dying, and how this self-exploration shapes interactions with those we care for.

Nursing 531 **3 units; (3-2)**

Community Health Nursing Theory

Concepts and models related to population-focused nursing with emphasis on community, health promotion, team building, assessment strategies, and planning approaches.

Nursing 533 **3 units; (128 hours within one term)**

Community Health Nursing Clinical Practice

Application and synthesis of concepts and models related to population-focused nursing.

Prerequisite(s): Nursing 531, current CPR Basic Cardiac Life Support, and proof of current, active nurse registration.

Antirequisite(s): Credit for Nursing 533 and 532 will not be allowed.

NOT INCLUDED IN GPA

Nursing 537 **3 units; (3-0)**

Nursing Leadership and Management

Professional and interpersonal relationships in nursing practice with an emphasis on leadership, interdisciplinary collaboration, and the management of nursing care at macro and micro levels.

Nursing 539 **3 units; (3-0)**

Research in Nursing

Concepts and process necessary for critiquing research and application to nursing practice.

Note: Completion of a statistics course is strongly recommended prior to taking Nursing 539.

Nursing 543 **3 units; (128 hours within one term)**

Senior Practicum

Synthesis and application of theoretical concepts within a selected area of practice with emphasis on further development of self-directed skills and professional attitudes.

Prerequisite(s): Nursing 441 and 533, current CPR Basic Cardiac Life Support, and proof of current, active nurse registration.

Antirequisite(s): Credit for Nursing 543 and 542 will not be allowed.

NOT INCLUDED IN GPA

Nursing 585 **3 units; (3-0)**

The Discipline and Profession of Nursing V: Preparing for Professional Role Transition

This course focuses on the integration of senior students into the environment of professional nursing practice with an evidence-informed emphasis on the essentials of leadership, relational and practice ethics, effective inter and intra-professional collaboration, communication and conflict management for the purpose of facilitating a healthy transition to the role of a new graduate professional nurse within a contemporary health-care climate.

Prerequisite(s): Nursing 495, 497, 498, 499.

Corequisite(s): Nursing 589 and two Senior Nursing Option courses.

Nursing 589 **6 units; (228 hours)**

Integrating Nursing Roles and Practices V: Learning, Praxis and Scholarship in the Practicum Setting

This focused clinical experience, supported by two corequisite substantive nursing option theory courses, is aimed at refining critical thinking and competent use of theoretic frameworks and evidence to support clinical reasoning processes including: comprehensive assessment, holistic analysis and interpretation of client data, and competence and confidence in clinical decision-making. Students will choose a focused area of nursing practice.

Prerequisite(s): Nursing 495, 497, 498, 499 and current CPR Health Care Provider Level (HCP).

Corequisite(s): Nursing 585 and two Senior Nursing Option courses.

NOT INCLUDED IN GPA

Nursing 599 **15 units; (418 clinical hours)**

Integrating Nursing Roles and Practices VI: Transition to Nursing Practice

Synthesis, application and further acquisition of knowledge, skills, and attitudes in a selected nursing practice setting. Emphasis on complexity of nursing care with clients (individuals, families, and/or aggregates). Selection of focus area will be made through consultation with faculty.

Prerequisite(s): Nursing 585 and 589, two Senior Nursing Option courses and current CPR Health Care Provider Level (HCP).

NOT INCLUDED IN GPA

Graduate Courses

Nursing 601 **3 units; (3S-0)**

Seminar on Special Topics Related to Health Care and Nursing

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Nursing 602 **3 units; (3S-0)**

Theoretical Perspectives in Aging

Overview of key theories of aging and explores contemporary and emerging issues associated with aging populations. Students will consider the provision of health and social services to older adults across different care continuums and explore their roles in the care of older adults at individual, community, and population levels.

Prerequisite(s): Consent of the Faculty.

Nursing 603 **3 units; (156 hours)**

Independent Supervised Clinical Practicum

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Nursing 604 3 units; (3S-0)**Comprehensive Geriatric Assessment**

Philosophy and principles of a comprehensive geriatric assessment. The impact of age-related changes that contribute to older adults' presentation and the responses to therapeutic management will be explored. Students will utilize this knowledge and explore how it relates to advanced practice.

Prerequisite(s): Consent of the Faculty.

Nursing 605 3 units; (3S-0)**Philosophical Knowledge and Advanced Nursing Practice**

Exploration of the philosophical knowledge of advanced nursing practice. A process of critical analysis, reflection and inquiry into the various philosophical approaches, ways of knowing, theories concepts and paradigms leading to a philosophically informed analysis of the knowledge practices activated during the conduct of nursing work.

Prerequisite(s): Consent of the Faculty.

Nursing 606 3 units; (3S-0)**Focused Studies in Aging**

Explores contemporary clinical issues of significance to an older adult population in detail. Students will select specific topics and may choose three modules from among the following: 1) Co-Morbidity and Chronicity; 2) Frailty and progressive changes in Functioning; 3) Cognitive Issues in Aging; 4) Palliation; and 5) Disability. Also covers principles of practice development and practice improvement using a quality improvement framework and development of a practice demonstration.

Prerequisite(s): Consent of the Faculty.

Nursing 607 3 units; (39 hours)**Independent Guided Study**

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT**Nursing 608** 3 units; (1S-2)**Specialized Practice Demonstration**

Integrates content knowledge with practice development or improvement processes, in order to enact a specialized workplace practice demonstration. Students will be supported by faculty to undertake their practice demonstration and to evaluate the effects of change on key stakeholders.

Prerequisite(s): Consent of the Faculty.

Nursing 609 3 units; (3-1)**Applied Statistics for Nursing Research**

The understanding of the conceptual basis, use, and pitfalls of common bio statistical methods used in the analyses of data, as well as, being able to analyze data using computer software. This course minimizes mathematical theory and concentrates on the 'when to use', 'why to use', and 'what the results mean' bio statistical issues.

Prerequisite(s): Consent of the Faculty.

Nursing 611 3 units; (3-0)**Theoretical Knowledge and Advanced Nursing Practice**

Introduction to substantive theory related to advanced nursing practice. As students identify their population focus they will examine frameworks for advanced nursing practice that inform their care for individuals, families and communities of practice.

Nursing 612 3 units; (3S-0)**Understand Comorbidity: Advanced Assessment, Screening, and Practice Implications**

Selected theories and models of addiction and mental health relevant to advancing specialized practice and including advanced assessment, screening and implications for practice innovation and leadership.

Prerequisite(s): Consent of the Faculty.

Nursing 614 3 units; (3S-0)**Therapeutic Practices: Counselling, Treatment Planning, and Sustained Recovery**

Selected therapeutic practices in addiction and mental health including but not limited to therapeutic relationships, therapeutic use of self, counseling (individual, group, family), motivational interviewing, cognitive behavioral therapy and contingency management and trauma informed care.

Prerequisite(s): Consent of the Faculty.

Nursing 616 3 units; (3S-0)**Specialized Practice Integration**

Specialized practice seminar focused on integration of advanced knowledge, practice and ethics; active engagement in critical debriefing of complex case scenarios augmented with virtual simulation; and development of a practice demonstration proposal.

Prerequisite(s): Consent of the Faculty.

Nursing 617 3 units; (3-0)**Philosophy and Practice in Palliative Care**

Examination of the philosophy of palliative/hospice care, taught by faculty from many disciplines. An important focus includes the students' self-exploration of their own beliefs, values, and attitudes about life, illness, death, and dying, and how this self-exploration shapes interactions with those we care for.

Prerequisite(s): Consent of the Faculty.

Nursing 618 3 units; (1S-2)**Specialized Practice Demonstration**

Implementation and evaluation of a proposed practice demonstration with a final report and recommendations.

Prerequisite(s): Consent of the Faculty.

Nursing 621 3 units; (3S-0)**Quantitative Designs and Analysis**

Critical analysis of nursing research. Emphasis on the study of research designs appropriate to clinical nursing problems, measurement, reliability and validity issues, and critique criteria.

Prerequisite(s): Consent of the Faculty.

Nursing 622 3 units; (3S-0)**Foundational Philosophy for Teaching and Learning Across Contexts**

Prepares students to teach in direct settings, simulation, online, as well as conventional classrooms. Focuses on building a philosophy for teaching and learning that incorporates foundational teaching and learning theory applicable to a variety of student contexts.

Prerequisite(s): Consent of the Faculty.

Nursing 623 3 units; (3-0)
(formerly Nursing 601.23)**Hermeneutic Phenomenology**

Inquiry into the philosophical and historical influences that have shaped hermeneutic phenomenol-

ogy as an approach to nursing and health care research. Exploration of interpretive practices essential to the conduct of hermeneutic research.

Prerequisite(s): Consent of the Faculty.

Nursing 624 3 units; (3S-0)**People, Places, and Relationships**

Involves the critical examination of teaching and learning specific to advancing professional practice with emphasis on cultivating relationships for learning, learning across diversity. Also focuses on generation of possibilities for change and innovation and consolidation of preferred teaching and learning practices in a selected focus of study.

Prerequisite(s): Consent of the Faculty.

Nursing 626 3 units; (3S-0)**Integrative Seminars: Current Trends in Teaching and Learning**

Introduces specialized topics in teaching and learning and provides an opportunity to engage in critical reflection and analysis. Students will explore a variety of teaching and learning strategies within multiple contexts and develop their individualized teaching practice.

Prerequisite(s): Consent of the Faculty.

Nursing 627 1.5 units; (18 hours)**Academic Scholarly Writing**

An intensive two-day writing workshop with additional pre-course reading and writing. Students will prepare for the course by reading texts and writing scholarly accounts that may be based in their nursing practice.

Prerequisite(s): Consent of the Faculty.

Nursing 628 3 units; (1S-2)**Teaching and Learning Demonstration Project**

Students will provide a demonstration of innovative teaching and learning strategies within a focused context (online, simulation, classroom, or clinical practice). Formulation and delivery of a proposed teaching and learning advanced practice demonstration will include a final report and recommendations.

Prerequisite(s): Consent of the Faculty.

Nursing 629 1.5 units; (18 hours)**Evidence-Informed Nursing**

Building on foundations of critical inquiry by emphasizing the evaluation and interpretation of qualitative and quantitative research, students develop an enhanced ability to use systematic reviews and research-based innovations in making evidence-based decisions for client care, nursing knowledge and organizational or system improvement.

Prerequisite(s): Consent of the Faculty.

Nursing 633 3 units; (3S-8)**Leadership in Advanced Nursing Practice and Practicum I**

A critical examination of theories and principles of leadership and leadership development as it relates to individual leadership practices, leading multidisciplinary teams, and leadership within the broader health system. Students will explore and discuss the influence of leaders and leadership on the health-care workplace, on client/population outcomes, and the health-care system. In the practicum project students will utilize evidence to assess their leadership skills and competencies, and how they relate to the development and evaluation of their practicum project.

Prerequisite(s): Nursing 605 and 611.

Nursing 634 **6 units; (2S-8)**

Advanced Nursing Practice: Practicums II and III

The purpose of clinical practicums II and III is to follow through with the project that was proposed in Nursing 633 including: implementing the study, analyzing and interpreting the findings, writing and submitting the paper for publication and/ or presenting the paper at a conference.

Prerequisite(s): Nursing 633.

Nursing 642 **6 units; (52S-180 within 8-week block)**

Nurse Practitioner Practicum I and Role Integration

Building on the foundational knowledge of advanced pathophysiology, advanced health assessment and pharmacology, this course provides an opportunity for students to begin to acquire advanced knowledge and skills related to clinical diagnosis, decision-making and management of commonly presented acute and chronic health problems. Additionally this course will address issues related to nurse practitioner role integration.

Prerequisite(s): Nursing 661, 663 and 665 or consent of the Faculty, registration in Post-Master's NP Diploma program or the integrated MN/NP program.

NOT INCLUDED IN GPA

Nursing 644 **6 units; (52S-180 within 8-week block)**

Nurse Practitioner Practicum II

Diagnostic and management skills related to care of patients. Further development of skills in clinical history taking, physical assessment, and diagnostic testing.

Prerequisite(s): Nursing 642.

NOT INCLUDED IN GPA

Nursing 646 **6 units; (52S-180 within 8-week block)**

Nurse Practitioner Practicum III

Learning opportunities and practice experience with emphasis on clinical diagnosis, diagnostic imaging, laboratory tests, differential diagnosis, and patient management.

Prerequisite(s): Nursing 644.

NOT INCLUDED IN GPA

Nursing 650 **6 units; (16S-292 within 8-week block)**

Nurse Practitioner Practicum IV

Consolidation of components of NP role in specialty focus.

Prerequisite(s): Nursing 646.

NOT INCLUDED IN GPA

Nursing 660 **3 units; (3S-0)**

Cultivating Personal Leadership

Exploration of relational leadership including self-awareness and development of leadership capacity. Students will explore their personal leadership style and the influence of leadership on workplace cultures, team dynamics and quality of healthcare delivery.

Prerequisite(s): Consent of the Faculty.

Nursing 661 **3 units; (4S-0)**

Advanced Pathophysiology and Therapeutics

Study of pathophysiological phenomena and therapeutics at an advanced level. Classes will be a combination of didactic presentations, seminars and case studies. Students are invited to explore

morbidity and mortality in the Canadian population in general and in their area of focus in particular.

Prerequisite(s): Consent of the Faculty.

Nursing 662 **3 units; (3S-0)**

The Future of Nursing: The Future of Health Systems

Examines the health delivery system focusing on accessibility, acceptability, appropriateness, effectiveness, efficiency and safety. Students will apply leadership principles to challenges inherent in a complex and dynamic health care system. Focuses on the role of nurses as leaders and transformers of health systems.

Prerequisite(s): Consent of the Faculty.

Nursing 663 **3 units; (3S-0)**

Pharmacotherapeutics in Advanced Nursing Practice

Principles of drug action, pharmacokinetics and pharmacotherapeutics in the context of advanced nursing practice. Opportunity to investigate pharmacotherapies specific to student's individual client populations.

Prerequisite(s): Consent of the Faculty.

Nursing 664 **3 units; (3S-0)**

Innovation in Health Systems

Focused exploration of the principles of innovation, and practices for leading innovation applied to complex healthcare environments. Students will apply design thinking, entrepreneurial practices and examine the value proposition and challenges of innovation in a health system context.

Prerequisite(s): Consent of the Faculty.

Nursing 665 **3 units; (3S-3)**

Advanced Health Assessment

Builds upon fundamental health assessment skills to provide a solid foundation for advanced assessment. Focuses on history taking physical examination, diagnostic reasoning and clinical judgment, as well as selected diagnostic skills necessary for advanced practice.

Prerequisite(s): Consent of the Faculty.

Nursing 668 **3 units; (1S-2)**

Specialized Practice Demonstration: Healthcare Grand Challenge

Formulation of a bold and innovative proposal developed through team collaboration and joint leadership that addresses a systemic problem and aims to improve the quality of healthcare in Alberta. Drawing on previous learning of personal and professional competencies, students will be presented with a grand challenge associated with leading and improving a complex health system.

Prerequisite(s): Consent of the Faculty.

Nursing 683 **3 units; (3S-0)**

Qualitative Designs and Analysis

Exploration of research methods based primarily on inductive reasoning. Methods, issues and techniques of sampling, data collection, analysis, and interpretation will be explored. Experience will be provided in data collection, management, and analysis.

Prerequisite(s): Consent of the Faculty.

Nursing 701 **3 units; (3-0)**

Doctoral Special Topics

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Nursing 705 **3 units; (3-0)**

Philosophy of Science in Nursing

Exploration of major philosophical positions and their contributions to the generation and evaluation of knowledge. Examination of the development and evolution of nursing knowledge.

Prerequisite(s): Consent of the Faculty.

Nursing 707 **3 units; (39 hours)**

Directed Study

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Nursing 711 **3 units; (2S-0)**

Doctoral Scholarship in Nursing

Focus on development of a nurse scientist. Seminar discussions will address launching a viable and fundable program of research, grantsmanship, managing multi-disciplinary research teams, and establishing a record of publication and dissemination.

Prerequisite(s): Consent of the Faculty.

NOT INCLUDED IN GPA

Nursing 721 **3 units; (3-0)**

Advanced Quantitative Research Methods

Opportunities for developing nurse scientists and other health professional doctoral students to increase understanding of, and ability to utilize, quantitative research methods for scientific inquiry. Focuses on identifying issues/dilemmas arising during the research process and methods to address these challenges.

Prerequisite(s): Nursing 621.

Nursing 723 **3 units; (3-0)**

Hermeneutic Phenomenology

Inquiry into the philosophical and historical influences that have shaped hermeneutic phenomenology as an approach to nursing and health care research. Exploration of interpretive practices essential to the conduct of hermeneutic research.

Nursing 733 **3 units; (2S-0)**

Doctoral Thesis Seminar

Opportunity for students to discuss development of their thesis proposal with a focus on the question, design, ethical considerations, and funding.

Prerequisite(s): Nursing 705 and one graduate level advanced research course.

NOT INCLUDED IN GPA

Nursing 769 **3 units; (3-0)**

Contemporary Issues in Health Care

Theoretical examination of concepts and research for increasing the availability and accessibility of health care. Appraisal of the relationships among leadership, policy and practice issues from a multidisciplinary perspective.

Prerequisite(s): Consent of the Faculty.

Nursing 783 **3 units; (3-0)**

Advanced Qualitative Research Methods

Exploration of the philosophical foundations and practice of qualitative research methods in health care inquiry. Emphasis on interpretive assumptions and practices relevant to the conduct of qualitative research.

Prerequisite(s): Nursing 683.

Operations Management OPMA

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses

Operations Management 301 3 units; (3-0)

Introduction to Operations and Supply Chain Management

A survey of the decision processes in production and operations management and their relationship to other business functions. Topics include project planning and scheduling, inventory management, quality management, capacity planning, facilities layout, and supply chain management.

Prerequisite(s): Any 200-level Mathematics or Statistics 213 (or equivalent, excluding Statistics 201), and Entrepreneurship and Innovation 201.

Antirequisite(s): Credit for Operations Management 301 and 317 will not be allowed.

Note: Not available for credit toward the Bachelor of Commerce degree. Preference in enrolment is given to students who have declared a Management and Society Minor.

Operations Management 317 3 units; (3-0)

Fundamentals of Operations and Supply Chain Management

An introduction to operations and supply chain management's strategic importance, wide applicability, and sustainability integration. Topics include management of inventory, quality, global supply chains, capacity, projects and process improvement.

Prerequisite(s): Admission to the Haskayne School of Business, Business and Environment 291 or Management Studies 217, and Statistics 213.

Antirequisite(s): Credit for Operations Management 317 and 301 will not be allowed.

Operations Management 401 3 units; (3-0)

Production Planning and Control

An in-depth treatment of inventory and production within an organization. Topics covered include inventory control, sales and operations planning, materials requirements planning, and lean processes. Recent advances in manufacturing may also be discussed.

Prerequisite(s): Admission to the Haskayne School of Business, Operations Management 317 and Management Studies 391.

Operations Management 403 3 units; (3-0)

Managing Quality in Products and Services

An in-depth treatment of quality management practices and techniques for products and services. Topics and techniques covered include designing and assuring quality, quality issues in the supply chain, statistical quality measurement, and continuous process and quality improvement.

Prerequisite(s): Admission to the Haskayne School of Business and Operations Management 317.

Operations Management 405 3 units; (3-0)

Service Operations Management

The management of service businesses from both a qualitative and quantitative perspective. Topics may include service design and performance measurement, service quality and recovery, managing people in service industries, service demand forecasting, scheduling, managing lineups, yield

management, network optimization, and the role of information technology. Industry examples include travel and hospitality, professional services, retail, communication and transportation and banking.

Prerequisite(s): Admission to the Haskayne School of Business, Operations Management 317 and Management Studies 391.

Operations Management 407 3 units; (3-0)

Project Management

The management of projects in a variety of settings such as software development and installation, disaster relief, new product development, advertising campaigns and financial auditing are examined. Material from the organizational, planning, technical, financial, informational, and logistical aspects of project management will emphasize the interdisciplinary nature of projects. Use of commercial computer software for planning and scheduling projects is learned.

Prerequisite(s): Admission to the Haskayne School of Business, Operations Management 317 and Management Studies 391.

Operations Management 409 3 units; (3-3T)

Computer Simulation for Business

Companies encounter numerous problems that are characterized by uncertainties for which they need to find a solution. Simulation provides a means for imitating the behaviour of real-life situations in a computer environment, allowing for "what-if" analyses of different scenarios. Hands-on experience in creating simulation models and obtaining reliable results for decision making with the use of different simulation techniques is gained.

Prerequisite(s): Admission to the Haskayne School of Business, Operations Management 317 and Management Studies 391.

Operations Management 411 3 units; (3-0)

Field Investigation in Operations and Supply Chain Management

Project-based experiential learning on operational improvements within an organization in operations or supply chain management. Students work in teams on a single project. Oral and written presentation skills are developed.

Prerequisite(s): Admission to the Haskayne School of Business, and 60 units including Operations Management 317, Management Studies 391 and two 400-level Operations Management or Supply Chain Management courses.

Operations Management 415 3 units; (3-1T)

Prescriptive Models in Business Analytics

Identification of data requirements for analytical decision-making. Case studies used throughout to develop insight for decision making while dealing with incomplete and ambiguous data. Introduction to VBA-enabled spreadsheet modelling to design and implement optimization models without/with uncertainty as well as advanced Monte Carlo simulation.

Prerequisite(s): Admission to the Haskayne School of Business and Management Studies 391.

Operations Management 419 3 units; (3-0)

Predictive Models in Business Analytics

Decision making with big data and predictive analytics methods. Students learn to describe and visualize business data, as well as to make predictions and classifications with data. Methods

include regression models, regression trees, association rules and cluster analysis.

Prerequisite(s): Admission to the Haskayne School of Business, Management Studies 217 and Statistics 217.

Operations Management 559 3 units; (3-0)

Selected Topics in Operations Management

Investigation of selected topics in Operations Management.

Prerequisite(s): Admission to the Haskayne School of Business, Operations Management 317 and Management Studies 391. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Operations Management 601 3 units; (3-0)

Operations Management

Management of the production and/or service delivery system of the organization in concert with marketing, human resources, finance, and information systems. Management decision making on a continuum from day-to-day operating decisions such as quality control to long-term strategic decisions such as capacity planning. Topics covered in the course may include operations strategy, project management and inventory and supply chain management.

Operations Management 672 1.5 units; (3-1T)

Operations and Supply Chain Integration

Technology infrastructure, collaborations in business-to-business relationships, and customization in business to client relationships.

Prerequisite(s): Admission to the Master of Management program.

Operations Management 715 3 units; (3-0)

Management Science Using Spreadsheets

The modelling and analysis of quantitative problems from a variety of fields within business, with emphasis on insight for decision making. Use of optimization, simulation, decision analysis, and other techniques in spreadsheets. Spreadsheet engineering as an approach to reducing spreadsheet errors. Case studies are used to develop skill in dealing with incomplete and ambiguous information.

Prerequisite(s): Management Studies 613.

Operations Management 719 3 units; (3-0)

Project Procurement and Logistics

Project procurement and logistics management in engineering, construction management and manufacturing, both nationally and internationally. Topics include fundamentals of procurement management, preparation of request for proposals, the selection of bidders, the evaluation of bids, supplier selection, contract management, control of inventory, handling of material flow and management of warehousing, logistics strategy and global issues.

Prerequisite(s): Business and Environment 691.

Operations Management 731 3 units; (3-0)

Decision-Making for Outcome Optimization

Evaluates the use of decision tools for analysis and synthesis to optimize decision-making in different types of businesses. Tools explored include mathematical programming, computer simulation,

decision analysis, forecasting and queuing theory. Theoretical treatment is considered, as well as practical model application to support managerial decision-making.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Operations Management 743 3 units; (3-0)

Simulation of Operational Systems

Simulation provides a means for imitating the behaviours of real-world situations in the computer environment, allowing for 'what-if' analyses of different scenarios. The emphasis is on hands-on experience in transforming a real situation into a simulation model and obtaining reliable results. The course will focus on discrete-event simulation, with the introduction of other techniques such as advanced Monte Carlo simulation.

Prerequisite(s): Operations Management 601 and Management Studies 613.

Operations Management 745 3 units; (3-0)

Operations Planning and Supply Chain Management

Case studies of real-world situations calling for appropriate state-of-the-art models and solution methods for the design, planning, control and improvement of supply chain operations. The main concepts and terminology in the domain of supply chain management are explored and then applied to a given situation.

Prerequisite(s): Operations Management 601 and Management Studies 613.

Operations Management 797 3 units; (3S-0)

Advanced Seminar in Operations Management

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Operations Management 799 3 units; (3S-0)

Doctoral Seminars in Operations Management

799.01. Strategic Research Issues

799.02. Tactical Research Issues

799.03. Operational Research Issues

Organizational Behaviour and Human Resources OBHR

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses

Organizational Behaviour and Human Resources 317 3 units; (3-0) (formerly Human Resources and Organizational Dynamics 317)

Organizational Behaviour

Examines individual, interpersonal and group processes to explain behaviour in organizations to better predict employee behaviour, and to interpret how context influences such behaviour. Topics may include motivation, groups and teams, decision-making, personality, power and influence, negotiation, leadership and stress.

Prerequisite(s): Admission to the Haskayne School of Business, and Business and Environment 291 or Strategy and Global Management 217.

Antirequisite(s): Credit for Organizational Behaviour and Human Resources 317 and 321 will not be allowed.

Organizational Behaviour and Human Resources 321 3 units; (3-0) (formerly Human Resources and Organizational Dynamics 321)

Foundations in Organizational Behaviour and Human Resources

Energies, skills and abilities of people to meet the challenge of today's organizations; diagnostic skills to recognize and analyze organizational problems; the linkage between effective management of people and goal accomplishment for organizations; current challenges in organizational forms, diverse environments and cultures; foundation for further study of Organizational Behaviour and Human Resources concepts.

Antirequisite(s): Credit for Organizational Behaviour and Human Resources 321 and 317 will not be allowed.

Note: Not available for credit towards the Bachelor of Commerce degree. Preference in enrolment is given to students who have declared a Management and Society Minor.

Organizational Behaviour and Human Resources 401 3 units; (3-0) (formerly Human Resources and Organizational Dynamics 401)

Strategic Human Resource Management

Provides the conceptual basis and skills to make strategic human resource decisions. Learning to think strategically about human resource management practices and policies such as reward systems, performance management, and hiring.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317.

Organizational Behaviour and Human Resources 405 3 units; (3-0) (formerly Human Resources and Organizational Dynamics 405)

Labour Relations

Examination of the nature and role of labour relations in the resolution of issues affecting employers, employees and the public interest.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317.

Organizational Behaviour and Human Resources 407 3 units; (3-0) (formerly Human Resources and Organizational Dynamics 407)

Rationality and Decisions

An overview of key concepts in the decision sciences including normative, descriptive and prescriptive models of judgment and choice. This course emphasizes real-world applications of different decision making and decision support models.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317.

Organizational Behaviour and Human Resources 409 3 units; (3-0)

Talent Management

Examines how organizations can proactively manage their talent pool, from the recruitment phase through to screening, assessing, interviewing, and

selecting top talent using scientifically valid and legally defensible practices.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317.

Antirequisite(s): Credit for Organizational Behaviour and Human Resources 409 and either Organizational Behaviour and Human Resources 559.02 or 559.05 will not be allowed.

Organizational Behaviour and Human Resources 411 3 units; (3-0)

Training and Development

Examines how to enhance job-relevant knowledge and skills to improve job performance. Topics include needs assessment, learning and transfer of training, training methods and evaluation.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317.

Antirequisite(s): Credit for Organizational Behaviour and Human Resources 411 and 559.03 will not be allowed.

Organizational Behaviour and Human Resources 413 3 units; (3-0)

Compensation and Performance Management

Systematically design compensation systems that improve employee engagement and performance. Topics include job analysis and evaluation, pay systems, and benefits.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317.

Antirequisite(s): Credit for Organizational Behaviour and Human Resources 413 and 559.04 will not be allowed.

Organizational Behaviour and Human Resources 421 3 units; (3-0) (formerly Human Resources and Organizational Dynamics 421)

Interpersonal Behaviour

Focus on increasing self-awareness, self-understanding and presentation of self. Interpersonal skills development necessary for group effectiveness and team management provide basis for performance leadership. Format involves learning in small groups.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317.

Organizational Behaviour and Human Resources 449 3 units; (3-1T) (formerly Human Resources and Organizational Dynamics 449)

Arbitration of Employment Disputes

Workplace dispute resolution using arbitration. Topics include discipline, drug testing, surveillance, dress codes, discrimination, absenteeism, employment contracts. Emphasis on legal principles in employment arbitration, data base research, and advocacy skills using simulations, case law and guest speakers.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317.

Organizational Behaviour and Human Resources 491 3 units; (3-0) (formerly Human Resources and Organizational Dynamics 491)

Lifework Planning and Career Assessment

Persons demonstrate competency in personal and career development by their ability to take personal

responsibility for the quality of their lives. Assess skills and values and plan for personal and career development after graduation.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317.

Organizational Behaviour and Human Resources 493 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 493)

Business Negotiations

The major concepts and theories of bargaining and negotiation; the dynamics of interpersonal and intergroup conflict; analysis of bargaining and conflict relationships and exploration of individual bargaining styles. Application to a variety of negotiation situations. Use of simulations and written assignments.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units including Organizational Behaviour and Human Resources 317.

Organizational Behaviour and Human Resources 559 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 559)

Selected Topics in Management and Organizations

Examination of selected topics in management and organizations.

Prerequisite(s): Admission to the Haskayne School of Business and Organizational Behaviour and Human Resources 317. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Organizational Behaviour and Human Resources 601 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 601)

Organizational Behaviour

Evidence-based approach to leadership and organizational behaviour. Begins with self-assessment and then uses experiential learning to develop leadership techniques, including: motivation, team processes, negotiation, and decision-making.

Organizational Behaviour and Human Resources 631 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 631)

Managing Human Resources from a Strategic Perspective

Integrated coverage of human resource management theory, practice and research as it applies to the strategic management of organizations.

Prerequisite(s): Organizational Behaviour and Human Resources 601.

Organizational Behaviour and Human Resources 672 1.5 units; (3-1T)

Working with People

Focuses on employment in different organizational contexts (e.g. established and start-up organizations, public and privately owned, or government and not-for-profit).

Prerequisite(s): Admission to the Master of Management program.

Organizational Behaviour and Human Resources 674 1.5 units; (3-1T)

Navigating the Organization

Development of negotiation, power and influence, politics, and conflict resolution skills leading to increased effectiveness with internal and external stakeholders.

Prerequisite(s): Admission to the Master of Management program.

Organizational Behaviour and Human Resources 691 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 691)

Project Team Building and Interpersonal Skills

Leadership style and behaviour; interpersonal effectiveness and self-awareness; project teams; group dynamics; organizational change; application to the project environment.

Prerequisite(s): Admission to the MEng Program (Project Management specialization). Not open to students in the MBA Program.

Organizational Behaviour and Human Resources 721 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 721)

Advanced Leadership

Examines leadership theories relevant to advanced leadership (e.g., ethical leadership, humble leadership, charismatic leadership). Delves into concepts that leaders must consider when making decisions and implementing strategy (e.g., power, influence, change-management).

Prerequisite(s): Organizational Behaviour and Human Resources 601.

Organizational Behaviour and Human Resources 723 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 723)

Organizational Change and Development

Diagnosing organizational situations where the need for change exists and facilitating such changes. Utilization of behavioural science knowledge for organizational problem-solving.

Prerequisite(s): Organizational Behaviour and Human Resources 601.

Organizational Behaviour and Human Resources 725 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 725)

Organizational Analysis and Design

Application of knowledge of organizational theory and behaviour to organizational analysis and design. Emphasis will be placed on the acquisition of the required analysis and design skills based on an understanding of how organizations are structured, how they function and their relationships with their environment.

Prerequisite(s): Organizational Behaviour and Human Resources 601.

Organizational Behaviour and Human Resources 727 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 727)

Competitive Advantage Through People

Analysis of the interdependencies and theoretical foundations of staffing and development programs, design and administration of reward compensation systems and performance management pro-

grams from the orientation of professional human resources management.

Prerequisite(s): Organizational Behaviour and Human Resources 601.

Organizational Behaviour and Human Resources 729 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 729)

Workplace Issues

Examination of the employment relationship, with a focus on controversial and significant topics in the workplace. Coverage may include: unjust dismissal; drug and alcohol testing; computer and Internet policies; privacy and surveillance; impact of unions; disability and accommodation; and workplace violence. Modular format with modules customized to meet student interests.

Prerequisite(s): Organizational Behaviour and Human Resources 601.

Organizational Behaviour and Human Resources 731 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 731)

Lifework Planning and Career Assessment

Persons demonstrate competency in personal and career development by their ability to take personal responsibility for the quality of their lives. Students will clarify their competencies and values and plan for dealing with the challenges faced by mature adults.

Prerequisite(s): Organizational Behaviour and Human Resources 601.

Organizational Behaviour and Human Resources 733 3 units; (3-0)

Leadership for Change

Focuses on understanding and developing the skills required to lead and sustain the process of change in oneself and others and being able to mobilize and harness the energy of multiple stakeholders in a constantly changing environment, moving the collective in a positive direction.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Organizational Behaviour and Human Resources 741 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 741)

Managerial Decision Making

Examines how decisions are made in organizations and how these decisions can be made more effectively, particularly at the top management and Board levels. Decision making in current business contexts are explored by way of simulations, case analyses, discussions, debates and written assignments.

Organizational Behaviour and Human Resources 745 3 units; (3-0)
(formerly Human Resources and Organizational Dynamics 745)

Cross-Cultural Leadership and Human Resources Management

Leadership of human resources in a cross-cultural and international context; the nature of cultural differences; influence on organizational processes and practices such as communication, leadership, decision-making, team dynamics, staffing, performance management and organizational design, and implications for those holding international managerial roles.

Organizational Behaviour and Human Resources 789 3 units; (3S-0) (formerly Human Resources and Organizational Dynamics 789)

Seminar in the Management of Human Resources

Intensive study and discussion of current literature, research and issues with respect to selected topics in the management of human resources.

Prerequisite(s): Organizational Behaviour and Human Resources 601 or consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Organizational Behaviour and Human Resources 793 3 units; (3-0) (formerly Human Resources and Organizational Dynamics 793)

Business Negotiations

The major concepts and theories of negotiation; the dynamics of interpersonal and intergroup conflict; analysis of negotiation strategies and individuals styles. Application to a broad range of business negotiations. Use of simulations and written assignments.

Prerequisite(s): Organizational Behaviour and Human Resources 601.

Organizational Behaviour and Human Resources 797 3 units; (3S-0) (formerly Human Resources and Organizational Dynamics 797)

Advanced Seminar in Organizational Behaviour and Human Resources

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Organizational Behaviour and Human Resources 799 3 units; (3S-0) (formerly Human Resources and Organizational Dynamics 799)

Doctoral Seminars in Organizational Behaviour and Human Resources

799.01. Organizational Behaviour

799.02. Organization Theory

799.03. Industrial Relations

799.05. Interorganizational Relationships: Creating and Managing Strategic Alliances

Petroleum Engineering ENPE

For more information about these courses, see the Department of Chemical and Petroleum Engineering: <https://schulich.ucalgary.ca/chemical-petroleum>.

Senior Courses

Petroleum Engineering 313 3 units; (3-1T-2/2)

Introduction to Flow in Porous Media

Fluid flow in porous media: pore structure; porosity and absolute permeability capillarity; Darcy's Law and single phase flow; immiscible and miscible fluid flow; wettability; multiphase flow and relative permeability; pore level analysis of two-phase displacement; and integration of these properties with geological information; application of fundamental

principles to hydrocarbon recovery from petroleum reservoirs.

Corequisite(s): Chemical Engineering 331 and admission to the Oil & Gas or Chemical Engineering with Petroleum Minor program.

Antirequisite(s): Credit for Petroleum Engineering 313 and Petroleum Engineering 513 will not be allowed.

Petroleum Engineering 423 3 units; (3-1)

Oil and Gas Engineering Process Development

Design of oil and gas processing units and plants; cost estimates and oil and gas process economics; optimization techniques; introduction to linear programming; safety and environmental considerations in process design.

Prerequisite(s): Chemical Engineering 315 and admission to the Oil and Gas Engineering program.

Antirequisite(s): Credit for Petroleum Engineering 423 and Chemical Engineering 423 will not be allowed.

Petroleum Engineering 429 3 units; (3-1)

Reservoir Engineering

Review of petroleum fluid properties and flow in porous media; reserve estimation using volumetric and material balance methods in gas, gas-condensate and oil reservoirs; discussion of reservoir drive mechanisms; aquifer models; decline analysis; routine and special core analysis; PVT data and equation of state modelling; single phase flow in reservoirs; introduction to well testing; introduction to reservoir modelling; introduction to reservoir recovery processes.

Prerequisite(s): Engineering 311, Petroleum Engineering 313 and Geology 377 and admission to the Oil & Gas or Chemical Engineering with Petroleum Minor program.

Antirequisite(s): Credit for Petroleum Engineering 429 and 523 will not be allowed.

Petroleum Engineering 505 3 units; (3-1)

Surface Production Operations

Oil and gas treating process equipment, design and operation. Two-phase and three-phase separators; heater treaters. Fluid gathering and distribution systems. Pumps and compressors. Flow measurement and production testing. Natural gas dehydration and sweetening. Produced water treatment and disposal.

Prerequisite(s): Chemical Engineering 427.

Petroleum Engineering 507 3 units; (3-1)

Well Logging and Formation Evaluation

Fundamentals of wireline well logging and the log interpretation techniques for oil and gas wells. Basic reservoir petrophysical parameters. Types of well logging devices; physics of operation and response characteristics of various well logging tools. Application of well logs for integrated petroleum reservoir management.

Prerequisite(s): Third-year standing, or higher, in Chemical Engineering or Oil & Gas Engineering.

Petroleum Engineering 509 3 units; (3-1)

Well Testing

Basic theory and current techniques for well testing. Drawdown and build up tests; diffusivity equation and various boundary conditions and flow regimes; superposition; single-rate and multi-rate testing; effect of boundaries; derivative analysis; fractured wells, fractured reservoirs and other flow models; wellbore dynamics; type curve matching; advanced decline curve analysis. Computer aided

analysis and hands on experience in the computer laboratory.

Prerequisite(s): Petroleum Engineering 429 or 523.

Petroleum Engineering 511 3 units; (3-4)

Design for Oil and Gas Engineering I

Team design project applying principles of project engineering and management to the recovery and processing of hydrocarbons. Petroleum design considerations will include; detailed reservoir characterization; well test analysis; recovery and production forecasting; preliminary drilling, completions and facilities design, and economic evaluation.

Prerequisite(s): Chemical Engineering 315, 427; Chemical Engineering 423 or Petroleum Engineering 423; Petroleum Engineering 429 or 523 and admission to the Oil & Gas or Chemical Engineering with Petroleum Minor program.

Antirequisite(s): Credit for Petroleum Engineering 511 and Chemical Engineering 511 will not be allowed.

Note: Petroleum Engineering 511 and 531 are a required two-course sequence that shall be completed in the same academic year. Concurrent enrolment in Petroleum Engineering 511 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Petroleum Engineering 513 3 units; (3-1)

Flow in Porous Media

Fundamentals of fluid flow in porous media: pore structure; porosity and absolute permeability capillarity; Darcy's Law and single phase flow; immiscible and miscible fluid flow; wettability; multiphase flow and relative permeability. Concepts applied to hydrocarbon reservoirs and fluid migration in soils including; characterization of pore space, pore level modelling of porous media, routine and advanced core analysis. Similarities and differences between hydrocarbon reservoirs and soils.

Corequisite(s): Third-year standing, or higher, in Chemical Engineering or Oil & Gas Engineering.

Antirequisite(s): Credit for Petroleum Engineering 513 and 313 will not be allowed.

Petroleum Engineering 515 3 units; (3-2)

Drilling and Well Completions

An introduction to drilling; overview of petroleum engineering geology; basic rock properties. Fluid flow in porous media. Drilling rig types, components and selection; overview of drilling operations; drilling fluids and mud systems; drilling hydraulics; casing design and casing seat selections; cementing; formation damage, well completions. Special topics including: directional drilling; blowout control; logging and coring; hole stability; planning and cost control; underbalanced drilling; coiled tubing drilling; offshore operations, environmental aspects.

Prerequisite(s): Engineering 311; Chemical Engineering 317 or Engineering 317; and Chemical Engineering 331 or Mechanical Engineering 341.

Corequisite(s): Petroleum Engineering 429 or 523.

Antirequisite(s): Credit for Petroleum Engineering 515 and 521 will not be allowed

Note: Priority will be given to students in the BSc Oil & Gas Engineering. All students are expected to attend the course field trip(s).

Petroleum Engineering 519 3 units; (3-0)

Special Topics

Current advanced topics in Petroleum Engineering.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Petroleum Engineering 521 3 units; (3-1)**Introduction to Drilling Engineering**

Introduction to the physics of flow in porous media; overview of drilling operations; equipment; relevant processes and procedures; basic completion operation; environmental aspect of drilling and completion operations.

Prerequisite(s): Engineering 311; Chemical Engineering 317 or Engineering 317 or Energy Engineering 360; and Chemical Engineering 331 or Mechanical Engineering 341 or Energy Engineering 480.

Corequisite(s): Petroleum Engineering 429 or 523.

Antirequisite(s): Credit for Petroleum Engineering 521 and 515 will not be allowed.

Petroleum Engineering 523 3 units; (3-1)**Introduction to Reservoir Engineering**

Basic concepts of fluid flow in porous media; important reservoir rock and fluid properties affecting productivity; reserve estimation using volumetric and material balance methods in gas, gas-condensate and oil reservoirs; discussion of different reservoir drive mechanisms; aquifer models; decline analysis; Darcy's Law and single phase flow through porous media. Introduction to well testing, solution of radial diffusivity equation corresponding to infinite-acting and pseudo-steady state flow of slightly compressible fluids and real gases.

Prerequisite(s): Engineering 311 and one of Chemical Engineering 331, or Mechanical Engineering 341 or Energy Engineering 480.

Antirequisite(s): Credit for Petroleum Engineering 523 and 429 will not be allowed.

Petroleum Engineering 525 3 units; (3-1)**Waterflooding and Enhanced Oil Recovery**

Review of rock-fluid properties; trapping and mobilization of residual oil; displacement theory; linear waterflood calculations; viscous fingering; flood patterns and sweep efficiency considerations; characterization of reservoir heterogeneity; analytical waterflood prediction models; black-oil reservoir simulation models; design engineering aspects of waterflooding; and overview of enhanced recovery methods.

Prerequisite(s): Petroleum Engineering 523 or 429.

Petroleum Engineering 531 3 units; (2-6)**Design for Oil and Gas Engineering II**

Team Design Project continuing from Petroleum Engineering 511. Detailed design of large scale development and commercial exploitation of a petroleum resource. Topics considered will include: reservoir simulation; drilling and completion design; specification of petroleum processing equipment such as heaters, heat exchangers, contacting and separating equipment; safety and environmental issues; economic evaluation.

Prerequisite(s): Petroleum Engineering 511.

Note: Petroleum Engineering 511 and 531 are a required two-course sequence that shall be completed in the same academic year. Concurrent enrolment in Petroleum Engineering 531 and one or more of Internship 513.01, 513.02, 513.03, and 513.04 will not be allowed.

Petroleum Engineering 533 3 units; (3-1)**Petroleum Production Engineering**

Principles of oil and gas production mechanics. Analysis of fluid flow from the formation to the surface facility. Reservoir inflow performance. Wellbore hydraulics and multiphase flow. Nodal analysis for production optimization Acidizing and hydraulic fracturing. Water and gas coning.

Diagnosis of production problems. Artificial lift; Sucker pumping; electrical submersible pumps; progressing cavity pumps; gas lift.

Prerequisite(s): Petroleum Engineering 523 or 429.

Petroleum Engineering 543 3 units; (3-0)**Geological Characterization of Oil and Gas Reservoirs**

Static model for field development. Review petroleum reservoir geology, geological depositional environments, petrophysical and geostatistical analysis, and reserves estimation. Emphasis on data analysis and integration for a model suitable for reservoir simulation.

Prerequisite(s): Petroleum Engineering 523 or 429.

Corequisite(s): Petroleum Engineering 507.

Petroleum Engineering 551 3 units; (2-4/2)**Petroleum Engineering Laboratory**

Experiments on Fluid Flow in Oil & Gas production. Measurements of porous rock and fluid properties, such as relative permeability, fluid dispersion, fluid phase behaviour and viscosity, unstable fluid displacement.

Prerequisite(s): Chemical Engineering 427, Petroleum Engineering 313 or 513 and 429 or 523.

Antirequisite(s): Credit for Petroleum Engineering 551 and Chemical Engineering 551 will not be allowed.

Petroleum Engineering 555 3 units; (3-1T)**Oil and Gas Field Safety and Equipment**

Review of safety issues, blow outs, fire and other hazards, hydrate formation and decomposition, H₂S and other toxic gases, safety standards, impact of petroleum operations on the environment, handling and safe transportation and disposal of petroleum wastes.

Petroleum Engineering 561 3 units; (3-1T)**Fuel Science and Technology**

Classification of fuels. Origin, geology, production and processing of fossil fuels. Supply, consumption and demand for fuels - historical patterns and future trends. Thermodynamics and reaction kinetics of combustion. Physical and chemical properties and influence on fuel utilization. Ecological, efficiency, safety, economic considerations. Non-conventional fuels. Transportation and handling.

Petroleum Engineering 563 3 units; (3-1T)**Corrosion in Engineering Applications**

Electrochemical principle of corrosion reactions. Corrosion thermodynamics and kinetics. Electrochemical corrosion measurement techniques. Passivity and pitting corrosion. Crevice corrosion and galvanic corrosion. Environmentally assisted cracking. Corrosion control techniques including cathodic protection, coatings and inhibitors. Material selection for corrosion resistance.

Prerequisite(s): Fourth-year standing or above.

Antirequisite(s): Credit for Petroleum Engineering 563 and Mechanical Engineering 519.18 will not be allowed.

Petroleum Engineering 571 3 units; (3-1T)**Unconventional Oil Production**

Description and analysis of heavy oil geology and heavy oil recovery technologies. Discussion of heavy oil production mechanisms and methods,

recovery process design, transportation, facilities, marketing, economics, and environmental issues.

Prerequisite(s): Petroleum Engineering 429 or 523.

Antirequisite(s): Credit for Petroleum Engineering 571 and 519.01 will not be allowed.

Petroleum Engineering 573 3 units; (3-1T)**Tight Oil and Unconventional Gas Exploitation**

Overview of tight oil and unconventional gas resources (tight gas, shale gas, tight oil, shale oil, coal bed methane, and natural gas hydrates) in a 'Total Petroleum System'. Geological aspects, drilling, completion and stimulation methods; reservoir characterization by petrophysics and well test analysis; forecasting methods; environmental and regulatory issues; economics and cost drivers.

Prerequisite(s): Petroleum Engineering 429 or 523.

Antirequisite(s): Credit for Petroleum Engineering 573 and 519.02 will not be allowed.

Graduate Courses**Petroleum Engineering 621** 3 units; (3-1)**Applied Reservoir Engineering**

Basic reservoir engineering principles including fluid flow in porous media, rock and fluid properties; estimation of recovery under different operating conditions.

Note: This course does not count towards the degree requirements of MSc and PhD students.

Petroleum Engineering 622 3 units; (3-1)**Subsurface Production Operations**

Analysis of fluid flow from the formation to the surface including inflow performance, wellbore hydraulics, multiphase flows and well stimulation techniques.

Note: This course does not count towards the degree requirements of MSc and PhD students.

Petroleum Engineering 623 3 units; (3-1)**Reservoir Analysis and Description**

Data analysis and integration for reservoir modelling and simulation.

Note: This course does not count towards the degree requirements of MSc and PhD students.

Petroleum Engineering 624 3 units; (3-1)**Enhanced Oil Recovery**

Introduction to water and polymer flooding, miscible displacements and surfactant flooding with focus on case studies.

