A Message from the Dean

As a new academic year begins, I welcome new and returning graduate students to the University of Calgary. You are valued members of our University's community as students, as researchers and as teachers. Your success – whether in the laboratory, the classroom or the community – is also our success, and we are committed to providing the training and support you need to achieve it. As a vibrant and growing research-intensive institution, the University of Calgary is committed to training the next generation of scholars, practitioners and professionals.

Many resources are available to you during the course of your graduate education. The faculty members in your program, notably your supervisor, should provide mentorship both in the substance of your area of study and in your development as a professional and scholar in your field. The Graduate Students' Association, the Student Success Centre, the Centre for International Students and Study Abroad, and the Wellness Centre, and the My GradSkills program among others, provide a wide range of services and support for graduate students over the course of their degree programs. I encourage you to familiarize yourself with these resources and make use of the assistance they can provide.

The Faculty of Graduate Studies provides leadership and support for excellence in graduate education. We are the faculty of registration for all graduate students; we also set admission and program standards, administer over $30 million annually in financial awards for graduate study, and promote uniform standards of excellence across programs.

You can contact us with questions about registration, fees, and scholarships, or to clarify the regulations contained in this Calendar. Students enrolled in thesis-based programs will complete their degree program by depositing their thesis with us. Please visit our offices (MacKimmie Tower 213) or contact us by telephone (403.220.4938) or e-mail (graduate@ucalgary.ca), and check our website for useful information (http://www.grad.ucalgary.ca/), including especially the Graduate Awards database.

This Calendar provides important information regarding the regulations of the University and of your program. It is your responsibility to know and comply with the relevant regulations. Being familiar with the material contained in the Calendar will also assist you in setting a timetable for moving successfully through your program. The on-line Calendar found at http://www.ucalgary.ca/pubs/calendar/grad/current/ is the official version, with the printed version just a snapshot in time of the constantly evolving Graduate Calendar. The on-line version will highlight changes that occur during the year. Any student may choose to remain with the regulations as they were upon her or his entering the program, but we anticipate that changes will always improve the graduate program, and therefore is to the student's advantage.

I wish you every success in your studies in the coming year.

Dr. Lisa Young
Vice Provost and Dean, Faculty of Graduate Studies

Welcome from the Provost

Welcome to graduate studies at the University of Calgary! On behalf of the university, I offer my congratulations as you embark on the next phase of your academic journey. You are now part of a special and thriving campus community of 6,019 full and part time graduate students in over 55 programs.

The University of Calgary is invigorated by our Eyes High vision. This vision defines a path that will see the University of Calgary become a global intellectual hub located in Canada's most enterprising city. In this spirited, high-quality learning environment graduate students will thrive in programs that are focused and supported. The University of Calgary will celebrate its 50th anniversary in 2016 when we aim to be one of Canada's top five research universities, fully engaging the communities we both serve and lead.

We are happy you have joined us and our journey! Our graduate students play a critical role in advancing the goals of the institution. We highly value graduate student engagement and contributions—and look forward to facilitating your potential while you are here.

Whether you are a returning student or someone who is new to our university, I hope that you will take full advantage of the opportunities offered to support your studies and research. These include the activities and services offered by the university, the Faculty of Graduate Studies, and those offered by the Graduate Students' Association, who are keenly interested in helping ensure you have a wonderful experience while you are here.

I wish you great success as you work towards the completion of your graduate program, and look forward to meeting you at some point on campus.

Dru Marshall
Provost and Vice-President (Academic)

Message from the GSA President

As a member of the graduate student population and on behalf of the GSA, I am pleased to welcome you to the University of Calgary. It is my wish and hope that you experience not only much academic success, but also that you experience a feeling of community and a sense of the support that is available to you both in and outside your graduate program. It is also my wish for you that you are able to join in and experience everything the Graduate Students' Association (GSA), the University, and the Calgary community have to offer.

As the University of Calgary moves towards achieving its Eyes High