Note: This course does not count towards the degree requirements of MSc and PhD students.

Petroleum Engineering 625 3 units; (3-0)**Natural Gas Engineering**

Basic principles of natural gas production and processing including properties of natural gases, vapour-liquid equilibrium and separation techniques.

Note: This course does not count towards the degree requirements of MSc and PhD students.

Petroleum Engineering 626 3 units; (3-0)**Economic Analysis of Petroleum Systems**

Basic principles of analyzing the profitability and risk of petroleum projects including project selection, investment ranking, budgeting and portfolio development.

Antirequisite(s): Credit for Petroleum Engineering 626 and Chemical Engineering 687 will not be allowed.

Petroleum Engineering 627 **3 units; (3-0)**

Drilling Engineering

Overview of modern drilling technologies and techniques including drilling hydraulics, directional drilling, drilling fluid properties and selection, well control and completion methods.

Antirequisite(s): Credit for Petroleum Engineering 627 and either Chemical Engineering 689 or Chemical Engineering 619.91 will not be allowed.

Philosophy PHIL

For more information about these courses, see the Department of Philosophy website: <https://phil.ucalgary.ca/>.

Junior Courses

Philosophy 201 **3 units; (3-1T) or (3-0)**

Mind, Matter and God

An introduction to philosophy through discussion of selected topics such as skepticism, perception, personal identity, free will and determinism, God.

Philosophy 249 **3 units; (3-1T) or (3-0)**

Morality, Virtue and Society

An introduction to philosophy through discussion of morality, virtue and the role of morality in society.

Philosophy 259 **3 units; (3-1T) or (3-0)**

Sex, Love and Death

Topics to be addressed may include the nature of sex, love, and death, the relation between sex and love, sexual ethics, sexual perversion, sexual harassment and pornography, abortion, suicide, euthanasia and the value of life.

Philosophy 264 **3 units; (3-1T) or (3-0)**

How Do We Know?

An investigation of belief, knowledge, and error in everyday life and the sciences, including discussion of the nature of knowledge; patterns of valid reasoning and sources of error; the influence of bias on belief and knowledge; scientific reasoning and theory building; the distinction between science and pseudo-science.

Philosophy 279 **3 units; (3-1T) or (3-0)**

Logic I

Sentential and first-order logic from both deductive and semantic points of view. Some elementary metatheorems.

Antirequisite(s): Credit for Philosophy 279 and 377 will not be allowed.

Senior Courses

Philosophy 301 **3 units; (3-0)**

The Classical Period

The study of a selection of philosophers from the Pre-Socratics, through Plato and Aristotle, to the Hellenistic and Roman philosophers.

Philosophy 303 **3 units; (3-0)**

The Medieval and Renaissance Period

The study of a selection of philosophers from Augustine to Montaigne, such as Boethius, Abelard, Ibn Rushd, Maimonides, Aquinas, Ockham, and Erasmus.

Philosophy 305 **3 units; (3-0)**

The Seventeenth and Eighteenth Centuries

The study of a selection of philosophers from Descartes to Kant.

Philosophy 307 **3 units; (3-0)**

Nineteenth- or Twentieth-Century Analytic Philosophy

A study of some major analytic philosophers, such as Frege, Russell, Moore, Wittgenstein, Carnap, Marcus, Kripke, and/or Quine.

Philosophy 309 (formerly Philosophy 369) **3 units; (3-0)**

Hegel to Nietzsche

A study of nineteenth-century European philosophers, such as Fichte, Schelling, Hegel, Feuerbach, Marx, Kierkegaard, Schopenhauer and/or Nietzsche.

Philosophy 311 (formerly Philosophy 469) **3 units; (3-0)**

Twentieth-Century Continental Philosophy

A study of twentieth-century Continental philosophers such as Husserl, Heidegger, Sartre, Merleau-Ponty, Adorno, Marcuse, Habermas, Foucault, Derrida, Kristeva and/or Irigaray.

Philosophy 313 **3 units; (3-0)**

Bioethics

A critical and analytical examination of ethical and legal problems arising in and about health care. May include euthanasia, abortion, the conditions for the withdrawal of treatment, the physician-patient relationship, research on human subjects, genetic engineering. The practical applications of ethical and legal theory are emphasized.

Philosophy 314 **3 units; (3-1T) or (3-0)**

Information Technology Ethics

A critical and analytical examination of ethical and legal problems arising in and about information technology. May include hacking, online privacy, intellectual property rights, artificial intelligence, globalization and regulation issues, cheating in online games, and others.

Philosophy 315 **3 units; (3-0)**

Philosophy in Literature

Introduction to various philosophical problems, theories and points of view as found in works of literature from classical times to the present. Authors may include Homer to Orwell and Huxley.

Philosophy 317 **3 units; (2-3) or (3-0)**

Philosophy and Film

Introduction to various philosophical problems, theories and points of view as found in works of film.

Philosophy 325 **3 units; (3-0)**

Law and Morality

An introduction to legal and political philosophy including the relation between law and morality, the nature of legal authority and political and social theory.

Antirequisite(s): Credit for Philosophy 325 and 319 will not be allowed.

Philosophy 329 **3 units; (3-0)**

Business Ethics

A critical and analytical examination of some central moral problems that arise in and for business with emphasis on the details of the particular problems studied and the conceptual and other tools needed to understand and resolve or solve such problems. May include the moral responsibilities and rights of corporations and their officers, codes of business ethics, and conflicts of responsibilities and rights.

Philosophy 330 **3 units; (3-0)**

Philosophy of Money

An examination of the historical and contemporary philosophical issues surrounding money, such as metaphysics of value, the justice of wealth distribution, and the ethics of wealth and charity.

Antirequisite(s): Credit for Philosophy 330 and 399.02 will not be allowed.

Philosophy 331 **3 units; (3-0)**

Philosophy of Religion

A philosophical examination of the fundamental concepts of religious thinking.

Prerequisite(s): Religious Studies 205 or a previous course in Philosophy.

Philosophy 333 **3 units; (3-0)**

Aesthetics

An examination of the criteria and concepts employed in aesthetic evaluation.

Philosophy 335 **3 units; (3-0)**

Asian Philosophy

Considers traditional philosophical topics such as metaphysics, epistemology, logic, ethics, aesthetics, political philosophy, and environmental philosophy as they are dealt with in Asian traditions or texts, as well as topics that are more specific to Asian traditions, such as actionless action, sagehood, karma, rebirth, enlightenment/liberation, egoism, and attachment.

Philosophy 337 **3 units; (3-0)**

Philosophy, Feminism and Gender

Study of social and political issues arising from philosophical considerations of gender including the intersection of gender and race with attention to feminist analyses of gender. May include feminist methodology as well as gender issues in such areas as knowledge and science, language, ethics and political theory.

Philosophy 345 (formerly Philosophy 447) **3 units; (3-0)**

Issues in Environmental Ethics

A philosophical examination of how humans conduct themselves in relation to other living species and the natural environment. May include: obligations to future generations; animal liberation theories; population policy; pollution; the value of species diversity and species preservation; biocentric and holistic ethical theories of environment; ethical dimension of environmental policy formation.

Philosophy 347 **3 units; (3-0)**

Contemporary Moral Problems

A critical and analytical examination of current moral issues, such as authority, religion in society, suicide, sexual morality, abortion, the legal enforcement of morality, justice.

Philosophy 359 **3 units; (3-0)**

Existentialism

An investigation of existentialist treatments of agency, religion, subjecthood, death, and despair. May include Kierkegaard, Nietzsche, Dostoevsky, Camus, Kafka, Sartre, and de Beauvoir.

Philosophy 361 **3 units; (3-0)**

Evidence

An investigation of philosophical perspectives on evidence, such as the nature of evidence, whether and how much evidence is required for reasonable belief and action, what sort of evidence

might be required for moral, scientific, religious, or mathematical belief, and the role of evidence in medical, legal, political, and social contexts.

Philosophy 367 **3 units; (3-0)**

Science and Philosophy

Examination of the fundamental principles of scientific enquiry, such as scientific explanation, theory, prediction and confirmation.

Philosophy 377 **3 units; (3-0)**

Elementary Formal Logic

Sentential and first-order logic, with identity and descriptions, from both deductive and semantic points of view. Completeness, compactness, decidability for sentential logic.

Antirequisite(s): Credit for Philosophy 377 and 279 will not be allowed.

Philosophy 379 **3 units; (3-0)**

Logic II

Introduction to the metatheory of logical systems. Completeness, compactness, Löwenheim-Skolem, and undecidability theorems for first-order logic. Preview of non-standard models, second-order logic, and Gödel's first incompleteness theorem.

Prerequisite(s): Philosophy 279 or 377.

Philosophy 383 **3 units; (3-0)**

Philosophy and Psychology

A study of topics such as: thought, emotions, action and the will, mind-body identity, personal identity, and theories about the nature of mind.

Antirequisite(s): Credit for Philosophy 383 and 381 will not be allowed.

Philosophy 395 **3 units; (3-0)**

Mind and World

An intensive study of selected topics in philosophy of mind, metaphysics and epistemology. Intended for philosophy majors, including students in the history and philosophy of science program.

Prerequisite(s): Admission to the Philosophy major and consent of the department.

Philosophy 397 **3 units; (3-0)**

Value Theory

An intensive study of selected topics in value theory.

Prerequisite(s): Admission to the BA or BA Honours in Philosophy or in Religious Studies and Applied Ethics and consent of the Department.

Philosophy 399 **3 units; (3-0)**

Topics in Philosophy

A detailed examination of a topic or tradition in European or Anglo-American philosophy.

MAY BE REPEATED FOR CREDIT

Philosophy 401 **3 units; (3-0)**

A Classical Philosopher

A study of the writings of a philosopher from the classical period.

Prerequisite(s): Two previous courses in philosophy one of which must be Philosophy 301, 303, 305, 307, 309 or 311.

MAY BE REPEATED FOR CREDIT

Philosophy 403 **3 units; (3-0)**

A Medieval or Renaissance Philosopher

A study of the writings of a philosopher from the medieval or renaissance period.

Prerequisite(s): Two previous courses in Philosophy one of which must be Philosophy 301, 303, 305, 307, 309 or 311.

MAY BE REPEATED FOR CREDIT

Philosophy 405 **3 units; (3-0)**

A Seventeenth- or Eighteenth-Century Philosopher

A study of the writings of a seventeenth- or eighteenth-century philosopher.

Prerequisite(s): Two previous courses in Philosophy, one of which must be Philosophy 301, 303, 305, 307, 309 or 311.

MAY BE REPEATED FOR CREDIT

Philosophy 407 **3 units; (3-0)**

A Nineteenth- or Twentieth-Century Philosopher

A study of the writings of a nineteenth- or twentieth-century philosopher.

Prerequisite(s): Two previous courses in Philosophy, one of which must be Philosophy 301, 303, 305, 307, 309 or 311.

MAY BE REPEATED FOR CREDIT

Philosophy 408 **3 units; (3-0)**

A Philosopher in the Continental Tradition - Nineteenth Century to Present

A study of the writings of a philosopher from the European tradition, emphasizing the influences of and on other philosophers and movements within the tradition.

Prerequisite(s): One of Philosophy 309, 311, 333, 359 or Religious Studies 363 and an additional 3 units in Philosophy.

MAY BE REPEATED FOR CREDIT

Philosophy 411 **3 units; (3-0)**

Topics in the History of Philosophy

An investigation of a historical theme or movement in philosophy.

Prerequisite(s): Two previous courses in Philosophy one of which must be Philosophy 301, 303, 305, 307, 309 or 311.

MAY BE REPEATED FOR CREDIT

Philosophy 412 **3 units; (3-0)**

Contemporary Continental Philosophy

An investigation of contemporary themes or movements in Continental philosophy.

Prerequisite(s): One of Philosophy 309, 311, 333, 359, or Religious Studies 363 and an additional 3 units in Philosophy.

Philosophy 423 **3 units; (3-0)**

Metaphysics

An examination of some central topics in metaphysics.

Prerequisite(s): Two previous courses in Philosophy, at least one of which must be at the 300 level, or higher, and one of which must be 201 or 395.

Antirequisite(s): Credit for Philosophy 423 and 421 will not be allowed.

Philosophy 425 **3 units; (3-0)**

Philosophy of Law

An investigation of philosophical accounts of the nature of law and legal systems including central positions in jurisprudence, such as natural law, legal realism and legal positivism; and relations between law and morality.

Prerequisite(s): Two previous courses in Philosophy, at least one of which must be at the 300 level, or higher, and one of which must be Philosophy 249, 325 or 397.

Antirequisite(s): Credit for Philosophy 425 and 319 will not be allowed.

Philosophy 449 **3 units; (3-0)**

Contemporary Meta-Ethics

A study of recent theories about the meaning of moral terms, the nature of moral reasoning, and the relations between facts and values. May include naturalism, intuitionism, emotivism, prescriptivism, and nihilism.

Prerequisite(s): Two previous courses in Philosophy, at least one of which must be at the 300 level, or higher, and one of which must be Philosophy 249 or 397.

Philosophy 451 **3 units; (3-0)**
 (formerly Philosophy 349)

Contemporary Ethical Theories

A detailed investigation of some central normative ethical theories, including utilitarian, contractarian, and deontological theories.

Prerequisite(s): Two previous courses in Philosophy, at least one of which must be at the 300 level or higher, and one of which must be either Philosophy 249 or 397.

Philosophy 453 **3 units; (3-0)**

Social and Political Philosophy

A study of fundamental issues in social and political thought, such as rights, justice, authority, equality, freedom, democracy, property, liberalism, communitarianism, socialism, and Marxism.

Prerequisite(s): Two previous courses in Philosophy, at least one of which must be at the 300 level, or higher, and one of which must be Philosophy 249 or 397.

Philosophy 461 **3 units; (3-0)**

Epistemology

An examination of some central topics in the theory of knowledge.

Prerequisite(s): Two previous courses in Philosophy, at least one of which must be at the 300 level, or higher, and one of which must be Philosophy 201 or 395.

Antirequisite(s): Credit for Philosophy 461 and 463 will not be allowed.

Philosophy 467 **3 units; (3-0)**

Problems in the Philosophy of Science

An examination of the central methodological and foundational issues arising in the sciences.

Prerequisite(s): Two previous courses in Philosophy one of which must be Philosophy 275, 279 or 377 and one of which must be Philosophy 201 or 395.

Philosophy 471 **3 units; (3-0)**
 (formerly Philosophy 371)

Philosophy of Language

An examination of some central topics in the philosophy of language.

Prerequisite(s): Philosophy 279 or 377.

Philosophy 473 3 units; (3-0)

Philosophy of Logic

An examination of some central topics in the philosophy of logic.

Prerequisite(s): Philosophy 279 or 377.

Philosophy 479 3 units; (3-0)

Logic III

Advanced metatheory for logical systems. Gödel's incompleteness theorems, models of arithmetic, and definability.

Prerequisite(s): Philosophy 379.

Philosophy 483 3 units; (3-0)

Philosophy of Mind

An examination of some central topics in the philosophy of mind.

Prerequisite(s): Two previous courses in Philosophy, at least one of which must be at the 300 level, or higher, and one of which must be Philosophy 201 or 395.

Antirequisite(s): Credit for Philosophy 483 and 481 will not be allowed.

Philosophy 499 3 units; (3-0)
(formerly Philosophy 409)

Topics in Philosophy

An intensive study of a selected topic in Philosophy.

Prerequisite(s): Two previous courses in Philosophy, at least one of which is at the 300 level.

MAY BE REPEATED FOR CREDIT

Philosophy 501 3 units; (3-0)

Advanced Topics in Ancient or Medieval Philosophy

An investigation into central issues in ancient or medieval philosophy.

Prerequisite(s): 6 units in Philosophy, at least one of which must be a course in the History of Philosophy and one of which must be at the 400 level or higher.

MAY BE REPEATED FOR CREDIT

Philosophy 505 3 units; (3-0)

Advanced Topics in Modern Philosophy

An investigation of central issues in modern philosophy.

Prerequisite(s): Two previous courses in Philosophy, at least one of which must be a course in the History of Philosophy and one of which must be at the 400 level, or higher.

MAY BE REPEATED FOR CREDIT

Philosophy 507 3 units; (3-0)

Advanced Topics in Nineteenth- or Twentieth-Century Philosophy

An investigation of central issues in nineteenth- and twentieth-century philosophy.

Prerequisite(s): Two previous courses in philosophy at least one of which must be a course in the History of Philosophy and at least one of which must be at the 400 level.

MAY BE REPEATED FOR CREDIT

Philosophy 517 3 units; (3-0)

Advanced Topics in the History and Philosophy of Science

An intensive investigation of one or more issues in the history and philosophy of science.

Prerequisite(s): Two previous courses in Philosophy, one of which must be Philosophy 201, 395, 421, 423, 461, 463, 467, 481 or 483 and one of which must be at the 400 level, or higher.

MAY BE REPEATED FOR CREDIT

Philosophy 519 3 units; (3-0)
(Linguistics 519)

Formal Semantics of Natural Language

Central issues in the logical semantics of natural language, focusing on topics such as quantification, scope, and the interpretation of pronouns.

Prerequisite(s): Philosophy 279 or 377. Philosophy 371 or Linguistics 319 recommended.

Antirequisite(s): Credit for Philosophy 519 and Linguistics 509 will not be allowed.

Philosophy 523 3 units; (3-0)

Advanced Topics in Metaphysics

An investigation of one or more issues in metaphysics.

Prerequisite(s): Two previous courses in philosophy at least one of which must be at the 400 level and one of which must be one of Philosophy 201, 395, 421, 423, 461, 463, 467, 481, or 483.

MAY BE REPEATED FOR CREDIT

Philosophy 525 3 units; (3-0)

Advanced Topics in Philosophy of Law

An intensive investigation of one or more issues in the philosophy of law.

Prerequisite(s): Two previous courses in Philosophy, one of which must be Philosophy 249, 397, 425, 449 or 453 and at least one of which must be at the 400 level, or higher.

MAY BE REPEATED FOR CREDIT

Philosophy 527 3 units; (3-0)

Advanced Topics in the Philosophy of Religion

An investigation of one or more issues in the philosophy of religion.

Prerequisite(s): Two previous courses in Philosophy at least one of which must be at the 400 level.

MAY BE REPEATED FOR CREDIT

Philosophy 547 3 units; (3-0)

Advanced Topics in Applied Ethics

An intensive investigation of one or more issues in applied ethics.

Prerequisite(s): Two previous courses in Philosophy, one of which must be Philosophy 249, 397, 425, 449 or 453 and at least one of which must be at the 400 level, or higher.

MAY BE REPEATED FOR CREDIT

Philosophy 549 3 units; (3-0)

Advanced Topics in Ethics

An intensive investigation of one or more issues in normative ethical theory or meta-ethics.

Prerequisite(s): Two previous courses in Philosophy, one of which must be Philosophy 249, 397, 425, 449 or 453 and at least one of which must be at the 400 level, or higher.

MAY BE REPEATED FOR CREDIT

Philosophy 553 3 units; (3-0)

Advanced Topics in Political Philosophy

An intensive investigation of one or more issues in political philosophy.

Prerequisite(s): Two previous courses in Philosophy, one of which must be 249, 397, 425, 449 or 453 and at least one of which must be at the 400 level, or higher.

MAY BE REPEATED FOR CREDIT

Philosophy 561 3 units; (3-0)

Advanced Topics in Epistemology

An investigation of one or more issues in epistemology

Prerequisite(s): Two previous courses in Philosophy at least one of which must be at the 400 level and one of which must be one of Philosophy 201, 395, 421, 423, 461, 463, 467, 481 or 483.

MAY BE REPEATED FOR CREDIT

Philosophy 565 3 units; (3-0)

Philosophical Topics in the Sciences

A study of philosophical issues arising in a particular area of science, such as philosophy of biology, philosophy of social sciences, and philosophy of physics.

Note: This course is intended for students who have already done advanced work either in philosophy or in one of the sciences.

MAY BE REPEATED FOR CREDIT

Philosophy 567 3 units; (3-0)

Advanced Topics in Philosophy of Science

An intensive study of one or more issues in the philosophy of science.

Prerequisite(s): Two previous courses in Philosophy, one of which must be 201, 395, 421, 423, 461, 463, 467, 481 or 483 and one of which must be at the 400 level, or higher.

MAY BE REPEATED FOR CREDIT

Philosophy 571 3 units; (3-0)

Advanced Topics in Philosophy of Logic and Philosophy of Language

An intensive study of one or more issues in the philosophy of logic or language

Prerequisite(s): Two previous courses in Philosophy, one of which must be either Philosophy 279 or 377, and one of which must be at the 400 level, or higher.

MAY BE REPEATED FOR CREDIT

Philosophy 579 3 units; (3-0)

Advanced Topics in Logic

An investigation of one or more issues in logic.

Prerequisite(s): Philosophy 279 or 377.

MAY BE REPEATED FOR CREDIT

Philosophy 583 3 units; (3-0)

Advanced Topics in Philosophy of Mind

An investigation of one or more issues in philosophy of mind

Prerequisite(s): Two previous courses in philosophy at least one of which must be at the 400 level and one of which must be one of Philosophy 201, 395, 421, 423, 461, 463, 467, 481 or 483.

MAY BE REPEATED FOR CREDIT

Philosophy 590 6 units; (0-3)

Honours Thesis

A year-long development of the honours thesis, under close supervision of a faculty member.

Prerequisite(s): Admission to the Honours program and consent of the Department.

Philosophy 595 3 units; (3-0)

Directed Reading

Directed reading for students in their third or fourth years.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Philosophy 597 3 units; (3S-0)

Honours Seminar

An introduction to the writing of the honours thesis, in which all those enrolled in the Philosophy 590 share their work with each other.

Prerequisite(s): Consent of the Department.

Corequisite(s): Philosophy 590.

Philosophy 599 3 units; (3-0)

(formerly Philosophy 589)

Advanced Topics in Philosophy

An in-depth investigation into a selected topic in Philosophy.

Prerequisite(s): Two previous courses in Philosophy, at least one of which must be at the 400 level or above.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Philosophy 601 3 units; (3-0)

Seminar in Selected Problems

MAY BE REPEATED FOR CREDIT

Philosophy 603 3 units; (3-0)

Graduate Proseminar

Philosophy 609 3 units; (3-0)

Topics in the History of Philosophy

MAY BE REPEATED FOR CREDIT

Philosophy 623 3 units; (3-0)

(formerly Philosophy 621)

Topics in Metaphysics

MAY BE REPEATED FOR CREDIT

Philosophy 627 3 units; (3-0)

Topics in the Philosophy of Religion

MAY BE REPEATED FOR CREDIT

Philosophy 649 3 units; (3-0)

Topics in Ethics

MAY BE REPEATED FOR CREDIT

Philosophy 653 3 units; (3-0)

Topics in Social and Political Philosophy

MAY BE REPEATED FOR CREDIT

Philosophy 661 3 units; (3-0)

(formerly Philosophy 663)

Topics in Epistemology

MAY BE REPEATED FOR CREDIT

Philosophy 667 3 units; (3-0)

Topics in Philosophy of Science

MAY BE REPEATED FOR CREDIT

Philosophy 671 3 units; (3-0)

Topics in Philosophical Logic and the Philosophy of Language

MAY BE REPEATED FOR CREDIT

Philosophy 677 3 units; (3-0)

Metalogic

Introduction to the metatheory of logical systems. Completeness, compactness, Loewenheim-Skolem, and undecidability theorems for first-order logic. Preview of non-standard models, second-order logic, and Godel's first incompleteness theorem.

NOT INCLUDED IN GPA

Philosophy 679 3 units; (3-0)

Topics in Logic

MAY BE REPEATED FOR CREDIT

Philosophy 683 3 units; (3-0)

(formerly Philosophy 681)

Topics in the Philosophy of Mind

MAY BE REPEATED FOR CREDIT

Philosophy 691 3 units; (3-0)

Topics in Philosophical Analysis

MAY BE REPEATED FOR CREDIT

Philosophy 695 3 units; (3-0)

Graduate Directed Reading

MAY BE REPEATED FOR CREDIT

Philosophy 699 3 units; (3S-0)

Master's Research and Professional Development

Students develop relevant skills for a successful academic or non-academic career. Topics include research and thesis writing strategies, presentation skills, preparing writing samples and articles for publication, teaching development including teaching portfolios, research statements, and CVs.

NOT INCLUDED IN GPA

Philosophy 700 3 units; (3S-0)

Doctoral Research and Professional Development

Students develop relevant skills for a successful academic or non-academic career. Topics include research and thesis writing strategies, presentation skills, preparing writing samples and articles for publication, teaching development including teaching portfolios, research statements, and CVs.

NOT INCLUDED IN GPA

Physical Education PHED

For more information about these courses, see the Faculty of Kinesiology: ucalgary.ca/knes.

Senior Courses

Physical Education 321 3 units; (1-3)

Games I

Games and sports suited to the needs of children and youth in schools.

Prerequisite(s): Kinesiology 201, 321 and admission to the Leadership in Pedagogy and Coaching Major.

Physical Education 333 3 units; (1-3)

Gymnastics and Track and Field

Dominant movement patterns in gymnastic activities and the run-jump-throw skills of track and field.

Prerequisite(s): Kinesiology 201 and 321 and admission to the Leadership in Pedagogy and Coaching Major.

Physical Education 349 3 units; (1-3)

Activities in Alternative Environments

Fundamental principles of creating an effective learning environment in the school Physical Education Alternative Environments setting (K to Grade 12).

Prerequisite(s): Kinesiology 201 and admission to the Leadership in Pedagogy and Coaching Major.

Corequisite(s): Kinesiology 321.

Physics PHYS

For more information about these courses contact the Department of Physics and Astronomy phas. ucalgary.ca/.

Module for First Year and First Term Second Year Physics Courses

Physics 106 0.75 units; (12 hours)

Module M6 Thermal Physics

Thermal Physics. Gas laws; kinetic theory of gases; temperature; internal energy; specific heat; energy transfer; laws of thermodynamics; PVT diagrams.

Prerequisite(s): Consent of the Department.

Note: Taught as part of Physics 223. Contact the instructor in Physics 223 regarding the schedule.

Junior Courses

Physics 211 3 units; (4-2)

Mechanics

Introductory Newtonian particle mechanics and rigid bodies in rotational equilibrium: Kinematics, Newton's laws, conservation of momentum and mechanical energy.

Prerequisite(s): Mathematics 30-1 or Mathematics 2 (offered by Continuing Education). Note: Physics 30 is recommended as preparation for Physics 211.

Antirequisite(s): Credit for Physics 211 and 221 will not be allowed. Students may not register in, or have credit for, Physics 211 if they have previous credit for Physics 227 or are concurrently enrolled in Physics 227.

Note: Physics 211 and 221 differ in their prerequisites, but cover the same material and have the same examinations and tutorial quizzes. Physics 211 has an extra lecture hour per week to deal with certain topics from High School Physics and Mathematics 31. Mathematics 31 is recommended.

Physics 221 3 units; (3-2)

Mechanics

Introductory Newtonian particle mechanics and rigid bodies in rotational equilibrium: Kinematics,

Newton's laws, conservation of momentum and mechanical energy.

Prerequisite(s): A grade of 70 per cent or higher in Physics 30; 50 per cent or higher in Mathematics 31; and 70 per cent or higher in Mathematics 30-1 or a grade of "B-" or 70 per cent or better in Mathematics 2 (offered by Continuing Education).

Antirequisite(s): Credit for Physics 221 and 211 will not be allowed. Students may not register in, or have credit for, Physics 221 if they have previous credit for Physics 227 or are concurrently enrolled in Physics 227.

Physics 223 **3 units; (3-3)**

Introductory Electromagnetism, and Thermal Physics

Electrical forces and energy. Static electric fields due to point charges. Parallel-plate capacitor. Simple DC circuits. Lorentz force. Static magnetic fields generated by electric currents. Electromagnetic induction. Gas Laws; kinetic theory of gases; temperature, thermal energy, specific heat; energy transfer; laws of thermodynamics; PVT diagrams.

Prerequisite(s): Physics 211 or 221 or 227.

Physics 227 **3 units; (3-2T-2)**

Classical Physics

Vector algebra; statics and kinematics of rigid bodies; Newton's laws of motion; conservation laws; collisions; rotational mechanics; computer modeling of physical systems; approximation methods.

Prerequisite(s): A grade of 75 per cent or higher in Physics 30; 60 per cent or higher in Mathematics 31; and 75 per cent or higher in Mathematics 30-1 or a grade of "B" or 70 per cent or better in Mathematics 2 (offered by Continuing Education) and admission to Physics, Astrophysics, Chemical Physics, Chemistry, Natural Science (Physics Concentration), or Environmental Science (Physics Concentration); or Mathematics 275 and Physics 211 or 221.

Antirequisite(s): Credit for Physics 227 and 321 will not be allowed.

Note: Natural Sciences students without approved concentrations who are interested in concentrating in Physics should contact the Department for approval.

Physics 229 **3 units; (3-3)**
(formerly Physics 325)

Modern Physics

Origins of quantum mechanics. Wave mechanics and applications. Nuclear physics and radioactivity. Special Theory of Relativity.

Prerequisite(s): Physics 211 or 221 or 227; and Mathematics 249 or 265 or 275.

Physics 259 **3 units; (4-2)**

Electricity and Magnetism (for students in Engineering)

Electric and magnetic fields related to charges and current through Maxwell's equations. Energy stored in fields, potential energy, and voltage. Conductors, insulators, and dielectrics. Resistance, capacitance, and inductance with applications to RC/RL circuits.

Prerequisite(s): Mathematics 265 or 275 and Mathematics 211.

Antirequisite(s): Credit for Physics 259 and any of 255, 323 or 355 will not be allowed.

Physics 271 **3 units; (3-0)**

How Things Work

Physics behind many common devices will be discussed. Topics will be chosen from among the following: the use of simple and compound

machines; waves, sound, acoustics; light and optics; household electric circuitry; magnetism.

Antirequisite(s): Credit for Physics 271 and any 200-level Physics course will not be allowed.

Note: Not intended for Physics majors, Natural Science Physics Concentrators, or Environmental Science Physics Concentrators. Will not count as part of the Field of Physics.

Senior Courses

Physics 303 **3 units; (3-0)**

Quantum Mysteries and Paradoxes

Aims to explain basic quantum phenomena for students outside the physical sciences. Topics covered may include wave-particle duality, quantum interference, as well as the paradoxes of entanglement and quantum nonlocality. Applications such as quantum cryptography and quantum teleportation are discussed, as are the philosophical interpretations of the quantum picture of the world.

Note: Not intended for Physics majors and will not count in the field of Physics.

Physics 321 **3 units; (3-2T)**

Harmonic Motion, Waves, and Rotation

Simple harmonic oscillations. Progressive waves in one dimension. Energy of a wave. Superposition. Standing waves. Newtonian mechanics of rigid body rotation.

Prerequisite(s): Physics 211 or 221 and Mathematics 211 or 213 and Mathematics 267 or 277.

Antirequisite(s): Credit for Physics 321 and 227 will not be allowed.

Physics 323 **3 units; (3-3/2)**

Optics and Electromagnetism

Static electric fields due to charge distributions. Static magnetic fields due to current distributions. Time-dependent behaviour of capacitors and inductances. Geometrical optics: Thin lenses and curved mirrors. Physical optics: Interference and diffraction.

Prerequisite(s): Physics 211 or 221 or 227 and 223; Mathematics 249 or 265 or 275.

Antirequisite(s): Credit for Physics 323 and any of 255, 259 or 355 will not be allowed.

Physics 341 **3 units; (3-3/2)**

Classical Mechanics I

Conservative and non-conservative forces; forced and damped harmonic oscillations; phase-space analysis; central force motion and scattering; non-inertial frames; applications of ordinary differential equations.

Prerequisite(s): Physics 227 or 321 or a grade of "A-" or higher in either Physics 211 or 221; and Mathematics 211 or 213; and one of Mathematics 267 or 277.

Physics 343 **3 units; (3-0)**

Classical Mechanics II

Lagrangian and Hamiltonian mechanics; general rotations of rigid bodies; moment of inertia tensor; eigenvalues and eigenvectors; perturbation theory; applications to multiple-particle systems.

Prerequisite(s): Physics 341.

Physics 355 **3 units; (3-3/2)**
(formerly Physics 255)

Electromagnetic Theory I

Electrostatics, DC circuits, calculation of magnetic intensity from currents, motion of charged particles

in electric and magnetic fields, electromagnetic induction, transient effects in capacitors and inductors, electric and magnetic properties of materials.

Prerequisite(s): Physics 227 and Mathematics 375 or 376.

Physics 365 **3 units; (3-3/2)**

Acoustics, Optics and Modern Physics (for students in Engineering)

Wave motion as applied to acoustics and physical optics. Wave-particle duality applied to light and matter; electron energy levels of atoms and crystals.

Prerequisite(s): Mathematics 277; and Physics 259.

Antirequisite(s): Credit for Physics 365 and 369 will not be allowed.

Note: Required for Electrical Engineering students. Open to all other engineering students, excluding geomatics.

Physics 369 **3 units; (3-3/2)**

Acoustics, Optics and Radiation (for students in Engineering)

Wave motion as applied to acoustics, geometric and physical optics, and radiant energy transfer. Traditional and modern applications.

Prerequisite(s): Mathematics 277 and Physics 259.

Antirequisite(s): Credit for Physics 369 and 365 will not be allowed.

Note: Required for Geomatics Engineering students. Open to all other engineering students, excluding electrical.

Physics 371 **3 units; (3-0)**

Introduction to Energy

Energy and power will be discussed. Sources of energy such as wind power, solar power, nuclear power, geothermal energy and fossil fuels and related limitations will be considered. Generation and distribution of electricity will be discussed.

Note: Not intended for Physics majors and will not count in the field of Physics.

Physics 375 **3 units; (3-3/2)**

Introduction to Optics and Waves

Geometrical Optics: lenses, mirrors, and other basic optical components. Wave motion. Description of light as a wave. Fermat's principle. Refraction, scattering, interference, diffraction, and polarization. Optical instruments (including telescopes and microscopes). Lasers and fibre optics if time allows.

Prerequisite(s): Physics 227 and Mathematics 267 or 277.

Physics 381 **3 units; (1-3)**

Computational Physics I

Working with floating point numbers, root finding, multivariate numerical integration, numerical solutions of coupled ordinary differential equations, least-squares fitting linear and non-linear models.

Prerequisite(s): Physics 341 and one of Computer Science 217, 231 or Data Science 211.

Physics 397 **3 units; (2-1T-3)**

Applied Physics Laboratory I

Basic laboratory electronics, vacuum systems, and optical devices. Introduction to experimental control, data collection, and analysis. Fundamentals of error analysis and error propagation.

Prerequisite(s): Physics 227 and 229.

Physics 435 **3 units; (3-0)****Mathematical Methods in Physics**

Partial differential equations. Fourier analysis. Laplace Transforms. Special functions and orthogonal polynomials. Complex analysis. Applications in Physics and Astronomy

Prerequisite(s): Physics 343, Mathematics 211; and Mathematics 375 or 376; and Mathematics 367 or 377.

Antirequisite(s): Credit for Physics 435 and Mathematics 433 will not be allowed.

Physics 443 **3 units; (3-0)****Quantum Mechanics I**

Basic concepts of quantum systems and their physical interpretation. Operator, matrix, and wave mechanics. Dirac notation. Schrödinger's time-independent and time-dependent equations. Applications.

Prerequisite(s): Physics 229 or 325; and 343; and Mathematics 311; and Mathematics 433 or Physics 435; and Mathematics 375 or 376; and Mathematics 367 or 377.

Physics 449 **3 units; (3-1T-0)****Statistical Mechanics I**

State-counting; classical distributions and probability theory; origins and role of entropy; equilibrium; ensemble theory; concepts of work, heat, and temperature; equations of state; heat capacity; equipartition theorem; engines; laws of thermodynamics; non-equilibrium systems; Maxwell-Boltzmann distribution; thermodynamic potentials.

Prerequisite(s): Physics 229 or 325; and 343; and Mathematics 375 or 376; and Mathematics 367 or 377.

Physics 451 **3 units; (3-0)****Statistical Mechanics II**

Quantum statistical mechanics; bosons and fermions; quantum counting; classical-quantum transition; blackbody radiation; applications of statistical mechanics to phase transitions, critical phenomena and complex systems, Ising model, mean-field theory.

Prerequisite(s): Physics 449.

Physics 455 **3 units; (3-0)****Electromagnetic Theory II**

Macroscopic Maxwell equations. Scalar and vector potentials. Electrostatics and magnetostatics. Dielectric and magnetic properties of materials. Superconductors.

Prerequisite(s): Physics 255 or 355 or 259 or 323; and Mathematics 375 or 376; and Mathematics 367 or 377.

Antirequisite(s): Credit for Physics 455 and Electrical Engineering 475 will not be allowed.

Physics 457 **3 units; (3-0)****Electromagnetic Theory III**

Electromagnetic wave solutions to Maxwell's equations, in vacuum and in insulating and conducting media. Waveguides. Electromagnetic radiation from accelerated charges. Relativistic formulation of electrodynamics.

Prerequisite(s): Physics 455 and one of Physics 435 or Mathematics 433.

Antirequisite(s): Credit for Physics 457 and Electrical Engineering 476 will not be allowed.

Physics 481 **3 units; (1-3)****Computational Physics II**

Random walks, cellular automata, pseudo-random number generation, Monte Carlo methods, numerical solution of ordinary and partial differential equations, introduction to Fourier transforms.

Prerequisite(s): Physics 381; and Mathematics 375 or 376; and Mathematics 367 or 377.

Physics 497 **3 units; (2-6)****Applied Physics Laboratory II**

Intermediate laboratory electronics. AC circuit theory and semiconductor devices, including operational amplifiers. Digital sampling theory and frequency-domain signal processing. Computer automation of experimental control, data collection, and analysis, including error analysis and error propagation.

Prerequisite(s): Physics 397; and Mathematics 433 or Physics 435.

Physics 501 **3 units; (3-0)****Relativity**

Lorentz transformations in classical mechanics; relativistic kinematics; spacetime diagrams; relativistic energy and momentum conservation; Geometrical interpretation; applications of relativistic kinematics; four-vector formalism and tensors; introduction to general relativity; applications.

Prerequisite(s): Physics 455; and Mathematics 375 or 376; and Mathematics 367 or 377.

Physics 507 **3 units; (3-0)****Solid State Physics**

Crystal structure. Classification of solids and their bonding. Fermi surface. Elastic, electric and magnetic properties of solids.

Prerequisite(s): Physics 443 or Chemistry 373; and Physics 449 and 455.

Physics 509 **3 units; (3-0)****Plasma Physics**

Occurrence of plasmas in nature, single particle motion, plasmas as fluids, waves in plasmas, diffusion, resistivity, equilibrium and stability, kinetic theory of plasmas, non-linear effects.

Prerequisite(s): Physics 343 and 455.

Physics 521 **3 units; (3-0)****Non-linear Dynamics and Chaos**

Introduction to non-linear dynamical systems: Phase space representation, bifurcations, normal forms, non-linear oscillators, deterministic chaos, attractors, fractals, universality, renormalization, and synchronization.

Prerequisite(s): Physics 381, 449 and one of Physics 435 or Mathematics 433.

Physics 543 **3 units; (3-0)****Quantum Mechanics II**

Intermediate quantum mechanics. Theory of angular momentum, symmetries, perturbation theory. Identical particles. Applications to atomic physics, spectroscopy. Entanglement.

Prerequisite(s): Physics 443 or Chemistry 373.

Physics 561 **3 units; (3-1)****Stable and Radioactive Isotope Studies, Fundamentals**

A multidisciplinary course. Topics include nucleosynthesis, radioactive decay, isotope exchange

phenomena, kinetic isotope effects, tracer techniques, molecular spectra and instrumentation.

Prerequisite(s): Consent of the Department.

Physics 577 **3 units; (3-0)****Implementations of Quantum Information**

Proposals and realizations of quantum information tasks including quantum computation, quantum communication, and quantum cryptography in optical, atomic, molecular, and solid state systems.

Prerequisite(s): Physics 455, 543; and Mathematics 375 or 376; and Mathematics 367 or 377.

Antirequisite(s): Credit for Physics 577 and 677 will not be allowed.

Physics 581 **3 units; (1-3)**
(formerly Physics 535)**Computational Physics III**

Linear inversion, spectral methods, calling external libraries, data formats, parallelization, numeric and symbolic programming languages.

Prerequisite(s): Physics 481 and Mathematics 433 or Physics 435.

Physics 593 **3 units; (3-0) or (0-6)****Topics in Contemporary Physics**

Topics will be from the research areas of staff members.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT**Physics 597** **3 units; (1-6)****Senior Physics Laboratory**

Selected advanced experiments. Where possible, students may choose those experiments most suited to their interests. Development of technical and computer-based skills, technical writing and presentation skills.

Prerequisite(s): Physics 229 or 325 and 497.

Physics 598 **6 units; (0-9)****Honours Research Thesis**

Each student will be assigned a project in consultation with a supervisor. Written reports and oral presentations are required.

Prerequisite(s): Physics 443 and 449 and 455 and consent of the Department.

Physics 599 **3 units; (0-9)****Senior Research Thesis**

Each student will be assigned a project in consultation with a supervisor. Written reports and oral presentations are required.

Prerequisite(s): Consent of the Department.

Note: A maximum of 6 units may be taken.

MAY BE REPEATED FOR CREDIT**Graduate Courses**

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Physics 603 **3 units; (3-0)****Experimental Methods of Physics**

Instrumentation for physical experiments. General philosophy of experimentation; signal processes; signal processing methods; instrument design and control; data acquisition and storage; specific detection methods.

Physics 605 **3 units; (3-0)**

Advanced Data Analysis

Methods of extraction of significant information from experimental data degraded by noise. Parametric and non-parametric statistical methods; curve fitting; spectral analysis; filtering, sampling, convolution and deconvolution techniques.

Physics 609 **3 units; (3-0)**

Advanced Classical Mechanics

Variational principles, Lagrange's equations, Noether's theorem. Hamilton's equations and canonical transformations. Hamilton-Jacobi theory, action-angle variables. Perturbation theory.

Physics 611 **3 units; (3-0)**

Statistical Physics

Classical and quantum ensemble theory applied to interacting systems: real gases, spin lattices, phase transitions. Kinetic theory: Boltzmann equation, transport processes, irreversible processes and fluctuations.

Physics 613 **3 units; (3-0)**

Electrodynamics

Interaction between charged particles and the electromagnetic field in relativistic formulation. Scattering and energy losses of charged particles. Radiation by charged particles.

Physics 615 **3 units; (3-0)**

Non-Relativistic Quantum Mechanics

Mathematical formalism of quantum mechanics. Topics may include addition of angular momenta, Clebsch-Gordan coefficients, Wigner-Eckart theorem; charged particles in electric and magnetic fields; quantum operators; approximation methods; scattering; quantum nonlocality, Einstein-Podolsky-Rosen paradox, Bell's theorem.

Physics 617 **3 units; (3-0)**

Relativistic Quantum Mechanics

Klein-Gordon and Dirac equations; Dirac spinor and the adjoint spinor; charge (C), parity (P) and (T) transformations and CPT symmetry; relativistic corrections to atomic spectra.

Physics 619 **3 units; (3-0)**

Statistical Physics II

Topics Theories of equilibrium and non-equilibrium critical phenomena and methods to study fluctuating systems selected from the following list of topics: Percolation, scaling theory, phase transitions, Landau-Ginzburg theory, lattice models, Monte Carlo methods, renormalization group, self-organized criticality, theory of random graphs; Brownian motion, random walks and diffusion, Fokker-Planck-Equation, Markov processes, stochastic differential equations, first passage times.

Prerequisite(s): Physics 611.

Physics 621 **3 units; (3-0)**

Nonlinear Dynamics and Pattern Formation

Topics: Introduction to pattern formation and self-organization in nature: Reaction-diffusion systems, hydrodynamical systems, bistable media, excitable and oscillatory media, stability analysis, bifurcations, pattern selection, amplitude equations and normal forms, fronts, traveling waves, topological defects, spiral waves, spatiotemporal chaos, defect-mediated turbulence, spatiotemporal point processes.

Physics 629 **3 units; (3-0)**

Gravitation

An introduction to Einstein's theory of gravitation. Applications to the solar system, black holes, and cosmology.

Physics 663 (Geology 663) **3 units; (2-1)**

Applications of Stable Isotopes

Application of stable isotope techniques with special focus on Hydrogeology, Geology and Environmental Sciences. The use of isotopes to understand the water, carbon, nitrogen and sulphur cycles is demonstrated. Topics include hydrology, paleoclimates, geothermometry, fossil fuels exploration and recovery, pollutant tracing, food webs, forensic investigations, among others.

Prerequisite(s): Consent of the Department.

Physics 671 **3 units; (3-0)**

Atomic and Molecular Spectroscopy

Atomic structure and spectra. Rotational, vibrational and electronic spectra of diatomic molecules, including microwave, infrared, Raman and visible/ultraviolet spectroscopic techniques. Hund's coupling cases. Polyatomic molecular spectroscopy. Examples from astronomy and upper atmosphere/space physics.

Physics 673 **3 units; (3-0)**

Quantum and Non-linear Optics

Theory of dispersion. Fast and slow light. Basics of nonlinear optics. Nonlinear optical crystals, phase matching. Coherence theory. Preparation, manipulation and measurement of quantum optical states and single-photon qubits. Elements of atomic physics, optical Bloch equation, rotating-wave approximation. Two-and three-level systems. Cavity quantum electrodynamics.

Physics 675 **3 units; (3-0)**

Special Topics in Laser and Optical Sciences

Lectures by Physics and Astronomy, Chemistry, Engineering, and/or Medicine staff on current research topics in laser science and modern optical techniques.

MAY BE REPEATED FOR CREDIT

Physics 677 **3 units; (3-0)**

Implementations of Quantum Information

Proposals and realizations of quantum information tasks including quantum computation, quantum communication, and quantum cryptography in optical, atomic, molecular, and solid state systems.

Prerequisite(s): Consent of the Department.

Physics 691 **1.5 units; (2S-0)**

Scientific Communication Skills

Required, multi-component, program of courses for all graduate students in the Department of Physics and Astronomy designed to assist students in improving their scientific oral and written communication skills. Each student must complete a minimum of three terms of Physics 691 during each graduate course, although the normal load is four terms, and additional terms may be required

of students on an as-needed basis. The components of Physics 691 are:

691.11. Effective Scientific Speaking for MSc Students

691.12. Graduate Seminar for MSc Students I

691.13. Effective Scientific Writing for MSc Students

691.14. Graduate Seminar for MSc Students II

691.16. Graduate Seminar for MSc Students III

691.18. Graduate Seminar for MSc Students IV

691.21. Effective Scientific Speaking for PhD Students

691.22. Graduate Seminar for PhD Students I

691.23. Effective Scientific Writing for PhD Students

691.24. Graduate Seminar for PhD Students II

691.26. Graduate Seminar for PhD Students III

691.28. Graduate Seminar for PhD Students IV

Effective Scientific Speaking courses provide instruction on preparing and presenting quality scientific oral presentations, including discussions of the aspects of quality presentations and exercises aimed at improving student speaking skills, and will be taken by graduate students in their first Fall Terms in program. Effective Scientific Writing courses provide students with instruction on preparing quality scientific papers, as well as exercises aimed at improving students' writing skills, and will be taken during students' second Fall Term in program. The Graduate Seminar courses will be run each winter, and provide all students enrolled in each course the opportunity to present one or two scientific talks, as well as to provide peer feedback to other students in the course. At the end of each Graduate Seminar term, the course instructor(s) will identify those students who have reached an acceptable level of scientific speaking competency and exempt these students from any further Physics 691 Graduate Seminar courses for their current degrees.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Physics 697 **3 units; (3-0) or (0-6)**

Topics in Contemporary Physics

Topics will be from the research areas of staff members.

MAY BE REPEATED FOR CREDIT

Physics 699 **3 units; (0-9)**

Project in Physics

Each student will select a project in consultation with a staff member. The project may be experimental or theoretical in nature. A written report and an oral presentation are required.

Physics 701 **3 units; (0-9)**

Independent Study

Each student will select a topic of study in consultation with a staff member. The topic will be in the research area of the staff member. This course may not be used to meet the regular course requirements in the MSc and PhD programs.

MAY BE REPEATED FOR CREDIT

Plant Biology PLBI

For more information about these courses contact the Department of Biological Sciences: bio.ucalgary.ca/.

Senior Courses

Plant Biology 327 3 units; (3-3)
(formerly Botany 327)

Systematics and Diversity of Plants

The diversity, form and function of plants ranging from algae, bryophytes (non-vascular land plants) and psilophytes to the angiosperms. Examples chosen to understand the origin of land plants and their subsequent evolution leading to highly diversified flowering plants.

Prerequisite(s): Biology 371.

Plant Biology 401 3 units; (3-0)
(formerly Botany 401)

Plant Biotechnology

The theory, application and history of plant biotechnology. Plant genome structure and the regulation of gene expression. Transcript, protein and metabolic profiling. Recombinant gene transfer into the plant genome. Biotechnological approaches to crop improvement, soil remediation and value-added traits.

Prerequisite(s): Biology 331, 371, and one of Biochemistry 341 or 393.

Plant Biology 403 3 units; (3-3)
(formerly Botany 303)

Plant Physiology

An integrative examination of the major physiological and metabolic processes in plants from the cellular to the whole-plant level. Emphasis on internal and external controls of growth and development; photosynthesis; nutrient assimilation; plant hormone metabolism and action; and stress physiology.

Prerequisite(s): Biology 371.

Plant Biology 421 3 units; (3-3)
(formerly Botany 321)

Plant Cell Biology and Anatomy

Study of plants at the cell and tissue level. Focus is on subcellular organization and dynamics, and on the structural and functional roles of cell and tissue systems. Lab sessions will emphasize brightfield and fluorescence microscopy imaging.

Prerequisite(s): Biology 371.

Plant Biology 507 3 units; (0-8) or (3-0)
(formerly Botany 507)

Advanced Topics in Plant Biology

Research or reading project that may include seminars, lectures, term papers and training in theoretical and/or laboratory methods.

Prerequisite(s): 54 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Plant Biology 528 6 units; (0-8)
(formerly Botany 528)

Independent Studies in Plant Biology

Original and independent thought, practical research and the completion of written and oral reports.

Prerequisite(s): 72 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Plant Biology 530 6 units; (0-8)
(formerly Botany 530)

Honours Research Project in Plant Biology

Research project under the direction of one or more faculty members in the Department of Biological Sciences. Formal written and oral reports must be presented on completion of this

course. Open only to Honours Botany students or Honours Biological Sciences students.

Prerequisite(s): 72 units and consent of the Department.

Plant Biology 541 3 units; (3-3)
(formerly Botany 541)

Taxonomy of the Seed Plants

A study of plants in relation to classification, phylogeny, evolution and identification. Students are required to make a plant collection of fifty plant specimens for identification in the laboratory. It is recommended that the collection be made in the preceding summer.

Prerequisite(s): Botany 327 or Plant Biology 327.

Plant Biology 543 3 units; (3-3)
(formerly Botany 543)

Plant Signaling and Development

Physiology, biochemistry, molecular and cellular aspects of plant growth and development. Emphasis on the co-ordinated regulation of gene expression, cell-cell communication, and signalling during development. Discussion on the methods used to study development, such as mutants of Arabidopsis and other model systems.

Prerequisite(s): Biology 331 and one of Botany 303 or 321 or Plant Biology 403 or 421.

Graduate Courses

Enrolment in any graduate course requires consent of the Department. Only when appropriate to a student's program may graduate credit be received for courses numbered 500-599. 600-level courses are available with permission to undergraduate students in the final year of their programs.

Plant Biology 633 3 units; (3-0)

Current Topics in Plant Biology

Topics include: plant genomics, biotechnology, biochemistry, cell biology, development and evolutionary biology. Emphasis is on technical advances and their application to plant biology research.

MAY BE REPEATED FOR CREDIT

Political Science POLI

For more information about these courses see the Department of Political Science website: poli.ucalgary.ca/.

Junior Courses

Political Science 201 3 units; (3-1T)

Introduction to Government and Politics

A systematic introduction to the basic concepts and institutions of the process of politics.

Political Science 213 3 units; (3-0)

Political Ideologies

An introduction to the study of political ideologies such as nationalism, socialism, liberalism and fascism.

Political Science 279 3 units; (3-0)

Politics of the Global South

An introduction to political issues common to the developing regions of Africa, Asia, Latin America and the Middle East, with special emphasis on topics such as democratization, globalization, development, and human rights.

Political Science 283 3 units; (3-0)

Issues and Trends in World Politics

Major trends and issues in world politics, such as international tensions, migration, ethnic conflicts, human rights and sustainable development.

Senior Courses

In selecting senior courses and in designing their programs, students are advised to consult the Undergraduate Guide, available from the Department.

Political Science 302 3 units; (3-0)

Topics in Politics

Introductory examination of a topic in Political Science with a Canadian Politics, Comparative Politics, International Relations, or Political Theory focus.

MAY BE REPEATED FOR CREDIT

Political Science 310 6 units; (3-0)

History of Political Thought

An introduction to some of the most profound attempts to think about the meaning, limits, and possibilities of political life through an examination of selected central texts within the history of Western political philosophy.

Political Science 321 3 units; (3-0)

Politics and Government in Canada

An examination of institutions and political processes in Canada. Significant attention is paid to key institutions such as Parliament, the executive, federalism, the Constitution, and the courts. Emphasis is also placed on the way that political processes are shaped by these and other institutions.

Political Science 342 3 units; (3-0)

Law and Politics

An introduction to the interplay between legal and political personnel, institutions, and processes. Examination of these connections in democratic states focusing on Canada in comparative perspective, authoritarian regimes, transitional and hybrid regimes, and the international system.

Antirequisite(s): Credit for Political Science 342 and 343 will not be allowed.

Political Science 345 3 units; (3-0)

Indigenous Governance

An examination of the institutions and logics of Indigenous governance structures in Canada. Emphasis will be placed on understanding how inter-Indigenous modes of governance contrast with institutions created by non-Indigenous politicians and bureaucrats. Attention will be paid to kinship, gender relations, war and conflict, and treaty land management.

Antirequisite(s): Credit for Political Science 345 and Indigenous Studies 311 will not be allowed.

Political Science 357 3 units; (3-0)

Introduction to Public Policy Analysis

An introduction to themes and methods in public policy studies. The practical and normative problems facing governments in initiating, formulating, enacting, and implementing policy will be discussed. May include case studies.

Political Science 359 3 units; (3-0)

Introduction to Comparative Politics

An introduction to the central concepts, problems, and approaches that comprise the field of comparative politics. Emphasis may also be placed on key analytical challenges, competing

methods, and basic governance systems in selected parts of the world.

Political Science 369 3 units; (3-0)

Governments and Politics of the Middle East

A survey and analysis of the organization and functioning of governments and politics of the contemporary Middle East, with emphasis on the social and economic environments which influence them.

Political Science 371 3 units; (3-0)

Governments and Politics of Africa

Political institutions of selected African states. The influence of class and tribal structure; political parties; elections, the source and nature of ideologies; and economic and social policies.

Political Science 379 3 units; (3-0)

The Politics of Development

A comparative survey of contemporary approaches to development theory and economics such as: modernization, neo-liberalism, post-development, critical globalism, gender and development, environment and development. Issues treated include poverty, cultural diversity, sustainability, and the role of state, market, NGOs, and science and technology.

Political Science 381 3 units; (3-0)

Introduction to International Relations

The structures and processes of international relations and foreign policy.

Political Science 397 3 units; (3-0)

Introduction to Research Methods

Introduction to the questions, strategies and rationales of political science research methods. Emphasis on the practical and theoretical advantages and disadvantages of quantitative, qualitative, and mixed-methods approaches.

Political Science 398 3 units; (3-0)
(formerly Political Science 599)

Qualitative Research Methods

An introduction to qualitative research methods in Political Science. Topics may include qualitative methodology, elite interviewing, focus groups, content analysis, case studies and qualitative data analysis.

Prerequisite(s): 3 units in Political Science.

Political Science 399 3 units; (3-1.5T)

Quantitative Research Methods

Quantitative research design, measurement, data collection, and data analysis.

Antirequisite(s): Credit towards degree requirements will be given for only one of Engineering 319, Political Science 399, Psychology 301, 312, Sociology 315, Statistics 205, 213, 217, 327; that one being a course appropriate to the degree program.

Political Science 402 3 units; (3-0)

Advanced Topics in Politics

Advanced examination of a topic in Political Science with a Canadian Politics, Comparative Politics, International Relations, or Political Theory focus

Prerequisite(s): 3 units in Political Science at the senior level.

MAY BE REPEATED FOR CREDIT

Political Science 406 3 units; (3-0)

Greek Love and Wisdom

A study of Ancient Greek attempts to address the relationship between love, sex, marriage, friendship, and how we might best lead our lives in a political community. Works by Aristophanes, Plato, Xenophon, Aristotle, Plutarch and others may be covered.

Prerequisite(s): Political Science 310.

Political Science 407 3 units; (3-0)

Classical Political Thought

An examination of selected classical texts from historians, dramatists and political philosophers with special focus upon the concepts relevant to political problems in the twentieth century.

Prerequisite(s): Political Science 310.

Political Science 409 3 units; (3-0)

The Foundations of Modernity

A study of selected sixteenth- to nineteenth-century political thinkers and themes foundational to the making and understanding of modernity in the West. Works by Rousseau, Kant, J.S. Mill, and others may be covered.

Prerequisite(s): Political Science 310.

Political Science 411 3 units; (3-0)

Recent Critics and Defenders of Modernity

A study of debates in recent political thought between theorists who take a strong stand against the universalistic and rational foundations of Enlightenment-based political thought (such as poststructuralists, postmodernists, communitarians, and Far Right populists) and defenders of Enlightenment modernity (such as liberals and Frankfurt School Critical Theorists).

Prerequisite(s): Political Science 310.

Political Science 413 3 units; (3-0)

Politics and Literature

Political analysis of how selected works of literature articulate visions of order and disorder.

Prerequisite(s): Political Science 310.

Political Science 415 3 units; (3-0)

Politics through Film

An examination of the complex relationship between politics and film, through selected fictional and documentary works.

Prerequisite(s): 3 units in Political Science.

Political Science 417 3 units; (3-0)

Feminist Political Theory

A comparative and critical survey of the main contemporary feminist approaches to political theory: this may include liberal feminism, radical/cultural feminism, socialist/Marxist feminism, and post-modern/post-colonial feminism.

Prerequisite(s): Political Science 310 or 453.

Political Science 422 3 units; (3-0)

Indigenous Politics in Canada

An introduction to historical and contemporary socio-political issues associated with Indigenous peoples and state-society relations in Canada.

Prerequisite(s): 3 units in Political Science or 3 units in courses labelled Indigenous Studies.

Antirequisite(s): Credit for Political Science 422 and 424 will not be allowed.

Political Science 425 3 units; (3-0)

City Government

A study of both institutions and political processes relating to city politics.

Prerequisite(s): Political Science 321.

Political Science 426 3 units; (3-0)
(formerly Political Science 325)

Federalism

Theoretical and empirical examination of federalism in Canada and other selected states.

Prerequisite(s): Political Science 321.

Political Science 427 3 units; (3-0)

Government and Politics of Alberta

An analysis of the institutions and processes of Alberta's government as well as activities in selected policy areas. The examination will include historical as well as contemporary references.

Prerequisite(s): Political Science 321.

Political Science 428 3 units; (3-0)

Comparative Provincial Politics

An analysis of provincial politics in Canada focusing on the distinctive political environments as well as similarities and differences in provincial political cultures, party systems and elections, and selected policy areas.

Prerequisite(s): Political Science 321.

Political Science 429 3 units; (3-0)

Electoral Behaviour

An examination of how and why citizens engage with their governments. Topics may include individual and group influences on citizen participation, electoral choice, and political behaviour in Canada and other democracies.

Prerequisite(s): One of Political Science 321 or 399.

Political Science 430 3 units; (3-0)

Public Opinion

An investigation of theories of public opinion in representative democracies and of survey techniques employed in their examination. A portion of the course will normally be devoted to developing and administering a public opinion survey.

Prerequisite(s): 3 units in Political Science.

Political Science 431 3 units; (3-0)

Canadian Political Parties

An examination of political parties and party systems in Canada. Party history is reviewed and attention is given to issues relating to organization, finance, representation and electoral competition.

Prerequisite(s): Political Science 321.

Political Science 432 3 units; (3-0)

Selecting and Removing Political Leaders

An examination of the processes political parties use to choose and remove their leaders. The focus is on Canadian parties with comparisons to selected parties in other countries.

Prerequisite(s): Political Science 321.

Political Science 433 3 units; (3-0)

Urban Policy and Governance

Examination of policy issues in Canadian cities, with a special focus on domains involving complex governance challenges. Emphasis on the consequences of policy governance for urban

public policy, political authority, and democratic accountability.

Prerequisite(s): 3 units in Political Science at the 300 level or above.

Political Science 435 **3 units; (3-0)**

Canada and World Politics

An analysis and evaluation of Canada's role on the international scene; main objectives of Canadian foreign policy; security and defence policies; Canada's participation in universal international organizations; the influence of Canada as a middle power upon world events.

Prerequisite(s): Political Science 381.

Political Science 439 **3 units; (3-0)**

Strategic Studies

An analysis of the causes of war, the meaning of security and defence in the post-Cold War era, including the use and control of military force.

Prerequisite(s): Political Science 381.

Political Science 440 **3 units; (3-0)**

Campaigns and Elections

Explores election campaigns in Canada through case studies of key elements such as the selection of candidates, the building of campaign teams and the strategies and tactics parties use to elect candidates and win general elections.

Political Science 444 **3 units; (3-0)**

Constitutional Law and Politics

The law and politics of the Canadian constitution, including the Charter of Rights and Freedoms, the federal division of powers, and responsible parliamentary government.

Prerequisite(s): Political Science 321 and 342.

Antirequisite(s): Credit for Political Science 444 and either 442 or 445 will not be allowed.

Political Science 447 **3 units; (3-0)**

Comparative Public Policy

An examination of a range of public policy issues from a comparative perspective. Topics include social policy, family policy, immigration and multiculturalism, and environmental policy across the advanced industrialized democracies.

Prerequisite(s): Political Science 357 or 359.

Political Science 451 **3 units; (3-0)**

Public Administration

Theories of public administration and their practical application in Canada and selected countries.

Prerequisite(s): Political Science 321.

Political Science 453 **3 units; (3-0)**
(formerly Political Science 553)

Women and Politics

An examination of current trends in women's political participation in Canada and around the world. Topics may include: women's political behaviour, women's political representation, and women's movements' engagement with political institutions.

Prerequisite(s): Political Science 359 or 321.

Political Science 455 **3 units; (3-0)**

Protest, Rebellion, and Revolution

A study of the origins, processes, and outcomes of peaceful and violent forms of political protest, rebellion and revolution. Cases may include historical and contemporary examples from around the world.

Prerequisite(s): Political Science 359.

Political Science 463 **3 units; (3-0)**

Politics of Post-Industrial States

Comparative analysis of the political dynamics of post-industrial states. Focus on problems associated with post-industrialization and on explanations for political stability and change.

Prerequisite(s): Political Science 359.

Political Science 464 **3 units; (3-0)**

European Politics

An introduction to the governments and politics of the states and societies of Europe, including the importance of their membership in the European Union.

Prerequisite(s): Political Science 359.

Political Science 465 **3 units; (3-0)**

Chinese Politics

An introduction to the politics of the Chinese communist party-state. Topics may include: the Mao era leadership debates on socialist development; the post-Mao reforms of Deng Xiaoping and his successors; and the emerging challenges associated with market reforms and China's integration into the global capitalist economy.

Prerequisite(s): Political Science 359.

Political Science 469 **3 units; (3-0)**

Middle East: Contemporary Political Problems

An in-depth analysis of selected political, economic and social problems and issues affecting individual nations and the area in general.

Prerequisite(s): Political Science 369.

Political Science 470 **3 units; (3-0)**

Genocide

An introduction to comparative genocide studies. Examines the causes, structures, and dynamics of genocide and mass violence.

Prerequisite(s): One of Political Science 359 or 381 or Law and Society 201.

Political Science 471 **3 units; (3-0)**

Africa: Contemporary Political Problems

An analysis of political problems in selected political systems of Africa. Topics will include the politics of rural development, political elites and the state in Africa, political institutions, constraints on development, and urban politics.

Prerequisite(s): Political Science 371 or African Studies 301.

Political Science 473 **3 units; (3-0)**

States Regimes in Latin America

An analysis of how selected Latin American states and societies are addressing both old and new problems such as the transitions from and legacies of dictatorship, political and criminal violence, as well as the construction of democratic institutions and inclusive citizenship.

Prerequisite(s): Political Science 359.

Political Science 477 **3 units; (3-0)**
(formerly Political Science 377)

American Politics

A study of the institutions and processes of American politics.

Prerequisite(s): Political Science 359.

Political Science 479 **3 units; (3-0)**

International Relations of the Contemporary Arab World

An examination of the Arab regional system, with emphasis on regional interaction, regional organizations, and external linkages. The specific cultural, political, ideological, and strategic characteristics of the system will be analyzed.

Prerequisite(s): Political Science 369.

Political Science 481 **3 units; (3-0)**
(formerly Political Science 571)

The Politics of Human Rights

An analysis of the origins, evolution, and contemporary politics of human rights. Topics may include the philosophic and religious roots of human rights; international and domestic human rights laws; and struggles to promote and protect human rights in specific contexts around the world.

Prerequisite(s): One of Political Science 310, 359, 381.

Political Science 483 **3 units; (3-0)**
(formerly Political Science 383)

International Law

The basic concepts, principles, and functions of international law.

Prerequisite(s): Political Science 381.

Political Science 485 **3 units; (3-0)**

Global Political Economy

Analysis of the politics of international economic relations. Topics may include the politics of trade and money relations, energy, multinational corporations, and the New International Economic Order.

Prerequisite(s): Political Science 381.

Political Science 487 **3 units; (3-0)**
(formerly Political Science 385)

International Organizations

An analysis of international governmental organizations with main emphasis on the United Nations and selected regional organizations.

Prerequisite(s): Political Science 381.

Political Science 491 **3 units; (3-0)**

U.S. Security Policy

Examination of U.S. security policy, with emphasis on how it is made and on contemporary security issues the U.S. faces.

Prerequisite(s): Political Science 381.

Political Science 502 **3 units; (3-0)**

Advanced Topics Seminar in Politics

Advanced seminar on a topic in political science with a Canadian politics, comparative politics, international relations, or political theory focus.

Prerequisite(s): 3 units in Political Science at the senior level.

MAY BE REPEATED FOR CREDIT

Political Science 503 **3 units; (3-0)**

Selected Topics in Political Theory

Content of the course will vary from year-to-year.

Prerequisite(s): Political Science 310.

MAY BE REPEATED FOR CREDIT

Political Science 505 **3 units; (3S-0)**

Sexual Ethics

An examination of attempts to theorize those things associated with human sexuality using works of historical and contemporary political

philosophy. Topics may include: the nature of love and friendship, the good of marriage, limits of sexuality, and the place of justice, equality, and shame.

Prerequisite(s): Political Science 310.

Political Science 506 **3 units; (3S-0)**

Social and Global Justice

An examination of contemporary theories and debates in social and global justice. Topics may include: the redistribution-recognition dilemma, multiculturalism, intersectionality, identity/post-identity politics, globalization, transnationalization, and post-Westphalian approaches to governance and democracy.

Prerequisite(s): Political Science 310, 379, 381, 481 or 417.

Political Science 515 **3 units; (3S-0)**

Advanced History of Political Thought

An intensive study of selected major political thinkers within the history of political thought.

Prerequisite(s): Political Science 310.

Political Science 519 **3 units; (3S-0)**

Interpretation and War

An examination of the philosophical justifications offered to defend the use of military force, based particularly on the analysis of texts in the history of Western political philosophy.

Political Science 521 **3 units; (3S-0)**

Canadian Federalism

An examination of the dynamics of Canadian Federalism including relations among provinces and between provinces and the federal government.

Prerequisite(s): One of Political Science 321, 426, 427 or 428.

Political Science 523 **3 units; (3S-0)**

Canada and the Circumpolar World

An examination of critical national and international issues in the circumpolar world.

Prerequisite(s): Political Science 381.

Political Science 524 **3 units; (3S-0)**

Advanced Seminar in Indigenous Politics in Canada

Engagement with the contributions made by Indigenous scholars to rethinking Canadian politics. Emphasis on Indigenous scholars' critiques of colonialism and settler-colonialism in Canada, and the decolonizing potential of Indigenous political thought.

Prerequisite(s): Political Science 422 or Indigenous Studies 407 or completion of at least 60 units.

Political Science 525 **3 units; (3-0)**

Energy Politics in Alberta

An examination of energy politics in Alberta. Topics may include the federal-provincial dimensions of energy politics and policymaking, environmental politics, and the economic dimensions of energy policy.

Prerequisite(s): Political Science 321.

Political Science 531 **3 units; (3-0)**

Parties, Elections and Representation

An examination of political parties and elections in both established and emerging democracies as a

means of understanding the nature of political representation in modern representative democracies.

Prerequisite(s): Political Science 431.

Political Science 543 **3 units; (3-0)**

Law and Armed Conflict

An examination of key texts and topics concerning the evolution, conceptualization, codification, and practical application of the laws of armed conflict. Topics may include the historical and philosophical development of the customary and codified laws of armed conflict, military law and military training and education, and the use of law to punish and deter war crimes.

Prerequisite(s): Political Science 342 or 483.

Political Science 551 **3 units; (3-0)**
(History 551)

Women in Canadian Politics

A political history of women in Canada in the twentieth and twenty-first centuries. Topics include campaigns for suffrage, legal personhood and equality rights, women's political activism, the evolution of public policy concerning women, and the participation of women in public life.

Prerequisite(s): Political Science 321.

Political Science 554 **3 units; (3S-0)**

Women and Public Policy

An examination of the impact of public policies on gender relations from a comparative perspective. Topics may include family and social policies, gender and the workplace, reproductive rights, and gender-based violence.

Prerequisite(s): Political Science 357, 359, or 453.

Political Science 561 **3 units; (3S-0)**

Government and Politics of the European Union

An examination of the politics of the European Union. May be offered as a seminar or in preparation for and participation in a model European Council Meeting.

Prerequisite(s): One of Political Science 359, 381, or 464.

Political Science 565 **3 units; (3S-0)**

Indigenous Politics in the Global South

Advanced examination of the competing theoretical explanations for the sudden and unexpected rise of Indigenous peoples as key political actors in countries of the Global South. May include Indigenous rights struggles in Africa, Asia, and Latin America.

Prerequisite(s): Political Science 359 or Indigenous Studies 407.

Political Science 569 **3 units; (3S-0)**

Selected Topics in Middle East Politics

Emphasis will be on foreign-policy development and application in the Middle East.

Prerequisite(s): Political Science 369 and one 400-level course in comparative politics or international relations.

MAY BE REPEATED FOR CREDIT

Political Science 575 **3 units; (3-0)**

Intelligence and Policy

An examination of the role and limits of intelligence in policymaking.

Prerequisite(s): Political Science 381.

Political Science 579 **3 units; (3-0)**

Political Economy of Development

Third World development projects, programs, and policies in Africa, Asia and Latin America, intended to raise the standard of living and enhance political participation.

Prerequisite(s): Consent of the Department.

Political Science 581 **3 units; (3S-0)**

Selected Topics in International Law and Organizations

An advanced seminar on international order and on co-operative and competitive efforts by states and other international actors to create, maintain and change that order.

Prerequisite(s): Political Science 483 or 487.

MAY BE REPEATED FOR CREDIT

Political Science 585 **3 units; (3-0)**

Preventing the Spread of Nuclear Weapons

An analysis of the politics of the international regime governing the control of nuclear weapons, including case studies of states that pose a challenge to that regime.

Prerequisite(s): Political Science 381.

Political Science 586 **3 units; (3S-0)**

Advanced Studies in Global Political Economy

Advanced analysis of selected themes in global political economy. Topics may include trade, migration, exchange rates, and foreign direct investment.

Prerequisite(s): Political Science 485.

Political Science 587 **3 units; (3-0)**

International Ethics

An examination of ethical reasoning and moral norms in political decision making, institutions, and processes in international politics. Topics such as justice in relation to war and terrorism, sovereignty, intervention and human rights, globalization and global poverty, and the environment may be analyzed.

Prerequisite(s): Political Science 381 or 310.

Political Science 590 **3 units; (3S-0)**
(formerly Political Science 499)

Honours Seminar

An examination of classic works in political science.

Prerequisite(s): Admission to Political Science Honours program and completion of 75 units.

Political Science 591 **3 units; (3-0)**
(formerly Political Science 500 and 504)

Honours Thesis

Preparation of an honours thesis under the supervision of a faculty member who will assign the final grade.

Prerequisite(s): Political Science 590.

Political Science 597 **3 units; (3-0)**

Directed Readings in Political Science

Study of a particular topic under the direct supervision of a faculty member.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Courses numbered 600-799 are offered either as special reading courses or as seminars, as required. Students should consult the Department regarding enrolment in these courses.

Political Science 605 3 units; (3S-0)**Advanced Introduction to Sexual Ethics**

An advanced introduction to theorizing human sexuality using works of historical and contemporary political philosophy. Topics may include: the nature of love and friendship, the good of marriage, limits of sexuality, and the place of justice, equality, and shame.

Antirequisite(s): Credit for Political Science 605 and 505 will not be allowed.

Political Science 606 3 units; (3-0)**Social and Global Justice**

An examination of contemporary theories and debates in social and global justice. Topics may include: the redistribution-recognition dilemma, multiculturalism, intersectionality, identity/post-identity politics, globalization, transnationalization, and post-Westphalian approaches to governance and democracy.

Political Science 615 3 units; (3S-0)**Advanced History of Political Thought**

An intensive study of selected major political thinkers within the history of political thought.

Political Science 617 3 units; (3-0)**Advanced Political Theory**

Discussion of contemporary topics in political thought. Emphasis on analysis of problems rather than history of ideas.

Political Science 619 3 units; (3-0)**War and Interpretation**

An examination of the philosophical justifications offered to defend the use of military force, based particularly on the analysis of texts in the history of Western political philosophy.

Political Science 621 3 units; (3-0)**Canadian Political Institutions**

Examination of the structure and operation of the central institutions of the Canadian state, including the constitution, federalism, parliamentary government, and political parties.

Political Science 623 3 units; (3-0)**Canadian Political Process**

Examination of Canadian political behaviour within its institutional context, including political parties, interest groups, voting and socialization.

Political Science 624 3 units; (3S-0)**Advanced Seminar on Indigenous-State Relations in Canada**

Structure and operation of colonialism and settler-colonialism in Canada, and Indigenous resistance to those structures of oppression. Attention will be paid to the reconciliation debates, Indigenous gender oppression, and the politics of decolonization in Canada.

Political Science 631 3 units; (3-0)**Parties, Elections and Representation**

An examination of political parties and elections in both established and emerging democracies as a means of understanding the nature of political representation in modern representative democracies.

Political Science 633 3 units; (3S-0)**U.S. Security Policy**

An examination of U.S. security policy, with an emphasis both on how U.S. security policy is made

and on the main contemporary security issues the U.S. faces today.

Political Science 641 3 units; (3-0)**Selected Topics in Public Law**

Examination of the political, philosophical, and institutional dimensions of selected public law issues, with particular reference to judicial and quasi-judicial tribunals as policy-making institutions. Consult the Department for information on choice of topics.

Political Science 643 3 units; (3-0)**Law and Armed Conflict**

An examination of key texts and topics concerning the evolution, conceptualization, codification, and practical application of the laws of armed conflict. Topics may include the historical and philosophical development of the customary and codified laws of armed conflict, military law and military training and education, and the use of law to punish and deter war crimes.

Political Science 651 3 units; (3-0)**Politics and Public Policy**

An examination of the main theories and approaches to the study of public policy.

Political Science 653 3 units; (3-0)**Gender and Public Policy**

Explores the gendered impact of a range of public policies and also explores the influence of gender norms and ideas on the formulation of public policy. Topics covered include gender-based policy analysis, gender and the welfare state, family and child-care policies, policies to address gender inequalities in the labour market and workplace, and reproductive rights policies.

Political Science 665 3 units; (3S-0)**Advanced Seminar on Indigenous Politics in the Global South**

Advanced examination of the competing theoretical explanations for the sudden and unexpected rise of Indigenous peoples as key political actors in countries of the Global South. In-depth case studies may include Indigenous rights struggles in Africa, Asia, and Latin America.

Political Science 671 3 units; (3-0)**Comparative Politics of Development in the Global South**

An examination of the major issues, theories, and debates about development and politics in the Global South.

Political Science 673 3 units; (3-0)**Comparative Politics: Theories and Methods**

An examination of the main theories, methods, and debates in the field of Comparative Politics.

Political Science 675 3 units; (3-0)**Selected Topics in Advanced Comparative Politics**

Selected regions and topics in Comparative Politics.

MAY BE REPEATED FOR CREDIT**Political Science 681** 3 units; (3-0)**Advanced Analysis of International Relations**

An examination of the main theories, issues, and approaches in the study of International Relations.

Political Science 683 3 units; (3-0)**Advanced Studies in Foreign Policy**

Selected themes in the formation and implementation of foreign policies.

Political Science 684 3 units; (3-0)**Human Rights and Humanitarianism**

An advanced introduction to the principal contemporary debates in the field of human rights and humanitarian politics.

Antirequisite(s): Credit for Political Science 684 and 571 will not be allowed.

Political Science 685 3 units; (3-0)**Strategic Studies**

Advanced seminar in major topics in strategic studies, such as arms control, deterrence, and other military doctrines.

Political Science 686 3 units; (3S-0)**Advanced Seminar in Global Political Economy**

Covering in-depth major debates in global political economy, provides an advanced exploration of the causes and effects of globalization, including the determinants of foreign economic policymaking (such as trade, money, migration, global production, finance, and foreign aid) as well as the subsequent impact of these policies.

Political Science 687 3 units; (3S-0)**Advanced Studies in Canadian Arctic Security**

The Canadian Arctic is an emerging area of concern due to changes scarcely imaginable even a few years ago. Examines the nature of some of these changes—e.g., climate change and the northern seas' dramatically changing ice conditions, growing recognition of the regions' resource wealth, and evolving international relations in the circumpolar region—and what they mean for Canadian Arctic security.

Antirequisite(s): Credit for Political Science 687 and 523 will not be allowed.

Political Science 689 3 units; (3-0)**Unconventional Warfare**

Analysis of warfare conducted by, or against, sub-state groups. This may include in-depth studies of guerrilla warfare, asymmetric conflict, or terrorism.

Political Science 691 3 units; (3-1)**Quantitative Analysis in Political Science**

Examination of empirical research methods and techniques of quantitative analysis in the study of political phenomena. Computer use is required.

Political Science 693 3 units; (3-0)**Advanced Quantitative Analysis in Political Science**

Examination of advanced empirical research methods and techniques of multivariate quantitative analysis in the study of political phenomena.

Prerequisite(s): Political Science 691.

Political Science 699 3 units; (3-0)**Qualitative Analysis in Political Science**

An introduction to qualitative research methods in Political Science. Topics may include qualitative methodology, elite interviewing, focus groups, content analysis, case studies and qualitative data analysis.

Prerequisite(s): Political Science 691.

Political Science 715 3 units; (3-0)

Special Topics in Political Theory
MAY BE REPEATED FOR CREDIT

Political Science 721 3 units; (3-0)

Special Topics in Canadian Politics
MAY BE REPEATED FOR CREDIT

Political Science 723 3 units; (3-0)

Special Topics in Political Science
MAY BE REPEATED FOR CREDIT

Political Science 725 3 units; (3-0)

Special Topics in Public Administration
MAY BE REPEATED FOR CREDIT

Political Science 741 3 units; (3-0)

Special Topics in Public Law
MAY BE REPEATED FOR CREDIT

Political Science 755 3 units; (3-0)

Special Topics in Public Policy
MAY BE REPEATED FOR CREDIT

Political Science 781 3 units; (3-0)

Special Topics in International Relations
MAY BE REPEATED FOR CREDIT

Political Science 791 3 units; (3-0)

Scope and Methods in Political Science

Advanced seminar covering various approaches, topics, methods and theories employed in the discipline of political science.

MAY BE REPEATED FOR CREDIT

Professional Land Management PLMA

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses

Professional Land Management 475
3 units; (3-1.5T)

Introduction to Professional Land Management

Professional land management including both technical and economic considerations in the search for and development and marketing of oil and gas resources. A field trip and/or simulation exercise may be required.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units including Business and Environment 395.

Professional Land Management 573
3 units; (3-0)

Energy Business Agreements

Legal requirements in the acquisition, disposition, and exploration of and production from energy rights and contracts in Canada.

Prerequisite(s): Admission to the Haskayne School of Business, Professional Land Management 475 and Business and Environment 395.

Professional Land Management 579
3 units; (3-0)

Professional Land Management Policy

Prepare graduates to effectively contribute to the management of energy properties throughout

the life of the properties by increasing the understanding and awareness of corporate resource property valuation techniques.

Prerequisite(s): Admission to the Haskayne School of Business, Professional Land Management 475, 583, Business and Environment 395 and Finance 317.

Corequisite(s): Professional Land Management 587.

Professional Land Management 583
3 units; (3-0)

Management of Energy Regulation

Overview of key regulations and surface regulatory principles important to energy resources.

Prerequisite(s): Admission to the Haskayne School of Business, Professional Land Management 475 and Business and Environment 395.

Professional Land Management 587
3 units; (3-0)

Cases in Professional Land Management

A "Hands on" case approach to the typical situations and decision-making processes faced by landmen and commercial negotiators. Historical perspectives, contemporary tactics, and modern applications for departments and energy companies.

Prerequisite(s): Admission to the Haskayne School of Business, Professional Land Management 475, 573, 583 and Finance 317.

Psychology PSYC

For more information about these courses see the Department of Psychology website: psyc.ucalgary.ca/.

Junior Courses

Psychology 200 3 units; (3-0)

Principles of Psychology I

A survey of topics associated with psychology's role as a biological science, including neuroscience, sensation and perception, cognition, learning, memory, and language.

Antirequisite(s): Credit for Psychology 200 and 205 will not be allowed.

Psychology 201 3 units; (3-0)

Principles of Psychology II

A survey of topics associated with psychology's role as a social science, including personality, motivation, health, social, developmental, industrial/organizational and clinical psychology.

Antirequisite(s): Credit for Psychology 201 and 205 will not be allowed.

Psychology 203 3 units; (3-0)

Psychology for Everyday Life

Provides students with an understanding of the key theories, research methods, and discoveries in coping and resilience, identity development, interpersonal relationships, and mental health with an emphasis on developing the knowledge and skills necessary to be effective consumers of psychological theory and research. Through a focus on adjustment issues that arise in everyday life, this course will demonstrate some of the ways in which psychology can be used to benefit students' wellbeing in their personal and professional lives.

Psychology 204 3 units; (3-0)

Human Sexuality

Examination of contemporary knowledge and attitudes toward human sexuality, relying on theoretical and empirical psychological research. Multiple perspectives are presented, including psychosocial, cross-cultural, and psychobiological. Sexuality across the life span is examined, including issues pertaining to sexual differentiation, intimacy and communication, gender role development, varieties of sexual relationships and behaviour, and legal and ethical issues.

Senior Courses

Note: Registration in 400- and 500-level Psychology courses is restricted to Psychology Majors.

Psychology 300 3 units; (3-2)

Research Methods and Data Analysis in Psychology I

Research methods in psychological research, with an introduction to data analysis.

Prerequisite(s): One of Mathematics 30-1, 30-2, 31, or Mathematics 2 (offered by Continuing Education); Psychology 200 and one of Psychology 201 or Neuroscience 201.

Antirequisite(s): Credit for Psychology 300 and any of the following will not be allowed: Engineering 319, Psychology 312, Sociology 311, Statistics 205, 213, 217, 327.

Psychology 301 3 units; (3-2)

Research Methods and Data Analysis in Psychology II

An integration of research methods and statistics in psychological research, with an emphasis on conducting and interpreting inferential statistical techniques.

Prerequisite(s): Psychology 300.

Antirequisite(s): Credit for Psychology 301 and any of the following will not be allowed: Engineering 319, Political Science 399, Psychology 312, Statistics 205, 213, 217, 327.

Psychology 305 3 units; (3-0)

History of Psychological Thought

The roots of psychological thought in Western culture, and the relationship between theories of human nature and changing social institutions.

Prerequisite(s): Psychology 200 and 201.

Psychology 321 3 units; (3-0)

Industrial and Organizational Psychology

Understanding and predicting behaviour and attitudes within an organizational setting. Topics normally include: personnel selection, attraction to organizations and job choice, person-organization fit, organizational culture, motivation and decision-making, employee attitudes, deviant behaviour in organizations, leadership, team behaviour, and personality in the workplace.

Prerequisite(s): Psychology 200 and 201.

Antirequisite(s): Credit for Psychology 321 and either 421 and 423 will not be allowed.

Psychology 345 3 units; (3-0)

Social Psychology

Social psychological approaches to understanding social influence, social perception and cognition, attitudes and group dynamics.

Prerequisite(s): Psychology 200 and 201.

Antirequisite(s): Credit for Psychology 345 and Sociology 341 will not be allowed.

Psychology 349 **3 units; (3-0)****Language Development**

Research into language development in typically developing children, with consideration of environmental and other factors that influence acquisition. Consideration also given to atypical language development.

Prerequisite(s): Psychology 200 and 201.

Antirequisite(s): Credit for Psychology 349 and Linguistics 331 will not be allowed.

Psychology 351 **3 units; (3-0)****Developmental Psychology**

An examination of psychological development through childhood and adolescence.

Prerequisite(s): Psychology 200 and 201.

Antirequisite(s): Credit for Psychology 351 and either Applied Psychology 311 or 313 will not be allowed.

Psychology 353 **3 units; (3-0)****Psychology of Aging**

Examines theory and research related to psychological processes during adulthood and aging. Topics may include life-span developmental theories and methods; biological processes; sensory, perceptual and cognitive processes; personality and social processes; life transitions, mental health issues; and dying.

Prerequisite(s): Psychology 200 and 201.

Psychology 365 **3 units; (3-0)****Cognitive Psychology**

A survey of research and theory in cognitive psychology. Research in pattern recognition, attention, memory, language, thinking, and other cognitive abilities is explored, with discussion of associated brain mechanisms.

Prerequisite(s): Psychology 200 and 201.

Antirequisite(s): Credit for Psychology 365 and Applied Psychology 411 will not be allowed.

Psychology 369 **3 units; (3-0)****Sensation and Perception**

The psychological and physiological bases of sensory and perceptual processes, including vision, audition, taste, smell, touch, proprioception, and basic psychophysics. Provides a background for advanced courses in sensory and perceptual processing, human factors, and environmental psychology.

Prerequisite(s): Psychology 200 and 201.

Psychology 373 **3 units; (3-0)****Motivation and Emotion**

A survey of theories, models, and research on the psychological aspects of human motivation from social, cognitive, behavioural, and biological perspectives.

Prerequisite(s): Psychology 200 and 201.

Psychology 375 **3 units; (3-0)****Brain and Behaviour**

The neural basis of learning, memory, language and thinking, as well as pathological, sexual, aggressive, and emotional behaviour that arises from neural and hormonal malfunctioning.

Prerequisite(s): Psychology 200.

Antirequisite(s): Credit for Psychology 375 and either 371 and Neuroscience 321 will not be allowed.

Psychology 383 **3 units; (3-0)****Personality**

Approaches to the study of personality.

Prerequisite(s): Psychology 200 and 201.

Psychology 385 **3 units; (3-0)****Abnormal Psychology**

Abnormal behaviour and experiences, their causes and treatment throughout the lifespan.

Prerequisite(s): Psychology 200 and 201.

Psychology 391 **1.5 units; (1.5-0)****Academic Competencies in Psychology**

Students acquire personal and academic competencies to support program success including effective communication, critical thinking, information literacy, and techniques to set realistic goals.

Prerequisite(s): Psychology 200, 201 and admission to the Psychology major or Honours program.

Corequisite(s): Psychology 300.

NOT INCLUDED IN GPA

Psychology 393 **1.5 units; (1.5-0)****Professional Development in Psychology**

Students acquire professional and career development skills to prepare for the transition into the workplace. Students explore career options and develop materials to increase success in professional and job opportunities.

Prerequisite(s): Psychology 200, 201 and admission to the Psychology major or Honours program.

Corequisite(s): Psychology 300.

NOT INCLUDED IN GPA

Psychology 400 **3 units; (0-3)****Conducting Research**

Students will learn to apply appropriate research methods to answer research questions, to collect and analyze data, and to interpret and report research findings.

400.01. Abnormal Psychology

400.02. Applied Psychology

400.03. Brain and Behaviour

400.04. Cognitive Psychology

400.05. Developmental Psychology

400.06. Industrial-Organizational Psychology

400.07. Sensation and Perception

400.08. Social Psychology

Prerequisite(s): Admission to the Psychology major or Honours program and: 01: Psychology 300, 301, 385; 02: Psychology 300, 301; 03: Psychology 300, 301, 375; 04: Psychology 300, 301, 365; 05: Psychology 300, 301 and one of 349 or 351 or 353; 06: Psychology 300, 301 and one of 321 or 383; 07: Psychology 300, 301, 369; 08: Psychology 300, 301, 345.

Antirequisite(s): Credit toward degree requirements will be given for only one of Psychology 400.01, 400.02, 400.03, 400.04, 400.05, 400.06, 400.07, 400.08.

Psychology 405 **3 units; (3-0)****Contemporary Theories in Psychology**

An analysis of what constitutes a "theory," "model" and "explanation" in psychology as a science.

Survey of major theoretical positions in twentieth-century psychology.

Prerequisite(s): Psychology 200 and 201, one senior course in Psychology, and admission to the Psychology major or Honours program.

Psychology 407 **3 units; (3-2)****Psychometrics**

Theory and application of methodological and statistical issues in psychological assessment. Topics include: theories of psychological measurement, scale development, item analysis, item bias, reliability, validity, and test fairness.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Antirequisite(s): Credit for Psychology 407 and Applied Psychology 307 will not be allowed.

Psychology 411 **3 units; (3-2)****Design and Analysis in Psychological Research**

Experimental design problems and techniques for analysis of psychological data.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Psychology 415 **3 units; (3-2)****Qualitative Inquiry in Psychology**

Qualitative approaches to psychological research such as phenomenology, grounded theory, and discourse analysis. Specific topics include research interviews, ethics, and evaluating qualitative research.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Psychology 417 **3 units; (3-2)****Tests and Individual Differences**

Individual differences and psychological testing including the description, use, evaluation and development of typical tests, as well as discussion of important issues in human difference.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Psychology 425 **3 units; (3-2)****Human Factors**

Application of psychological research and theory to people-system relationships and the work environment; display and control devices, design and evaluation of the built environment, human skills and limitations, work schedules, safety, and research methods in human factors engineering.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Psychology 427 **3 units; (3-2)****Environmental Psychology**

The theory and data pertaining to the relationship between human behaviour and the physical environment, both natural and built. Particular emphasis is placed on the implications of current knowledge for the management of the human-environment interface. A research project is an integral part of the course.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Psychology 429 **3 units; (3-0)**

Adolescence

An in-depth examination of the physical, cognitive, emotional, and social changes occurring during adolescence, drawing upon theory and relevant research.

Prerequisite(s): Psychology 300, 301, 351 and admission to the Psychology major or Honours program.

Antirequisite(s): Credit for Psychology 429 and 355 will not be allowed.

Psychology 430 **3 units; (3-2)**

Psychophysiology in Health Research

An examination of the impact of emotions on physiological activity and risk for disease, including coronary heart disease, ulcers, asthma, cancer and other immune-related disorders, with an emphasis on the discussion and understanding of empirical research. Hands-on experience with psychophysiological measurement equipment and procedures commonly used in stress research will be provided.

Prerequisite(s): Psychology 300, 301, 375 and admission to the Psychology major or Honours program.

Psychology 431 **3 units; (3-0)**

Current Issues in Psychopathology

Discussion of current developments and controversies in the assessment, etiology, and treatment of psychopathology. Emphasis will be on teaching students how to strengthen their critical thinking skills using controversial issues in the fields of abnormal and clinical psychology as a basis for discussion and debate.

Prerequisite(s): Psychology 300, 301, 385 and admission to the Psychology major or Honours program.

Psychology 433 **3 units; (3-0)**

Clinical Psychology

Assessment and treatment problems in clinical settings.

Prerequisite(s): Psychology 300, 301, 385 and admission to the Psychology major or Honours program.

Psychology 435 **3 units; (3-2)**

Behaviour Therapy

Theory, principles, and practices of contemporary behaviour therapy/behaviour modification as applied to a representative range of disorders, problems, and child and adult populations.

Prerequisite(s): Psychology 300, 301, 385 and admission to the Psychology major or Honours program.

Psychology 437 **3 units; (3-0)**

Health Psychology

Health psychology involves the discipline and principles of psychology and human behaviour in understanding how the mind, body, and behaviour interact in health and disease. Class topics include psychosocial models of health and disease, stress and coping, health enhancing and health damaging behaviours, pain management, and a variety of specific behaviour-related medical illnesses (e.g., heart disease, cancer, insomnia).

Prerequisite(s): Psychology 300, 301, 375 and admission to the Psychology major or Honours program.

Antirequisite(s): Credit for Psychology 437 and 330 will not be allowed.

Psychology 439 **3 units; (3-0)**

Psychology of Gender

An analysis of psychological theory and research on gender situated within the interdisciplinary field of gender studies. Topics include the meaning of gender, psychological development and gender, and gender and interpersonal relationships.

Prerequisite(s): Psychology 300 and 301; one of 345 or 351 and admission to the Psychology major or Honours program.

Antirequisite(s): Credit for Psychology 439 and 347 will not be allowed.

Psychology 442 **3 units; (3-0)**

Intergroup Relations

In-depth exploration of intergroup relations from a social psychological perspective. Theory and research about the processes involved in stereotyping, prejudice, and discrimination.

Prerequisite(s): Psychology 300, 301, 345, and admission to the Psychology major or Honours program.

Psychology 443 **3 units; (3-0)**

Interpersonal Relationships

Application of social psychological theory and methodology to a variety of topics in the area of interpersonal relationships such as attraction, close relationships, interpersonal conflict, communication, and power. Course projects will be an integral part of the course.

Prerequisite(s): Psychology 300, 301, 345 and admission to the Psychology major or Honours program.

Psychology 445 **3 units; (3-0)**

Psychology of Morality

An exploration of the origins and nature of moral conduct from the perspective of psychological theory and research. Examination of the naturalistic basis for why people care about morality, behave morally or not, and the psychological bases of moral judgment. Topics may include the evolutionary basis for morality, moral intuitionism, moral development, and moral judgment.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Antirequisite(s): Credit for Psychology 445 and 447.08 will not be allowed.

Psychology 447 **3 units; (3-0)**

Advanced Topics in Personality or Social Psychology

An examination of current research topics in personality or social psychology or gender.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Note: Students are advised to consult with the Department regarding the topic and recommended prerequisites for the course in a given term.

MAY BE REPEATED FOR CREDIT

Psychology 449 **3 units; (3-0)**

Social-Personality Development

Socialization processes and behaviours from birth to adolescence; observational learning, altruism, moral development, sex-roles, dependency, emotional development, and social motivation.

Prerequisite(s): Psychology 300, 301, 351 and admission to the Psychology major or Honours program.

Psychology 451 **3 units; (3-0)**

Cognitive Development

Current and classic research in the area of cognitive development is explored. Topics may include sensory and perceptual development, language acquisition, symbolic representation, concept formation, memory, and social-cognitive development. Laboratory projects introduce methodologies used in research with children.

Prerequisite(s): Psychology 300, 301, 351 and admission to the Psychology major or Honours program or to the minor in Speech-Language Sciences for Linguistics Majors.

Psychology 455 **3 units; (3-0)**

Sensory, Perceptual, and Cognitive Aspects of Aging

Basic research and contemporary issues in the age-related changes in sensation, perception, attention, learning and memory, intelligence and problem-solving.

Prerequisite(s): Psychology 300, 301, 353 and admission to the Psychology major or Honours program.

Psychology 457 **3 units; (3-0)**

Social and Clinical Aspects of Aging

Stability and change in the later years of life with a focus on social and clinical areas of aging.

Prerequisite(s): Psychology 300, 301, 353 and admission to the Psychology major or Honours program.

Psychology 459 **3 units; (3-0)**

Developmental Psychopathology

A critical examination of developmental psychopathology during childhood and adolescence with an emphasis on the characteristics of the disorders, their determinants, and outcomes. Current theories and research, and recent trends in intervention and prevention will be emphasized.

Prerequisite(s): Psychology 300, 301, 351, 385 and admission to the Psychology major or Honours program.

Psychology 463 **3 units; (3-0)**

Memory

Current memory research is explored. Topics include how memories are encoded, and retrieved. Laboratory projects introduce methodologies used in memory research.

Prerequisite(s): Psychology 300, 301, 365 and admission to the Psychology major or Honours program.

Psychology 467 (Linguistics 467) **3 units; (3-2)**

Experimental Psycholinguistics

Exploration of the cognitive, neuropsychological, and social processes that underlie language abilities, with reference to linguistic theory.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program or to the minor in Speech-Language Sciences for Linguistics Majors.

Antirequisite(s): Credit for Psychology 467 and either Linguistics 339 or 439 will not be allowed.

Psychology 469 **3 units; (3-0)**

Vision

A systematic examination of vision and its role in our interactions with the natural environment. Topics may include: the physics of light; optics; eye and retina; visual pathways and visual brain; perception of colour, space, change and motion;

visual development and aging; art and vision; visual disorders; and recovery from blindness.

Prerequisite(s): Psychology 300, 301, 369 and admission to the Psychology major or Honours program.

Psychology 471 **3 units; (3-0)**

Auditory Cognitive Neuroscience

Exploration of auditory perception from an auditory cognitive neuroscience perspective, using music and speech as domains of inquiry. Focus on acoustics, psychophysics, cognitive psychology, cognitive development, neurophysiology, and neuropsychology. Includes hands-on exercises in sound manipulation and experimentation.

Prerequisite(s): Psychology 300, 301, 369 and admission to the Psychology major or Honours program or to the minor in Speech-Language Sciences for Linguistics Majors or the Concentration in Speech-Language Sciences for Linguistics Majors.

Psychology 473 **3 units; (3-0)**

Evolution and Human Behaviour

An examination of the scientific synthesis of evolutionary biology and modern psychology, which offers a novel approach to such issues as short-term and long-term human mating strategies, short-term sexual strategies, conflict between the sexes, parental investment, aggression, and social dominance.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Antirequisite(s): Credit for Psychology 473 and 377 will not be allowed.

Psychology 474 **3 units; (3-0)**
(Neuroscience 474)

Neuroscience of Learning and Memory

An examination of learning and memory from a neuroscience perspective. Molecular, cellular, systems-level, and behavioural approaches will be applied to themes such as consolidation, amnesia, and pathological processes.

Prerequisite(s): Psychology 300, 301, 375 and admission to the Psychology major or Honours program.

Psychology 475 **3 units; (3-0)**
(Neuroscience 475)

Drugs and Behaviour

The behavioural effects of drugs specifically employed to affect the nervous system, as seen in the treatment of mental disorders, behavioural disorders, and other conditions such as Parkinson's, Huntington's and Alzheimer's diseases. Neuro-pharmacologic agents will be discussed as they relate to the biochemistry and physiology of putative neurotransmitters.

Prerequisite(s): Psychology 300, 301, 375 and admission to the Psychology major or Honours program.

Psychology 477 **3 units; (3-0)**
(Neuroscience 477)

Sleep and Biological Rhythms

Behaviours are temporally co-ordinated and occur in a rhythmic fashion. The most obvious rhythmic behaviour humans engage in is sleeping; we spend one-third of our lives asleep. This course will survey the behavioural, physiological, and clinical aspects of sleep and biological rhythms.

Prerequisite(s): Psychology 300, 301, 375 and admission to the Psychology major or Honours program.

Psychology 478 **3 units; (3-3)**
(Neuroscience 478)

Behavioural Neuroscience

An examination of the neural underpinnings of behaviour. Experimental approaches, neural mechanisms, and health implications will be explored through both lecture material and laboratory exercises.

Prerequisite(s): Psychology 300, 301, 375 and admission to the Psychology major or Honours program.

Psychology 479 **3 units; (3-0)**
(Neuroscience 479)

Human Neuropsychology

Integration of the literature on human brain damage with the evidence from animal research. Topics include developmental neuropsychology; cognitive deficits associated with frontal, parietooccipital, and temporal lobes; origins and mechanisms in the determination of cerebral dominance; disorders of learning and memory; long-term effects of cerebral lesions.

Prerequisite(s): Psychology 300, 301, 375 and admission to the Psychology major or Honours program or to the minor in Speech-Language Sciences for Linguistics Majors.

Psychology 481 **3 units; (3-0)**

Advanced Topics in Organizational Psychology

Students will be expected to critically evaluate current theory, research, and practice in the field of Organizational Psychology with content emphasizing primary readings. Student presentations, project work, and debates will emphasize the implications for linking knowledge and practice.

481.01. Leadership and Motivation

481.02. Teams and Teamwork

481.03. Workplace Attitudes and Individual Differences

Prerequisite(s): Psychology 300 and 301; one of 321 or 421 or 423 and admission to the Psychology major or Honours program.

Psychology 483 **3 units; (3-0)**

Advanced Topics in Personnel Psychology

Students will be expected to critically evaluate current theory, research, and practice in the field of Personnel Psychology with content emphasizing primary readings. Student presentations, project work, and debates will emphasize the implications for linking knowledge and practice.

483.01. Personnel Selection

483.02. Personnel Recruitment and Job Choice

483.03. Performance Management

Prerequisite(s): Psychology 300 and 301; one of 321 or 421 or 423 and admission to the Psychology major or Honours program.

Psychology 491 **3 units; (3-0)**

Cross-Cultural Cognition

Theory and research on the interaction of culture and human cognition. Topics include cross-cultural research in perception, language processing, memory, concepts, and reasoning.

Prerequisite(s): Psychology 300, 301, 365 and admission to the Psychology major or Honours program.

Psychology 492 **3 units; (3-0)**
(Indigenous Studies 492)

Indigenous Psychology

An in-depth examination of research in psychology related to Indigenous populations, including the

history of research, major topics, appropriate approaches to conducting research, and new directions.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Psychology 493 **3 units; (3-0)**

Psychology and Law

Consideration of the contributions of psychological theory and research to the understanding of crime investigation, courtroom dynamics, and the legal system. Specific topics may include eyewitness testimony, police practices, judge and jury decision making, lie detection and confessions, and expert testimony. Topics will be discussed from the perspectives of social and cognitive psychology.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Psychology 495 **3 units; (3-0)**

Consumer Psychology

Consideration of the psychological concepts used to understand the processes involved in consumer behaviour. Specific topics may include research methodology, individual and group influences, marketing strategies, and consumer decision making. Topics will be discussed from the perspectives of cognitive and social psychology.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Antirequisite(s): Credit for Psychology 495 and Marketing 483 will not be allowed.

Psychology 497 **3 units; (3-0)**

Consciousness

An exploration of the origin, nature, and function of consciousness as informed by research on conscious and unconscious processes, psychological disorders, neuropsychological case studies, consciousness-altering drugs, hypnosis, meditation, state-dependent memory, sleep, and dreams.

Prerequisite(s): Psychology 300 and 301; one of 365 or 375 and admission to the Psychology major or Honours program.

Psychology 499 **1.5 units; (0-1.5)**

Research Experience in Psychology

Students acquire research experience working under the supervision of a faculty member. Assignments may include literature search, materials preparation, data collection, data organization and management, and data analysis.

499.01 Research Experience I

499.02 Research Experience II

Prerequisite(s): Psychology 300 and 301; 18 units in Psychology, admission to the Psychology major or Honours program, and consent of the Department.

Note: An application is required and it is the student's responsibility to find a research supervisor.

**MAY BE REPEATED FOR CREDIT
NOT INCLUDED IN GPA**

Psychology 501 **3 units; (3S-0)**

Honours Topics Seminar in Psychology

Selected topics from one or more areas in psychology.

Prerequisite(s): Psychology 300, 301, admission to the Psychology Honours program and consent of the Department.

Note: May be repeated once for credit with the consent of the Department. Students should consult the Department concerning topics and recommended preparation for a given term.

Psychology 502 **3 units; (3-2)**

Selected Topics in Psychology with Lab

Selected topics from one or more areas in psychology.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Note: Students are advised to consult with the Department regarding the topic and recommended preparation for the course in a given term.

MAY BE REPEATED FOR CREDIT

Psychology 503 **3 units; (3-0)**

Selected Topics in Psychology

Selected topics from one or more areas in psychology.

Prerequisite(s): Psychology 300, 301 and admission to the Psychology major or Honours program.

Note: Students are advised to consult with the Department regarding the topic and recommended prerequisites for the course in a given term.

MAY BE REPEATED FOR CREDIT

Psychology 504 **6 units; (3-3)**

Research in Psychology

Research project in psychology conducted under the supervision of a faculty member.

Prerequisite(s): Psychology 300, 301, admission to the Psychology major or Honours program and consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 505 **3 units; (3-3)**

Research in Psychology

Research project in psychology conducted under the supervision of a faculty member.

Prerequisite(s): Psychology 300, 301, admission to the Psychology major or Honours program and consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 521 **3 units; (3-0)**
(Neuroscience 521)

Cognitive and Clinical Neuroscience

An examination of how the human central nervous system controls higher order, complex behaviours. Experimental and clinical evidence for the neurobiological regulation of memory, language, attention, perception and emotion will be evaluated.

Prerequisite(s): Psychology 300, 301, 375 and admission to the Psychology major or Honours program.

Psychology 531 **3 units; (3-0)**
(Neuroscience 531)

Nervous System Development

This course will cover the fundamental principles of the development of nervous systems, integrat-

ing anatomical, cellular, molecular, genetic, and behavioural approaches.

Prerequisite(s): Psychology 475 and admission to the Psychology major or Honours program.

Psychology 585 **3 units; (3-0)**

Advanced Themes in Psychopathology

Examination of assessment, phenomenology, etiology, and/or treatment of common psychological disorders. Course will cover few disorders in greater detail.

Prerequisite(s): Psychology 300, 301, 385, 433 and admission to the Psychology major or Honours program.

Psychology 591 **3 units; (3-0)**

Advanced Topics in Cognitive Psychology

A detailed examination of current research topics in cognitive psychology. Topics may include one or more of the following: human memory, thinking, attention, language processing, and computer modelling.

Prerequisite(s): Psychology 300, 301, 365 and admission to the Psychology major or Honours program.

MAY BE REPEATED FOR CREDIT

Psychology 598 **6 units; (3S-6)**

Honours Thesis and Seminar

Research project under the direction of a member of the Department. In the seminar, students will present and discuss their projects and other topics of current relevance.

Prerequisite(s): Admission to the Psychology Honours degree program.

Graduate Courses

Psychology 601 **3 units; (3-0)**

History and Systems of Psychology

History of psychological concepts in Western culture, major theoretical systems of twentieth-century psychology, foundational assumptions of theories in contemporary psychology.

Prerequisite(s): Consent of the Department.

Psychology 607 **3 units; (3-0)**

Advanced Research Design and Methodology in Psychology

Survey of advanced topics in the conduct of psychological research including issues in philosophy of science; origins of research ideas; validity and reliability; measurement; experimental, quasi-experimental, and non-experimental designs; survey research; specialized methods such as computer simulation, psychophysiological methods, event-sampling, online data collection, and cognitive procedures; and ethics.

Prerequisite(s): Consent of the Department.

Psychology 611 **3 units; (3-3)**

Advanced Qualitative Inquiry in Psychology

Qualitative research designs and historical research in psychology. Advanced study of selected qualitative approaches in psychology to include research design, methods, and analysis. Specific topics covered include foundations of qualitative research, evaluation and practical techniques including computerized analysis.

Prerequisite(s): Consent of the Department.

Psychology 613 **3 units; (3-3)**

Signal and Systems Analysis in Behavioural Research

Application of signal and systems analysis to behavioural neuroscience and psychophysics.

Prerequisite(s): Consent of the Department.

Psychology 615 **3 units; (3-3)**

Analysis of Variance

Applications of the general linear model to research design and analysis. Topics include analysis of variance, regression, and analysis of covariance.

Prerequisite(s): Consent of the Department.

Psychology 617 **3 units; (3-3)**

Multivariate Data Analysis

Multivariate techniques and design issues, including canonical correlation, discriminant analysis, multivariate analysis of variance, multivariate regression, principal components analysis and factor analysis.

Prerequisite(s): Consent of the Department.

Psychology 619 **3 units; (3-3)**

Special Topics in the Design of Psychological Research

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 620 **3 units; (3-0)**

Advanced Topics in Brain and Cognitive Sciences

An advanced survey of some of the fundamental issues and recent developments in the Brain and/or Cognitive Sciences. Topics will vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 623 **3 units; (3-0)**

Functional Neuroanatomy

Human neuroanatomy and the development of the central nervous system. Functional relationships between brain and behaviour in a variety of domains (sensorimotor, language, memory, affective processing, social behaviour, etc).

Prerequisite(s): Admission to the Psychology or Clinical Psychology graduate programs.

Psychology 625 **3 units; (3S-0)**

Clinical Neuropsychology

Examination of brain disorders across the lifespan. Epidemiology, etiology and pathogenesis, phenotypic expression, and assessment and treatment of these disorders will be considered.

Prerequisite(s): Admission to the Psychology or Clinical Psychology graduate programs.

Psychology 627 **3 units; (3-3)**

Neuropsychological Testing

The clinical assessment of neuropsychological functioning in children and adults using a hypothesis-testing model. Fundamentals of administration, scoring, and interpretation of core tests used in neuropsychological assessment.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

Psychology 630 3 units; (3-0)**Advanced Topics in Social and Theoretical Psychology**

An advanced survey of some of the fundamental issues and recent developments in Social and/or Theoretical Psychology. Topics will vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 639 3 units; (3-0)**Advanced Industrial and Organizational Psychology**

Application of psychological principles, research and methods relating to human interactions and performance in work settings.

Prerequisite(s): Consent of the Department.

Psychology 641 3 units; (3-0)**Advanced Topics in Health Psychology**

Introduces students to current research issues in health psychology. Focuses primarily on issues related to the study of chronic illnesses and evaluates the role of psychological/behavioural factors in: the etiology of disease, disease prevention, adaptation to illness, and disease progression.

MAY BE REPEATED FOR CREDIT

Psychology 650 6 units; (1S-0)**Research Seminar in Clinical Psychology**

An introduction to research and design issues in clinical psychology.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

MAY BE REPEATED FOR CREDIT

Psychology 651 3 units; (3-0)**Psychopathology**

Current theory, issues, and research regarding the epidemiology, etiology, diagnosis, and prognosis of psychopathology. Implications for assessment and treatment.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

Psychology 659 3 units; (3-0)**Ethics and Professional Issues in Clinical Psychology**

Ethical and legal standards for clinical psychologists. An introduction to professional issues in contemporary clinical practice.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

Psychology 660 6 units; (0-14)**Summer Practicum in Clinical Psychology**

Supervised training experience in an approved clinical setting. Provides exposure to basic issues and techniques in the practice of psychological assessment.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Psychology 671 3 units; (3-3)**Psychological Assessment of Adults**

An overview of theoretical, professional, and ethical issues in the psychological assessment of adult clinical populations. Instruction in the administration and interpretation of assessment procedures for adults including interviews, behavioural assessments, and selected intellectual

and personality tests. Supervised practical experience in the application of adult assessments in a relevant clinical setting.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

Psychology 673 3 units; (3-3)**Psychopathology and Psychological Assessment of Children**

An overview of theoretical, professional and ethical issues in the psychopathology and psychological assessment of child clinical populations. Instruction in the administration and interpretation of child and family assessment procedures including interviews, behavioural assessments, and selected psychological tests. Supervised practical experience in the application of child and family assessments in a relevant clinical setting.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

Psychology 681 3 units; (3-3)**Adult Psychotherapy**

Theory, research, and practice in adult psychotherapy and behaviour change. Supervised exposure to the practice of adult psychotherapy in a relevant clinical setting.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

Psychology 683 3 units; (3-3)**Child Psychotherapy**

Theory, research, and practice in child and family psychotherapy and behaviour change. Supervised exposure to the practice of child and family psychotherapy in a relevant clinical setting.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

Psychology 700 3 units; (3S-0)**Integrative Seminar in Psychology**

Selected interdisciplinary topics in Psychology. Topics will vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 702 3 units; (0-3)**Research in Brain and Cognitive Sciences**

Completion of a research project in Brain and/or Cognitive Sciences conducted under the supervision of a faculty member. Topics may vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 703 3 units; (0-3)**Research in Social and Theoretical Psychology**

Completion of a research project in the areas of Social and/or Theoretical Psychology conducted under the supervision of a faculty member. Topics may vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 709 3 units; (0-3)**Research in Industrial/Organizational Psychology**

Completion of a research project in Industrial/Organizational Psychology conducted under the supervision of a faculty member. Topics may vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 710 6 units; (3S-0)**Integrative Seminar in Psychology**

Selected interdisciplinary topics in Psychology. Topics may vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 712 6 units; (0-3)**Research in Brain and Cognitive Sciences**

Completion of a research project in Brain and/or Cognitive Sciences conducted under the supervision of a faculty member. Topics may vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 713 6 units; (0-3)**Research in Social and Theoretical Psychology**

Completion of a research project in the areas of Social and/or Theoretical Psychology conducted under the supervision of a faculty member. Topics may vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 720 3 units; (3S-0)**Seminar in Brain and Cognitive Sciences**

Selected topics in Brain and/or Cognitive Sciences. Topics may vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 730 3 units; (3S-0)**Seminar in Social and Theoretical Psychology**

Selected topics in Social and/or Theoretical Psychology. Topics may vary.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 739 3 units; (3S-0)**Seminar in Industrial/Organizational Psychology**

Application of psychological principles and methods to business, industry and other organizational settings.

Prerequisite(s): Psychology 639.

MAY BE REPEATED FOR CREDIT

Psychology 750 1.5 units; (3S-0)**Advanced Seminar in Clinical Psychology**

A doctoral-level seminar in advanced topics in the practice of clinical psychology.

750.01. Psychopharmacology

750.02. Neuropsychology

750.05. Diversity Issues in Clinical Psychology

750.06. Clinical Geropsychology

750.09. Addictions

750.10. Health Psychology

750.11. Eating Disorders

750.12. Consultation/Supervision

Prerequisite(s): Admission to the Clinical Psychology graduate program.

NOT INCLUDED IN GPA

Psychology 751 3 units; (3-0)**Special Topics in Adult Psychopathology**

A specialized topic course in the area of adult psychopathology. Course offerings will vary from year-to-year and may include such topics as: schizophrenia, substance abuse, suicide, mental

health delivery systems, or computer applications in clinical psychology.

MAY BE REPEATED FOR CREDIT

Psychology 760 **6 units; (1-7)**

Specialty Practicum in Clinical Psychology I

Supervised training experience in an approved clinical setting. Provides in-depth exposure to specific clinical populations and to the application of various psychological assessment and intervention strategies and techniques.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

NOT INCLUDED IN GPA

Psychology 762 **6 units; (1-7)**

Specialty Practicum in Clinical Psychology II

Supervised training experience in an approved clinical setting. Provides advanced in-depth exposure to specific clinical populations and to the application of various psychological assessment and intervention strategies and techniques.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Psychology 765 **3 units; (1-7)**

Practicum in Clinical Psychology

Supervised training experience in an approved clinical setting. Provides exposure to specific clinical populations and to the application of various psychological assessment and intervention strategies and techniques.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Psychology 798

Pre-Doctoral Internship in Clinical Psychology

A full calendar year, full-time (or two-years, half-time) supervised training experience in an approved clinical setting. Intensive exposure to various professional issues, the opportunity to work with a diverse range of clinical populations and problems, and advanced training in the use of specific psychological assessment and intervention strategies.

Prerequisite(s): Admission to the Clinical Psychology graduate program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Public Policy PPOL

For more information about these courses, see the School of Public Policy: policyschool.ca.

Public Policy 601 **3 units; (3-0)**

Foundations I

This preparatory course covers the foundations necessary to understand and apply economic analysis and it covers selected topics relevant to the core courses listed below.

NOT INCLUDED IN GPA

Public Policy 603 **3 units; (3-0)**

Foundations II

This preparatory course covers the foundations of basic empirical analysis, including quantitative and qualitative research methods.

NOT INCLUDED IN GPA

Public Policy 605 **3 units; (3-0)**

Markets and Public Policy

The role of markets in the allocation of resources and the determination of income. Sources of market failure, and the appropriate public policy response to those failures, are examined. Students learn how private firms make decisions, and how they respond to policy initiatives.

Public Policy 607 **3 units; (3-0)**

Politics and Collective Choice

How public policy issues emerge and how they are developed, refined, and influenced by the political process. The roles and influences of NGOs, interest groups, the media, political parties, and social protest on the development of new public policies are examined from the perspective of several disciplines. The importance of agenda setting, management and planning, policy reform and the organizational resistance to change is examined. Models of rational actors and bureaucratic behaviour are explored.

Public Policy 609 **3 units; (3-0)**

Decision Analysis

The focus is on the foundations, applications and use of quantitative methods commonly used in decision making in the public and private sectors. Included are methods such as impact analysis, cost-benefit analysis, surveys, game theory and risk management tools.

Public Policy 611 **3 units; (3-0)**

Independent Study

Supervised individual study in a selected public policy area.

MAY BE REPEATED FOR CREDIT

Public Policy 613 **3 units; (3-0)**

Effective Writing and Research Skills

Development of skills for writing high quality documents in a professional setting. Defining, designing and executing applied, policy-oriented research.

Public Policy 615 **3 units; (3-0)**

Public Finances

An overview of government finances and the restrictions on policy choices resulting from the need for governments to satisfy a budget constraint. Tax policy, the appropriate design of expenditure policies, policies with respect to deficits and debt, and issues of intergovernmental relations will be examined.

Public Policy 617 **3 units; (3-0)**

Regulation and the Law

The role of international and national legal institutions in determining public policy choices. Legal research and interpretation skills are developed through specific public policy issues such as the design of market regulation in telecommunications, energy and various utility markets.

Public Policy 619 **3 units; (3-0)**

Governance, Institutions and Public Policy

An examination of the rules and informal relationships among those determining public policy outcomes. Alternative institutional relationships and the evolution of those relationships are studied. The ever-changing dynamic of multi-level governance and court versus legislative public policy making are explored.

Public Policy 621 **3 units; (3-0)**

Communicating Policy

Examines all aspects of communication in the context of policy, including the impact of new modes of communication on the development and dissemination of public policy. The new role of blogs, online communities, and web-based media at marshalling and influencing public opinion and the changing role of print media are discussed and evaluated. Implications for copyright policies, media concentration, privacy, and advertising are among the issues examined.

Public Policy 623 **3 units; (9-0)**

Capstone Project

Students learn methods by which research contributes to the design and development of policy outcomes. Students are required to apply the skills they have learned to the completion of a capstone project which investigates a well-defined issue of public policy. The final product of the capstone project is expected to be a substantive, well-researched, focused and highly professional document. Work on the capstone project will be guided by a School of Public Policy faculty member and may include input provided by an expert from the private sector or public sector.

MAY BE REPEATED FOR CREDIT

Real Estate Studies REAL

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Real Estate Studies 317 **3 units; (3-0)**

Real Estate Development and Urbanization

Fundamentals of the real estate industry from bare land to built form, including land development and regulatory body approval acquisition. Exploration of the context of city building, including topics such as the conflict between use value and exchange value of land, political economy of space, globalization trends, sustainability, gentrification and social movements.

Prerequisite(s): Admission to the Haskayne School of Business and 30 units.

Antirequisite(s): Credit for Real Estate Studies 317 and either Management Studies 559.17 or 559.22 will not be allowed.

Real Estate Studies 427 **3 units; (3-0)**

Real Estate Investment and Analysis

Introduction to the instruments, techniques, and institutions of real estate finance, sources of funds and mortgage risk analysis. Residential and commercial real estate contracting fundamentals are also covered. Examination of the risk and rewards when investing in and financing both commercial and residential real estate deals. Concepts include investment, financing, site analysis, appraisals,

lending, and management of real estate portfolios and corporate real estate.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units including Finance 317.

Antirequisite(s): Credit for Real Estate Studies 427 and either Management Studies 559.19 or 559.20 will not be allowed.

Real Estate Studies 437 **3 units; (3-0)**

Land Development and Planning

Introduction to the urban planning process and what is required to gain government approvals for land development proposals, from small-scale re-development projects to large-scale complete new communities. Topics will include: an overview of planning legislation; municipal processes and timelines; the risks and costs associated with planning approvals; stakeholder engagement; developing political acumen; and new trends in managing growth and achieving sustainability goals.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Antirequisite(s): Credit for Real Estate Studies 437 and Management Studies 559.23 will not be allowed.

Real Estate Studies 447 **3 units; (3-0)**

Real Estate Legal and Operating Environment

Foundation of legal, regulatory and stakeholder issues affecting real estate. Topics include: real estate transactions, real estate brokerage, real property ownership interests, illegal discrimination in residential and commercial transactions, and other legal transactions involving real estate, such as sales and leases. Challenges within approvals processes based on government relations and stakeholder perceptions are also a focus.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units including Business and Environment 395.

Real Estate Studies 457 **3 units; (3-0)**

Real Estate Marketing

Marketing is essential to the success of any real estate development project. In this course, students review the role that marketing plays at each step in the development process, gain an understanding of changing real estate markets, and learn how to utilize market research information, develop and manage a marketing program, create unique project identities, and undertake an effective advertising and communications program.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units including Marketing 317.

Real Estate Studies 559 **3 units; (3-0)**

Selected Topics in Real Estate Studies

Investigation of selected topics in Real Estate Studies.

Prerequisite(s): Admission to the Haskayne School of Business and 54 units including Real Estate Studies 317.

Real Estate Studies 567 **3 units; (3-0)**

Project-Based Capstone

Application of classroom learnings to a project relevant to the real estate industry. Sectors may include: commercial developers, brokerage firms,

residential developers (greenfield and infill), municipal government and consulting firms.

Prerequisite(s): Admission to the Haskayne School of Business, Bachelor of Commerce Real Estate Studies concentration, Real Estate Studies 317 and 427.

Graduate Courses

Real Estate Studies 707 **3 units; (3-0)**

Fundamentals of Real Estate

Provides an overview of real estate development – from bare land to built form. Covers valuation, conflict between use and exchange value of land, market value/assessment, comparison of different sectors and business models, environmental/social considerations, and trends.

Prerequisite(s): Admission to the Master of Business Administration program.

Antirequisite(s): Credit for Real Estate Studies 707 and any of Management Studies 789.04, 789.08, or Real Estate Studies 757 will not be allowed.

Real Estate Studies 717 **3 units; (3-0)**

Real Estate Investment and Analysis

Structure and operations of the Canadian mortgage and asset-backed securities markets. Topics include instruments, techniques, and institutions of real estate finance, sources of funds, mortgage risk analysis, and fundamentals of residential and commercial real estate contracting. Examination of the risks and rewards when investing in and financing both commercial and residential real estate deals. Concepts include investment, financing, site analysis, appraisals, lending, and management of real estate portfolios and corporate real estate.

Prerequisite(s): Admission to the Master of Business Administration and Finance 601.

Antirequisite(s): Credit for Real Estate Studies 717 and either Management Studies 789.03 or 789.05 will not be allowed.

Real Estate Studies 727 **3 units; (3-0)**

Land Development and Planning

Introduction to urban planning. Topics will include planning legislation, municipal processes and timelines, the risks and costs associated with planning approvals, stakeholder engagement, developing political acumen, and new trends in managing growth and achieving sustainability goals.

Prerequisite(s): Admission to the Master of Business Administration.

Antirequisite(s): Credit for Real Estate Studies 727 and Management Studies 789.09 will not be allowed.

Real Estate Studies 737 **3 units; (3-0)**

Legal and Operating Environment

Foundation of legal, regulatory and stakeholder issues affecting real estate. Topics will include real estate transactions, real estate brokerage, real property ownership interests, illegal discrimination in residential and commercial transactions, and other legal transactions involving real estate, such as sales and leases. Governance models, legislation, policies and by-laws in relation to the business of real estate and land development.

Prerequisite(s): Admission to the Master of Business Administration.

Real Estate Studies 747 **3 units; (3-0)**

Real Estate Marketing

Coverage includes real estate marketing programs based on theoretical principles, an understanding of changing real estate markets, marketing

methods, research approaches and marketing program development.

Prerequisite(s): Admission to the Master of Business Administration and Marketing 601.

Real Estate Studies 767 **3 units; (3-0)**

Advanced Real Estate Development

Includes market and financial analyses, development planning and design, presentations, and contact with key industry sources. May include site visits.

Prerequisite(s): Admission to the Master of Business Administration program.

Corequisite(s): Prerequisite(s) or Corequisite(s): Either Real Estate Studies 707 as a prerequisite or Real Estate Studies and 717 as a corequisite.

Antirequisite(s): Credit for Real Estate Studies 767 and either Management Studies 789.12 or Environmental Design 683.69 will not be allowed.

Real Estate Studies 789 **3 units; (3-0)**

Selected Topics in Real Estate Studies

Investigation of selected topics in Real Estate Studies.

Prerequisite(s): Admission to the Master of Business Administration and one of Real Estate Studies 707 or 757.

Religious Studies RELS

For more information about these courses, see the Department of Classics and Religion website: <https://clare.ucalgary.ca/>.

Religious Studies Table of Streams

For use in selecting courses to meet stream requirements:

| Western Religions | Nature of Religion | Eastern Religions |
|-------------------|--------------------|-------------------|
| 201 | 200 | 203 |
| 300 | 205 | 303 |
| 301 | 309 | 307 |
| 302 | 331 | 310 |
| 305 | 333 | 312 |
| 353 | 335 | 313 |
| 357 | 338 | 314 |
| 367 | 339 | 316 |
| 369 | 341 | 317 |
| 383 | 343 | 319 |
| 385 | 344 | 320 |
| 387 | 345 | 322 |
| 389 | 346 | 323 |
| 469 | 348 | 324 |
| 477 | 349 | 327 |
| 484 | 363 | 329 |
| 486 | 381 | 359 |
| | 397 | 360 |
| | 398 | 445 |
| | 417 | 451 |
| | 437 | 453 |
| | 439 | 461 |
| | 440 | Philosophy 335 |
| | 442 | |

| | | |
|--|-----------------------------|--|
| | 444 | |
| | 447 | |
| | 463 | |
| | 479 | |
| | Philosophy 331 | |
| | Philosophy 527 | |
| | Greek and Roman Studies 499 | |

Religious Studies 373, 399, 474, 491, and 595 will be designated as Western, Eastern or Nature of Religion depending on the topic covered. Religious Studies 377, 577, and 590 are not counted in any of the three streams.

Notes:

- To request "consent of the Department", students should contact the Department Undergraduate Program Support at clare@ucalgary.ca.
- The Department of Classics and Religion Studies' policy is to consider requests for prerequisite waivers no earlier than one month prior to the start of a term.

Junior Courses

Religious Studies 200 **3 units; (3-0)**

Religious Myths and Worldviews

Readings (in English translation) from the classical literatures of middle Eastern and Asian religions. Introduction to the evolving mythological traditions from three geo-cultural centres (the middle East, India, and China) by examining religious themes: cosmology; existential values and goals; destinies of humans, the world, and the cosmos.

Religious Studies 201 **3 units; (3-0)**

Jews, Christians and Muslims

Introduction to Judaism, Christianity and Islam.

Religious Studies 203 **3 units; (3-0)**

Asian Religions

Introduction to Eastern religions such as Jainism, Hinduism, Sikhism, Buddhism, Confucianism and Taoism.

Religious Studies 205 **3 units; (3-0)**

Religion and The Good Life

An introduction to the academic study of religion with particular emphasis on the nature of religion, its role as a response to existential questions, and the relationship of religion to contemporary thought and culture.

Antirequisite(s): Credit for Religious Studies 205 and 350 will not be allowed.

Senior Courses

Religious Studies 300 **3 units; (3-0)**
(formerly Religious Studies 207)

Classical Hebrew I

Classical or Biblical Hebrew language; the development of ability in the critical reading of ancient texts. No attempt will be made to provide any competence in medieval or modern Hebrew.

Religious Studies 301 **3 units; (3-0)**

Studies in the Hebrew Bible/Old Testament

An introduction to the critical study and reading of the books of the Hebrew Bible/Old Testament in English translation. The course focuses on the Bible as religious literature.

Religious Studies 302 **3 units; (3-0)**
(formerly Religious Studies 209)

Classical Hebrew II

Continuation of Religious Studies 300.

Prerequisite(s): Religious Studies 300.

Religious Studies 303 **3 units; (3-0)**

Introduction to Hinduism

The history, textual traditions, schools and sectarian traditions of Hinduism.

Religious Studies 305 **3 units; (3-0)**
(Greek and Roman Studies 305)

Greek Religion

A survey of religious beliefs and practices in the pre-Christian Greek World.

Prerequisite(s): One of Greek and Roman Studies 205, 209, Religious Studies 201, or 205.

Religious Studies 307 **3 units; (3-0)**

Popular Hinduism

An introductory survey of the contemporary practices of Hinduism in South Asia and in diaspora Hindu communities throughout the world. Focusing on recent ethnographic research, the course examines the diversity of popular Hindu practices with special attention to differences defined by region, language, caste, and gender. Topics covered will include, but are not limited to, the structure of social and family life, the organization of sacred space and time, ritual practices, and the influence and impact of modernity in Hindu life.

Religious Studies 309 **3 units; (3-0)**

Religious Experience

A study of philosophical and psychological theories of the nature and function of religious experiences and an introduction to a variety of religious experiences, which may include theophany, mysticism, enlightenment, conversion, and guilt.

Religious Studies 310 **3 units; (3-0)**
(formerly Religious Studies 211)

Sanskrit I

Classical Sanskrit language; the development of ability in the critical reading of ancient Hindu or Buddhist texts.

Religious Studies 312 **3 units; (3-0)**
(formerly Religious Studies 213)

Sanskrit II

Continuation of Religious Studies 310.

Prerequisite(s): Religious Studies 310.

Religious Studies 313 **3 units; (3-0)**

Introduction to Buddhism

Buddhist developments from the time of Buddha to the development of Mahayana.

Religious Studies 314 **3 units; (3-0)**
(formerly Religious Studies 215)

Tibetan I

Classical Tibetan language; the development of ability in the critical reading of ancient Bon and Buddhist texts.

Religious Studies 316 **3 units; (3-0)**
(formerly Religious Studies 217)

Tibetan II

Continuation of Religious Studies 314.

Prerequisite(s): Religious Studies 314.

Religious Studies 317 **3 units; (3-0)**

Religion in South Asia

An in-depth survey of the religious traditions of the Indian sub-continent. Special attention will be given to the long history of religious pluralism and recent communal conflicts in South Asia. The course will cover religious traditions that have come to South Asia from other parts of the world (primarily Islam, but also Zoroastrianism, Judaism, Christianity and Baha'i).

Religious Studies 319 **3 units; (3-0)**

Esoteric Buddhism

The development of Vajrayana, Tantric and other esoteric traditions of Buddhism in India, Tibet, China, Japan and in the West from medieval times to the present.

Religious Studies 320 **3 units; (3-0)**
(formerly Religious Studies 219)

Classical Chinese for Religious Texts I

Introduction to Classical Chinese language, with emphasis on developing the ability to read ancient Chinese religious texts.

Religious Studies 322 **3 units; (3-0)**
(formerly Religious Studies 221)

Classical Chinese for Religious Texts II

Continuation of Religious Studies 320.

Prerequisite(s): Religious Studies 320.

Religious Studies 323 **3 units; (3-0)**

Mahayana Buddhism

Mahayana developments in India, China, Tibet or Japan.

Religious Studies 324 **3 units; (3-0)**

Zen Buddhism

An exploration of the thought and practice of Chan (Chinese) and Zen (Japanese) Buddhism, including twentieth-century developments in the west.

Religious Studies 327 **3 units; (3-0)**

Tibetan Religious Traditions

The religious developments in Tibet, with emphasis on religious history, literature and philosophy and their contemporary implications.

Religious Studies 329 **3 units; (3-0)**

Buddhism in East Asia

The history, doctrines, literature and leading figures of Buddhism in China and Japan.

Religious Studies 331 **3 units; (3-0)**

Religious Perspectives on Suffering

An examination of various religious perspectives on the nature and causes of human suffering.

Religious Studies 333 **3 units; (3-0)**

Religious Perspectives on Death and Afterlife

An examination of various religious perspectives on the nature of death and life after death.

Religious Studies 335 **3 units; (3-0)**

Ritual and Religion

A major form of religious expression is the various practices and rituals performed by individuals and the community. Various ritual theories and approaches will be examined along with different examples of religious ritual expressions.

Religious Studies 338 3 units; (3-0)**Atheism**

A consideration of various historical and thematic critiques of religion, including the development of modern agnosticism, atheism and in recent times, the 'new atheism'.

Religious Studies 339 3 units; (3-0)**Transformations of Religion in Africa**

Nature of religion through a study of religious transformations in Africa.

Religious Studies 341 3 units; (3-0)**New Religious Movements**

An examination of the beliefs, practices and developments of new religious movements of both Eastern and Western origins (e.g. Krishna Consciousness, Transcendental Meditation, Unification Church, Children of God, etc.).

Religious Studies 343 3 units; (3-0)**Religion and Social Morality**

Critical examination of social theories of religion and religious perspectives on ethical issues of social, economic, and political consequence in contemporary cultures.

Religious Studies 344 3 units; (3-0)**The Bible as Literature**

An exploration of the various literary genres that make up the sixty-six books of the Bible, understood as a compilation of human literature reflecting millennia of communal struggle, vision, and engaged reception.

Religious Studies 345 3 units; (3-0)**God and Transcendence**

Comparative and theoretical discussion of various traditions, Eastern and Western, regarding the object of religious belief and devotion.

Religious Studies 346 3 units; (3-0)**Chaos, Demons and Monsters**

An examination of religious depictions of supernatural evil agents and forces in the light of their role in the experience of good/evil, suffering/happiness, and existence/death.

Religious Studies 348 3 units; (3-0)**Religion, Empire and Colonialism**

An examination of the complex interplay of religious traditions and imperial projects. The development of religion in response to engagement with other cultures, religions and traditions brought on by colonialism, as well as the religious construction and categorization of these others, will be considered through comparative, historical, literary and/or thematic lenses. Modern responses to colonialism as well as discussions of multiculturalism and immigration may be discussed as they relate to religion.

Religious Studies 349 3 units; (3-0)**Religion and Politics**

A study of the complex relationship between religion and politics, including nationalism and political religions. Topics may include the origin of apartheid in South Africa, Black Theology, the rise of the New Christian Right in America, Hindu and Islamic political movements, and various forms of Fascism including the Nazi movement.

Religious Studies 353 3 units; (3-0)**Islam in the Modern World**

Reform, revivalist and sectarian movements and significant thinkers in Modern Islam.

Religious Studies 357 3 units; (3-0)**Islam**

A survey of the basic religious ideas, texts, figures, and practices in Islam, including their historical development.

Religious Studies 359 3 units; (3-0)**East Asian Religious Traditions**

The history, doctrines and literature of the major religious traditions of China, Korea and Japan.

Religious Studies 360 3 units; (3-0)**Buddhist Practice Traditions**

An introduction to different kinds of meditation practices in Buddhist traditions, through their historical trajectories and their related devotional and ritual aspects. The material is organized according to principal contemporary areas (Vipassana, Chan/Zen/Son, Pureland, Tibetan).

Religious Studies 363 3 units; (3-0)**Cross-Cultural Philosophy of Religion**

Comparative study of philosophical issues of religious interest arising from diverse cultures.

Religious Studies 367 3 units; (3-0)**Comparative Studies in Western Religions**

A comparative and critical examination of a specific topic within Judaism, Christianity, and Islam. Possible topics include: Material Culture, Pilgrimage, and Scriptural Exegesis.

Note: May be counted only twice towards the Major Field requirements in Religious Studies.

MAY BE REPEATED FOR CREDIT**Religious Studies 369** 3 units; (3-0)**Introduction to Judaism**

An introduction to the major practices, beliefs, institutions and religious literature of the Jewish religion, as developed from antiquity to modern times.

Religious Studies 373 3 units; (3-0)**Topics in Religious Studies**

Topics may include an overview of a specific religious tradition, an examination of religious expressions in a particular context, a thematic study of a religion or religions, or a methodological approach to the study of religion.

MAY BE REPEATED FOR CREDIT**Religious Studies 377** 3 units; (3-0)**Research and Critical Inquiry in Religious Studies**

Systematic instruction in research methods, academic writing, and the practice of critical analysis in the field of Religious Studies. Besides practical instruction, students will be introduced to a variety of methods and theories used in the academic study of religion.

Prerequisite(s): Admission to Religious Studies major or minor.

Religious Studies 381 3 units; (3-0)**Gender, Sex and Religion**

An examination of the complex interrelationship between understandings and constructions of

gender, sexuality and Religion as they arise in the context of several religious traditions.

Antirequisite(s): Credit for Religious Studies 381 and 373.09 will not be allowed.

Religious Studies 383 3 units; (3-0)**From Jesus to Christ**

The study of formative Christianity up to 200 CE in its political, social and religious contexts.

Religious Studies 385 3 units; (3-0)**Pagans and Christians**

Examination of the evolution of ancient 'pagan' (Greek and Roman non-Christian) and early Christian religions from 200-800 CE, exploring their similarities, differences, and interactions, and situating them in their social, economic, cultural, and political context.

Religious Studies 387 3 units; (3-0)**Christian Monks, Mystics and Reformers**

An overview of medieval Christian monasticism and mysticism, including female mystics such as Margery Kempe and Julian of Norwich, as well as humanists such as Erasmus, and early modern Protestant and Catholic Reformers.

Religious Studies 389 3 units; (3-0)**Christian Responses to Modernity**

Examines various Christian responses to modernity from 1600 CE, including German Pietism, English Puritanism, John Wesley and early Evangelicalism, Protestant Liberalism, Vatican II and modern Roman Catholicism, Liberation Theology, and inter-religious dialogue.

Religious Studies 397 3 units; (3-0)**Religion and Science**

The relationship between religion and science with emphasis on contemporary discussions regarding the intersection of religious thought and theories in the natural sciences.

Religious Studies 398 3 units; (3-0)**Religion and the Environment**

Consideration of issues of public environmental concern from the perspectives of religious studies and ethics. Possible topics include climate change, water depletion, environmental pollution, animal stresses, species/ecosystem decimation, and the climate refugee problem.

Religious Studies 399 3 units; (3-0)**Religion in Popular Culture**

The intersection of religion with popular culture is explored through specific topics.

Note: May be counted only once towards the major field requirements in Religious Studies.

MAY BE REPEATED FOR CREDIT**Religious Studies 417** 3 units; (3-0)**Recent Religious Thought**

Detailed examination of a selected writer, topic, or intellectual current in recent religious thought.

Prerequisite(s): 3 units in Nature of Religion at the 300 level (see Table of Streams at beginning of Department offerings).

MAY BE REPEATED FOR CREDIT**Religious Studies 437** 3 units; (3-0)**Hermeneutics**

Significance of the hermeneutical tradition for an understanding of religious issues and traditions with attention to the thought of Schleiermacher,

Dilthey, Husserl, Heidegger, Gadamer, and Ricoeur among others.

Prerequisite(s): 3 units of Religious Studies at the 300 level.

Religious Studies 439 **3 units; (3-0)**

Advanced Studies in New Religious Movements
Detailed study of selected topics in New Religious Movements.

Prerequisite(s): Religious Studies 341.

MAY BE REPEATED FOR CREDIT

Religious Studies 440 **3 units; (3-0)**

Religion and Economic Systems

A consideration of the relationship between religious practices and systems of exchange, credit, and economic rationalization. Historical documents will be used to illustrate the complex nature of religion and economics.

Prerequisite(s): 3 units in Religious Studies at the 300 level.

Religious Studies 444 **3 units; (3-0)**

Existentialism

An examination of existentialist thinkers from the nineteenth and twentieth centuries, contextualizing their work within both modernity and theist/atheist discourses.

Prerequisite(s): 3 units of Religious Studies at the 300 level.

Religious Studies 445 **3 units; (3-0)**

Advanced Studies in Asian Thought

A critical examination of Asian philosophical and religious thinkers.

Prerequisite(s): Philosophy 335 or 3 units of Religious Studies at the 300 level.

Religious Studies 447 **3 units; (3-0)**

Theories of Religion

A critical examination of various theories used in the academic study of religion.

Prerequisite(s): Religious Studies 377 and 3 units of courses labelled Religious Studies at the 300 level.

Note: Only open to Religious Studies major and Honours students and students registered in combined programs with Religious Studies.

Religious Studies 451 **3 units; (3-0)**

Advanced Studies in Hinduism

In-depth study of the historical developments of Hinduism (Vedic, Classical, Medieval, Modern) in a seminar or independent study format.

Prerequisite(s): Religious Studies 303 or 307.

MAY BE REPEATED FOR CREDIT

Religious Studies 453 **3 units; (3-0)**

Advanced Studies in Buddhism

A seminar course that focuses on selected traditions, or philosophical or historical themes, such as Madhyamaka, Yogacara, T'ien T'ai, Hua Yen, Zen, Pure Land, Nyingma, Kargyud, Abhidharma, Tathagatagarbha, and Dhyana.

Prerequisite(s): One of Religious Studies 313, 319, 323, 327, or 329.

MAY BE REPEATED FOR CREDIT

Religious Studies 461 **3 units; (3-0)**

Advanced Studies in East Asian Religions

A seminar course that focuses on selected topics related to the Confucian, Daoist, Buddhist, or Shinto traditions in China, Korea and Japan.

Prerequisite(s): Religious Studies 359.

MAY BE REPEATED FOR CREDIT

Religious Studies 463 **3 units; (3-0)**

Advanced Topics in Cross-Cultural Philosophy of Religion

Advanced comparative study of selected philosophical issues of religious interest arising from diverse cultures.

Prerequisite(s): 3 units of Religious Studies at the 300 level.

MAY BE REPEATED FOR CREDIT

Religious Studies 469 **3 units; (3-0)**

Advanced Studies in Judaism

Selected topics in Jewish practices, institutions, beliefs and religious literature. Possible topics include: Jewish Movements of the Second Temple Era; Jewish Rituals and Observances; Midrash and Jewish Biblical Interpretation; Law and Religion in Judaism; Jewish Philosophy and Theology; Judaism in the Modern World; Kabbalah and Jewish Mysticism.

Prerequisite(s): Religious Studies 369.

MAY BE REPEATED FOR CREDIT

Religious Studies 473 **3 units; (3-0)**

Advanced Studies in Islam

Thematic considerations of topics, such as Islamic philosophy, mysticism, theology, or contemporary trends, based on primary sources. Although no knowledge of Arabic is required, students with backgrounds in Arabic will have the option of working with texts in their original languages.

Prerequisite(s): Religious Studies 353 or 357.

MAY BE REPEATED FOR CREDIT

Religious Studies 474 **3 units; (3-0)**

Advanced Topics in Religious Studies

Topics may include an overview of a specific religious tradition, an examination of religious expressions in a particular context, a thematic study of a religion or religions, or a methodological approach to the study of religion.

Prerequisite(s): 3 units of courses labelled Religious Studies at the 300 level.

MAY BE REPEATED FOR CREDIT

Religious Studies 477 **3 units; (3-0)**

Further Studies in the Hebrew Bible/Old Testament

Selected readings, in English translation, from the three major divisions (Pentateuch, Prophets, and Writings) of the Hebrew Bible/Old Testament. Covers topics such as creation, miracles in Egypt, ark of the covenant, sacrifice, prophecies of the Bible, and biblical views of death and immortality.

Prerequisite(s): Religious Studies 301.

Religious Studies 479 **3 units; (3-0)**

Contemporary Issues in Women and Religion

A topical examination of developments in current research in such areas as: gender theory, post-colonialism, philosophy and religion, feminist theology, feminist evaluation of traditional religious

structures, or interdisciplinary work in the reconstruction of women's religiosity.

Prerequisite(s): 3 units of Religious Studies at the 300 level.

Religious Studies 484 **3 units; (3-0)**

Advanced Studies in Christianity

A seminar course examining topics, personalities and movements in Christianity from its origins to its modern and contemporary developments.

Prerequisite(s): One of Religious Studies 383, 385, 387, or 389.

MAY BE REPEATED FOR CREDIT

Religious Studies 491 **3 units; (3-0)**

Reading Religious Texts in Primary Languages

Study of religious texts in original languages such as Hebrew, Sanskrit, Tibetan, Chinese or Japanese.

Prerequisite(s): One of Religious Studies 302, 312, 316 or 322.

MAY BE REPEATED FOR CREDIT

Religious Studies 577 **3 units; (3-0)**

Senior Project Seminar

Students will complete an independent research project on a topic within their area of concentration in Religious Studies and present their research in a seminar setting.

Prerequisite(s): Religious Studies 377 and 6 units of Religious Studies at the 400 or 500 level and admission to the Religious Studies major or minor.

Religious Studies 590 **6 units; (0-3T)**

Honours Thesis

Students compose a major research paper under the close supervision of a member of the Department and defend the thesis before an examining committee.

Prerequisite(s): Religious Studies 377 and 6 units of Religious Studies at the 400 or 500 level and admission to the Honours program in Religious Studies or Ancient and Medieval History.

Religious Studies 595 **3 units; (3T-0)**

Directed Independent Study

Advanced study of a particular topic under the direction of a faculty member. Qualified students will be supervised through a session of independent study.

Prerequisite(s): 9 units in Religious Studies at the senior level with at least 3 units at the 400 level or above and consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Religious Studies 601 **3 units; (3-0)**

Studies in Western Religions

MAY BE REPEATED FOR CREDIT

Religious Studies 603 **3 units; (3-0)**

Studies in Eastern Religions

MAY BE REPEATED FOR CREDIT

Religious Studies 605 **3 units; (3-0)**

Studies in the Nature of Religion

MAY BE REPEATED FOR CREDIT

Religious Studies 607 3 units; (0-3T)

Supervised Master's Thesis Inquiry

Religious Studies 609 3 units; (3-0)

Selected Topics on Critical Discourses in the Study of Religion

Selected topics on critical discourses in the study of religion.

MAY BE REPEATED FOR CREDIT

Religious Studies 681 3 units; (3-0)

Specialized Studies in Western Religions

MAY BE REPEATED FOR CREDIT

Religious Studies 683 3 units; (3-0)

Specialized Studies in Eastern Religions

MAY BE REPEATED FOR CREDIT

Religious Studies 685 3 units; (3-0)

Specialized Studies in the Nature of Religion

MAY BE REPEATED FOR CREDIT

Religious Studies 701 3 units; (3-0)

Studies in Western Religions

MAY BE REPEATED FOR CREDIT

Religious Studies 703 3 units; (3-0)

Studies in Eastern Religions

MAY BE REPEATED FOR CREDIT

Religious Studies 705 3 units; (3-0)

Studies in the Nature of Religion

MAY BE REPEATED FOR CREDIT

Religious Studies 707 3 units; (3-0)

PhD Departmental Colloquium

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Religious Studies 709 3 units; (3-0)

Advanced Topics on Critical Discourses in the Study of Religion

Advanced topics on critical discourses in the study of religion.

MAY BE REPEATED FOR CREDIT

Risk Management and Insurance RMIN

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses

Risk Management and Insurance 317 3 units; (3-0)

Introduction to Risk Management and Insurance

Introduction to, and an understanding of, risk management and insurance as they pertain to both personal and business situations, with an emphasis on personal risk management. Includes a survey of risk management and insurance principles and focuses on risk assessment, property-liability insurance, employee benefits, retirement, and life and health insurance.

Prerequisite(s): Admission to the Haskayne School of Business or the Actuarial Science program, and 30 units including Economics 201.

Risk Management and Insurance 439 3 units; (3-0)

Protecting your Family and Wealth

Examines the role that life and health insurance plays in securing individuals' financial futures, whether ensuring family security, or preserving the value produced by the time and energy spent building a business. Topics include wealth transfer to the next generation as well as protection of income and assets. The best fit for different types of policies available at different stages in life will also be examined.

Prerequisite(s): Admission to the Haskayne School of Business or the Actuarial Science program, and Finance 317 or Risk Management and Insurance 317.

Risk Management and Insurance 449 3 units; (3-0)

Employee Benefits and Social Insurance

Employee benefits are a major component of a firm's compensation package. This course examines employer and employee objectives for benefit plans; government programs around which employer-sponsored plans must be designed, design and administration of benefits programs (including group life insurance, group health insurance, and pension plans), and how the employer and government-based benefits fit into an individual's financial plan.

Prerequisite(s): Admission to the Haskayne School of Business or the Actuarial Science program, and Finance 317 or Risk Management and Insurance 317.

Risk Management and Insurance 459 3 units; (3-0)

Managing Commercial Property and Liability Risks

Examines risk management for commercial property and liability exposures. The first half of the course focuses on common property loss exposures that firms face and examines methods of handling such risks. The second half focuses on liability exposures of commercial enterprises, including premises and operations liability, product liability, employment practices liability and director's and officers' liability.

Prerequisite(s): Admission to the Haskayne School of Business.

Corequisite(s): Risk Management and Insurance 317.

Risk Management and Insurance 559 3 units; (3-0)

Selected Topics in Risk Management and Insurance

Combines a fundamental understanding of insurance and risk management with current issues confronting the insurance industry and risk managers.

Prerequisite(s): Admission to the Haskayne School of Business and Risk Management and Insurance 317. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Risk Management and Insurance 579 3 units; (3-0)

Advanced Topics in Risk Management and Insurance

A study of the various methods used to finance the operational risks of commercial enterprises.

Key topics addressed are: loss forecasting, insurance, alternative risk financing, reinsurance and environmental risk management.

Prerequisite(s): Admission to the Haskayne School of Business and Risk Management and Insurance 317.

Graduate Course

Risk Management and Insurance 763 3 units; (3-0)
(formerly Finance 763)

Managing Risks and Disasters

Risk management strategies with emphasis on the management of operational and hazard risks. Topics include risk identification and assessment; organizational responsibility for risk management; risk mitigation; risk financing; crisis management, and business continuity planning.

Prerequisite(s): Consent of the Haskayne School of Business.

Romance Studies ROST

For more information about these courses, see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

Junior Course

Romance Studies 299 3 units; (3-0)

Romance Culture

Study of Mediterranean cultures: France, Italy and Spain.

Senior Courses

Romance Studies 341 3 units; (3-0)

Italian Literature of the Renaissance

Major authors of the Italian Renaissance whose works have influenced artists and writers in England, France and Spain.

Note: This course is given in English and no knowledge of Italian is required.

Romance Studies 399 3 units; (3-0)

Topics in Romance Languages

Topics in Romance Languages, Literatures and Cultures.

MAY BE REPEATED FOR CREDIT

Romance Studies 499 3 units; (3-0)

Advanced Topics in Language and Culture

Discussion of selected topics dealing with Romance languages, literatures and cultures.

Prerequisite(s): One of French 227, 317, Italian 303 or Spanish 303.

Note: May be counted as one of the required courses at the 400 level for French and Spanish Majors.

MAY BE REPEATED FOR CREDIT

Russian RUSS

For more information about these courses, see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

Language Placement information see 4.59 Placement in Language Courses.

Note: Russian 317, 355 and 451 are taught in English and no knowledge of Russian is required.

Junior Courses

Russian 201 **3 units; (3-0)**

Introductory Russian I

Introduction to Russian in its cultural context. Four-skills language learning (reading, listening, speaking, writing) covering the principal elements of modern Russian. Focuses on Russian pronunciation and intonation, the Cyrillic alphabet, the foundations of Russian grammar, as well as basic vocabulary.

Note: Students must complete an online placement form before classes begin. For information, consult <https://sllc.ucalgary.ca/placement>.

Russian 209 **3 units; (3-1)**

Introductory Russian II

A further introduction to the basics of the Russian language, including its differences from and similarities to English, within the cultural and historical context. Structured according to various aspects of everyday life, such as family, university, professions, etc.

Prerequisite(s): Russian 201 or 205.

Antirequisite(s): Credit for Russian 209 and 203 will not be allowed.

Senior Courses

Russian 301 **3 units; (3-1)**

Continuing Russian I

Further acquisition of the basic level of the language, enabling function in a variety of everyday situations by building comprehensive knowledge of grammar, expanding active vocabulary, and providing cultural information.

Prerequisite(s): Russian 30, 30-3Y, 209.

Russian 303 **3 units; (3-1)**

Continuing Russian II

Further strengthens knowledge of the basics of the language enabling advancement to a more advanced stage of language mastery.

Prerequisite(s): Russian 301.

Russian 309 **3 units; (2-1)**

Russian Urban Culture in Immersion Setting

Introduction to contemporary urban Russian culture through research projects and life experience.

Prerequisite(s): Russian 303.

Note: This course is offered during a group study program in Russia. A supplementary fee will be assessed to cover additional costs associated with this course.

Russian 311 **3 units; (1-2)**

Russian Rural Culture in Immersion Setting

Introduction to contemporary rural Russian culture through research projects and life experience.

Corequisite(s): Russian 309 and 313.

Note: This course is offered during a group study program in Russia. A supplementary fee will be assessed to cover additional costs associated with this course.

Russian 313 **3 units; (1-2)**

Russian Language in Immersion Setting

Further development of oral skills and writing proficiency.

Corequisite(s): Russian 309 and 311.

Note: This course is offered during a group study program in Russia. A supplementary fee will be

assessed to cover additional costs associated with this course.

Russian 317 **3 units; (3-0)**

Topics in Russian Civilization and Thought

Distinctive features in the development of Russian civilization and thought.

Note: Taught in English. May be repeated for a maximum credit of 6 units.

MAY BE REPEATED FOR CREDIT

Russian 331 **3 units; (3-1)**

Intermediate Russian I

Strategies for accelerated proficiencies in the areas of vocabulary, the deciphering of written and oral texts and the relating of learned linguistic patterns to communicative contexts, with attention to appropriate discourse level in a variety of situations.

Prerequisite(s): Russian 303.

Russian 333 **3 units; (3-1)**

Intermediate Russian II

A continuation of Russian 331.

Prerequisite(s): Russian 331.

Russian 355 **3 units; (3-0)**

Russian Literature in Translation

Selected texts by author, genre or period designed to explore issues of significance in the context of Russian culture.

Note: Taught in English. May be repeated for credit to a maximum of 6 units.

MAY BE REPEATED FOR CREDIT

Russian 360 **3 units; (3-0)**

Russian Literature of the Nineteenth and Twentieth Centuries

Overview of Russian literature of the nineteenth and twentieth centuries in a historical perspective, with attention to issues of particular significance in Russian literary culture. Initial experience of literary analysis on the basis of diverse Russian texts.

Prerequisite(s): Russian 303 and one of 355 or 317.

MAY BE REPEATED FOR CREDIT

Russian 363 **3 units; (3-0)**

Current Issues in Russian Culture

Selected significant issues in Russian culture, as manifested in written and/or oral texts, with particular attention to language function and usage.

Prerequisite(s): Russian 303.

MAY BE REPEATED FOR CREDIT

Russian 397 **3 units; (3-0)**

Inter-Cultural Immersion Experience I

Independent study course. Project with inter-cultural theme, derived from an immersion experience, most likely abroad.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: Permission to enrol requires a faculty member's agreement to sponsor the course of study.

NOT INCLUDED IN GPA

Russian 400 **3 units; (3-0)**

Topics in Advanced Russian

Provides diverse contexts and relies on various media and techniques to generate active and

sophisticated usage of the language. Equips students with skills and strategies for independent language learning.

Prerequisite(s): Russian 333.

MAY BE REPEATED FOR CREDIT

Russian 451 **3 units; (3-0)**

Cross-Cultural Explorations

Cross-cultural comparison of events, cultural patterns, historical periods, or social movements which find a parallel in more than one of the cultural traditions represented in the School of Languages, Linguistics, Literatures and Cultures.

Prerequisite(s): Russian 360 or 361.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

Russian 461 **3 units; (3-0)**

Topics in Russian Literature

Development of a topic, issue, period or author introduced in Russian 360.

Prerequisite(s): Russian 360 or 361.

MAY BE REPEATED FOR CREDIT

Russian 463 **3 units; (3-0)**

Topics in Russian Language and Culture from a Historical Perspective

Concentration on a linguistic and/or cultural topic in its historical development.

Prerequisite(s): One of Russian 360, 361 or 363.

MAY BE REPEATED FOR CREDIT

Russian 497 **3 units; (3-0)**

Inter-Cultural Immersion Experience II

Independent study course. Project with inter-cultural theme, derived from an immersion experience at an advanced level, most likely abroad.

Prerequisite(s): Russian 397 and consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: Permission to enrol requires a faculty member's agreement to sponsor the course of study.

NOT INCLUDED IN GPA

Russian 551 **3 units; (3-0)**

Independent Study

An independent research project on a topic that is not normally a part of the program's course offerings.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures. Permission to enrol in this course depends on a faculty member's agreement to sponsor the project.

MAY BE REPEATED FOR CREDIT

Russian 561 **3 units; (3S-0)**

Research Seminar

Centred on a professor's current research project, the course will engage senior students as members of a collaborative research team. Independent research, discussion, group presentations, dissemination of results in an appropriate venue.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

Note: May not be offered every year.

MAY BE REPEATED FOR CREDIT

Russian 591 **3 units; (0-3T)**

Honours Project

A research paper or creative project for honours students in their final year on a topic chosen in consultation with their supervisor.

Prerequisite(s): Consent of the School of Languages, Linguistics, Literatures and Cultures.

School of Creative and Performing Arts SCPA

For more information, see the School of Creative and Performing Arts: arts.ualgary.ca/schools/creative-performing-arts.

Junior Course

School of Creative and Performing Arts 290 **3 units; (3-0)**

History and the Performing Arts

The history of dance, drama and music through an interarts lens, focusing on works and ideas across time periods and art forms.

Prerequisite(s): Admission to BA Dance, BFA Dance, BFA Drama, BA Music, BA Honours Music, or BMus.

Senior Courses

School of Creative and Performing Arts 399 **3 units; (3-0)**

Approaching Interdisciplinarity

An introduction to the challenges and opportunities of interdisciplinary exchange and collaboration in the arts.

Prerequisite(s): School of Creative and Performing Arts 290.

School of Creative and Performing Arts 401 **3 units; (3-0)**

Performing Arts Management

Introduction to politics, strategies, and practices of marketing and fundraising as they apply to non-profit performing arts companies.

Prerequisite(s): 9 units in courses labelled Dance, Drama, Music, Music Performance or School of Creative and Performing Arts.

School of Creative and Performing Arts 499 **3 units; (3-0)**

Interdisciplinary Praxis

Intermediate development of theory and practice of interdisciplinary exchange and collaboration in the arts.

Prerequisite(s): School of Creative and Performing Arts 399.

School of Creative and Performing Arts 501 **3 units; (2-2)**

Topics in Inter-Arts Collaborations

Experiential or lecture-based work that crosses the disciplinary boundaries of Dance, Drama and Music.

Prerequisite(s): 6 units in any of Dance, Drama or Music or consent of the School.

MAY BE REPEATED FOR CREDIT

School of Creative and Performing Arts 503 **6 units; (72 hrs)**

Travel Study

An international perspective on performance and culture that crosses the disciplinary boundaries of Dance, Drama and Music.

Prerequisite(s): Consent of the School.

MAY BE REPEATED FOR CREDIT

School of Creative and Performing Arts 599 **3 units; (4-0)**

Interdisciplinary Creation

Advanced development of creative inquiry and practice through interdisciplinary exchange and collaboration in the arts.

Prerequisite(s): School of Creative and Performing Arts 499.

Graduate Courses

School of Creative and Performing Arts 601 **3 units; (2-2)**

Topics in Inter-Arts Collaborations

Experiential or lecture-based work that crosses the disciplinary boundaries of Dance, Drama and Music.

Prerequisite(s): Consent of the School.

MAY BE REPEATED FOR CREDIT

School of Creative and Performing Arts 603 **6 units; (72 hours)**

Travel Study

An international perspective on performance and culture that crosses the disciplinary boundaries of Dance, Drama and Music.

Prerequisite(s): Consent of the School.

MAY BE REPEATED FOR CREDIT

Science SCIE

For more information about these courses contact the Natural Sciences Program ualgary.ca/natsci/.

Senior Courses

Science 301 **3 units; (3-1T)**

Research Design and Statistical Analysis

A focus on the management, analysis, interpretation and communication of research results. Students will also examine and critique research design using examples from the primary literature in a multidisciplinary context.

Prerequisite(s): 24 units and admission to the Natural Sciences Program.

Science 311 **3 units; (3-1T)**

Writing and Reviewing Scientific Reports

Elements of writing and reviewing scientific reports, use and enhancement of library skills, ethical principles of reviewing reports, and exposure to the literature of science. Papers and reviews will be transmitted electronically.

Prerequisite(s): Any 200-level course offered by the Faculty of Science.

Science 317 (formerly Science 507.17) **3 units; (3-2T)**

Energy Transformations

Discusses the heat engines that harness fuels to power the developed world. Includes where energy comes from and how that energy is converted into

useful forms for transmission, distribution and use; informed by an overview of thermodynamics.

Prerequisite(s): One of Physics 211, 221 or 227; and one of Physics 223, 255, 259 or 355.

Science 331 **3 units; (3-0)**

Scientific Explorations

Students will develop a well-rounded perspective and appreciation of science by investigating the nature of scientific inquiry and critically assessing key historical and contemporary achievements in science.

Science 403 **3 units; (3-0)**

Science in Society

Exploration of the interaction among science and non-science areas in various ways including by written and oral presentations.

Prerequisite(s): 54 units and admission to the Natural Sciences program.

Science 421 **3 units; (3-2T)**

Fundamentals of Nuclear Energy Production

The science behind nuclear energy production including nuclear reactions, reactor design, waste disposal and historical and proposed accidents.

Prerequisite(s): Science 317 or Physics 449 or Chemistry 371 or Engineering Energy and Environment 355.

Science 423 **3 units; (3-2T)**

Fundamentals of Fuel Cells

Study of science and technology of next generation alternative energy conversion and storage technologies. Includes fundamental aspects of fuel cells, basic electrochemistry, classification of fuel cells, fuel cell performance curves, thermodynamics and kinetics of fuel cells, reforming, electrodes and electrolytes. Understanding the chemical and physical property relationships of fuel cell materials.

Prerequisite(s): Science 317 or Physics 449 or Chemistry 371 or Engineering Energy and Environment 355.

Science 427 (formerly Science 507.27) **3 units; (3-2T)**

Principles of Solar Power

Discusses solar power in its various forms, including photovoltaics and solar thermal technologies.

Prerequisite(s): Science 317 or Physics 449 or Chemistry 371 or Engineering Energy and Environment 355.

Science 431 (formerly Science 531) **3 units; (3-2T)**

Principles of Hydroelectric Energy

An introduction to the scientific fundamentals of hydroelectric energy production. Includes an examination of the technologies and potential for developing hydroelectricity, along with the environmental, societal, and economic issues surrounding its development.

Prerequisite(s): Science 317 or Geology 353 or Engineering Energy and Environment 355.

Science 433 (formerly Science 533) **3 units; (3-2T)**

Principles of Geothermal Energy

The scientific principles governing geothermal energy development for both low and high tempera-

ture systems, and related technical, environmental and socioeconomic issues.

Prerequisite(s): Science 317 or Geology 353 or Engineering Energy and Environment 355.

Science 501 **3 units; (3-0)**

Project Course in Natural Sciences

Intended to achieve integration and interdisciplinarity within the Natural Sciences program.

Prerequisite(s): 75 units and admission to the Natural Sciences program.

Science 502 **6 units; (0-9)**

Research Project in Natural Sciences

A comprehensive research project under the direction of staff member(s) in the Faculty of Science. Research projects may be disciplinary or interdisciplinary in nature. Interdisciplinary projects may involve more than one Science discipline or a Science discipline combined with a non-Science discipline.

Prerequisite(s): Admission to the Natural Sciences Honours program and consent of the Director.

Science 507 **3 units; (3-0) or (3-3)**

Experiential Learning in Science - Special Topics

Lectures, seminars, tutorials and/or research project leading to a focused examination of a topic from interdisciplinary perspective.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Science 510 **6 units**

Field Placement

Students spend one term as an intern in a government, non-profit or private-sector organization under the auspices of an agency or organization that has a Co-operation Agreement with the University of Calgary.

Prerequisite(s): Consent of the Faculty of Science and acceptance to a program offered by the agency or organization that has a Co-operation Agreement with the University of Calgary.

Science 511 **3 units; (3-0)**

Peer Mentoring and Collaborative Learning in Science

Students (peer mentors) gain theoretical knowledge of peer mentoring, practical facilitation instruction and experience to support peers in their learning. Grounded knowledge of science-based learning theories, peer mentors will encourage and motivate learning, convey enthusiasm for course material, and provide support for active learning in and out of the classroom.

Prerequisite(s): Consent of the Faculty.

Antirequisite(s): Credit for Science 511 and either Science 507.18 or Communication and Culture 507 will not be allowed.

Note: This course includes a 40-hour practicum as a Peer Mentor in your host class. Students should contact the USC Specialized Programs Office regarding consent to register.

Science 529 **3 units; (3-0)**

Project Course in Sustainable Energy, Environment and Economy

Intended to achieve integration across the interdisciplinary energy, environment and economy programs.

Prerequisite(s): Engineering Energy and Environment 355 and 75 units and admission to the Energy and the Environment Specialization, the Energy Management Concentration or the Energy Science Concentration.

Graduate Courses

Science 601 **3 units; (3-0)**

Theory and Practice of University Teaching and Learning in STEM

Current educational theory and practice relating to university teaching and learning in STEM will be explored and critically evaluated. Students will critically evaluate their teaching beliefs and broaden their knowledge and skills through a combination of discussion, microteaching opportunities and a capstone project involving the design of a teaching unit.

Prerequisite(s): Admission to a MSc or PhD program in the Faculty of Science and consent of the instructor.

NOT INCLUDED IN GPA

Science 603 **3 units; (0-3)**

STEM Teaching Development

Design and delivery of a unit of a course within the student's area of specialization and under the guidance of a faculty member. Course and curriculum design elements are emphasized through the production of a detailed lesson plan, strategy for assessment and evaluation of the success of the teaching unit. The importance of reflective practice and mentorship to the teaching function is stressed through reflective essays and group discussions. Experiences will be shared through a symposium poster presentation.

Prerequisite(s): Science 601.

NOT INCLUDED IN GPA

Slavic SLAV

For more information see the School of Languages, Linguistics, Literatures and Cultures website: slilc.ucalgary.ca/.

Senior Course

Slavic 356 **3 units; (3-0)**

Perspectives on Eastern Europe

Selected significant current issues in East-European cultures through the lens of literature, visual arts, drama, music, and film.

Note: Taught in English.

MAY BE REPEATED FOR CREDIT

Social Work SOWK

For more information about these courses, see the Faculty of Social Work: fsw.ucalgary.ca.

Notes:

- Social Work 201 is open to all students; all other Social Work courses are restricted to BSW students only.
- Students must maintain concurrent registration in practica and related integrative seminars.

- In all BSW routes, students must complete all required 300-level core Social Work courses before registering in practica.

Junior Courses

Social Work 201 **3 units; (3-0)**

Introduction to Social Work

Provides an overview of the profession of social work and the social policy context within which it is practiced.

Note: Alberta Social Work Post-Diploma students cannot take this course as fulfillment of their non-Social Work course requirements.

Senior Courses

Social Work 300 **6 units; (6-0)**

Generalist Practice in Context Theme Course

Examination of the professional use of self in relation to the knowledge, values, and skills pertaining to the practice of generalist social work practice in rural, remote, and Aboriginal communities.

Social Work 301 **3 units; (1S-2T)**

Generalist Practice in Context Portfolio Project

Individual preparation of a self-directed portfolio as an expression of the student's own understanding of generalist social work practice in relation to the local context. The student's prior learning experiences will be incorporated in the development of the project.

Corequisite(s): Prerequisite or Corequisite: Social Work 300.

Social Work 302 **6 units; (6-0)**

Research in Context Theme Course

An introduction to knowledge generation relevant to generalist social work practice. Foundational concepts and approaches of various research methodologies will be introduced as ways of knowledge building to inform practice and influence policy, particularly within rural, remote and Indigenous contexts.

Social Work 303 **3 units; (1S-2T)**

Practice With Individuals in Context

Focuses on interviewing and counselling skills from a generalist social work perspective. Emphasis will be given to skill development, critical reflection, practice evaluation, and practical application within rural, remote and Indigenous contexts.

Social Work 304 **6 units; (6-0)**

Diversity and Oppression Theme Course

Examines diversity, colonization, oppression, and intergroup relations associated with the practice of social work in rural, remote, and Indigenous communities. Anti-oppressive frameworks will be introduced for understanding the processes associated with social justice.

Social Work 305 **3 units; (1S-2T)**

Diversity and Oppression Portfolio Project

Individual preparation of a self-directed portfolio as an expression of the student's own critical analysis of diversity, oppression, and social justice in relation to the local context. Honouring the student's prior learning experiences by acknowledging and incorporating aspects of that learning in the development of the project.

Corequisite(s): Prerequisite or Corequisite: Social Work 304.

Social Work 306 6 units; (6-0)**Social Work Methods Course**

Examines various perspectives and theoretical approaches relating to the development, maintenance, and application of empowering relationships in generalist social work practice. Particular emphasis will be placed on local applications in rural, remote, and Indigenous organizations and communities.

Social Work 307 3 units; (1S-2T)**Practice Skills in Context**

Focuses on theory and practice relating to social work with individuals, families and groups in diverse communities. Particular emphasis will be paid to skill development, critical analysis and practical application within rural, remote and Indigenous contexts.

Social Work 355 3 units; (3S-0)**Research in Context**

An introduction to basic research methodology, data analysis and a critical appraisal and application of research findings within a reflective model of practice.

Social Work 361 3 units; (3S-0)**Professional Use of Self**

Focuses on the examination and integration of theoretical and practical understandings of professional social work practice. Topics covered include: critical thinking; ethical decision-making; knowledge of the associations to which social work professionals belong; professional writing; and self-care.

Social Work 363 3 units; (3S-0)**Human Development and Environments**

Explores the nature of human behaviour and development in diverse environments and contexts (personal, community, social, and environmental) and explores the implications for social work practice and theory.

Social Work 365 3 units; (3S-0)**Critical Approaches to Social Work Practice**

Provides theoretical frameworks, including anti-oppressive social work concepts, as a foundation for reflective professional generalist social work.

Social Work 371 3 units; (3S-0)**Social Work and Diversity**

Students will critically examine the issues of diversity and the power relations that form common links among the experiences of oppression and marginalization in Canadian society.

Social Work 383 3 units; (3S-0)**Social Policy and Social Justice**

Provides an understanding of Canadian social policy, its impact on social justice and how it influences social work practice.

Note: University Transfer route only.

Social Work 391 3 units; (3S-0)**Practice and Evaluation with Individuals**

An introduction to theories and skills for communicating with people in a professional social work context. Generic interviewing and basic counselling skills from a generalist perspective of social work practice will be developed.

Note: University Transfer route only.

Social Work 393 3 units; (3S-0)**Practice and Evaluation with Families**

An introduction to theories and skills for family-centred social work practice with families. There will be an emphasis on diversity in relation to family development issues, the stresses families face, family assessment techniques, and theories and practices of family intervention.

Note: University Transfer route only.

Social Work 395 3 units; (3S-0)**Practice and Evaluation with Groups**

An introduction to theories and skills for working with groups within a context of practice and assessment frameworks.

Note: University Transfer route only.

Social Work 397 3 units; (3S-0)**Practice and Evaluation with Communities**

An introduction to theories and skills about community practice. The focus will be on understanding the basic values, and ethical, strategic, evaluative and political issues involved in working for community change.

Note: University Transfer route only.

Social Work 399 3 units; (3S-0)**Practice and Evaluation with Organizations**

An introduction to theories and skills in the study of human service organizations. Examines organizational dynamics and how these impacts professional practice, relationships with clients, and the potential for organizational change.

Note: University Transfer route only.

Social Work 410 6 units; (300 hours within one term)**Practicum I**

Application of conceptual framework, experience, knowledge and skills within a specific practice setting.

Prerequisite(s): All required 300 level Social Work courses.

NOT INCLUDED IN GPA

Social Work 411 3 units; (3S-0)**Integrative Seminar I**

Integration of theory and practice within the context of the field practicum.

Prerequisite(s): All required 300 level Social Work courses.

Corequisite(s): Social Work 410.

Social Work 412 6 units; (400 hours within one term)**Practicum II**

Application of professional theory and skills in supervised social work practice settings.

Prerequisite(s): All required 300 level Social Work courses. University Transfer Route: Social Work 410 and 411.

NOT INCLUDED IN GPA

Social Work 413 3 units; (3S-0)**Integrative Seminar II**

Advanced integration of concepts, perspectives, theories and skills with practicum experiences, developing conceptual frameworks of practice.

Prerequisite(s): All required 300 level Social Work courses. University Transfer Route: Social Work 410 and 411.

Corequisite(s): Social Work 412.

Social Work 551 3 units; (3S-0)**Selected Topics: Social Work Interventions**

Focuses on theory and practice related to social work interventions.

MAY BE REPEATED FOR CREDIT

Social Work 553 3 units; (3S-0)**Selected Topics: Fields of Practice**

Examines contexts, theories, practice models and skill development in specialized fields of practice.

MAY BE REPEATED FOR CREDIT

Social Work 555 3 units; (3S-0)**Selected Topics: Practice with Selected Populations**

Explores contexts, theories and practice models in working with specific populations.

MAY BE REPEATED FOR CREDIT

Social Work 557 3 units; (3S-0)**Selected Topics: Contexts for Practice**

Examines social work practice in specific contexts.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Note: Not all options are offered every academic year. The number of options will vary across the programs and program locations.

Social Work 600 3 units; (3S-0)**Social Justice and Theory in Advanced Social Work Practice**

Examines concepts of culture, identity, oppression and "differentness" in relationship to theories of social justice, at all levels of professional practice.

Prerequisite(s): Admission to the MSW program or the Graduate Certificate in Advanced Social Work Practice.

Social Work 602 3 units; (3S-0)**Research and Philosophy in Advanced Social Work Practice**

Explores social work research through examination of various approaches (qualitative and quantitative), paradigms, and methods and applies social work research to theories as students develop their professional practice model.

Prerequisite(s): Admission to the MSW program or the Graduate Certificate in Advanced Social Work Practice.

Social Work 604 3 units; (3S-0)**Advanced Practice Theories in Context**

Examines theoretical models, philosophical frameworks and ethical foundations of social work practice as a means to facilitate change while locating social work's development and current practice in historical, economic, political, social and cultural contexts.

Prerequisite(s): Admission to the MSW program or the Graduate Certificate in Advanced Social Work Practice.

Social Work 606 3 units; (3S-0)**Advanced Policy Practice in Context**

Explores the influences of public policy on the lives, relationships, and well-being of individuals, families, groups and communities, while examining the relationship between social justice in the policy-making process and the role of social workers in shaping policy.

Prerequisite(s): Admission to the MSW program or the Graduate Certificate in Advanced Social Work Practice.

Social Work 610 **3 units; (3S-0)**

Advanced Topics in Clinical Social Work I

Examines multiple social work theories, models, and approaches to clinical practice. Clinical social work practice is situated within in historical, economic, political, social and cultural contexts. Critical perspectives, contemporary issues and research debates are discussed.

Prerequisite(s): Admission to the MSW with specialization in Clinical Social Work Practice or the Graduate Certificate in Clinical Social Work Practice.

Social Work 612 **3 units; (3S-0)**

Advanced Topics in Clinical Practice and Research I

Application of evidence-based and anti-oppression modalities and best practices towards supporting and helping individuals, groups, families and communities.

Prerequisite(s): Admission to the MSW with specialization in Clinical Social Work Practice or the Graduate Certificate in Clinical Social Work Practice.

Social Work 614 **3 units; (3S-0)**

Advanced Topics in Clinical Social Work II

Examines issues in clinical practice with diverse populations, including Indigenous, Francophone and newcomer populations. Specific treatment modalities and techniques are examined in depth.

Prerequisite(s): Admission to the MSW with specialization in Clinical Social Work Practice or the Graduate Certificate in Clinical Social Work Practice.

Social Work 616 **3 units; (3S-0)**

Advanced Topics in Clinical Practice and Research II

Considers complicating factors in applying best, promising and ethical practices and techniques in clinical practice with diverse populations. Students will advocate for the needs of diverse and specific populations, including Indigenous Canadians and other minorities. Students will develop and use self-care practice.

Prerequisite(s): Admission to the MSW with specialization in Clinical Social Work Practice or the Graduate Certificate in Clinical Social Work Practice.

Social Work 620 **3 units; (3S-0)**

Advanced Topics in International and Community Development I

Examines the role of social work and social workers in international and community development work at home and abroad. Theoretical foundations are examined alongside global influences in relation to historical, economic, political, social and cultural contexts. Critical perspectives, contemporary issues and research debates in social development, internationalization and globalization are discussed.

Prerequisite(s): Admission to the MSW with specialization in International and Community Development or the Graduate Certificate in International and Community Development.

Social Work 621 **3 units; (3S-0)**

History and Foundation of the Profession

An examination of the relationship between knowledge, values, ethics and power and how they shape interventions in social work.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 622 **3 units; (3S-0)**

Advanced Topics in Practice and Research in International and Community Development I

Application of theories and concepts of international social work and community development to practice, with a focus on promoting change and challenging structured inequalities. Development of skills, strategies and tools for engaging in international social work and community development in international and North American settings.

Prerequisite(s): Admission to the MSW with specialization in International and Community Development or the Graduate Certificate in International and Community Development.

Social Work 624 **3 units; (3S-0)**

Advanced Topics in International and Community Development II

Examination of various approaches, strategies, and perspectives for taking action as a social worker in international and community development settings, and growing a professional toolkit of resources and techniques to engage in this work.

Prerequisite(s): Admission to the MSW with specialization in International and Community Development or the Graduate Certificate in International and Community Development.

Social Work 625 **3 units; (3S-0)**

Practice with Individuals, Families and Groups

A basic understanding of social work practice theory with respect to work with individuals, families and groups.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 626 **3 units; (3S-0)**

Advanced Topics in Practice and Research in International and Community Development II

Designing, creating and evaluating international and community development projects that integrate theory, research, and best practices. Development of greater self-awareness of the role, values, and skills of a social worker engaging in international and community development work.

Prerequisite(s): Admission to the MSW with specialization in International and Community Development or the Graduate Certificate in International and Community Development.

Social Work 627 **3 units; (3S-0)**

Practice with Organizations and Communities

A basic understanding of social work practice theory with respect to work with organizations and communities.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 629 **3 units; (3S-0)**

Professional Communication and Interviewing

Offers experiential learning aimed at developing basic professional competencies and practice skills along with critical self-reflection.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 632 **3 units; (3S-0)**

Social Policy and Social Justice

An exploration of the social, political and economic forces, social movements and social structures that are transforming the Canadian welfare state and the practice of social work.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 633 **3 units; (426 hours-2T)**

Foundational Field Practicum

Direct and indirect social work practice opportunities with professional supervision.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

NOT INCLUDED IN GPA

Social Work 637 **3 units; (3S-0)**

Human Behaviour in the Environment

Human development and diversity within a social work context.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 640 **3 units; (3S-0)**

Advanced Topics in Leadership in the Human Services I

Examines multiple theories, models and approaches of leadership in the human services. The historical, political, economic, social, and cultural influences impacting human service organizations are examined. Critical perspectives, contemporary issues, and research debates are discussed.

Prerequisite(s): Admission to the MSW with specialization in Leadership in the Human Services or the Graduate Certificate in Leadership in the Human Services.

Social Work 641 **3 units; (3S-0)**

Models of Practice

Provides the conceptual and theoretical foundation for students to acquire the skills to practice in Social Work.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 642 **3 units; (3S-0)**

Advanced Topics in Practice and Research in Leadership in the Human Services I

Integrates leadership theories, models, and approaches in organizational and community practice. Applies evidence-based tools and strategies in assessment, evaluation, intervention, innovation, evaluation, change, and collaboration to develop a professional model of leadership.

Prerequisite(s): Admission to the MSW with specialization in Leadership in the Human Services or the Graduate Certificate in Leadership in the Human Services.

Social Work 644 **3 units; (3S-0)**

Advanced Topics in Leadership in the Human Services II

Examines issues of diversity, culture, power and oppression in organizational and community practice. The changing roles of leadership in complex systems and changing contexts will be examined. Explores the influences of policy on the human service organization and the practice of leadership in this setting.

Prerequisite(s): Admission to the MSW Leadership in the Human Services specialization or the Graduate Certificate in Leadership in the Human Services.

Social Work 645 **3 units; H3S-0)**

Issues in Social Work Research

An overview of social work research topics and issues.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 646 3 units; (3S-0)**Advanced Practice and Research in Leadership in the Human Services II**

Enhances skills in facilitation, building trust, managing conflict, and fostering relationships in working with individuals, groups and communities. Integration of practice-based research to inform best practices, policy development and social change.

Prerequisite(s): Admission to the MSW Leadership in the Human Services specialization or the Graduate Certificate in Leadership in the Human Services.

Social Work 651 3 units; (3S-0)**Policy as Context for Clinical Work**

Policies and their impacts on the delivery of clinical work will be examined.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 653 3 units; (3S-0)**Comparative Approaches to Change**

Various clinical change applications will be examined and critiqued.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 655 3 units; (3S-0)**Thesis Research**

An introduction to preparing a thesis proposal.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 657 3 units; (3S-0)**Clinical Social Work Applications**

Specific issues involved in the effective application of clinical approaches will be studied.

Prerequisite(s): Social Work 653 and admission to the MSW program, or consent of the Faculty.

Social Work 659 3 units; (3S-0)**Evidence and Clinical Practice**

Research as utilized in the clinical arena will be the focus of this course.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 660 6 units; (500 hours)**Advanced Practicum**

Direct and indirect Social Work practice opportunities with professional supervision in student's area of specialization.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Corequisite(s): Social Work 662.

NOT INCLUDED IN GPA

Social Work 662 3 units; (6S-0)**Integrative Seminar**

Integration of theory, research applications/evaluation and professional practice in the student's area of specialization; and preparation of a capstone exit requirement.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Corequisite(s): Prerequisite or corequisite: Social Work 660.

NOT INCLUDED IN GPA

Social Work 665 3 units; (3S-0)**Influencing Policy Development**

Focuses on leadership in policy practice and in particular policy advocacy at all levels of policy (i.e., organizational, community, and provincial or national levels).

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 667 3 units; (3S-0)**Leadership Theories in Action**

Directed toward helping prepare leaders for "best practice" across the range of sectors and roles in which human service leaders work.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 669 3 units; (3S-0)**Leading Organizations and Communities**

A practical course that will emphasize networked and collaborative approaches to leadership in a global context.

Prerequisite(s): Social Work 667 and admission to the MSW program, or consent of the Faculty.

Social Work 671 3 units; (3S-0)**Social Policy**

Explores social welfare policy in Canada and in a globalizing world, the current roles of social welfare policy, and the roles they should have.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 673 3 units; (3S-0)**International Social Development**

Examines issues in international social development. There will be an emphasis on analysis of the social forces and conditions giving rise to different models of social development, and on what each of these alternative models tends to produce in terms of social welfare policies and programs.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 675 3 units; (3S-0)**Advanced International Social Work Modules**

This set of modules will give students tools for social change.

Prerequisite(s): Social Work 673 and admission to the MSW program, or consent of the Faculty.

Social Work 677 3 units; (3S-0)**Social Work Research for International and Community Methods**

International and Community Development Research is designed to provide methodological knowledge and skills specifically oriented to community-based practice abroad or in Canada.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 679 3 units; (3S-0)**Special Topics Seminar I**

Selected topics related to area of specialization or interest.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Social Work 682 0.75 units; (3S-0)**Special Seminar II**

Selected topics related to an area of specialization or interest.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Social Work 693 3 units; (3S-0)**Research as a Foundation for Leadership**

This course will provide students with a working understanding for the study and nature of the theoretical and practical issues underlying the application of the research process to professional and leadership practice.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 695 3 units; (3S-0)**Becoming an Evidence-Based Leader**

Extends students' abilities to identify, assess, and utilize research knowledge as a problem-solving tool in social work.

Prerequisite(s): Social Work 693 and admission to the MSW program, or consent of the Faculty.

Social Work 696 6 units; (525 hours within two consecutive terms)**Advanced Practicum**

Direct and indirect Social Work practice opportunities with professional supervision in student's area of specialization or interest.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

NOT INCLUDED IN GPA

Social Work 697 3 units; (3S-0)**Diversity, Oppression and Social Justice**

Critical examination of the issues of diversity and the power relations that form common links among the experiences of oppression and marginalization in Canadian society.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

Social Work 699 3 units; (3S-0)**Special Topics Seminar II**

Advanced selected topics related to area of specialization or interest.

Prerequisite(s): Admission to the MSW program or consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Social Work 721 3 units; (3S-0)**Integrative Research Colloquia**

A concluding course offered as final component of student's course work. Allows doctoral students and the instructor to engage in a series of research colloquia, thereby facilitating critical analysis, feedback and synthesis of materials covered and skills learned in other course work. This process will help students to develop conceptual and methodological skills.

Prerequisite(s): Admission to the Social Work PhD program.

Note: Social Work 721 can only be taken once all other required (core and option) courses have been completed.

Social Work 741 **3 units; (3S-0)**

Research Foundations: Epistemology and Professional Knowledge-Building

An exploration of major philosophical issues that have shaped social work's diverse approaches to knowledge building and research methods. The relevance of this exploration to the student's area of interest is emphasized.

Prerequisite(s): Admission to the Social Work PhD program or consent of the Faculty.

Social Work 743 **3 units; (3S-0)**

Theory, History and Philosophy: Values, Ethics and Professional Beliefs

An exploration of the philosophical and ideological issues that have been historically important to the profession with respect to its conception of its ethics, mandate and practices. The relevance of this exploration to the student's area of interest is emphasized.

Prerequisite(s): Admission to the Social Work PhD program or consent of the Faculty.

Social Work 745 **3 units; (3S-0)**

Research Methods I: Quantitative

Quantitative methodological and design options in social work research.

Prerequisite(s): Admission to the Social Work PhD program or consent of the Faculty.

Social Work 747 **3 units; (3S-0)**

Research Methods II: Qualitative

Qualitative methodological and design options in social work research.

Prerequisite(s): Admission to the Social Work PhD program or consent of the Faculty.

Social Work 749 **3 units; (3S-0)**

Quantitative Data Analysis

Statistical analysis of quantitative data.

Prerequisite(s): Admission to the Social Work PhD program or consent of the Faculty.

Social Work 799 **3 units; (3S-0)**

Special Topics Seminar

Advanced selected topics related to the PhD focus area.

Prerequisite(s): Admission to the Social Work PhD program.

MAY BE REPEATED FOR CREDIT

Sociology SOCI

For more information about these courses see the Department of Sociology website: soci.ucalgary.ca/.

Junior Courses

Sociology 201 **3 units; (3-0)**

Introductory Sociology

Sociology as a discipline examines how the society in which we live influences our thinking and behaviour. An introduction to sociology through the study of society, social institutions, group behaviour and social change.

Senior Courses

Sociology 301 **3 units; (3-0)**

Topics in Sociology

A variety of sociological topics are explored at an introductory level.

Prerequisite(s): Sociology 201.

MAY BE REPEATED FOR CREDIT

Sociology 303 **3 units; (3-0)**

Sociology of Gender

A sociological exploration of the way genders are constructed and how they play-out at the level of individuals and institutions, and in diverse social contexts.

Prerequisite(s): Sociology 201.

Sociology 307 **3 units; (3-0)**

Sociology of Indigenous People in Canada

The dynamics of Indigenous groups' relations with each other and the larger society. Topics include decolonization and relations with the state, demography, Indigenous organizations, Indigenous nationalism and nation-building, power, social class and public policy.

Prerequisite(s): Sociology 201.

Sociology 309 **3 units; (3-0)**

Alberta Society

Sociological introduction to the ideology, composition, dynamics, and institutions of Albertan society, using external comparisons where relevant.

Prerequisite(s): Sociology 201.

Sociology 311 **3 units; (3-3)**

Introductory Social Statistics I

Univariate and bivariate statistics for survey data. Topics include cross tabular analysis, the normal distribution, confidence intervals for means, hypothesis testing, Chi-squared and F distributions and bivariate linear regression analysis. In labs statistical software to analyze survey data will be used.

Prerequisite(s): Sociology 201.

Antirequisite(s): Credit towards degree requirements will be given for only one of Sociology 311 and Engineering 319, Psychology 300, 312, Statistics 205, 213, 217, 327.

Sociology 313 **3 units; (3-2)**

Introductory Social Research Methods

Research processes including problem definition, data collection and analyses; quantitative and qualitative strategies.

Prerequisite(s): Sociology 201.

Sociology 315 **3 units; (3-3)**

Introductory Social Statistics II

Multivariate statistics for survey data; and measurement issues in quantitative research. Topics include reliability, multivariate tabular analysis, multiple regression, dummy variable regression, statistical interaction and path analysis. In labs statistical software to test measurement and causal models will be used.

Prerequisite(s): Sociology 311.

Sociology 321 **3 units; (3-0)**

Sociology of Health and Illness

Introduction to social factors influencing health, illness, and medicine. Topics covered may include the organization of medical institutions and occupations, the socialization of medical

professionals, the social construction of illness, social determinants of health, and comparative health-care systems and policy.

Prerequisite(s): Sociology 201.

Sociology 325 **3 units; (3-0)**

Introduction to Deviance and Social Control

The presentation and analysis of theories of criminality and of non-criminal deviance, methods to uncover the incidence of deviance and criminality, a survey of forms of deviant and criminal behaviours, and the social and institutional responses to them.

Prerequisite(s): Sociology 201.

Sociology 327 **3 units; (3-0)**

Introduction to Criminal Justice

Introduction to the field of criminal justice in Canada from a sociological perspective. May include: examination of the definitions of crime; crime measurement; institutional responses to crime by the police, the courts and correctional services; and alternatives to the justice model.

Prerequisite(s): Sociology 201.

Antirequisite(s): Credit for Sociology 327 and 427 will not be allowed.

Sociology 331 **3 units; (3-0)**

Classical Sociological Theory

The development of sociological theory from the nineteenth century to the Second World War.

Prerequisite(s): Sociology 201.

Sociology 333 **3 units; (3-0)**

Contemporary Sociological Theory

The development of sociological theory from the Second World War to the present.

Prerequisite(s): Sociology 331.

Sociology 341 **3 units; (3-0)**

Social Psychology

A wide range of interdependent individual and social topics that influence our thinking, feeling, and behaviour. Topics may include social cognition, perception, social experience, group behaviour, social interaction, and emotions.

Prerequisite(s): Sociology 201.

Antirequisite(s): Credit for Sociology 341 and Psychology 345 will not be allowed.

Sociology 345 **3 units; (3-0)**

Mass Communication

A critical, theoretically-informed look at what it means to live in a society in which the forms and content of mass media/mass communication – and our uses of them – shape our lives in significant ways.

Prerequisite(s): Sociology 201.

Sociology 353 **3 units; (3-0)**

Urban Sociology

Discusses the impact of urbanization on social relationships by analyzing city living in historical and global perspective but also through local issues such as density and neighbourhoods. Provides a sociological perspective on issues that cities are facing today.

Prerequisite(s): Sociology 201.

Sociology 355 **3 units; (3-0)**

Population and Society

Introduction to social demography – the study of population structure (size, composition and

distribution) and processes (fertility, mortality and migration). Focuses on both empirical and theoretical relationships between demography, social change and structured inequality.

Prerequisite(s): Sociology 201.

Sociology 365 **3 units; (3-0)**

Social Stratification

Introduction to the sociological study of social inequalities and stratification and the major theoretical explanations of social inequalities.

Prerequisite(s): Sociology 201.

Sociology 371 **3 units; (3-0)**

Sociology of Families

A sociological examination of family life in all its multiple and changing forms. Topics may include key transitions and common practices in family life; gender, sexuality and family life, and family life in cross-cultural context.

Prerequisite(s): Sociology 201.

Sociology 373 **3 units; (3-0)**

Sociology of Aging

Social and institutional factors associated with aging in modern society.

Prerequisite(s): Sociology 201.

Sociology 375 **3 units; (3-0)**

Sociology of Ethnicity and Racialization

Introduction to the forms of ethnic and racial dynamics in selected cases around the world. Such concepts as identity, ethnicity, race, racialization, racism, assimilation, integration, pluralism, colonialism, post-colonialism, transnationalism and diasporas are examined in theoretical and cross-national contexts.

Prerequisite(s): Sociology 201.

Sociology 377 **3 units; (3-0)**

Sociology of Religion

An introduction to the theories and concepts utilized by sociologists to interpret religious behaviour and the organization of religion.

Prerequisite(s): Sociology 201.

Sociology 393 **3 units; (3-0)**

Sociology of Work

A sociological perspective for gaining a better understanding of the meaning and nature of work. Provides an overview of core concepts and current topics fundamental to understanding work in society.

Prerequisite(s): Sociology 201.

Sociology 399 **3 units; (3-0)**

Sociology of Sport

Organized around the theme of social problems in sport, examines sports-related behaviour, consumption, and sponsorship. A variety of approaches shows how sport is socially constructed and embodies different meanings for different groups of people.

Prerequisite(s): Sociology 201.

Antirequisite(s): Credit for Sociology 399 and Kinesiology 244 will not be allowed.

Sociology 401 **3 units; (3-0)**

Advanced Topics in Sociology

A variety of specialized sociological topics are explored at an advanced level.

Prerequisite(s): Sociology 313.

MAY BE REPEATED FOR CREDIT

Sociology 403 **3 units; (3-0)**

Topics in Gender Relations

Selected themes and issues in the sociology of gender relations. Topics such as illness, consumer society, environmental risk, compassion, homelessness, poverty and identity have recently been explored.

Prerequisite(s): Sociology 303 and 313.

MAY BE REPEATED FOR CREDIT

Sociology 405 **3 units; (3-0)**

Topics in Canadian Social Structure

A macro-level examination of Canadian social structure including a socio-developmental analysis of selected Canadian institutions such as bilingualism, regionalism, multiculturalism, multinational corporations, and ethnic stratification. Critical examination of sociological models for the study of Canadian society.

Prerequisite(s): Sociology 313.

MAY BE REPEATED FOR CREDIT

Sociology 407 **3 units; (3-0)**
(formerly Sociology 401.15)

Sociology of the Body

Considers aspects of the lived body and the body as object of social construction, modification, and regulation.

Prerequisite(s): Sociology 313 and 321.

Sociology 409 **3 units; (3-0)**
(formerly Sociology 401.16)

Social Determinants of Health

An advanced study of health in a social context. Examines the social determinants of health and illness outcomes along with their implications for public policies conducive to better health.

Prerequisite(s): Sociology 313 and 321.

Sociology 413 **3 units; (3-0)**

Qualitative Research Methods

Research methods such as participant observation, naturalistic observation, interviewing, non-reactive techniques, and life histories, and methodological issues such as gaining access to subjects, and issues pertaining to the ethics of research.

Prerequisite(s): Sociology 313.

Sociology 419 **3 units; (3-0)**

Topics in the Sociology of Health and Illness

Advanced analysis of selected themes and issues in the sociology of health and illness.

Prerequisite(s): Sociology 313 and 321.

MAY BE REPEATED FOR CREDIT

Sociology 421 **3 units; (3-0)**

Topics in Deviance and Criminology

Advanced study of contemporary issues in the research in deviance and crime.

Prerequisite(s): Sociology 325 and 313.

MAY BE REPEATED FOR CREDIT

Sociology 423 **3 units; (3-0)**

The Sociology of Youth Crime

Explanations of the criminal activities of young people including an assessment of treatment strategies and legal regimes developed in response to this behaviour.

Prerequisite(s): Sociology 327 and 313.

Sociology 425 **3 units; (3-0)**

The Sociology of Violence

An exploration of violence in a variety of situations and social institutions and more general patterns of victimization in contemporary society.

Prerequisite(s): Sociology 313 and 325.

Sociology 427 **3 units; (3-0)**

The Social Organization of Criminal Justice

Comparative social organization of the criminal justice system from a sociological perspective; special attention to and analysis of the structure of the Canadian criminal justice system.

Prerequisite(s): Sociology 327 and 313.

Sociology 429 **3 units; (3-0)**

The Sociology of Law

Sociological problems regarding the origin, impact and definition of law, dispute resolution, and the relationship between law and social change.

Prerequisite(s): Sociology 327 and 313.

Sociology 435 **3 units; (3-0)**

The Sociology of Knowledge

The study of knowledge as a social practice; theories of knowledge, representation and interpretation; practical knowledge in everyday life; the role of organized knowledge in social domains such as science, biomedicine, bureaucracy, social service administration and professional occupations.

Prerequisite(s): Sociology 331 and 333.

Sociology 443 **3 units; (3-0)**

Topics in Social Psychology

An advanced study of social processes and interactions of persons in groups with some methodological considerations.

Prerequisite(s): Sociology 341 and 313.

MAY BE REPEATED FOR CREDIT

Sociology 445 **3 units; (3-0)**
(formerly Sociology 401.36)

Visual Sociology

Visual representation in contemporary society. Social Practices of making and using Visual images, such as photographs. The use of visual methods in sociological research.

Prerequisite(s): Sociology 313, 331, and 333.

Sociology 453 **3 units; (3-0)**

Topics in Urban Sociology

Critical analysis of theories of urban institutional and ecological characteristics. Emphasis is on comparative data derived from a sample of world cities.

Prerequisite(s): Sociology 313 and 353.

MAY BE REPEATED FOR CREDIT

Sociology 461 **3 units; (3-0)**

Worker Movements and Labour Unions

A social movement perspective on working class struggle and accommodation in capitalist societies. Historical and contemporary movements will be considered, with an emphasis on Canada.

Prerequisite(s): Sociology 313 and one of 331, 333, or 365.

Sociology 467 **3 units; (3-0)**

Ethnic Relations in Canada

An introduction to the structure and form of ethnic (racial) group relations in Canada. Contemporary

relations will be analyzed from a historical perspective.

Prerequisite(s): Sociology 313 and 375.

Sociology 471 3 units; (3-0)

Topics in the Sociology of Families

Selected themes and issues in the sociology of families.

Prerequisite(s): Sociology 371 and 313.

MAY BE REPEATED FOR CREDIT

Sociology 475 3 units; (3-0)

Topics in Race and Ethnic Relations

Advanced analysis of selected themes and issues in race and ethnic relations within the framework of theory and research.

Prerequisite(s): Sociology 313 and 375.

MAY BE REPEATED FOR CREDIT

Sociology 483 3 units; (3-0)

Topics in Social Inequalities and Social Justice

Advanced, critical analysis of the causes and consequences of dimensions of social stratification and patterned inequalities. Teaching and learning practices are organized around social justice principles, i.e. ensuring the representation of diverse voices and perspectives.

Prerequisite(s): Sociology 307, 313 and 365.

MAY BE REPEATED FOR CREDIT

Sociology 485 3 units; (3-0)

Topics in Social Theory

Exploration of selected themes in social theory to develop advanced knowledge of specific social theorists and schools of social theory.

Prerequisite(s): Sociology 333.

MAY BE REPEATED FOR CREDIT

Sociology 487 3 units; (3-0)

Sociology of Development

A study of the process of change and modernization in the developing areas of the world.

Prerequisite(s): Sociology 313 and one of 331, 333.

Sociology 493 3 units; (3-0)

Topics in the Sociology of Work

Selected themes and issues in the sociology of work. May include gender and work, families and work, and the sociology of organizations.

Prerequisite(s): Sociology 313 and 393.

MAY BE REPEATED FOR CREDIT

Sociology 499 1.5 units; (3S-0)

Field School/Seminar in Sociology

A variety of specialized topics explored through concentrated learning opportunities. May include urban issues, the self in society, settlement and immigration, and disorder and crime.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 501 3 units; (0-3T)

Directed Reading

Independent study of a variety of advanced topics under the supervision of a member of the department.

Prerequisite(s): Sociology 315, and 333 and at least 6 units Sociology at the 400 level, and consent of the Department.

Note: May be counted only twice towards the major field requirements in Sociology.

MAY BE REPEATED FOR CREDIT

Sociology 504 3 units; (3S-0)

Integrative Seminar

Advanced topics in sociology to facilitate special research projects, especially community-engaged and/or group research.

Prerequisite(s): Sociology 313, 315, 333, at least 6 units in courses labelled Sociology at the 400 level, and consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 590 6 units; (3S-0)

Sociology Honours Thesis and Seminar

Students will conduct an independent research project under the direction of a supervisor. In the seminar, students will discuss and present their projects and other topics relevant to conducting research.

Prerequisite(s): Sociology 313, admission to the Sociology Honours program and consent of the Department.

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Sociology 601 3 units; (3S-0)

Seminar in Special Topics in Sociology

Arranged for various topics of Sociology on the basis of special interest and need.

Prerequisite(s): Consult Department for assignment to Faculty member.

MAY BE REPEATED FOR CREDIT

Sociology 602 6 units; (3/2S-0)

Master's Seminar in Professional Sociology NOT INCLUDED IN GPA

Sociology 603 3 units; (3S-0)

Seminar in Sociology of Health and Illness

Prerequisite(s): Consent of the Department.

Sociology 611 3 units; (3S-3)

Social Statistics: The General Linear Model

Multiple regression with applications to sociological research, with topics such as regression diagnostics, categorical predictors, non-linear relationships, logistic regression, and testing of mediation and moderation.

Prerequisite(s): Consent of the Department. (Sociology 311 and 315 normally required.)

Sociology 613 3 units; (3S-0)

Seminar in Quantitative Research Methods

Advanced study in the theory and practice of quantitative research methods. Topics may include the logic of causality, mixed methods designs, sampling, measurement, survey construction and implementation.

Prerequisite(s): Sociology 313.

Sociology 615 3 units; (3S-0)

Seminar in Qualitative Research Methods

Advanced study in the theory and practice of qualitative research methods. Topics may include participant observation, in-depth interviews, narrative analysis, conversation and discourse analysis, autoethnography, archival research, and feminist research methods.

Prerequisite(s): Sociology 313. Sociology 413 is recommended.

Sociology 625 3 units; (3S-0)

Seminar on Deviant Behaviour

Prerequisite(s): Sociology 325.

Sociology 631 3 units; (3S-0)

Seminar in Sociological Theory

Prerequisite(s): Sociology 331 and 333 or equivalents.

Sociology 653 3 units; (3S-0)

Seminar on Urban Sociology

Prerequisite(s): Sociology 353.

Sociology 667 3 units; (3S-0)

Seminar on Ethnic Relations

Prerequisite(s): Sociology 375.

Sociology 671 3 units; (3S-0)

Seminar on Families, Relationships, and Personal Life

Prerequisite(s): Sociology 471.

Sociology 677 3 units; (3S-0)

Seminar in Sociology of Gender Relations

Prerequisite(s): Consent of the Department.

Sociology 699 1.5 units; (0-3)

Special Topics in Sociology

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 701 3 units; (3S-0)

Doctoral Seminar in Sociology

Seminar on selected topics. Consult Department for details.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 702 6 units; (3/2S-0)

Doctoral Seminar in Professional Sociology

Prerequisite(s): Consent of the Department.

NOT INCLUDED IN GPA

Sociology 705 1.5 units; (3S-0)

Selected Topics in Advanced Methodological Issues

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 711 1.5 units; (3S-3)

Selected Topics in Advanced Quantitative Methods

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 715 1.5 units; (3S-0)

Selected Topics in Advanced Qualitative Methods

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 731 3 units; (3S-0)

Doctoral Seminar in Sociological Theory

Prerequisite(s): Consent of the Department.

Software Engineering SENG

For more information about these courses, see the Department of Computer Science: <https://www.ucalgary.ca/cpsc/>.

Senior Courses

Software Engineering 300 3 units; (3-2T)

Introduction to Software Engineering

Introduction to the development and evolution of software. Covers key conceptual foundations as well as key methods and techniques used in the different phases of the software lifecycle. Emphasis on both technical and soft skills needed for high quality software and software-based products developed in teams.

Prerequisite(s): Computer Science 319 or 331.

Antirequisite(s): Credit for Software Engineering 300 and any of Software Engineering 301, 311, 403, 411, Computer Science 301, 333, 451 or Software Engineering for Engineers 480 will not be allowed.

Software Engineering 401 3 units; (3-2)

Software Architecture

Software architectures and design for non-functional software properties. Introduction to program comprehension skills including analysis of existing architectures.

Prerequisite(s): Software Engineering 300 or 301 or Software Engineering for Engineers 480.

Antirequisite(s): Credit for Software Engineering 401 and 443 will not be allowed.

Software Engineering 437 3 units; (3-2)

Software Testing

Concepts, methods, techniques, processes, and tools for software testing.

Prerequisite(s): Software Engineering 301 or Software Engineering for Engineers 480.

Software Engineering 438 3 units; (3-2)

Software Testing, Reliability, and Quality

Concepts, methods, techniques, processes, and tools for software testing. The principles, processes, and applications of software reliability and software quality assurance.

Prerequisite(s): Software Engineering 300, 301 or Software Engineering for Engineers 480.

Antirequisite(s): Credit for Software Engineering 438 or either Software Engineering 437 or 521 will not be allowed.

Software Engineering 471 3 units; (3-2)
(formerly Software Engineering for Engineers 471)

Software Requirements Engineering

Introduction to elicitation, modelling, expression and validation of the requirements. Techniques and methodologies for requirements engineering. Ap-

plications of requirements engineering to the management of the software development lifecycle.

Prerequisite(s): Computer Science 319 or 331 or Software Engineering for Engineers 409.

Software Engineering 499 3 units; (3-2)

Introductory Topics in Software Engineering

Special topics at an introductory level on software development methods, technologies, or tools.

Prerequisite(s): Consent of either the Department of Electrical and Computer Engineering or the Department of Computer Science.

Note: Consult Department (Computer Science or Electrical and Computer Engineering) for details regarding offerings in the upcoming academic year.

MAY BE REPEATED FOR CREDIT

Software Engineering 501 3 units; (3-2)

Advanced Topics in Software Engineering

Special topics at an advanced level on software development methods, technologies, or tools.

Prerequisite(s): Consent of either the Department of Electrical and Computer Engineering or the Department of Computer Science.

Note: Consult Department (Computer Science or Electrical and Computer Engineering) for details regarding offerings in the upcoming academic year.

MAY BE REPEATED FOR CREDIT

Software Engineering 511 3 units; (3-2)

Software Process and Project Management

Analysis of methods, tools, and techniques for software process improvement and software project management as an effort to achieve quality software products.

Prerequisite(s): Software Engineering 300 or 301 or 403 or Software Engineering for Engineers 480.

Software Engineering 513 3 units; (3-2)

Web-Based Systems

An overview of software engineering methods and technologies for developing web-based software systems.

Prerequisite(s): Software Engineering 300 or 301 or Software Engineering for Engineers 480.

Software Engineering 515 3 units; (3-2)

Agile Software Engineering

Investigation and application of agile software development practices.

Prerequisite(s): One of Software Engineering 401, 403, 411, or 443.

Software Engineering 521 3 units; (3-2)

Software Reliability and Software Quality

The principles, processes, and applications of software reliability and software quality assurance.

Prerequisite(s): Software Engineering 437 or 421.

Antirequisite(s): Credit for Software Engineering 521 and 637 will not be allowed.

Software Engineering 523 3 units; (3-2)

Formal Methods

Software specification, verification, and validation using a mathematically rigorous technique.

Prerequisite(s): Software Engineering 300 or 301 or Software Engineering for Engineers 480.

Software Engineering 533 3 units; (3-2)
(formerly Software Engineering for Engineers 533)

Software Performance Evaluation

Analyzing quality requirements of large-scale software. Performance analysis, testing, and tuning techniques. Evaluating software scalability. Capacity planning methodologies. Issues related to safety, security, and availability of software.

Prerequisite(s): Computer Science 457 and one of Software Engineering 300 or 301 or Software Engineering for Engineers 480.

Software Engineering 541 3 units; (3-2T)
(formerly Software Engineering 531)

Fundamentals of Software Evolution and Reuse

Phenomena and approaches involved in the evolution and reuse of large-scale software, including design for modifiability and tool support. Strengths and weaknesses of industrially-current techniques as well as recent research results.

Prerequisite(s): Software Engineering 300 or 301 or Software Engineering for Engineers 480.

Antirequisite(s): Credit for Software Engineering 541 and 641 will not be allowed.

Software Engineering 550 3 units; (3-2)

Engineering Large Scale Analytics Systems

Sources and characteristics of large scale data, i.e., "big data", large scale data analysis, benefits of large scale data analysis to various industry domains, programming paradigms and middleware technologies for scalable data analysis, algorithms that enable large scale data processing, application of large scale data algorithms in selected application domains, e.g., Web user behaviour analysis and text processing, analytics frameworks.

Prerequisite(s): Software Engineering 300 or Software Engineering for Engineers 480.

Antirequisite(s): Credit for Software Engineering 550 and 501.05 will not be allowed.

Graduate Courses

Software Engineering 605 1.5 units; (3-1)

Industrial Topics in Software Engineering

A study of practical approaches of industrial relevance to students specializing in Software Engineering.

MAY BE REPEATED FOR CREDIT

Software Engineering 607 3 units; (3-1) or (3-0)

Special Topics in Software Engineering

A study of problems of particular interest to students specializing in Software Engineering.

MAY BE REPEATED FOR CREDIT

Software Engineering 609 1.5 units; (3-1)

Special Topics in Software Engineering

A study of problems of particular interest to students specializing in Software Engineering.

MAY BE REPEATED FOR CREDIT

Software Engineering 611 1.5 units; (3-1)

Requirements Engineering I

The elicitation, modelling, expression, and validation of requirements.

Software Engineering 615 **3 units; (3-1)**

Agile Software Engineering

Investigation and application of agile software development practices.

Antirequisite(s): Credit for Software Engineering 615 and Computer Science 601.93 will not be allowed.

Software Engineering 622 **3 units; (3-1)**

Software Release Planning

Product release planning covers systematic methods, tools and techniques for defining the functionality of a sequence of product releases in incremental development. The planning and re-planning is established as a systematic process trying to optimize resources available towards the functionality most requested by customers and stakeholders.

Antirequisite(s): Credit for Software Engineering 622 and 607.25 will not be allowed.

Software Engineering 627 **3 units; (3-1)**

Software Engineering Decision Support

Provides methodological foundations of software engineering decision-making and how to apply them to make better decisions about processes, products, and resources as well as for selection of tools and techniques.

Software Engineering 629 **1.5 units; (3-0)**

Software Engineering Standards and Models

Formal description of algorithms for current software engineering standards and models. Trends and future development in software engineering standardization.

Antirequisite(s): Credit for Software Engineering 629 and 609.17 will not be allowed.

Software Engineering 637 **3 units; (3-0)**

Dependability and Reliability of Software Systems

Principles of software dependability techniques, and techniques to improve and predict software reliability.

Antirequisite(s): Credit for Software Engineering 637 and 521 will not be allowed.

Software Engineering 639 **3 units; (3-0)**

Advanced Software Testing

Advanced techniques, tools and concepts in software testing including: Agile testing, acceptance testing, GUI testing, test coverage analysis, automated testing, and new developments in testing research.

Antirequisite(s): Credit for Software Engineering 639 and 607.22 will not be allowed.

Software Engineering 641 **3 units; (3-0)**
(formerly Computer Science 601.33)

Software Evolution and Reuse

Phenomena and approaches involved in the evolution and reuse of large-scale software, including design for modifiability and tool support. Strengths and weaknesses of industrially-current techniques as well as recent research results.

Antirequisite(s): Credit for Software Engineering 641 and 541 will not be allowed.

Software Engineering 643 **3 units; (3-0)**

Automated Software Engineering

Discusses the main techniques for automating software engineering tasks such as requirement analysis, design, development, and testing. The covered automation techniques are based on concepts from data science, search-based software

engineering, and model-driven software engineering. Focuses on the fundamental techniques and algorithms in each category with examples.

Antirequisite(s): Credit for Software Engineering 643 and 607.26 will not be allowed

Software Engineering 652 **6 units; (3S-0)**

Software Engineering Project

A project in either software development or software best practice and experience.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Software Engineering 652 and Electrical Engineering 698 will not be allowed.

Software Engineering 696 **3 units; (3-0)**
(formerly Software Engineering 697)

Agent-Based Software Engineering

Principles and practices of engineering agent-based software systems.

Antirequisite(s): Credit for Software Engineering 696 and Computer Science 609 will not be allowed for programs offered by the Department of Computer Science.

Software Engineering for Engineers ENSF

For more information about these courses, see the Department of Electrical and Computer Engineering: <https://schulich.ualgary.ca/electrical-computer>.

Senior Courses

Software Engineering for Engineers 337
3 units; (3-1T-1.5)

Programming Fundamentals for Software and Computer

Key features of the C programming language. Pointers, memory models and memory management. Manipulation of text files and binary files. Introduction to recursion. Introduction to a modern object-oriented language. Development of basic program design skills with small projects.

Prerequisite(s): Engineering 233.

Antirequisite(s): Credit for Software Engineering for Engineers 337 and Computer Engineering 339 will not be allowed.

Software Engineering for Engineers 409
3 units; (3-2)

Principles of Software Development

A survey of software design and development topics for Engineering students. Topics include: key features of an object-oriented programming language, especially inheritance and polymorphism; elements of object-oriented design; programming and application of common data structures; strategies and tools for testing and debugging.

Prerequisite(s): Computer Engineering 335 or 339 or Software Engineering for Engineers 337.

Antirequisite(s): Credit for Software Engineering for Engineers 409 and either Electrical Engineering 409 or Computer Engineering 493 will not be allowed.

Software Engineering for Engineers 480
3 units; (3-2)

Principles of Software Design

Brief overview of typical software development lifecycles. Systematic methods for designing large-scale, quality software. Concepts such as abstraction, modularity, and software modelling

will be covered. Designing for non-functional properties of software will be introduced. Emphasis on individual skills.

Prerequisite(s): Software Engineering for Engineers 409 and Computer Engineering 369.

Antirequisite(s): Credit for Software Engineering for Engineers 480 and any of Software Engineering 300, 301, 311, 411, Computer Science 301, 333, or 451 will not be allowed.

Software Engineering for Engineers 519
3 units; (3-2)

Special Topics in Software Engineering

Current topics in software engineering.

Prerequisite(s): Consent of the Department.

Note: Consult Department for announcement of topics.

MAY BE REPEATED FOR CREDIT

Software Engineering for Engineers 545
3 units; (3-2)

Introduction to Virtual Reality

Introduce VR technologies. Emphasize on engineering methodologies of creating VR systems. Characterize VR systems, hardware and software, user 3D interaction, and VR applications and future.

Prerequisite(s): Software Engineering for Engineers 409.

Antirequisite(s): Credit for Software Engineering for Engineers 545 and 519.45 will not be allowed.

Graduate Courses

Registration in all courses requires the approval of the Department of Electrical and Computer Engineering.

Software Engineering for Engineers 603
3 units; (3-0)

Modelling and Measurement of Software Performance

Performance-oriented review of computer systems; methodologies to evaluate software performance; fundamental performance laws; performance prediction using queuing network models; discrete event simulation of computer system performance, simulation input and output analysis; performance testing, monitoring and benchmarking; workload characterization; software performance engineering.

Antirequisite(s): Credit for Software Engineering 603 and 619.02 will not be allowed.

Software Engineering for Engineers 604
3 units; (3-0)

Theoretical Foundations of Software Engineering

Explores formal principles of software engineering based on the common recognition that software engineering is not constrained by any physical laws as we know. The transdisciplinary foundations of software engineering are presented from the facets of information, computing, mathematics, cognitive, and management sciences, software engineering philosophies; engineering, mathematical, computational, management science, cognitive informatics, computational intelligence foundations and approaches of software engineering. As a result, a coherent framework of software engineering theories is learnt.

Antirequisite(s): Credit for Software Engineering for Engineers 604 and Software Engineering 609.19 will not be allowed.

Software Engineering for Engineers 606
 3 units; (3-0)

Software Engineering Fundamentals

Methodological foundation of software development principles from requirements analysis to software design and architecture.

Prerequisite(s): Software Engineering for Engineers 409 or consent of the Department.

Antirequisite(s): Credit for Software Engineering for Engineers 606 and 619.16 will not be allowed.

Software Engineering for Engineers 607
 3 units; (3-2)

Software Design and Architecture I

A study of software design topics including: abstraction, modularity, design patterns, software modelling, architectural patterns.

Prerequisite(s): Software Engineering for Engineers 500 or 519.48, 501 or 519.49, and 502 or 519.50; or consent of the department.

Corequisite(s): Software Engineering for Engineers 608.

Antirequisite(s): Credit for Software Engineering for Engineers 607 and 619.21 will not be allowed.

Software Engineering for Engineers 608
 3 units; (3-2)

Software Design and Architecture II

A study of topics related to architecting software systems: database design, methods and technologies for developing web-based software systems, and architecting systems for non-functional software properties.

Prerequisite(s): Software Engineering for Engineers 500 or 519.48, 501 or 519.49, and 502 or 519.50; or consent of the department.

Corequisite(s): Software Engineering for Engineers 607.

Antirequisite(s): Credit for Software Engineering for Engineers 608 and 619.22 will not be allowed.

Software Engineering for Engineers 609
 3 units; (3-0)

Team Design Project in Software Engineering I

A team design project in either software development or software best practice and experience.

Prerequisite(s): Consent of the department.

Antirequisite(s): Credit for Software Engineering for Engineers 609 and 619.23 will not be allowed.

Software Engineering for Engineers 610
 3 units; (3-0)

Team Design Project in Software Engineering II

A team design project in either software development or software best practice and experience.

Prerequisite(s): Consent of the department.

Antirequisite(s): Credit for Software Engineering for Engineers 610 and 619.24 will not be allowed.

Software Engineering for Engineers 611
 3 units; (3-2)

Machine Learning for Software Engineers

Covers Machine Learning, which focuses on developing machine learning applications, specifically in the engineering domain. Covers basic techniques for supervised and unsupervised learning, with the emphasis on the applied aspects of the techniques.

Prerequisite(s): Software Engineering for Engineers 500 or 519.48; or consent of the department.

Antirequisite(s): Credit for Software Engineering for Engineers 611 and either 519.47 or 619.25 will not be allowed.

Software Engineering for Engineers 612
 3 units; (3-2)

Engineering Large Scale Data Analytics Systems

Sources and characteristics of large scale data, i.e., "big data", large scale data analysis, benefits of large scale data analysis to various industry domains, scalable data analysis frameworks, large scale data algorithms in selected application domains.

Prerequisite(s): Software Engineering for Engineers 500 or 519.48, 501 or 519.49, and 502 or 519.50; or consent of the department.

Antirequisite(s): Credit for Software Engineering for Engineers 612 and 619.28 will not be allowed.

Software Engineering for Engineers 613
 3 units; (3-0)

Software Requirements Analysis and Process Management

Introduction to software development process, product management, and software requirements analysis: Elicitation, modelling, and validation of requirements.

Prerequisite(s): Consent of the department.

Antirequisite(s): Credit for Software Engineering for Engineers 613 and 619.30 will not be allowed.

Software Engineering for Engineers 619
 3 units; (3-1) or (3-0)

Special Topics

A study of problems of particular interest to students specializing in Software Engineering.

MAY BE REPEATED FOR CREDIT

South Asian Studies SAST

For more information see the Department of Classics and Religion website: clare.ucalgary.ca/.

Junior Course
South Asian Studies 203 3 units; (3-0)
 (formerly South Asian Studies 315)

Understanding South Asia

The roots of ancient civilization; society, resources and environment; racial, ethnic and cultural diversities; philosophic and religious traditions; arts and aesthetics; historical bases of tradition and modernity; role of education in social development; ideological differences and economic development. Primary focus on India, Sri Lanka, Pakistan, Bangladesh, Bhutan and Nepal.

Senior Courses
South Asian Studies 303 3 units; (3-0)
 (formerly South Asian Studies 415)

Contemporary Indian Society and Culture

This interdisciplinary course will discuss the culture and society of India today. Emphasis will be on casteism, communalism, religion, regionalism, globalization, ethnicity, class and gender in Indian society.

Prerequisite(s): South Asian Studies 203 or 315.

South Asian Studies 499 3 units; (3-0)

Topics in South Asian Studies

Investigation of themes and methodologies related to the study of South Asian civilizations. A single theme, multiple themes or the study and application of one or more methods employed in Asian

Studies may be offered. Themes/methods will vary among offerings.

499.01. Methods in South Asian Studies

499.02. Contemporary Issues in South Asia

499.03. Topics in the History of South Asia

Prerequisite(s): One of South Asian Studies 203, 303, 315 or 415.

South Asian Studies 531 3 units; (3-0)

Supervised Research in South Asian Studies

An interdisciplinary, inquiry-based course in which students will pursue a supervised, independent research project on a topic from social, philosophical, economic, political and/or international issues within South Asia and analysis of the basis for interactions among South Asian countries and across the Pacific will be presented in-depth.

Prerequisite(s): One of South Asian Studies 203, 303, 315 or 415 and consent of the Program Coordinator.

Antirequisite(s): Credit for South Asian Studies 531 and South Asian Societies 500 will not be allowed.

Space Physics SPPH

For more information about these courses contact the Department of Physics and Astronomy phas.ucalgary.ca/.

Note: For listings of related courses, see Astronomy, Astrophysics, Medical Physics and Physics.

Graduate Course
Space Physics 671 3 units; (3-0)

Physics of the Magnetosphere

Physics of the interaction between the earth's magnetic field and the fields and plasmas of the surrounding interplanetary environment. Topics include magnetic field models and co-ordinate systems, reconnection, current flow in the magnetosphere, substorms, and particle acceleration.

Prerequisite(s): Note: It is expected that a student's background will include Physics 509 and 555 or equivalent.

Spanish SPAN

For more information see the School of Languages, Linguistics, Literatures and Cultures website: sllc.ucalgary.ca/.

Language Placement information see 4.59 Placement in Language Courses.

Junior Courses
Spanish 201 3 units; (3-1)

Beginners' Spanish I

A comprehensive course for students with no prior knowledge of Spanish, focused on listening, speaking, reading, and writing skills having to do with immediate needs in everyday situations. Emphasis on intercultural awareness of Spanish-speaking cultures.

Antirequisite(s): Credit for Spanish 201 and 30 will not be allowed.

Note: Students must complete an online placement form before classes begin. For information, consult <https://sllc.ucalgary.ca/> placement.

Spanish 203 **3 units; (3-1)**

Beginners' Spanish II

Development of listening, speaking, reading, and writing skills on familiar topics and topics of personal interest. Emphasis on intercultural awareness of Spanish-speaking cultures.

Prerequisite(s): Spanish 30 or 201.

Antirequisite(s): Credit for Spanish 203 and 205 will not be allowed.

Spanish 205 **6 units; (8-2)**

Intensive Spanish

A challenging task-oriented course, intended for students exiting high school with Spanish 30 or equivalent, Spanish 201 or previous knowledge of Spanish. Prepares students to transition to Spanish 303.

Prerequisite(s): Spanish 30 or 201.

Antirequisite(s): Credit for Spanish 205 and either 203 or 301 will not be allowed.

Senior Courses

Spanish 301 **3 units; (3-1T)**

Intermediate Spanish I

Advances the development of the three major modes of communication: interactional, interpretative, and presentational, with emphasis on intercultural understanding of Spanish-speaking cultures.

Prerequisite(s): Spanish 203.

Antirequisite(s): Credit for Spanish 301 and 205 will not be allowed.

Spanish 303 **3 units; (3-1T)**

Intermediate Spanish II

Advances the development of the three major modes of communication: interactional, interpretative, and presentational, with emphasis on intercultural understanding of Spanish-speaking cultures, enabling communication on a variety of topics and comprehension and discussion of more complex texts and ideas.

Prerequisite(s): Spanish 301 or 205.

Note: Normally Spanish 303 and Spanish 323 are taken concurrently.

Spanish 321 **3 units; (3-0)**

Contemporary Hispanic Cultures

Study of current issues in the Hispanic world as seen through various media sources such as newspapers, magazines, television and especially the web. Introduction to tools and resources for such study. Extensive reading, written work and oral presentations.

Prerequisite(s): Spanish 203 or 205.

Antirequisite(s): Not open to students with credit in 400-level Spanish courses or higher.

Spanish 323 **3 units; (3-0)**

Introduction to Textual Analysis and Composition

Focus on all forms of communication in Spanish, including journalistic, scientific, literary texts and other media, with emphasis on critical reading as well as analytical written assignments.

Prerequisite(s): Spanish 301 or 205.

Antirequisite(s): Not open to students with credit in 400-level Spanish courses or higher.

Note: Normally Spanish 303 and Spanish 323 are taken concurrently.

Spanish 405 **3 units; (3-0)**

High-Intermediate Spanish

Development of reading skills through selected online materials or books. Increased emphasis on accurate pronunciation and ability to communicate in a more spontaneous Spanish as well as in written form. Review of selected grammatical structures, vocabulary enrichment and development of conversation skills dealing with cultural issues.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

Spanish 407 **3 units; (3-0)**

Critical Thinking in Spanish

Designed to develop students' critical thinking skills and academic writing proficiency. Further development of reading and writing skills, through the analysis of selected texts and constant practice in writing expository and argumentative essays from outline to completion. Writing is seen as a process that includes many states of development, revision and editing.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

Spanish 421 **3 units; (3-0)**

Introduction to Hispanic Prose

Analysis of selected Spanish and Spanish-American novels, short stories and essays, with an emphasis on literary analysis and literary history.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

Spanish 423 **3 units; (3-0)**

Introduction to Hispanic Poetry and Drama

Analysis of Spanish and/or Spanish-American poetry and plays, with an emphasis on literary analysis and literary history.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

Spanish 437 **3 units; (3-0)**

Spanish and Latin American Short Story

The analysis and interpretation of shorter fictional forms in Spain and Latin America, progressing from basic narrative techniques to the broad range of critical approaches to literary works. Strong emphasis will be placed on the understanding of the Hispanic cultures through literature and the development of critical thinking.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

Spanish 441 **3 units; (3-0)**

Women's Perspectives

Literary, artistic and other cultural works produced by Spanish, Latin American, Caribbean and Latina women. A variety of topics and disciplines (film, art, photography, philosophy, etc.) will be examined. Class material will include theoretical and critical texts, primarily from feminism. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

Spanish 471 **3 units; (3-2)**

Hispanic Cinema

Study of Spanish, Latin American, Caribbean and Chicano cinema in its historical, political, and social context. Examines a variety of topics (national and gender identities, construction of myths, relations of cinema to popular culture, relations of cinema and literature, etc.). Use of contemporary theories of cinematographic

expression. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

MAY BE REPEATED FOR CREDIT

Spanish 473 **3 units; (3-0)**

Hispanic Cultures

Overview of Hispanic history, literature and art. Use of essays, journalism, films and electronic media for classroom discussion. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

MAY BE REPEATED FOR CREDIT

Spanish 475 **3 units; (3-0)**

Topics in Spanish Language

Topics in Spanish phonology, dialectology, and other general aspects of the Spanish language. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

MAY BE REPEATED FOR CREDIT

Spanish 499 **3 units; (3-0)**

Topics in Hispanic Studies

Discussion of selected topics in Hispanic language, literature or culture.

Prerequisite(s): Spanish 303 and 3 units of Spanish at the 300 level or above.

MAY BE REPEATED FOR CREDIT

Spanish 505 **3 units; (3-0)**

Advanced Spanish

Advanced course in Spanish language and culture with particular emphasis on composition, vocabulary building and linguistic accuracy. Includes a capstone project to combine the knowledge and skills learned in the Spanish Major with other areas of concentration. It may include readings and enhancement of learning through other media.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 523 **3 units; (3-0)**

Translation

Introduction to the theory and practice of translation from Spanish into English and from English into Spanish. Format and content of course may vary from year-to-year to include other languages in addition to English.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 533 **3 units; (3-0)**

Uses of Spanish as a Second Language

Introduction to basic issues related to the teaching of Spanish as a second language. In special circumstances the theoretical component may be taught in English. The practical component may vary from year-to-year.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 553 **3 units; (3-0)**
(formerly Spanish 433)

Spanish American Literature to 1900

A survey of Spanish American literature in its cultural and historical context. Includes the study of indigenous voices, literature of the conquest, as well as the colonial period and the major authors

of the nineteenth century. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 555 3 units; (3-0)

Spanish American Literature after 1900

Study of the major movements and authors of the twentieth century. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 557 3 units; (3-0)

Current Trends in Hispanic Studies

In-depth study of literary and cultural issues which could include marginalization, identity, nationalism, the emergence of silenced voices, or other new developments. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 563 3 units; (3-0)

Medieval Literature

Representative works of literature in the Spanish language from the tenth to the fifteenth centuries.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Antirequisite(s): Credit for Spanish 563 and 565 will not be allowed.

Spanish 567 3 units; (3-0)

Early Modern Literature

Representative works of literature in the Spanish language from the sixteenth to the seventeenth centuries. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Antirequisite(s): Credit for Spanish 567 and 565 will not be allowed.

Spanish 571 3 units; (3-0)

Art and Literature

Study of the interrelations of the visual arts and literature, using as its reference Hispanic literary texts and works of art. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 573 3 units; (3-2)

Critical Analysis of Hispanic Cinemas

In-depth study of Hispanic Cinemas, including genres, movements, histories, industrial mechanisms of distribution, and cultural reception, in consolidated, developing and emerging film industries. Content can be organized based on region (Chicano/a, Mexican, Spanish cinema, etc.); topic (identity, transnationalism, women's cinema, etc.); genre (road movie, documentary, border cinema, auteur cinema, etc.); filmmakers and/or by identifiable traditions (cine de la movida, Nuevo cine latinoamericano, New cinemas, etc.). Use of contemporary theories and study of cinematographic techniques.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 581 3 units; (3-0)
(formerly Spanish 481)

Spanish Literature and Culture from the Eighteenth Century to the Spanish Civil War

Survey of major works and cultural movements from the eighteenth century to the early twentieth century. Focus on reading and analytical skills. Format and content of the course may vary from year-to-year.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 583 3 units; (3-0)

Spanish Literature and Culture from the Spanish Civil War to the Present

Interdisciplinary course stressing the relationship between various cultural manifestations and their socio-political background. Format and content of course may vary from year-to-year.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Spanish 593 3 units; (3-0)

Literary Theory

An introduction to modern literary theory and its various schools of thought, with application to works of Hispanic literature.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

Note: This course is mandatory for students registered in the Spanish Honours Program.

MAY BE REPEATED FOR CREDIT

Spanish 598 6 units; (0-3T)

Honours Thesis

Students carry out a research project under the supervision of a faculty member and submit a thesis written in Spanish.

Prerequisite(s): Admission to Spanish Honours program and completion of 75 units.

Spanish 599 3 units; (3-0)

Advanced Topics in Hispanic Studies

A specialized course for advanced students. Course may function as a seminar or as a directed readings course.

Prerequisite(s): Spanish 405 and 9 units in Spanish at the 400 level.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Note: The School of Languages, Linguistics, Literatures and Cultures will give graduate credit for 500-level courses in cases it deems exceptional. This option is subject to the approval of the School. Graduate students taking a 500-level course for graduate credit will be asked to complete additional requirements.

Spanish 601 3 units; (3-0)

Literary and Cultural Theory

MAY BE REPEATED FOR CREDIT

Spanish 613 3 units; (3-0)

Critical Analysis of Medieval Texts

MAY BE REPEATED FOR CREDIT

Spanish 615 3 units; (3-0)

Golden Age Literature

MAY BE REPEATED FOR CREDIT

Spanish 617 3 units; (3-0)

Theatre and Performance in the Nineteenth or Twentieth Centuries

MAY BE REPEATED FOR CREDIT

Spanish 619 3 units; (3-0)

Post-Franco Literature, Art and Film

MAY BE REPEATED FOR CREDIT

Spanish 621 3 units; (3-0)

Art, Film and Literature in the Spanish Avant-Garde

MAY BE REPEATED FOR CREDIT

Spanish 623 3 units; (3-0)

Spanish American Literature and Culture to 1900

MAY BE REPEATED FOR CREDIT

Spanish 625 3 units; (3-0)

Twentieth-Century Spanish American Literature

MAY BE REPEATED FOR CREDIT

Spanish 627 3 units; (3-0)

Avant-Garde Movements in Spanish America

MAY BE REPEATED FOR CREDIT

Spanish 631 3 units; (3-0)

Popular Culture

MAY BE REPEATED FOR CREDIT

Spanish 633 3 units; (3-0)

Writings in Exile

MAY BE REPEATED FOR CREDIT

Spanish 635 3 units; (3-0)

Literature and the Visual Arts in Hispanic Culture

MAY BE REPEATED FOR CREDIT

Spanish 637 3 units; (3-0)

Identities and Post-Colonial Voices

MAY BE REPEATED FOR CREDIT

Spanish 639 3 units; (3-0)

Hispanic Female Voices

MAY BE REPEATED FOR CREDIT

Spanish 641 3 units; (3-0)

Hispanic Cinema

MAY BE REPEATED FOR CREDIT

Spanish 643 3 units; (3-0)

Special Topics in Hispanic Culture, Language or Literature

MAY BE REPEATED FOR CREDIT

Statistics STAT

For more information about these courses contact the Department of Mathematics and Statistics math.ucalgary.ca/.

Junior Courses

Statistics 205 3 units; (3-1T)

Introduction to Statistical Inquiry

The systematic progression of statistical principles needed to conduct a statistical investigation culmi-

nating in parameter estimation, hypothesis testing, statistical modelling, and design of experiments.

Prerequisite(s): Mathematics 30-1 or 30-2 or Mathematics 2 (offered by Continuing Education).

Antirequisite(s): Credit for Statistics 205 and any one of Statistics 211, 213, 217, 327, Political Science 399, Psychology 300, 301, 312, or Sociology 311 will not be allowed. Students may not register in, or have credit for, Statistics 205 if they have previous credit for one of Statistics 321 or Engineering 319 or are concurrently enrolled in Statistics 321 or Engineering 319.

Statistics 213 **3 units; (3-1)**

Introduction to Statistics I

Collection and presentation of data, introduction to probability, including Bayes' law, expectations and distributions. Properties of the normal curve. Introduction to estimation and hypothesis testing.

Prerequisite(s): Mathematics 30-1 or Mathematics 2 (offered by Continuing Education).

Antirequisite(s): Credit for Statistics 213 and any one of Statistics 205, Statistics 327, Political Science 399, Psychology 300, 301, 312, or Sociology 311 will not be allowed. Not available to students who have previous credit for one of Statistics 321 or Engineering 319 or are concurrently enrolled in Statistics 321 or Engineering 319.

Statistics 217 **3 units; (3-1)**

Introduction to Statistics II

Estimation of population parameters; confidence intervals for means; choice of sample size. Tests of hypotheses including 2-sample tests and paired comparisons. The Chi-squared tests for association and goodness-of-fit. Regression and correlation; variance estimates; tests for regression and correlation coefficients. Non-parametric methods and associated tests. Time series, forecasting.

Prerequisite(s): Statistics 213.

Antirequisite(s): Credit for Statistics 217 and any one of Statistics 205, 327, Political Science 399, Psychology 300, 301, 312, or Sociology 311 will not be allowed. Not available to students who have previous credit for one of Statistics 321 or Engineering 319 or are concurrently enrolled in Statistics 321 or Engineering 319.

Senior Courses

Statistics 321 **3 units; (3-1T)**
(formerly Mathematics 321)

Introduction to Probability

A calculus-based introduction to probability theory and applications. Elements of probabilistic modelling, Basic probability computation techniques, Discrete and continuous random variables and distributions, Functions of random variables, Expectation and variance, Multivariate random variables, Conditional distributions, Covariance, Conditional expectation, Central Limit Theorem, Applications to real-world modelling.

Prerequisite(s): Mathematics 267 or 277.

Antirequisite(s): Credit for Statistics 321 and Engineering 319 will not be allowed.

Note: Statistics 205, 213, 217, and 327 are not available to students who have previous credit for one of Statistics 321 or Engineering 319 or are concurrently enrolled in Statistics 321 or Engineering 319.

Statistics 323 **3 units; (3-1T)**
(formerly Mathematics 323)

Introduction to Theoretical Statistics

Statistics and their distributions. Introduction to statistical inference through point estimation and confidence interval estimation of a population parameter. Properties of statistics including unbiasedness and consistency in estimation. Single parameter hypothesis testing, Type I and Type II Error. Multi-parameter estimation through confidence interval estimation and hypothesis testing. The analysis of bivariate data through simple linear regression, including inferences on the parameters of the linear model and the analysis of variance. Chi-square test of independence and goodness of fit test.

Prerequisite(s): Statistics 321.

Antirequisite(s): Credit for Statistics 323 and Data Science 305 will not be allowed.

Statistics 327 **3 units; (3-1)**

Statistics for the Physical and Environmental Sciences

Introduction to the collection of data. Probability and probability distributions. Single and Multi-sample estimation of distribution parameters. Regression and Goodness of Fit tests. Experimental Design and Analysis of Variance.

Prerequisite(s): One of Mathematics 249, 265 or 275.

Antirequisite(s): Credit for Statistics 327 and any one of Statistics 205, 213, 217, Political Science 399, Psychology 300, 301, 312, or Sociology 311 will not be allowed.

Note: Statistics 327 is not available to students who have previous credit for one of Statistics 321 or Engineering 319 or are concurrently enrolled in Statistics 321 or Engineering 319.

Statistics 421 **3 units; (3-0)**

Mathematical Statistics

An advanced examination of core concepts in mathematical statistics, including the multivariate normal distribution, limit distributions, sufficient statistics, completeness of families of distributions, exponential families, likelihood ratio tests, chi-square tests, and the analysis of variance. Additional topics and examples relating to sequential tests, non-parametric methods, Bayesian statistical modelling, and the general linear model may also be explored.

Prerequisite(s): Statistics 323.

Statistics 423 **3 units; (3-0)**

Statistical Analysis of Sample Survey

Introduction to questionnaire design of sample surveys. Treatment of the various sampling methodologies used in population parameter estimation. Ratio and regression estimation. Sampling weights and variance estimation of statistics. Estimation of population size and density. Non-response.

Prerequisite(s): One of Statistics 217, 323, 327, Data Science 305, Engineering 319, Psychology 300, 301, 312, or Sociology 311.

Statistics 425 **3 units; (3-0)**

Statistical Design and Analysis of Experiments

Introduction to the design of experiments and the statistical analysis of data. Analysis of variance in the response variable and adequacy of the model. Multiple comparison methods. Extensions to completely randomized block, latin-squares, and factorial experimental design. Introduction to

nested and split-plot design, with emphasis on statistical software usage.

Prerequisite(s): One of Statistics 217, 323, 327, Data Science 305, Engineering 319, Psychology 300, 301, 312, or Sociology 311.

Statistics 429 **3 units; (3-1T)**

Linear Models and Their Applications

Multiple linear regression model, parameter estimation, simultaneous confidence intervals and general linear hypothesis testing. Residual analysis and outliers. Model selection: best regression, stepwise regression algorithms. Transformation of variables and non-linear regression. Applications to forecasting. Variable selection in high-dimensional data using linear regression. Computer analysis of practical real world data.

Prerequisite(s): Statistics 323 or Data Science 305; and Mathematics 211 or 213.

Statistics 431 **3 units; (3-0)**

Introduction to Biostatistics

Fundamental topics in biostatistics, including descriptive statistics, graphical presentation of data, analysis of variance (ANOVA), study designs, contingency tables, measures of association, tests of significance, categorical data analysis, regression, time to event data analysis.

Prerequisite(s): Statistics 323 or Data Science 305.

Statistics 505 **3 units; (3-1T)**

Time Series Analysis

An introduction to the theory and tools to conduct time series analysis, with the emphasis on modelling and forecasting using a software. Stationarity, white noise, autocorrelation, partial autocorrelation, and linear predictor. Stationary ARIMA models, seasonality and trends. Model fitting, diagnostics and forecasting. Additional topics may include state space models, spectral analysis of time series, and GARCH models.

Prerequisite(s): Statistics 429.

Statistics 507 **3 units; (3-0)**
(formerly Statistics 407)

Introduction to Stochastic Processes

Markov chains. Limit distributions for ergodic and absorbing chains. Classification of states, irreducibility. The Poisson process and its generalizations. Continuous-time Markov chains. Brownian motion and stationary processes. Renewal theory.

Prerequisite(s): Statistics 321.

Statistics 517 **3 units; (3-0)**

Practice of Statistics

A capstone course intended for students in their final year of study. The emphasis is on how to address real world scientific and social issues by applying the various statistical methods acquired in the earlier years in a unified and appropriate way. This involves method selection, data handling, statistical computing, consulting, report writing and oral presentation, team work, and ethics.

Prerequisite(s): Two of Statistics 423, 425, 429 and 505.

Antirequisite(s): Credit for Statistics 517 and either 513 or 515 will not be allowed.

Statistics 519 **3 units; (3-0)**

Bayesian Statistics

Fundamentals of Bayesian inference, single and multiparameter models, hierarchical models, regression models, generalized linear models,

advanced computational methods, Markov chain Monte Carlo.

Prerequisite(s): Statistics 323; and Mathematics 267 or 277.

Antirequisite(s): Credit for Statistics 519 and 619 will not be allowed.

Statistics 523 **3 units; (3-0)**

Non-parametric Statistics

Non-parametric estimation and tests of hypotheses. Distribution-free tests. Asymptotic Theory. Re-sampling method and density estimation.

Prerequisite(s): Statistics 323.

Statistics 525 **3 units; (3-0)**

Applied Multivariate Analysis

Normal distribution. Statistical inference: confidence regions, hypothesis tests, analysis of variance, simultaneous confidence intervals. Multivariate statistical methods; principal components, factor analysis, discriminant analysis and classification, canonical correlation analysis, cluster analysis.

Prerequisite(s): Statistics 323.

Antirequisite(s): Credit for Statistics 525 and 625 will not be allowed.

Statistics 529 **3 units; (3-1)**

Special Topics in Applied Statistics

Content of the course will vary from year-to-year. Consult the Department for information on choice of topics.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Statistics 531 **3 units; (3-1)**

Monte Carlo Methods and Statistical Computing

Introduction to statistical computing; random numbers generation; Monte Carlo methods (variance reduction technique; computation of definite integrals); Optimizations; Numerical integrations.

Prerequisite(s): Statistics 323; Mathematics 267 or 277.

Statistics 533 **3 units; (3-1T)**
(formerly Statistics 433)

Survival Models

Nature and properties of survival models; methods of estimating tabular models from both complete and incomplete data samples including actuarial, moment and maximum likelihood techniques; estimations of life tables from general population data; Kaplan-Meier estimator and Nelson-Allan estimator; the accelerated failure time model; the Cox proportional hazards model; model building and high-dimensional survival data analysis.

Prerequisite(s): Statistics 323.

Antirequisite(s): Credit for Statistics 533 and 633 will not be allowed.

Statistics 541 **3 units; (3-1T)**

Categorical Data Analysis

Description and inference for binomial and multinomial observations using proportions and odds ratios; multi-way contingency tables; generalized linear models for discrete data; logistic regression for binary responses; multi-category logit models for nominal and ordinal responses; loglinear models, and inference for matched-pairs and correlated clustered data.

Prerequisite(s): Statistics 429.

Statistics 543 **3 units; (3-0)**

Statistical Learning

Introduction and linear regression; classification; regularization; model assessment and selection; support vector machines; unsupervised learning; tree-based methods; additional topics selected by course instructor.

Prerequisite(s): Statistics 429.

Antirequisite(s): Credit for Statistics 543 and 641 will not be allowed.

Graduate Courses

Statistics 600 **1.5 units; (3S-0)**
(formerly Statistics 621)

Research Seminar

A professional skills course, focusing on the development of technical proficiencies that are essential for students to succeed in their future careers as practicing statistician in academia, government, or industry. The emphasis is on delivering professional presentations and using modern statistical research tools. A high level of active student participation is required.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Statistics 601 **3 units; (3-0)**

Topics in Probability and Statistics

The content of this course is decided from year-to-year in accordance with graduate student interest and instructor availability. Topics include but are not restricted to: Advanced Design of Experiments, Weak and Strong Approximation Theory, Asymptotic Statistical Methods, the Bootstrap and its Applications, Generalized Additive Models, Order Statistics and their Applications, Robust Statistics, Statistics for Spatial Data, Statistical Process Control, Time Series Models.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

MAY BE REPEATED FOR CREDIT

Statistics 603 **3 units; (3-1)**
(formerly Statistics 601.14)

Applied Statistics for Nursing Research

Descriptive statistics; probability theory; statistical estimation/inference; power analysis; regression analysis; anova; logistic regression analysis; non-parametric tests; factor analysis; discriminant analysis; Cox's Proportional Hazard Model.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Statistics 619 **3 units; (3-0)**

Bayesian Statistics

Fundamentals of Bayesian inference, single and multiparameter models, hierarchical models, regression models, generalized linear models, advanced computational methods, Markov chain Monte Carlo.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Statistics 619 and 519 will not be allowed.

Statistics 625 **3 units; (3-0)**

Multivariate Analysis

Normal distribution. Statistical inference: confidence regions, hypothesis tests, analysis of variance, simultaneous confidence intervals. Principal components. Factor Analysis. Discrimination and classification. Canonical correlation analysis.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Statistics 625 and 525 will not be allowed.

Statistics 631 **3 units; (3-0)**

Computational Statistics

Unconstrained optimization methods, simulation and random number generation, Bayesian inference and Monte Carlo methods, Markov chain Monte Carlo, non-parametric inference, classical inference and other topics. An emphasis will be placed on computational implementation of algorithms.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Statistics 633 **3 units; (3-0)**

Survival Models

Advanced topics in survival models such as the product limit estimator, the cox proportional hazards model, time-dependent covariates, types of censorship.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Statistics 633 and 533 will not be allowed.

Statistics 635 **3 units; (3-0)**

Generalized Linear Models

Exponential family of distributions, binary data models, loglinear models, overdispersion, quasi-likelihood methods, generalized additive models, longitudinal data and generalized estimating equations, model adequacy checks.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Statistics 637 **3 units; (3-0)**

Non-linear Regression

Topics include but are not restricted to selections from: linear approximations; model specification; various iterative techniques; assessing fit; multiresponse parameter estimation; models defined by systems of differential equations; graphical summaries of inference regions; curvature measures.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Statistics 641 **3 units; (3-0)**

Statistical Learning

Introduction and Linear Regression; Classification; Regularization; Model Assessment and Selection; Support Vector Machines; Unsupervised Learning; Tree-Based Methods; Other Topics (e.g., Neural Networks, Graphical Models, High-Dimensional Data).

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Antirequisite(s): Credit for Statistics 641 and 543 will not be allowed.

Statistics 701 3 units; (3-0)

Theory of Probability I

Probability spaces, integration, expected value, laws of large numbers, weak convergence, characteristic functions, central limit theorems, limit theorems in R_d , conditional expectation, introduction to martingales.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Statistics 703 3 units; (3-0)

Theory of Probability II

Stopping times, renewal theory, martingales, almost sure convergence, Radon-Nikodym derivatives, Doob's inequality, square integrable martingales, uniform integrability, Markov chains, stationary measure, Birkhoff's Ergodic Theorem, Brownian motion, stopping times, hitting times, Donsker's Theorem, Brownian bridge, laws of the iterated logarithm.

Prerequisite(s): Statistics 701 and admission to a graduate program in Mathematics and Statistics or consent of the Department.

Statistics 721 3 units; (3-0)

Statistical Inference

Statistical models, likelihoods, maximum likelihood estimators, likelihood ratio, Wald and score tests, confidence intervals, bounds and regions, Bayesian estimation and testing, basic large sample theory, estimating equations, jackknife, bootstrap and permutation.

Prerequisite(s): Admission to a graduate program in Mathematics and Statistics or consent of the Department.

Statistics 723 3 units; (3-0)

Theory of Hypothesis Testing

Likelihood ratio (LR), union-intersection, most powerful, unbiased and invariant tests, Neyman-Pearson Lemma, Karlin-Rubin Theorem, confidence interval (CI), pivotal quantities, shortest length and shortest expected length CI, uniformly most accurate CI, confidence region, simultaneous CI, large-sample tests (Wald's, score, LR tests), Bayesian hypothesis testing, analysis of variance and linear models.

Prerequisite(s): Statistics 721 and admission to a graduate program in Mathematics and Statistics or consent of the Department.

Strategic Studies STST

For more information, see the Centre for Military, Security and Strategic Studies: cmss.ualgary.ca.

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Strategic Studies 601 3 units; (4 months)

MSS First Term Co-operative Education

Strategic Studies first term co-operative education work placement.

Prerequisite(s): Admission to the co-operative education option of the MSS program.

NOT INCLUDED IN GPA

Strategic Studies 602 3 units; (4 months)

MSS Second Term Co-operative Education

Strategic Studies second term co-operative education work placement.

Prerequisite(s): Admission to the co-operative education option of the MSS program.

Strategic Studies 603 3 units; (3-0)

Questions and Methods

A Block Week introduction to research design and methods in Military and Strategic Studies. Introduces the field, its history, major methodological debates and challenges of interdisciplinary research.

Prerequisite(s): Admission to Military and Strategic Studies graduate program.

NOT INCLUDED IN GPA

Strategic Studies 609 3 units; (3-0)

The Canadian Military in the Second World War

An examination of the political parameters imposed by the Canadian government, the quality of Canadian leadership, and the "fit" between British forms of military organization and the fighting quality of Canadian soldiers, sailors and airmen.

Strategic Studies 611 3 units; (3-0)

Canadian Military Studies

Canadian military studies, excepting the two world wars. Topics will include the evolution of Canadian defence policy, past or present, the development and evolution of the Canadian Forces or any of its main elements (army, navy or air force), Canadian military operability with the military forces of Allied nations, and the relationship between Canadian foreign policy and the use of the Canadian military.

Strategic Studies 613 3 units; (3S-0)

The Canadian Military in the First World War

The development and operational achievements of the Canadian Expeditionary Force, wartime civil-military relations and conscription politics.

Antirequisite(s): Credit for Strategic Studies 613 and History 520 will not be allowed.

Strategic Studies 649 3 units; (3S-0)

Special Topics in Military and Strategic Studies

MAY BE REPEATED FOR CREDIT

Strategic Studies 651 3 units; (3-0)

Reading Seminar

Prerequisite(s): Consent of the Graduate Co-ordinator.

MAY BE REPEATED FOR CREDIT

Strategic Studies 653 3 units; (3-0)

Research Seminar

Prerequisite(s): Consent of the Graduate Co-ordinator.

MAY BE REPEATED FOR CREDIT

Strategic Studies 655 (History 655) 3 units; (3-0)

Classics of Strategy

Strategic thought from Sun Tzu to Clausewitz, Mahan to Corbett. Analyzes the writings of classic strategic thinkers and then, by way of case studies, examines their theories as they pertain to military and political planners from the Peloponnesian War to the present.

Strategic Studies 657 3 units; (3-0)

Intelligence; Information Operations; and "Command, Control, Communications and Computers"

An assessment of the history of intelligence, information operations, and command systems for military and diplomatic institutions as well as contemporary theory and practice related to these issues.

Strategic Studies 659 3 units; (3-0)

Sea Power

The meaning of sea power and an assessment of how modern states use it. An analysis of the writings of major naval strategic thinkers and case-study examination of the application of those theories from Nelson to the present.

Strategic Studies 662 3 units; (3S-0)

Advanced Studies in Canadian Arctic Security

The Canadian Arctic is an emerging area of concern due to changes scarcely imaginable even a few years ago. Examines the nature of some of these changes – e.g. climate change and the northern seas' dramatically changing ice conditions, growing recognition of the region's resource wealth, and evolving international relations in the circumpolar region – and what they mean for Canadian Arctic Security.

Strategic Studies 663 3 units; (3S-0)

Wars – Causes and Aftermaths

An examination of the complexity and experience of conflict and war as well as the broader institutions that govern post-conflict recovery and transition in the twentieth and twenty-first centuries. Special attention will be paid to the methodological complexities of studying violence.

Strategic Studies 751 3 units; (3-0)

Reading Seminar

Prerequisite(s): Consent of the Graduate Co-ordinator.

MAY BE REPEATED FOR CREDIT

Strategic Studies 753 3 units; (3-0)

Research Seminar

Prerequisite(s): Consent of the Graduate Co-ordinator.

MAY BE REPEATED FOR CREDIT

Strategy and Global Management SGMA

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ualgary.ca/>.

Junior Course

Strategy and Global Management 217
3 units; (3-3) or (3-1.5)

Introduction to Business Skills

Introduction to the external business environment, human resource management, and marketing. Topics will include ethical decision-making, teamwork, secondary research, proper use of business communication tools and presentation skills. Pedagogical approaches may include case analysis, exercises, simulations, and class discussion.

Prerequisite(s): Admission to the Haskayne School of Business.

Antirequisite(s): Credit for Strategy and Global Management 217 and Business and Environment 291 will not be allowed.

Senior Courses

Strategy and Global Management 371
3 units; (3-0)
(formerly Strategy and Global Management 575)

International Business

Covers the concepts and knowledge base required to understand how foreign cultural, economic and political developments affect the strategies of firms involved in international trade and investment, as well as of firms often seen as principally domestic in orientation.

Prerequisite(s): Admission to the Haskayne School of Business and 24 units.

Strategy and Global Management 403
3 units; (3-0)

Business in BRIC Markets

Introduction to complexities facing multinationals when operating in emerging markets, particularly Brazil, Russia, India and China. Exploration of institutional contexts and consumer cultures in each of the BRIC countries, and the impact of the above on strategy. Comparison of multinational enterprises from emerging economies versus companies from developed economies, in terms of international strategies, challenges and opportunities.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Strategy and Global Management 405
3 units; (3-0)

East Asia in the World Economy

Investigation of how firms become international and achieve superior performance in the international business environment, with an emphasis on Asia. Exploration of opportunities and contemporary issues for doing business in the diverse countries of Asia. Similarities and differences in business practices among Asian countries are studied. International business concepts and strategies for doing business in Asia are considered.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Strategy and Global Management 407
3 units; (3-0)

International Business Regulation

International business regulations are examined, and their impact on a firm's international strategies are analyzed. Exploration of how multinational enterprises must simultaneously adapt to the external/regulatory environments of their home country and multiple host countries.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Strategy and Global Management 409
3 units; (3-0)

Cross-Cultural Management

Introduction to the challenges posed by managing in international environments and across cultural boundaries. Emphasis is placed on understanding the nature of cultural differences; the influence of these differences on organizational processes including leadership, teams, communication, ethics and conflict resolution; their impact on human resource practices including staffing and performance management; and implications for those holding international managerial roles.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Antirequisite(s): Credit for Strategy and Global Management 409 and Management Studies 559.26 will not be allowed.

Strategy and Global Management 559
3 units; (3-0)

Selected Topics in Strategy and Global Management

Examination of selected topics in Strategy and Global Management.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Strategy and Global Management 571
3 units; (3-0)

Business Under USMCA

Legal, political, economic and social considerations important to Canadian firms pursuing the US and/or Mexican markets, including the implications of the United States - Mexico - Canada Agreement.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Strategy and Global Management 573
3 units; (3-0)

Business with Japan

An integrated approach to the cultural, governmental and structural factors influencing the conduct of business with Japan, whether as a supplier, customer, partner or investor.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Strategy and Global Management 577
3 units; (3-0)

International Strategic Management

A focus on why and how firms internationalize and the strategic challenges facing firms that operate within an international business environment. The course covers key concepts, theories and perspectives in international management. These are critiqued, contextualized and applied to particular firm level cases.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Strategy and Global Management 579
3 units; (3-0)

Co-ordinating Global Business

Applies international business theory to the practical operational challenges faced by international managers with a focus on functional implications throughout the entire value chain of the firm's cross-border activities.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units.

Note: A basic understanding of the international business environment and international strategic management is assumed.

Strategy and Global Management 589
3 units; (3-0)

Field Investigation in International Business

Research project based on a live "case". Student groups are presented with a case of a real-world local multinational company facing an international strategy issue, conduct primary and secondary research, analyze impediments, and apply knowledge and skills gained to provide actionable recommendations for managers in charge of international strategy. Final projects may be

submitted as IVEY teaching cases in cooperation with interested faculty.

Prerequisite(s): Admission to the Haskayne School of Business and 60 units including one of Finance 461, Marketing 467, Strategy and Global Management 371, 403, 405, 407, 409, 571, 573, 577 or 579.

Strategy and Global Management 591
3 units; (3-0)

Strategic Management

Analysis of competitive situations from the general management point of view, including fit between key environmental forces and the firm's resources, and changes in these over time. Formulating and implementing strategy based on that analysis. Developing and leveraging a firm's core competencies to gain long-term sustainable advantage.

Prerequisite(s): Admission to the Haskayne School of Business and 84 units including Accounting 217 or 317, Accounting 323, Business and Environment 395, Communications Studies 363 or 369 or Entrepreneurship and Innovation 317, Management Studies 391, Organizational Behaviour and Human Resources 317, Business Technology Management 317, Finance 317, Marketing 317, Operations Management 317.

Graduate Courses

Strategy and Global Management 601
3 units; (3-0)
(formerly Strategy and Global Management 701)

Strategic Management I

The role of the CEO and other senior executives in formulating and implementing corporate strategies, and provides an overview of key strategic issues and topics. Covers such areas as industry analysis, executive leadership, corporate strategy, corporate diversification, strategic change, global strategy, mergers and acquisitions, and strategic implications of new technologies.

Antirequisite(s): Credit for Strategy and Global Management 601 and 701 will not be allowed.

Strategy and Global Management 672
1.5 units; (3-1T)

Strategic Analysis

Introduction to the key concepts, tools, and principles of strategy formulation and competitive analysis.

Prerequisite(s): Admission to the Master of Management program.

Strategy and Global Management 674
1.5 units; (3-1T)

International Business

Strategic challenges of managing and operating within an international business environment, their potential implications at a firm level, strategies for firms competing in international markets, and operational tactics employed in functional areas.

Prerequisite(s): Admission to the Master of Management program.

Strategy and Global Management 707
3 units; (3-0)

Advanced Strategic Management Tools

Re-examination of the main tools used in strategy analysis with a unique triple focus on: 1) inclusion only of tools that are actionable and lead to outcomes with clear management implications; 2) critical assessment of the 'limits' associated with applying each tool (boundary conditions; weaknesses; danger of wrong interpretation of results; unexpected negative spill-over effects; etc.); and 3) discussion of the most recent insights from

the scholarly and practitioner oriented literatures, emphasizing dynamics.

Prerequisite(s): Admission to the Doctor of Business Administration program.

Strategy and Global Management 725
3 units; (3-0)

e-Strategy

The impact of Internet technology on strategic management of large corporations. How the technology influences industry structure and how it drives companies' competitive strategies and their organizational structures and systems. Explores the implications for strategic leadership in organizations.

Corequisite(s): Business Technology Management 725.

Strategy and Global Management 751
3 units; (3-0)

Strategic Management in the Global Energy Industry

Characteristics of the energy industry. Major strategic issues facing top management teams in corporations involved in oil and gas and power businesses and relevant strategic tools for addressing them. Industry structure, energy value chain, key players and their strategies, industry dynamics and trends, supply and demand, expansion, M&As, roles of governments, OPEC and international politics, Kyoto Protocol, major technological drivers, organization and top management leadership.

Corequisite(s): Strategy and Global Management 601.

Strategy and Global Management 775
3 units; (3-0)

International Business Environment

The environment which influences international business activities including economic, legal, political and socio-cultural factors. Foreign direct investment in Canada will also be considered.

Strategy and Global Management 789
3 units; (3S-0)

Seminar in Strategy and Global Management

Study and discussion of current research literature and contemporary issues on topics related to Strategy and Global Management in the private and/or the public sectors.

MAY BE REPEATED FOR CREDIT

Strategy and Global Management 795
3 units; (3-0)

Strategic Management II

Application of strategic concepts and frameworks of analysis. Decisions and the processes to mobilize resources for the attainment of objectives. Measurement of performance through industry and competitive analysis.

Prerequisite(s): Strategy and Global Management 601 or consent of the Haskayne School of Business.

Strategy and Global Management 796
3 units; (3-0)

Qualitative Research in Strategy and Organizations

Processes of collecting, analyzing, and reporting qualitative data, as well as inducing theory from them. Application to the area of Strategy and Organizations is emphasized. Focus on various ap-

proaches to qualitative research and on developing competence in conducting it.

Prerequisite(s): Consent of the Haskayne School of Business.

Strategy and Global Management 797
3 units; (3S-0)

Advanced Seminar in Strategy and Global Management

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Strategy and Global Management 799
3 units; (3S-0)

Doctoral Seminars in Strategy and Global Management

799.01. Survey of the Field

799.02. Corporate and Competitive Strategy

799.03. Current Topics in Strategic Management

799.04. Business Environment

799.05. Interorganizational Relationships: Creating and Managing Strategic Alliances

Supply Chain Management SCMA

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses

Supply Chain Management 451 3 units; (3-0)

Supply Chain Management Analysis

Current issues confronting supply chain managers are examined. The role of supply chain management in the overall strategy and performance of companies is studied. Students analyze real-world cases and develop suitable solutions to improve supply chain operations. Topics include advanced inventory management, supply chain co-ordination, network design and risk management.

Prerequisite(s): Admission to the Haskayne School of Business, Operations Management 317 and Management Studies 391.

Supply Chain Management 453 3 units; (3-0)
(formerly Operations Management 417)

Procurement Management

An in-depth analysis of strategic procurement practices for competitive advantage, cost management, contractual negotiations and supplier management. Strategic implications of supply processes, outsourcing, and supplier relations are discussed.

Prerequisite(s): Admission to the Haskayne School of Business, Operations Management 317 and Management Studies 391.

Supply Chain Management 455 3 units; (3-0)

Logistics Management

Logistics entails some of the major operations of supply chains. The objective of this course is to introduce the general concepts and analytical tools of logistics management from a supply chain perspective.

Prerequisite(s): Admission to the Haskayne School of Business, Operations Management 317 and Management Studies 391.

Antirequisite(s): Credit for Supply Chain Management 455 and Operations Management 559.05 will not be allowed.

Supply Chain Management 559 3 units; (3-0)

Selected Topics in Supply Chain Management

Investigation of selected topics in Supply Chain Management.

Prerequisite(s): Admission to the Haskayne School of Business, Operations Management 317 and Management Studies 391. For certain topics, consent of the Haskayne School of Business will also be required.

Note: For more information on topics and prerequisite requirements, see Class Notes in the Course Search.

MAY BE REPEATED FOR CREDIT

Sustainability Studies SUST

For more information about these courses, see the Sustainable Energy Development program: <https://www.ucalgary.ca/sustainability/learn/certificate-sustainability-studies>.

Sustainability Studies 201 3 units; (3-0)
(formerly University 207)

Exploring Sustainability

Examines principles, practices, obstacles and opportunities pertaining to sustainability. Potential issues to be explored include: Sustainability: Origins, Principles and Practices; Sustainable Development; Planning for Sustainability: The Campus, The City and Beyond; Resource Audits and Sustainability; Corporations and Responsibility; Government and Governance; Climate Change.

Sustainability Studies 401 3 units; (3S-0)

Sustainability Research Methods

Understanding sustainability research, research processes, mixed methods, quantitative and qualitative approaches to data collection and analysis, etc. This will help students to identify their research projects and to become well prepared to conduct applied research projects.

Prerequisite(s): Sustainability Studies 201 or University 207.

Antirequisite(s): Credit for Sustainability Studies 401 and University 401.30 will not be allowed.

Sustainability Studies 403 3 units; (3S-0)

Sustainability Research Project

Students develop applied research projects to engage in experiential learning with partners both on and off-campus.

Prerequisite(s): Sustainability Studies 401.

Sustainability Studies 501 3 units; (3S-0)

Capstone in Sustainability Studies

Emphasizes reflection and integration through experiential learning experiences from research projects and applied problem solving. Students will apply the lessons learned through reflective writing, presentations, case studies, and career goals development.

Prerequisite(s): Sustainability Studies 403 and enrolment in the embedded Certificate in Sustainability Studies.

Sustainability Studies 503 3 units; (0-6)

Directed Studies

Supervised independent study of a specific topic.

Prerequisite(s): Consent from the Academic Coordinator of Sustainability Studies.

Note: Students should contact the Academic Co-ordinator of Sustainability Studies, at least two weeks before the start of classes to arrange an independent study course.

MAY BE REPEATED FOR CREDIT

Sustainable Energy Development SEDV

For more information about these courses, see the Sustainable Energy Development program: ucalgary.ca/sustainableenergy.

Graduate Courses

Sustainable Energy Development 601 3 units; (3-0)

Energy Systems I: Non-Renewable Energy

Interactions between non-renewable energy resources and the environment; exploration, production and exploitation of energy resources, including conventional and unconventional oil and gas, coal, and nuclear; technical, economic and environmental and policy aspects of production transportation and use of non-renewable energy.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 603 3 units; (3-0)

Energy Systems II: Renewable Energy

Renewable energy sources, such as: wind, hydro, solar photovoltaic, solar heat collection, geothermal, biomass, cogeneration; system level physical modelling; steady-state turbine operation; introductory thermodynamics; economic tools, such as levelized cost of energy analysis.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 605 3 units; (3-0)

Indigenous Peoples and Sustainability in Energy Development

In-depth analysis of indigenous peoples and ecological sustainability in relation to energy development. Systems ecology, ecological economics, cultural anthropology, indigenous rights and ethics provide theoretical foundations for sustainable development in global context of indigenous peoples with primary focus on Canadian indigenous peoples. Historical and legal-political context addresses treaties, policy and land-use including duty to consult and accommodate with emphasis on reconciliation.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 607 3 units; (3-0)

Water Pollution and its Impact on the Energy Sector

Water pollution, water chemistry, water and wastewater quality and quantities, conventional, non-conventional and emerging contaminants, water and wastewater treatment methods, water usage and reuse options, municipal and industrial water treatment, water energy nexus, water requirements and pollution as related to the energy sector.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 609 3 units; (3-0)

Air Pollution and its Impact on the Energy Sector

Population growth and energy options; meteorological parameters, physical and chemical

properties of the atmosphere; nature of pollutants present: anagenetic-made sources; stationary and mobile; generation, methods of control and effects of photochemical smog; global warming; particulates, acid rain gases, carbon monoxide, hydrocarbons and their emission control; pollution monitoring and instrumentation; environmental regulations; tail gas clean-up; health impacts; industrial site selection; pollutant dispersion.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 611 3 units; (3-0)

Land Pollution and Waste Management in the Energy Sector

Waste management principles and effective practices in the development of energy projects. Causes and consequences of land pollution associated with energy production and management practices and technologies for prevention, mitigation and control of pollution.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 613 (3-0) 3 units;

Energy Systems III: Planning and Energy Economics

Financial principles and evaluation techniques and their application to energy investment planning; assessment methods applied to real-world examples; assessment of foundations in environmental energy economics and policies.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 615 3 units; (3-0)

Environmental Impact Assessment in the Energy Sector

Principles and professional practice of environmental impact assessment, with application to energy development projects.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 617 3 units; (3-0)

Human Resource and Management in the Energy Sector

Major concepts and theories of management and organizational dynamics as they impact on the energy sector; Interpersonal effectiveness and self-awareness, motivation, group dynamics, project teams, supportive communication, stress, leadership, power, influence and conflict, organizational culture, processes of change.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 619 3 units; (3-0)

Environmental Law in the Energy Sector

General legal concepts, administrative law, aspects and sources of environmental law, environmental decision making, international agreements and treaties, and law reform.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 621 3 units; (3-0)

Environmental Management Tools in the Energy Sector

Environmental management systems and issues are discussed as they relate to organizational and environmental impacts. Topics include: environmental management for both compliance and innovation; management processes including audits, development of indicators and reporting, green product development, risk management.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 623 3 units; (3-0)

Strategic Environmental Planning for Energy Organizations

The strategy of sustainable development concepts and principles and their application to energy policies and development opportunities for businesses, including stakeholder engagement.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Sustainable Energy Development 631 3 units; (3-0)

Life Cycle Assessment in the Energy Sector

The concept of life cycle assessment (LCA) as it applies to energy production and consumption from an environmental and sustainability perspective; Use of LCA to support informed decision-making for improved environmental performance of energy projects and for avoiding problem-shifting and sub-optimization.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

Antirequisite(s): Credit for Sustainable Energy Development 631 and 699.03 will not be allowed.

Sustainable Energy Development 640 1.5 units; (1.5-0)

Capstone Project I: Research Design

Identification of potential capstone project research questions that are anchored in energy, environment and one other aspect of the student's choice; development of research designs and skills to determine the feasibility of investigating potential research questions, narrowing options, and advancing the best option into a short proposal.

Prerequisite(s): Admission to the Sustainable Energy Development Program.

Antirequisite(s): Credit for Sustainable Energy Development 640 and 625 will not be allowed.

Note: This course is one section of a three part series. Sustainable Energy Development 640, 641 and 642 are scheduled as a continuum and must be taken immediately after each other.

NOT INCLUDED IN GPA

Sustainable Energy Development 641 0.75 units; (0.75-0)

Capstone Project II: Proposal Development

Writing a comprehensive proposal designed to answer a research question. Seeking approval from a supervisor with expertise on the chosen topic, with guidance from the course instructor. Verbally presenting the research question and convincing the audience of its importance. Continuing investigation of the research question with progress reports

submitted to both the supervisor and the course instructor.

Prerequisite(s): Admission to the Sustainable Energy Development Program and Sustainable Energy Development 640.

Antirequisite(s): Credit for Sustainable Energy Development 641 and 625 will not be allowed

Note: This course is one section of a three part series. Sustainable Energy Development 640, 641 and 642 are scheduled as a continuum and must be taken immediately after each other.

NOT INCLUDED IN GPA

Sustainable Energy Development 642
0.75 units; (0.75-0)

Capstone Project III: Research Exploration and Examination

Exploring the research question through an in-depth literature review, data collection, and analyses of the aspects of energy, environment, and one other aspect. Completion and submission of a professionally prepared final report that explains the investigation and findings. Presentation of findings.

Prerequisite(s): Admission to the Sustainable Energy Development Program and Sustainable Energy Development 641.

Antirequisite(s): Credit for Sustainable Energy Development 642 and 625 will not be allowed.

NOT INCLUDED IN GPA

Sustainable Energy Development 699
3 units; (3-0)

Topics in Energy and the Environment

Study of selected topics related to energy and the environment and related subjects. Specific course(s) will reflect changing needs and faculty interests.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program.

MAY BE REPEATED FOR CREDIT

Term Abroad Program TAP

For more information about these courses, refer to the individual faculty offering the course.

Junior Courses

Term Abroad Program 201 3 units; (3-0)

National Language I

Instruction in the Language (or one of the languages) of the country of residence as part of a Term Abroad Program.

Term Abroad Program 203 3 units; (3-0)

National Language II

A continuation of Term Abroad Program 201.

Prerequisite(s): Term Abroad Program 201 or consent of the Faculty of Arts.

Senior Courses

Term Abroad Program 301 3 units; (3-0)

National Language Intermediate I

A continuation of Term Abroad Program 203.

Prerequisite(s): Term Abroad Program 203 or consent of the Faculty of Arts.

Term Abroad Program 303 3 units; (3-0)

National Language Intermediate II

A continuation of Term Abroad Program 301.

Prerequisite(s): Term Abroad Program 301 or consent of the Faculty of Arts.

Tourism Management TOUR

For more information about the Faculty offering these courses, see the Haskayne School of Business: <https://haskayne.ucalgary.ca/>.

Senior Courses

Tourism Management 309 3 units; (3-0)

Introduction to Leisure, Tourism and Society

An interdisciplinary introduction to the concepts, methods and practices of leisure, recreation and tourism studies.

Prerequisite(s): Admission to the Haskayne School of Business and 30 units.

Antirequisite(s): Credit for Tourism Management 309 and 409 will not be allowed.

Tourism Management 409 3 units; (3-0)

Travel and Tourism Management

Economic, social, cultural, political, and technological dimensions of tourism, in particular changing travel markets, industry structure, evolving issues and problems.

Prerequisite(s): 60 units.

Antirequisite(s): Credit for Tourism Management 409 and 309 will not be allowed.

Note: Not available for credit toward the Bachelor of Commerce program. Preference in enrolment is given to students who have declared a Management and Society Minor.

Transportation Studies TRAN

Instruction offered collaboratively by members of the Departments of Economics, Geography, and Political Science in the Faculty of Arts and the Department of Civil Engineering in the Schulich School of Engineering.

Senior Courses

Transportation Studies 301 3 units; (3-0)
(formerly Transportation Science 301)

Transportation Systems and Analysis

An introduction to sources of data and methods of analysis for describing and analyzing transportation systems. Transportation systems will be treated at the municipal, provincial and federal levels and on a modal basis.

Transportation Studies 303 3 units; (3-0)

Introduction to Transportation Studies

Provides a critical foundation for understanding transportation systems in their modern context, with a particular emphasis on a broad, policy focused exploration. Topics include the role of various transportation modes in Canada's development as a nation, the current status of Canadian transportation modes, and challenges facing the transportation system.

Transportation Studies 473 3 units; (3-2)
(formerly Transportation Science 473)

Introduction to Transportation Planning

Goals and objectives of urban and regional transportation planning; the transportation planning process; trip generation, trip distribution, modal

split, traffic assignment; transportation surveys and data collection; fundamentals of traffic flow; capacity and level of service; urban transportation technology; computer simulation models of urban transportation; environmental impacts; transportation systems management; energy considerations; pedestrian movement systems; urban goods movement; impact of transportation system on city growth; urban transportation policy and financing in Canada.

Prerequisite(s): Transportation Studies 301 or both Engineering 319 and Civil Engineering 371; or consent of the instructor.

Transportation Studies 499 3 units; (5-0)
(formerly Transportation Science 499)

Group Project in Transportation Issues

Students will work in groups to examine real-world transportation problems identified by the instructor. Methodology will be based on knowledge acquired in Transportation Studies 301.

Prerequisite(s): Transportation Studies 301 and consent of the Program.

Transportation Studies 503 3 units; (3-2)

Decision Support Systems in Transportation Planning

An exploration of the history of decision support in transportation planning from theory to application, including a critical exploration of the 1960's through to modern spatial and aspatial approaches, with an emphasis on critically understanding the decision-support techniques of modern transportation planning. Students will use modern decision-support software tools.

Prerequisite(s): Transportation Studies 303.

Transportation Studies 511 3 units; (3-0)

Selected Topics in Transportation Economics

Topics may vary from year-to-year. Provides students with in-depth coverage of transportation issues in a specific sector or region in Canada and relies heavily on microeconomic analysis. Consult the Transportation Studies Program Director for topics available in a given year.

Prerequisite(s): Economics 301, 357 and one of 315 or 395; or consent of the Transportation Studies Director.

MAY BE REPEATED FOR CREDIT

Transportation Studies 513 3 units; (3-0)

Selected Topics in Transportation Policy

Analysis of government's role in regulating, financing, and managing transportation infrastructure and operations. Comparison of cases in Asia, North America, and Europe will highlight the challenges and opportunities of making transportation more sustainable. Consult the Transportation Studies Program Director for the topics to be explored in a given year.

Prerequisite(s): Political Science 357, and one of 447 or 451 or consent of the instructor.

MAY BE REPEATED FOR CREDIT

Transportation Studies 599 3 units; (5-0)
(formerly Transportation Science 599)

Independent Research in Transportation Issues

Individual work on an assigned topic concerning a practical transportation issue under the supervision of a faculty member. The project will normally involve a literature review and the application of theoretical analysis to an actual problem encountered by practitioners. Submission and defence of a midterm progress report and a final report are included.

Prerequisite(s): Consent of Program.

University UNIV

Instruction offered by the University and individual Faculties depending on the topic(s) being covered.

Junior Courses

University 201 3 units; (3-0.5S)

Global Challenges Inquiry I

Students will engage in inquiry-based learning to explore solutions to a complex, socially relevant problem using knowledge, evidence, and methods from multiple disciplines, under the guidance of University of Calgary experts. Examples of problems include poverty, water and food security, child health, racial conflict, and gender discrimination.

Prerequisite(s): Completed fewer than 18 units at the time of registration.

Note: Students with AP or IB credit or in second year may seek consent to enrol from the Director of the College of Discovery, Creativity, and Innovation. A day-long Global Challenges Conference during Block Week is a required component of this course and must be completed to earn a passing grade. The 0.5 seminar hours account for the day-long conference. Because the conference is mandatory, registration in the course is closed the day previous to the conference. Students who have completed more than 18 units at the time of registration may seek consent to enrol.

University 203 3 units; (3-2.5S)

Global Challenges Inquiry II

Students will continue to engage in inquiry-based learning to explore solutions to a complex, socially relevant problem using knowledge, evidence, and methods from multiple disciplines, under the guidance of University of Calgary experts.

Prerequisite(s): University 201 and completed fewer than 18 units at the time of registration.

Note: Students must register in the same section of 203 in which they were registered in University 201 in the Fall Term. A one-week Global Challenges Conference held during Block Week is a required component of this course and must be completed to earn a passing grade. The 2.5 seminar hours account for the week-long conference. Because the conference is mandatory, registration in the course is closed the day previous to the start of the conference. Students who have completed more than 18 units at the time of registration may seek consent to enrol.

University 205 3 units; (3-0)

Effective Learning Strategies

Theories, research and practice regarding learning and thinking in adult learners. The importance of metacognition, attention, memory, emotions, motivation and attitudes to learning will be discussed. Students will apply the theory and research to their own learning experiences.

Antirequisite(s): Credit for University 205 and Educational Psychology 205 will not be allowed.

Senior Courses

University 301 3 units; (3S-0)

The Poisoned Pen

Consideration of poisons from two different perspectives, science and literature. Using a problem-based approach, students will not only learn what makes a poison effective but also the essence of good story-telling.

University 401 3 units; (3-0)

Topics in Interdisciplinary Studies

The focused examination of a topic from a variety of interdisciplinary perspectives.

MAY BE REPEATED FOR CREDIT

University 501 3 units; (0-4)

Experiential Learning

An application of theory in a community or workplace setting.

Prerequisite(s): Consent of the student's faculty.

Note: Information regarding procedures to be followed in registering for this course is available from Associate Deans (Student Affairs) of undergraduate faculties and the Registrar.

MAY BE REPEATED FOR CREDIT

University 511 3 units; (3-0)

Special Topics in Sustainability

511.01. Introduction to Sustainable Development
511.02. Theoretical Basis for Interdisciplinary Intervention and Design

University 513 3 units; (0-8)

Introduction to Interdisciplinary Design Practice

University 515 3 units; (0-8)

Advanced Interdisciplinary Design Practice

Prerequisite(s): University 511.01.

Graduate Courses

University 601 3 units; (3-0)

Ethics of Research with Human Subjects

A multidisciplinary course addressing issues in research with human subjects. Topics include theoretical approaches to understanding ethics, respect for persons, benefit and harm, confidentiality and publication, and selection of research subjects. Taught by a multidisciplinary team with very broad experience on research ethics boards.

Prerequisite(s): Consent of the Course Coordinator.

University 611 3 units; (3-0)

Special Topics in Sustainability

611.01. Introduction to Sustainable Development
611.02. Theoretical Basis for Interdisciplinary Intervention and Design

MAY BE REPEATED FOR CREDIT

University 613 3 units; (0-8)

Introduction to Interdisciplinary Design Practice

University 615 3 units; (0-8)

Advanced Interdisciplinary Design Practice

Prerequisite(s): University UNIV 611.01.

University Exchange UNEX

Courses administered by University of Calgary International.

Junior Course

University Exchange 200 3 units; (3-0)

Topics in Exchange I

Prerequisite(s): Acceptance into an exchange program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Senior Courses

University Exchange 300 3 units; (3-0)

Topics in Exchange II

Prerequisite(s): Acceptance into an exchange program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

University Exchange 400 3 units; (3-0)

Topics in Exchange III

Prerequisite(s): Acceptance into an exchange program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

University Exchange 500 3 units; (3-0)

Topics in Exchange IV

Prerequisite(s): Acceptance into an exchange program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Urban Studies UBST

For more information see the Department of Geography website: geog.ucalgary.ca/.

Junior Course

Urban Studies 253 3 units; (3-0)

Introduction to Cities

A broad introductory survey, from diverse perspectives, of the processes that shape cities and urban life.

Antirequisite(s): Credit for Urban Studies 253 and either Geography 253 or 254 will not be allowed.

Senior Courses

Urban Studies 311 3 units; (3-0)

The Gendered City

Introduction to urban gender issues from historical and spatial perspectives. Issues such as the gendering of urban design and planning, daily urban activities, urban labour markets, urban politics, gentrification, suburbanization, and identity construction in urban places are addressed.

Prerequisite(s): 3 units from Urban Studies 253, Geography 253.

Urban Studies 313 3 units; (3-3)

The City in Film

Introduction to the representation of cities in film. Theoretical understandings of urban processes are linked to urban experiences as portrayed in urban film. Topics may include changing urban form, suburbanization, economic restructuring, racial conflict, community formation, urban politics, and more. May focus on particular cities around the world.

Prerequisite(s): 3 units from Urban Studies 253, Geography 253, Anthropology 379, Sociology 353.

Urban Studies 394 3 units; (36 hours)

Overseas Field School in Sustainable Urbanism Part I

Field research focusing on urban sustainability themes in regions outside North America. Group

travel-study combined with formal instruction and seminars.

Prerequisite(s): Consent of the Department.

Note: Offered as part of a group study program. A supplementary fee will be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

Urban Studies 395 **3 units; (36 hours)**

Overseas Field School in Sustainable Urbanism Part II

Field research focusing on urban sustainability themes in regions outside North America. Group travel-study combined with formal instruction and seminars.

Prerequisite(s): Consent of the Department.

Note: Offered as part of a group study program. A supplementary fee will be assessed to cover additional costs associated with this course.

MAY BE REPEATED FOR CREDIT

Urban Studies 451 **3 units; (3-0)**

Planning in the Canadian City

Introduction to Canadian urban planning theory and practice. Focuses on the history of planning, and aspects of practice such as neighbourhood planning, historic preservation, urban design and long-range planning.

Prerequisite(s): Urban Studies 253.

Urban Studies 461 **3 units; (3-0)**

The Transit City

An exploration of the relationships among public transit, urban form, and land use planning and policy in the context of challenges such as climate change, energy shortages, widespread urbanization and traffic congestion.

Prerequisite(s): 3 units from Geography 341, 351, 452 or 454.

Antirequisite(s): Credit for Urban Studies 461 and 505.03 will not be allowed.

Urban Studies 501 **3 units; (3-0)**

Research in Selected Topics

An examination of selected topics in Urban Studies in a lecture format.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Urban Studies 505 **3 units; (3S-0)**

Advanced Topics in Urban Studies

An examination of selected topics in Urban Studies in a seminar format.

Prerequisite(s): Admission to Urban Studies major or minor and completion of 75 units.

MAY BE REPEATED FOR CREDIT

Urban Studies 553 **3 units; (3S-0)**

Seminar in Urban Theory

Overview of contemporary themes in urban theory such as modernity and postmodernity, political economy, production of social difference, public and private space, globalization, inequality, and urban sustainability. Topics may vary depending on developments in the field and student interests.

Prerequisite(s): Consent of the Department.

Urban Studies 591 **3 units; (3-3)**

Capstone in Urban Studies

Capstone course applying the broad interdisciplinary training of the Urban Studies Program to

selected problems in urban studies. Collaborative research and analysis is stressed.

Prerequisite(s): 90 units and admission to the Urban Studies Major or Minor.

Urban Studies 596 **3 units; (0-1T)**

Directed Independent Study

Advanced study of a particular topic under the direct supervision of a faculty member.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Veterinary Medicine VETM

For more information about these courses see the Faculty of Veterinary Medicine website: vet.ucalgary.ca/.

First Year Curriculum

All courses are compulsory.

Veterinary Medicine 300 **(3-0)(3 credits)**

Clinical Presentations I

A series of integrated clinical presentations applied to a range of problems faced in veterinary medicine in individuals, groups, and populations of animals. Students develop analytic and non-analytic diagnostic reasoning skills, and use foundational knowledge from discipline courses to help understand clinical presentations.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 305 **(0-6)(5 credits)**

Clinical Skills I

A series of clinically-oriented learning experiences aimed at developing competence in individual animal and herd physical examinations and reporting. Students develop basic skill sets in clinical intervention, patient management, and disease prevention. Experience is gained in diagnostic procedures.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 307 **(1.5-1.5)(3 credits)**

Professional Skills I

Professionalism, applied economics and business, clinical communication skills, ethics and jurisdiction, and research in veterinary medicine are explored. Students will begin to formulate competencies in these areas and in stewardship, clinical reasoning and small business management. The concepts of the healthy veterinarian and self-management are introduced.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 320 **(1-4)(5 credits)**

Anatomy and Histology

Provides a foundation in comparative anatomy of production and companion animals. Histology and embryology are integrated throughout. Guided and task-driven dissections are supplemented with pro-sections of live animals, and medical imagery. Clinically relevant structures and the three-dimensional relationships of organs are emphasized.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 321 **(3-0)(3.5 credits)**

Physiology

Provides a foundation in fundamental and comparative physiological concepts for each body sys-

tem. Physiological concepts are reinforced through clinical presentations of production and companion animals. Emphasis placed upon formulating how, and why, a disturbance affecting one particular body system manifests in a particular way.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 322 **(3-0)(1.5 credits)**

Animal Behaviour and Welfare

Fundamental concepts of behaviour and welfare are examined. Emphasis is placed on understanding normal and abnormal behaviour, and the effects of husbandry practices on behaviour and welfare of production and companion animals. Wildlife behaviour, particularly at the interface with human activities, is addressed. Legislations and societal changes regarding animal welfare are discussed.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 323 **(3-0)(1.5 credits)**

Animals, Health, and Society

Roles of veterinarians in promoting, and contributing to, animal, human and ecosystem health are discussed. Emphasis is placed on determinants of health, and the interactions of animals, humans and the environment. Demonstrates how laws, policies and management decisions are applied to foster healthy animals, ecosystems and human-animal interactions.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 324 **(3-0)(1 credit)**

Genetics and Molecular Biology

Fundamental concepts of genetics and molecular biology are explored in the context of cellular biology and animal health. Applications of molecular biology tools in veterinary medicine are addressed. Relevant examples from veterinary medicine are used to explain foundation principles.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 342 **(3-0)(1.5 credits)**

Pathologic Basis of Disease

Morphologic and functional changes in cells, tissues and organs as a result of disease are discussed. Students are introduced to safe, systematic approaches to performing post-mortem examinations and learn to recognize and describe common gross and microscopic lesions using appropriate medical terminology. Emphasis is placed on the understanding of basic disease mechanisms.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 343 **(3-0)(1.5 credits)**

Immunology

Students will gain a working knowledge of the immune system and its role in health and disease. Emphasis is placed on achieving an understanding of major immunological concepts and vaccinology and their implications in veterinary medicine.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 344 **(3-0)(0.75 credits)**

Principles of Epidemiology

Introduction to epidemiological concepts including types of epidemiologic studies, measures of disease frequency and association, epidemic and infectious disease dynamics, principles

of evidence-based medicine, and the relationships between population and individual animal medicine. Provides foundational skills relevant to population medicine.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 345 (3-0)(0.75 credits)

Introduction to Nutrition

Presents fundamental concepts pertaining to function, metabolism, requirements, and sources of nutrients and energy for production and companion animals. Feeds and ingredients used in animal diets are also examined.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 360 (54 hours)(2 credits)

Introduction to Veterinary Medicine

Students explore how people associate with animals, the issues that arise from these associations and the roles that veterinarians play in these contexts. Students observe animals as companions, in sport, for food, and in research. The structure and function of the major livestock industries and the roles that veterinarians occupy within those industries are examined.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

NOT INCLUDED IN GPA

Second Year Curriculum

All courses are compulsory.

Veterinary Medicine 400 (3-0)(3 credits)

Clinical Presentations I

Building on Veterinary Medicine 300, students continue to develop analytic and non-analytic diagnostic reasoning skills. These skills include developing schemata and differential diagnoses lists, making decisions about using appropriate diagnostic tests, interpreting and integrating data from those tests, and using foundational knowledge to diagnose common clinical presentations.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 405 (0-6)(5 credits)

Clinical Skills I

Building on Veterinary Medicine 305, students develop skills in basic surgical principles, clinical examination of relevant body systems, clinical and anatomic pathology, and parasitology. Students also gain hands-on experience in practical clinical intervention, case management, and disease prevention.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 407 (1.5-1.5)(3 credits)

Professional Skills I

Building on Veterinary Medicine 307, professional skills competencies and knowledge are enhanced with additional focus on small business management skills, relationship-centered practice and self-care. Legal issues regarding veterinary practice are discussed. Research and informatics skills are used to identify knowledge gaps, generate testable hypotheses, and design experiments.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 410 (1.5-0)(0.75 credits)

Basic Surgical Principles

A comprehensive introduction to general veterinary surgery principles across species. Provides stu-

dents with a foundation in the basic principles of soft tissue and orthopedic surgery that can then be used to develop their hands-on surgical skills.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 420 (3-0)(1.5 credits)

Health Management

Building on Veterinary Medicine 344, introduces additional epidemiological concepts used in veterinary medicine. These concepts include appropriate use and choice of diagnostic tests, developing a structured approach for investigating disease outbreaks, exploring strategies and effectiveness for treating and controlling disease, and developing evidence-based protocols.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 421 (3-0)(2.25 credits)

Systemic Pathology

Building on Veterinary Medicine 342, uses a species-specific approach to review common disease conditions. Students identify and describe common gross and microscopic lesions and formulate a morphologic diagnosis. Disease pathogenesis, tissue sampling, sample submission, and the value of ancillary diagnostic testing, and communicating post-mortem findings are emphasized.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 422 (3-0)(1.5 credits)

Virology

Fundamental knowledge on the nature of viruses and prions are imparted through clinical, cellular and molecular analysis of important diseases of animals and, if inter-transmissible, humans. Students learn to develop diagnostic plans and understand principles of laboratory diagnostic testing. Implementation of intervention measures for viral and prion infections and diseases are discussed.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 423 (3-0)(1.5 credits)

Bacteriology

Introduction to fundamental principles of bacteriology, and bacterial diseases of domestic animals. Provides an understanding of how bacteria interact with the environment and the animal host, and how bacterial virulence mechanisms lead to animal diseases. Diagnosis of bacterial infections, and matching of appropriate preventive and control measures with different pathogens are discussed.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 424 (3-0)(1.5 credits)

Parasitology

Introduction to fundamental principles of parasitism in domestic and wild animals. Emphasis is placed on understanding the occurrence, transmission and impacts of parasites, and diagnosis of parasitic diseases of clinical, trade, and zoonotic importance in North America.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 440 (3-0)(1.5 credits)

Public Health and Risk Analysis

The roles of animals as sources of public health hazards and as sentinels for public health risk are examined. Students apply systems thinking to identify how zoonotic diseases and food safety hazards emerge, spread and are controlled. Public

health strategies related to veterinary issues are applied to identify options for the prevention and control of hazards and reduction of health risks.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 442 (3-0)(1.5 credits)

Clinical Pathology

Students develop a systematic approach to the use, evaluation and correct interpretation of routine clinical pathology tests. Integration of laboratory results with the patient's clinical presentation is emphasized. Correct interpretation of routine laboratory tests, communication of results, and appropriate integration of lab tests into decision-making in daily practice are covered.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 443 (3-0)(1.5 credits)

Clinical Pharmacology and Toxicology

Effective and safe use of drugs in veterinary medicine. Basic principles of pharmacology, including mechanisms of action, for the major drug classes. Clinical toxicology principles that apply to common poisonings and adverse drug reactions.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 444 (3-0)(0.75 credits)

Diagnostic Imaging

Introduction to principles and uses of common diagnostic imaging modalities. The theoretical basis behind each imaging technology, the acquisition of quality images, and the ability to interpret and describe normal and abnormal findings are emphasized. Control measures for working safely with diagnostic imaging equipment are examined.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 450 (3-0)(0.75 credits)

Selected Topics in Areas of Emphasis I

Students select from two of the Faculty's four major areas of emphasis: production animal health or equine health.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 451 (3-0)(0.75 credits)

Selected Topics in Areas of Emphasis II

Students are exposed to career options in two of the Faculty's four major areas of emphasis: ecosystem and public health, and investigative medicine.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 460 (3-0)(1 credit)

Applied Nutrition

Core concepts pertaining to nutritional requirements, feeding regimes, and nutritional disorders in production and companion animals are examined. Feeding management of exotic animals is also discussed. Emphasis is placed on practical application of nutritional concepts in production and companion animals.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 461 (27 hours)(0.75 credits)

Outbreak Investigation

Building on Veterinary Medicine 420, students further develop the framework for investigating

outbreaks of disease. Students investigate a series of simulated outbreaks, applying steps to determine whether an outbreak exists, establishing a case definition, describing the epidemiology of the disease, generating and testing hypotheses, and communicating their findings.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

NOT INCLUDED IN GPA

Veterinary Medicine 462 (27 hours)(0.75 credits)

Foreign Animal Disease

Students work through a simulation of an incursion of foreign animal disease into Canada. The simulation and background gives students experience working with disease surveillance, case identification, emergency preparedness, and the role of public practice veterinarians in maintaining the safety of Canadian livestock.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 463 (27 hours)(0.75 credits)

Field Experiences in Areas of Emphasis

Students select a field experience in one of the Faculty's four major areas of emphasis: production animal health, equine health, ecosystem and public health, or investigative medicine.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Third Year Curriculum

All courses are compulsory.

Veterinary Medicine 500 (3-0)(3 credits)

Clinical Presentations III

Building on Veterinary Medicine 300 and 400, students continue their development of diagnostic reasoning skills and problem management in veterinary medicine. Students synthesize comprehensive treatment plans that take into account therapeutic approaches, outcomes, feasibility, economics, client expectations, compliance, public health, regulations, and the environment.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 505 (0-6)(7 credits)

Clinical Skills III

Building on Veterinary Medicine 305 and 405, students gain experience in clinical evaluations, routine anaesthesia and surgery. Diagnostic and therapeutic skills, practical clinical intervention, case management, and disease prevention knowledge and skills are further developed.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 507 (1.5-1.5)(3 credits)

Professional Skills III

Building on Veterinary Medicine 307 and 407, students participate in a class research project, integrating research, informatics, communication, and clinical skills. Students will develop professional skills necessary for dealing with challenging issues in veterinary medicine. The concept of the healthy veterinarian and self-management will be expanded.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 520 (3-0)(2.25 credits)

Advanced Health Management

Provides an overview of diagnosing, managing, and preventing common disorders that occur at a population level. Emphasis is placed upon application of evidence-based medicine to make a herd diagnosis and control, and prevent the problem. Health programs and animal welfare assessment for production and companion animals are explored.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 521 (3-0)(2.50 credits)

Equine Medicine and Surgery

Prepares students for general equine practice by providing the foundational knowledge needed for diagnosing and treating common equine diseases using medical or surgical approaches. Emphasizes the importance of professional conduct in the context of equine practice and promotes life-long continuing education.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 522 (3-0)(2.50 credits)

Small Animal Medicine and Surgery

Prepares students for small animal practice by providing the foundational knowledge needed for diagnosing and treating common diseases in cats and dogs using medical or surgical approaches. Promotes practices that comply with animal welfare professional conduct.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 523 (3-0)(1.5 credits)

Anaesthesiology and Therapeutics

Introduction to the principals and practice of veterinary anaesthesiology and therapeutics in production, companion and exotic animals, and the practical application of clinical pharmacology. Focus on local and general anaesthesia for low risk animals and on therapeutic decisions, drug selection, and drug delivery.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 530 (3-0)(0.75 credits)

Selected Topics in Clinical Medicine

Prepares students for clinical practice by providing the foundational knowledge needed for diagnosing and treating oncologic, ophthalmic and dermatological diseases in production and companion animals.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 531 (3-0)(0.75 credits)

Selected Topics in Small Ruminant, South American Camelid and Non-traditional Livestock Production

Selected medical, surgical and reproductive diseases of small ruminants, South American camelids and non-traditional livestock.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 540 (3-0)(2 credits)

Food Animal Medicine and Surgery

Prepares students for general food animal practice by providing the foundational knowledge needed for diagnosing, treating and preventing common diseases using medical or surgical approaches.

Promotes practices that comply with animal welfare and professional conduct.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 541 (3-0)(1.5 credits)

Theriogenology

Provides knowledge and skills to develop clinical competence in managing the reproductive health of production and companion animals. Students integrate knowledge from various disciplines to diagnose and manage clinical issues pertaining to the reproductive health of animals on an individual animal or herd basis.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 542 (3-0)(0.75 credits)

Emergency and Critical Care

Veterinary emergency and critical care, with emphasis on how to recognize and implement therapy in the unstable patient.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 550 (3-0)(0.75 credits)

Zoological Medicine

Provides the foundational knowledge needed for diagnosing, treating and preventing common diseases in non-traditional companion animal and wildlife species.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 551 (3-0)(0.75 credits)

Laboratory Animal Medicine

Provides an introduction to laboratory animal medicine and disease, roles of the laboratory animal veterinarian and animal care committees, and the involvement of animals in research and teaching.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 561 (27 hours)(1 credit)

Ecosystem and Public Health Field Course

Students will synthesize concepts learned in Veterinary Medicine 440 and 462. Provides experience in applying regulatory requirements and diagnostic testing performed as part of the Canadian Food Inspection Agency accredited veterinary duties.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Fourth Year Curriculum

All students are required to take Veterinary Medicine 570, 580 and 590. Students also take one of Veterinary Medicine 582, 583, 584 or 585.

Veterinary Medicine 570 (4 weeks)(4 credits)

Laboratory Diagnostics

Required for entering general veterinary practice. Students must successfully complete rotations in laboratory diagnostics and diagnostic imaging at laboratories at the Clinical Skills Building on the Spy Hill campus.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 580 (16 weeks)(16 credits)

General Veterinary Practice

Required for entering general veterinary practice. Students must successfully complete clinical rota-

tions in general veterinary practice at sites located within the Distributed Veterinary Teaching Hospital.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 582 (10 weeks)(10 credits)

Production Animal Health

Students choose from a variety of rotations that enable concentration within Production Animal Health.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 583 (10 weeks)(10 credits)

Ecosystem and Public Health

Students choose from a variety of rotations that enable concentration within Ecosystem and Public Health.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 584 (10 weeks)(10 credits)

Equine Health

Students choose from a variety of rotations that enable concentration within Equine Health.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 585 (10 weeks)(10 credits)

Investigative Medicine

Students choose from a variety of rotations that enable concentration within Investigative Medicine.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Veterinary Medicine 590 (10 weeks)(10 credits)

Clinical Enrichment

Students choose elective rotations from a range of practicum experiences in veterinary medicine in order to expand or deepen their knowledge and skills.

Prerequisite(s): Admission to the Doctor of Veterinary Medicine (DVM) Program.

Graduate Courses

For more information about these courses, see Veterinary Medical Sciences Graduate Program: vet.ucalgary.ca/graduate.

Enrolment in these courses is not open to DVM students.

Veterinary Medicine 601 3 units; (3-0)

Professional Skills in Health Science Research

Includes a series of workshops focusing on skills essential for success in health science research. Topics include: Research Integrity; Ethics; Grants and Grant Writing; Verbal and Written Communication of Research Findings; Career Development; and Career Options in the Health Sciences.

Prerequisite(s): Consent of the Faculty.

NOT INCLUDED IN GPA

Veterinary Medicine 603 3 units; (3-1) (Biology 603)

Biology of Laboratory Animals

Based on the Canadian Council on Animal Care Syllabus "Basic Principles of Laboratory Animal Science for Research Scientists." In addition to the study of common, research, farm and exotic animals, topics to be covered include ethical considerations, regulation and legislation, animal models, animal facilities and husbandry, hazard control, surgery, anaesthesiology, euthanasia and post-mortem examinations. Practical sessions will

provide experience in handling and restraint of specific laboratory animals, injections, blood collection, anaesthesiology and surgery.

Note: Enrolment in this course is restricted in the first instance to graduate students who will do research utilizing animals.

Veterinary Medicine 605 3 units; (3-1T) (Community Health Sciences 605)

Introduction to Biostatistical Methods

Analysis and design of research related to biological sciences. Emphasis is placed upon formulating good research questions, evaluating the appropriateness of different statistical methods for analyzing results, and performing and interpreting such statistical analyses. Statistical analyses will be carried out using modern statistical software.

Prerequisite(s): Consent of the Faculty.

Veterinary Medicine 610 3 units; (3-2T) (Community Health Sciences 610)

Biostatistics I: Essentials of Biostatistics

Introduces the fundamental concepts of summarizing data and statistical inference, including graphical displays, hypothesis testing, p-values, and confidence intervals. Specific topics include comparisons of means and proportions, non-parametric tests, correlation and regression, confounding, sample size determination, and power calculations. Additional topics include a brief introduction to analysis of variance and covariance, logistic regression, and analysis of time-to-event data. Students gain hands-on experience analysing data using STATA statistical software. Although this course uses STATA exclusively, much of the technical knowledge and some of the computing techniques are applicable to any statistical package.

Prerequisite(s): Admission to the Veterinary Medical Sciences graduate program.

Veterinary Medicine 611 3 units; (3-2T) (Community Health Sciences 611)

Biostatistics II: Models for Health Outcomes

Extends the fundamental concepts to modelling health outcomes using modern regression analysis techniques. Logistic and linear regressions, and their extensions, are covered in detail. The rationale, formulation, and statistical assumptions underlying each regression technique are discussed. Methods for selecting and assessing models are included. Additional topics include a brief introduction to models used in the analysis of repeated measures, longitudinal studies, and time-to-event data.

Prerequisite(s): Veterinary Medicine 610.

Veterinary Medicine 640 3 units; (3-2T) (Community Health Sciences 640)

Fundamentals of Epidemiology

Principles and methods of descriptive and analytic epidemiology. Emphasizes the underlying concepts and approaches of epidemiological research and critical appraisal of epidemiologic studies including: observational study designs and their vulnerabilities to bias, measures of frequency and association, basic methods for addressing sampling variability, confounding, and effect modification. Concepts related to causal judgment in epidemiology are also introduced.

Prerequisite(s): Admission to the Veterinary Medical Sciences graduate program or consent of the Faculty.

Corequisite(s): Veterinary Medicine 610.

Note: Not available to Open Studies students.

Veterinary Medicine 690 3 units; (3-0)

Directed Study

Lectures, seminars, term papers and/or other training directed to one or only a few students in theoretical and/or laboratory methods at the advanced level in veterinary medical sciences. These courses are offered when no other suitable alternatives are available.

Prerequisite(s): Consent of the Faculty.

Note: An approval form may be obtained from the Office of Research and Graduate Education, and must be signed by the VMS Graduate Program Director before a student can register.

MAY BE REPEATED FOR CREDIT

Veterinary Medicine 701 3 units; (3-0)

Advanced Topics in Reproductive Health

A series of topics, ranging from basic sciences to clinical topics (including ethical issues) to increase awareness and comprehension regarding current issues in reproductive health.

Prerequisite(s): Research interest in reproductive health/reproductive biology. Consent of course coordinator and student's supervisor, if applicable.

Veterinary Medicine 702 3 units; (3-0)

Advanced Topics in Stem Cell Biology and Regenerative Medicine

Provides a comprehensive overview of stem cell biology in the context of embryonic development and adult tissue maintenance. Students will gain an appreciation for embryonic versus adult stem cells and how these pluripotent or multipotent cells may be utilized in regenerative medicine (i.e. treatment of congenital defects, diseases or injury).

Prerequisite(s): Students not enrolled in the VMS graduate program will require consent of the instructor.

Veterinary Medicine 721 3 units; (3-0)

Wildlife Parasitology: Principles and Techniques

Students will learn about the ecology of parasites in wildlife populations with emphasis on impacts of parasitism, invasive species, and conservation issues. This is taught through a series of seminars, critical evaluation and discussion of the literature, and independent and group projects. Laboratory sessions include on parasitology techniques for surveillance and research.

Prerequisite(s): Consent of the instructor.

Note: This course may not be offered every year. Please contact vmgrad@ucalgary.ca for information.

Veterinary Medicine 740 3 units; (3-2T) (Community Health Sciences 740)

Advanced Epidemiology

An expansion on the understanding of causality and threats to validity in epidemiologic research. The focus will be on the assessment and control of bias, including selection, information and confounding. The concept of effect modification (interaction) will be appraised. Stratified analysis will be considered as a tool for the assessment and control of confounding and effect modification and will be applied to a variety of study designs including case-control, and cohort studies.

Prerequisite(s): Veterinary Medicine 640 or consent of the Faculty.

Wellbeing WELL

For more information about these courses see the Embedded Certificate in Mental Wellbeing and Resilience website: mentalhealth/embedded-certificate.

Wellbeing 300 **3 units; (3-0)**

Challenges of Intersectionality in Mental Wellbeing

Evaluation of cultural, structural, systemic, and/or socioeconomic issues related to positive mental health and wellbeing in today's society, through an intersectional lens that may include an analysis of ethnicity, culture, race, socioeconomic status, age, ability/disability, gender, sexuality, and other factors. Focus on developing students' abilities to foster mental wellbeing in others.

Prerequisite(s): Psychology 203 and admission to the Embedded Certificate in Mental Health and Wellbeing.

Wellbeing 400 **3 units; (3S-0)**

Capstone in Mental Wellbeing

Reflection and integration of experiential learning to engage in applied problem solving. Focus on helping students to become agents of change, fostering mental wellbeing in the community.

Prerequisite(s): Wellbeing 300 and completion of 75 units.

Women's Studies WMST

For more information about these courses see the Department of Philosophy website: phil.ucalgary.ca/.

Junior Course

Women's Studies 201 **3 units; (3-0)**

Talking Gender and Sexuality

An interdisciplinary and intersectional examination of the social and cultural constructions of gender and sexuality. Uses a series of case studies involving historical events and current affairs to discuss how ideas about gender and sexual identity shape our social systems, cultural expression, and political values. The Canadian context is emphasized.

Senior Courses

Women's Studies 303 **3 units; (3-0)**

Topics in Feminism

Explores key issues in feminist theory and activism, including relevant related issues in gender, sexuality, race and others.

MAY BE REPEATED FOR CREDIT

Women's Studies 305 **3 units; (3-0)**

Topics in Gender and Sexuality

Explores key issues in gender and sexuality studies.

MAY BE REPEATED FOR CREDIT

Women's Studies 311 **3 units; (3-0)**

Theorizing Gender and Sexuality

Explores contemporary approaches to theorizing gender and sexuality, with attention to their historical bases. Includes consideration of feminist, queer, trans, and intersectional theories.

Women's Studies 315 **3 units; (3-0)**

Methods for Gender and Sexuality Research

Explores the scholarly and political implications of engaging in research on gender and sexuality by

examining key feminist, queer, trans, and intersectional methods.

Women's Studies 401 **3 units; (3-0)**

Special Topics in Feminist, Gender, and Sexuality Studies

An in-depth exploration of a specific area of research interest in feminist, gender or sexuality studies.

Prerequisite(s): 3 units in courses labelled Women's Studies.

MAY BE REPEATED FOR CREDIT

Women's Studies 405 **3 units; (3S-0)**

Praxis Seminar

Reflection upon best practices and theoretical paradigms for feminist, gender, and sexuality activism. Activist/volunteer work, outside of class-time, will be required.

Prerequisite(s): 3 units in courses labelled Women's Studies.

Women's Studies 501 **3 units; (3-0)**

Independent Research

Supervised individual study of a special topic. Intended primarily for students in Women's Studies programs.

Prerequisite(s): Consent of the Department.

Note: Students wishing to register in this class must first consult with the Department, and are responsible for proposing a topic and securing a supervisor.

MAY BE REPEATED FOR CREDIT

Women's Studies 503 **3 units; (1.5S-2)**

Community Service Learning

An opportunity for students to learn from volunteer service in community organizing and/or activism relating to feminist, gender, and sexuality studies. Students will present findings related to their community engagement placement to the class in scheduled sessions during the term.

Prerequisite(s): Women's Studies 201, 405 and consent of the Department.

Note: Students wishing to register in the class must first secure a volunteer position and have that position approved by the department. Volunteer commitment over the term must be between 20-25 hours.

Women's Studies 590 **6 units; (3-0)**

Honours Thesis

Supervised individual research and preparation of an Honours thesis.

Prerequisite(s): Admission to the Honours program in Women's Studies and consent of the Department.

Note: Students are responsible for securing a thesis supervisor prior to enrolling in the class.

Zoology Z00L

For more information about these courses see the Department of Biological Sciences website: bio.ucalgary.ca/.

Senior Courses

Zoology 401 **3 units; (3-3)**
(formerly Zoology 375)

An Introduction to Invertebrate Zoology

Natural history and diversity of invertebrates, which include sponges, corals, jellyfish, snails, octopus, insects, crustaceans, sea stars, and various

worms. Emphasis on how free-living and parasitic organisms feed, move, reproduce, and survive in marine, freshwater, and terrestrial habitats.

Prerequisite(s): Biology 371.

Zoology 403 **3 units; (3-3)**
(formerly Zoology 379)

An Introduction to Vertebrate Zoology

Systematics, natural history and biology of vertebrates, including fishes, amphibians, reptiles, birds and mammals. Laboratory work will emphasize the identification and morphology of native taxa as well as basic techniques of biological systematics.

Prerequisite(s): Biology 371.

Antirequisite(s): Credit for Zoology 403 and either Zoology 477.01 or 477.02 will not be allowed.

Zoology 435 **3 units; (3-3)**

Entomology

Introduction to the insects, with emphasis on diversity, evolution, structure/function relationships, behaviour, and ecology.

Prerequisite(s): Biology 371.

Zoology 461 **3 units; (3-3/2)**

Animal Physiology I

Study of control mechanisms in nerves, sensory organs, muscles and endocrine glands.

Prerequisite(s): Biology 331.

Antirequisite(s): Credit for Zoology 461 and any of Biology 305, Medical Science 404, 604, Zoology 269, Kinesiology 259, 260 or 323 will not be allowed.

Zoology 463 **3 units; (3-3/2)**

Animal Physiology II

Study of body fluids and hemostasis, body defence systems, reproductive physiology, respiration, circulation, excretion, gastrointestinal physiology and thermoregulation.

Prerequisite(s): Zoology 461.

Antirequisite(s): Credit for Zoology 463 and any of Biology 305, Medical Science 404, 604, Zoology 269, Kinesiology 259, 260 or 323 will not be allowed.

Zoology 507 **3 units; (0-8) or (3-0)**

Advanced Topics in Zoology

Independent research, lectures, seminars, term papers and training in theoretical and/or laboratory methods.

Prerequisite(s): 54 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Zoology 515 **3 units; (3-3)**

Comparative Vertebrate Anatomy

The structural, functional, developmental and evolutionary relationships of the organs and systems of the vertebrates. Laboratory work will emphasize the dissection, identification and homologies of structures in various vertebrates.

Prerequisite(s): Zoology 379 or 403.

Antirequisite(s): Credit for Zoology 515 and 377 will not be allowed.

Zoology 528 6 units; (0-8)**Independent Studies in Zoology**

Original and independent thought, practical research and the completion of written and oral reports.

Prerequisite(s): Biology 315, 72 units and consent of the Department.

MAY BE REPEATED FOR CREDIT

Zoology 530 6 units; (0-8)**Honours Research Project in Zoology**

Research project under the direction of one or more faculty members in the Department of Biological Sciences. Formal written and oral reports must be presented on completion of this course. Open only to Honours Zoology students or Honours Biological Sciences students.

Prerequisite(s): Biology 315, 72 units and consent of the Department.

Zoology 567 3 units; (3-0)**Animal Behaviour**

Offered from an evolutionary and ecological perspective. Development of ethological ideas; interaction of genotype and environment in ontogeny of behaviour; role of behaviour in dealing with environmental challenges.

Prerequisite(s): Biology 313 and one of Biology 371, Ecology 429, Zoology 375, 377, 401 or 477.

Antirequisite(s): Credit for Zoology 567 and Marine Science 546 will not be allowed.

Zoology 571 3 units; (3-2)**Palaeobiology of Vertebrates**

Evolutionary trends in the major groups of vertebrates from both neontological and palaeontological viewpoints. The interpretation of palaeontological data and their applicability to our understanding of evolution, systematics and palaeoecology.

Prerequisite(s): One of Zoology 377, 379 or 403.

Antirequisite(s): Credit for Zoology 571 and either Zoology 571.01 or 571.02 will not be allowed.

Zoology 576 3 units; (3-3)
(formerly Zoology 475)**The Invertebrates**

Collaborative research experience in invertebrate zoology, with emphasis on discovering, describing, and classifying diversity using zoological collections, systematic theory, and phylogenetic methods.

Prerequisite(s): One of Zoology 375, 401 or 435.

Zoology 577 3 units; (3-3)**Mammalogy**

A detailed examination of the evolution, morphology, physiology, ecology and behaviour of mammals.

Prerequisite(s): Biology 313 and one of Zoology 379, 403 or 477.01.

Zoology 581 3 units; (3-3)
(formerly Zoology 483)**Principles in Parasitism**

An introduction to parasitism. Topics include: host-parasite interactions, life-cycles, evolution and societal concerns. There is a focus on current research into these topics.

Prerequisite(s): Cellular, Molecular and Microbial Biology 343 or Zoology 375 or 401.

Zoology 595 3 units; (3-0)**Evolutionary Perspectives in Neurobiology**

Explores form, function and performance of invertebrate and vertebrate neurons and nervous systems through examination of physical, biochemical, metabolic, (neuro)physiological and behavioural constraints and trade-offs.

Prerequisite(s): Zoology 461.

Antirequisite(s): Credit for Zoology 595 and Neuroscience 541 will not be allowed.

Zoology 597 3 units; (3-0)**Principles of Endocrinology**

General and molecular aspects of endocrine physiology. Topics will include the mechanisms of hormone action (receptor occupancy and transduction of signal), current techniques in endocrinology, synthesis and release of hormones, and the functional role of different endocrine organs. Lectures will include examples from lower vertebrates and invertebrates to emphasize comparative aspects.

Prerequisite(s): Zoology 463.

Graduate Course**Zoology 697** 3 units; (3-1T)**Advanced Topics in Comparative Endocrinology**

The principles of endocrinology will be provided through the lecture component of Zoology 597, and this will be augmented with additional reading, term papers and seminars in comparative endocrinology.

Prerequisite(s): Zoology 463.

Antirequisite(s): Credit for Zoology 697 and 597 will not be allowed.

About the University of Calgary

The University of Calgary is a co-educational, non-denominational government supported institution possessing the right of conferring degrees, other than degrees in Divinity, within the Province of Alberta. It is a member of the Association of Commonwealth Universities and of Universities Canada.

The University of Calgary is Canada's leading next-generation university – a living, growing and youthful institution that embraces change and opportunity with a can-do attitude. Located in the nation's most enterprising city, the university is making tremendous progress on our journey to become one of Canada's top five research institutions, grounded in innovative learning and teaching and fully integrated with the community of Calgary.

As a comprehensive academic and research institution, the University of Calgary inspires and supports discovery, creativity and innovation across all disciplines. Through the Taylor Institute for Teaching and Learning, the university takes the lead in educational innovation by researching the most effective methods for engaging students, by supporting faculty to be the best teachers they can be and by providing some of the most innovative learning spaces available anywhere in North America.

The University of Calgary attracts and nurtures the talent that drives new knowledge creation, improves lives and betters our world. In this rich learning environment, the university serves over 31,000 students in more than 200 undergraduate, graduate and professional degree programs, and provides the community with diverse lifelong learning opportunities. International study, volunteer, work, and research programs provide global context while promoting diversity and excellence in learning, teaching and research.

The University of Calgary stands out among Canadian universities in how it actively engages students in leadership development in all areas – the arts, athletics, science, medicine, engineering, volunteerism and business. It is also a leader in sustainability with its set of values embraced by the campus through teaching, leadership and campus operations.

Research and Education

As a member of the U15 leading research-intensive universities in Canada, the University of Calgary is ranked one of the Top 10 research universities in the country. As a

comprehensive research institution, the university houses 73 Canada Research Chairs and more than 50 research institutes and centres working to find solutions to some of the most challenging problems facing society today. It has over 1,800 academic staff actively engaged in research, scholarship and teaching in Canada and around the world.

Innovation, discovery and learning are at the heart of all that we do. Our relentless pursuit of quality in our teaching and research programs is guided by our mission to contribute to the well-being of the people of Alberta, Canada and the world. Research brings significant benefits provincially, nationally and internationally, and is the foundation of Alberta's economic and social vitality. Interdisciplinary research is core to the university's teaching and research mandate.

The university offers a high quality undergraduate education that is characterized by the synthesis of research, teaching and learning. We mean to enhance the undergraduate learners' experience by using a student-centred focus that maximizes opportunities to provide a distinctive learning experience that fully integrates the features of a research university. The university is broadening opportunities for students to take inquiry-based courses that lead to greater critical thinking skills, increased exposure to undergraduate research and greater access to leading edge scholars. International study, volunteer, work, and research programs give graduates global context while promoting diversity and innovation in teaching and research.

Students at the University of Calgary are officially recognized for their involvement in campus activities outside of the classroom. The co-curricular record is an initiative that encourages and fosters a campus culture of volunteerism and community involvement amongst its students.

The University of Calgary stands out among Canadian universities in how it actively engages students in leadership development in all areas – the arts, athletics, science, medicine, engineering, volunteerism and business. It is also a leader in sustainability – living a set of values embraced by the campus through teaching, leadership, and campus operations.

Our efforts are to raise our global profile, enhance the quality of our undergraduate and graduate programs, promote innovation and excellence in scholarly activity and provide

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significant returns and tangible benefits to our community and economy.

Facilities

The MacEwan Student Centre, Taylor Family Digital Library, the Taylor Institute for Teaching and Learning serve as hubs of scholarly and leisure activity on main campus. There is also a museum and art gallery, four performance theatres, two childcare centres and residences for single students and students with families. The university recently expanded the Engineering Complex and created new residences.

The Cumming School of Medicine and the Faculty of Veterinary Medicine are located on the south campus adjacent to the Foothills Hospital. Satellite institutes of the university include the Kananaskis Biogeoscience Institute, located a short drive from the city on the eastern slopes of the Rocky Mountains, the Rothney Astrophysical Observatory, located in the foothills south of the city, and a campus in Doha, Qatar, offering internationally accredited nursing degrees to students in the Middle East. Development of the university's west campus is currently taking place, and is the site of the Alberta Children's Hospital.

The University of Calgary features some of the finest athletic facilities in the country. The Olympic Oval is an international speedskating facility and houses the Canadian Sport Institute, a high-performance training centre and two Olympic-sized rinks where the reigning women's gold-medal hockey team trains. There are also tennis courts, a triple gymnasium, a yoga studio, an Olympic-size swimming pool, weight rooms, jogging tracks, an Outdoor Centre offering equipment rentals, courses and instruction, and a huge indoor climbing wall. Nearby is the home of the Dinos football team, McMahon Stadium.

Governance

The University of Calgary has two governing bodies:

- The Board of Governors is the corporate body charged with the management and control of the university, its property, revenue, business and affairs.
- The General Faculties Council (GFC) is responsible for the academic affairs of the university, subject to the authority of the Board of Governors.

Each faculty has a Faculty Council empowered to determine the faculty's programs of

study, conduct examinations, provide for the admission of students, determine conditions for withdrawal, and to authorize the granting of degrees, subject to conditions imposed by the General Faculties Council.

The Students' Union and the Graduate Students' Association provide for the administration of the affairs of students and the promotion of their general welfare.

More information can be found at: ucalgary.ca/secretariat.

Logo/Coat of Arms

The University of Calgary combines the best of long-established university traditions with Calgary's frontier spirit of originality and innovation.

Our logo was designed to reflect bold thinking and a connection with the origins of Calgary. The logo has two components: the crest and the wordmark. The crest represents and respects our historical heraldry while the more contemporary wordmark reflects our focus on the future.

The university also has an official Coat of Arms, which represents and respects our historical roots.

The Coat of Arms consists of a shield, an escroll containing the motto and the wordmark in vertical format.

The shield consists of two parts, the upper part (the chief) separated from the lower (the base) by an arched line symbolizing the Chinook arch. The ground colour of the chief is scarlet, commemorating the North West Mounted Police under whose influence Western Canada was settled. Upon this colour is a pair of open books bound in gold. Between the books is a white rose, symbolic of Alberta. The ground colour of the base is gold, indicative of golden sunshine or golden grain. Upon this is a black bull's head with red horns and crossed staves bearing red flags, reminiscent of the family crest of Lt. Col. J.F. Macleod, the NWMP officer who founded Fort Calgary.

Below the shield, printed on an escroll, is the university's motto, "Mo shuille togam suas" (translated as "I will lift up mine eyes"), rendered in Gaelic uncial letters. The scroll is white; the draped ends are red. They were granted to the university in 1966 by Lord Lyon King of Arms at Edinburgh.

Official Colours

The university has two official colours: red and gold.

Tartan

The University of Calgary has an official tartan that incorporates the university's official colours of red and gold in its design. It was designed by Jim Odell, a University of Calgary Education and Fine Arts graduate and accredited in a 2001 ceremony presided over by Duncan Paisley of Westerlea, President of the Scottish Tartans Society and director of the Register of All Publicly Known Tartans.

The Mace

Certain formal occasions involve the use of special regalia, the significance of which is now symbolic but most of which has practical origins. In early times the mace was used first as a weapon to protect and second as a symbol of authority.

The mace carried into Convocation is a symbol of the authority of the Chancellor. It represents the Crown and the authority vested in the Chancellor to grant degrees. It is always carried in front of the Chancellor at Convocation. One interesting tradition in the use of maces is that if the real authority (the Queen) was present in person, the mace would be inverted.

Administration and Governance

For information about senior administration and administrative departments, please visit: ucalgary.ca/about/our-organization/governance-and-leadership.

Historical Highlights

For more, see: ucalgary.ca/about/our-story/our-history.

1922

- Calgary Normal School (formerly Alberta Normal School) relocates onto the Institute of Technology and Art campus (now SAIT).

1945

- The Normal School becomes a southern extension of the University of Alberta Faculty of Education.

1946

- Citizens form the Calgary University Committee.

1947

- The Calgary Branch of the University of Alberta offers the first two years of a Bachelor of Education degree. A.L. Doucette is appointed the first director. Land is set aside in Houndsfield Heights for an eventual university.

1950

- The Board of Governors at the University of Alberta sells all land south of 24th Avenue because the Calgary Branch of the University of Alberta would never grow large enough to use it.

1951

- First years of the BA and BSc are offered.

1953

- First year of BComm is offered.

1957

- The name changes to University of Alberta in Calgary (UAC). By now the first years of the BSc (Eng) and BPE are offered.

1958

- Sod-turning for the present campus. The Department of Public Works begins leveling the land.

1960

- The new campus opens with two new buildings, Arts and Science A. McMahon

Stadium opens. M.G. Taylor is appointed principal.

1961

- The name changes to University of Alberta, Calgary. The first physical education building opens.

1962

- The 80-acre research park is designated. Campus patrol arrives. Full degree study is offered.

1963

- Students begin a drive for autonomy from the University of Alberta.

1964

- H.S. Armstrong is appointed President. Name changes to University of Alberta at Calgary. The football Dinos begin to play.

1965

- On May 1 UAC is granted academic and financial autonomy. The residence complex, Calgary Hall (now Craigie Hall), Science B and the Meteorological Station are completed. The Faculty of Engineering and the Division of Continuing Education are founded.

1966

- The *Universities Act* passes, creating the University of Calgary. F. C. Manning is appointed as the first Chair of the Board of Governors. The Senate and School of Social Welfare are established.

1967

- The first convocation is held March 29.
- The first recipient of a degree, Doctor of The University of Calgary, is Lester B. Pearson.
- Faculties of Business and Fine Arts are established.

1969

- A.W.R. Carrothers is named President. School of Nursing is established.
- The Social Sciences Building, Mathematical Sciences Building and Physical Plant open.

1970

- General Faculty Council is renamed General Faculties Council.
- First students are admitted to the Faculty of Medicine.

1971

- Faculty of Environmental Design is established.
- Four year degree programs begin.
- Dinnies Den opens as the first pub on campus.

1974

- W.A. Cochrane is named President.

1975

- Faculty of Law is established.

1976

- Faculty of Arts and Science is divided into the University College and the Faculties of Science, Social Science, and Humanities. Day Care Centre opens. Arc-

tic Institute of North America is relocated here.

1978

- Norman E. Wagner is named President.

1979

- The Canadian Institute of Resources Law is established.

1981

- The University College becomes the Faculty of General Studies.
- The University of Calgary Press is established.

1982

- The University of Calgary is selected as the 1988 Olympic Games venue for the athletes' village and speed-skating events.

1984

- A \$17 million supercomputer is acquired.

1985

- Calgary Hall is re-named Craigie Hall in memory of former Vice-President (Academic) Peter Craigie.

1988

- The Winter Olympics come to campus.
- Murray Fraser is named President.

1991

- The university celebrates its 25th anniversary.

1992

- NASA space shuttle Columbia blasts off carrying a University of Calgary science experiment.

1993

- The university raises more than \$45 million in its first national fundraising campaign. Students commit \$2.2 million to the Building on the Vision campaign.

1994

- The University of Calgary hosts the 1994 Learned Societies Conference in June and welcomes a record 8,100 delegates representing 105 societies and conferences from 24 countries.

1995

- Site dedication ceremony held for the new Rozsa Centre.

1996

- Terry White is appointed President.

1997

- The university launches U of C 101 - a four-day orientation session for new students and the first program of its kind in Canada.

1999

- Largest Information Commons of its kind in North America opens in MacKimmie Library.
- New 400-bed Cascade Hall residence welcomes students.

2001

- Dr. Harvey P. Weingarten is appointed as seventh President and Vice-Chancellor of the University of Calgary.

2003

- The Libin Cardiovascular Institute of Alberta is created with a \$15-million gift from the Alvin and Mona Libin Foundation and a \$5-million donation by David and Gail O'Brien helped launch a world-class undergraduate educational centre in the Faculty of Medicine.

2004

- Allan Markin, chairman of Canadian Natural Resources, donates \$18 million to establish an Institute for Public Health.

2005

- Seymour Schulich donates \$25 million to the university's engineering faculty. The faculty is renamed the Schulich School of Engineering in honour of the donation.

2006

- The university marked its 40th anniversary with a series of celebrations touching on almost every area of the campus community.

2007

- Official opening of a branch campus called University of Calgary-Qatar, will bring state-of-the-art nursing education, in Qatar's capital city of Doha.

2008

- University of Calgary launches Canada's fifth veterinary program in the new Faculty of Veterinary Medicine.

2010

- Elizabeth Cannon, Dean of the Schulich School of Engineering, is officially selected as the University of Calgary's eighth president and vice-chancellor.

2011

- Taylor Family Digital Library (TFDL) opens January 2011.
- The new Energy Environment and Experiential Learning (EEEL) Building opens.

2013

- The Taylor family donates \$40 million to establish the Taylor Institute for Teaching and Learning.
- The Faculty of Education is re-named Werklund School of Education in recognition of Dr. David P. Werklund's \$25 million donation.

2014

- The University of Calgary is named the number one university in Canada under the age of 50 and ranked as one of the top ten young international universities.
- The Faculty of Medicine is re-named the Cumming School of Medicine in honour of a \$100 million donation from Geoffrey Cumming.

2015

- Two new residences: Aurora Hall (for undergraduate students) and Crownsnest Hall (for graduate students) open on main campus.

2016

- The University of Calgary marked its 50th Anniversary as an autonomous institution.

Research Centres, Groups and Affiliations

The University of Calgary is a comprehensive academic and research institution, with a mission to discover new knowledge and translate our discoveries into applications that provide benefits to our society and global communities. It is the creation of new knowledge in all forms that distinguishes us as a research university.

For more information on research at the University of Calgary refer to: ucalgary.ca/research/.

Institutional Strategies

Refer to ucalgary.ca/about/our-strategy for information on the University of Calgary's institutional vision and strategy.

To view the *Eyes High* document: ucalgary.ca/about/our-strategy/our-strategies-and-plans.

Alcohol Policy (Use of)

The Use of Alcohol policy deals with the consumption of alcoholic beverages on the campus and at University functions. No one may bring or consume liquor on campus except as permitted under the University's Institution License from the Alberta Gaming and Liquor Commission.

Details regarding the University's liquor policy may be obtained from Risk Management & Insurance under Policies and Guidelines. See Special Events & Use of Alcohol: ucalgary.ca/riskmgmt/home/policies-procedures-handbooks-legislation/alcohol-policy-use.

If there are concerns about student misconduct, please refer to: ucalgary.ca/conduct/.

Smoking Policy

The University strives to provide a safe and healthy work, learning and living environment for all staff, faculty, students and visitors. Smoking is not permitted indoors nor within 7.5 metres of building entrances and air intake vents. Please respect everyone's right to clean air and a healthy environment.

For details see the Smoking Policy at: ucalgary.ca/policies/files/policies/smoking-policy.

Scent-Free Awareness

There is a growing understanding that the health of some people is adversely affected by exposure to scented products. There are members of our community who may not be able to use facilities such as study spaces, libraries, theatres, classrooms, and work spaces due to the presence of scented personal care products.

Please see the website ucalgary.ca/safety/indoor for information about the health effects related to scented personal care products and alternatives that you can choose.

Glossary of Terms

The following is a glossary of terms often encountered by students. This list is not intended to be exhaustive.

Academic Program: A set of courses, a number of which may be mandatory and of a specialized nature, leading toward a particular degree.

Academic Year: Begins on the first day of July and ends the last day in June. The University operates three academic sessions during the year.

Baccalaureate: An undergraduate degree awarded by the University upon the successful completion of an academic program. Commonly referred to as a bachelor's degree.

Blended Learning: A combination of face-to-face and online delivery of material.

Change of Program: Students in a program may elect to pursue a different program within their Faculty or enter a new program in a different Faculty. A Change of Program may be completed through the online Student Centre via MyUofC.

Co-operative Education/ Internship: The process of education which formally integrates academic study with work experience in co-operating employer organizations. The following Faculties offer certain programs in Co-op or Internship education: Arts, Haskayne School of Business, Medicine, Schulich School of Engineering and Science.

Corequisite: A course the content of which is integrated with that of another course such that the courses must be taken simultaneously.

Course: A unit of instruction that will be recorded on the student transcript with a final letter grade. Courses can have different credit or unit values.

Course Numbering System: Junior courses - courses numbered from 100-299. Senior courses - courses numbered from 300-599. Courses numbered 600 and above are normally restricted to students completing graduate programs. Normally a 6-unit course is offered for twenty-six weeks; a 3-unit course or less is offered for thirteen weeks.

Cross-listed Courses: Courses that are listed under two Departments and can be taken for credit from either Depart-

ment, but not both. The credit is determined by the student's registration.

Deadline: A date by which specific actions/requirements must be satisfied such as drop/add or fee payment deadline. Deadlines are enforced at the University of Calgary.

Deferred Final Examinations: Examinations scheduled by the Registrar for students unable to write regularly scheduled final examinations for reasons of illness, domestic affliction or religious conviction.

Deferred Term Work: A temporary extension of time granted at the discretion of the Dean of the Faculty offering the course for completion of course requirements. Permission for Deferred Term Work is granted for reasons of illness, domestic affliction or religious conviction.

Discipline: A subject of study within a Department or Faculty.

Elective: Another word for option. Degree Navigator uses the term elective.

Field: A set of courses identifying the main area of study of a degree program.

Full-Time Student: Those students in a degree program who are registered in three or more courses or 9 units each Fall or Winter Term. The minimum for Summer Term is at least two courses or 6 units per Spring or Summer Intersession.

GPA: Abbreviation for grade point average.

Grade Point: Positive numerical value given to an alphabetical letter grade used in assessment of academic performance such as in the calculation of grade point averages. See "Undergraduate Grading System" in this Calendar for details.

Internship: See Co-operative Education/Internship above.

Major: The primary area of specialization in either a General or Honours program. Details of course and grade point average requirements are given in Faculty program sections of this Calendar.

Minor: A secondary area of specialization completed by a student in a subject outside the "Major" area. Minor program requirements are described in Faculty program sections of this Calendar.

Open Studies: A student who is permitted to register in credit courses, but who is not admitted to a program leading to a degree or diploma. This has also previously been known as an Unclassified Student.

Option: A course, acceptable within the academic program but chosen at the discretion of the student.

Part-Time Student: Those students in a degree program who are registered in no more than two courses or 6 units each Fall or Winter Term. For Summer Term it is a maximum of one course or 3 units per Spring or Summer Intersession.

Prerequisite: A prior requirement for entry into a course. Where a course is specified as a prerequisite, pass standing in the course is required unless a specific grade is indicated.

Probation: A trial period for a student whose registration is subject to academic conditions. Failure to satisfy these conditions may result in the student being required to withdraw from the University.

Registration: The selection of courses once a student has been admitted to the University.

Suspended Program: A program (major or minor) that is no longer accepting students. It may be going under review and may be permanently terminated.

Term: The University offers three terms during the year as follows - Fall Term (13 weeks from September to December), Winter Term (13 weeks from January to April), Summer Term (12 weeks from May to August). The University may also use "session" or "semester" in the same sense.

Transfer Credit: Courses completed at other post-secondary institutions and accepted for credit towards a degree program at the University of Calgary.

Transfer Student: Transfer students are those who have attended any post-secondary institution.

Tuition Fees: Fees paid for enrolment in courses.

Unclassified Student: see Open Studies.

Unit: A value, or weighting, assigned to a course counting towards a degree or diploma. The term "credit" is also used. In 2007 the University of Calgary

implemented a new computer system where the "unit" became the primary measurement of course weighting. Previously, courses were known as Full, Half, Quarter and Eighth Courses. Most degree programs require 120 units.

Visiting Student: A visiting student is a student who has not been formally admitted to the University but who, as a bona fide student of another accredited degree granting institution, is permitted to take courses for credit at the University of Calgary to be applied to a degree program at the student's home institution.

Withdrawal: The formal procedure, according to regulations laid down by the University, of withdrawing from a course or courses, or from the University.

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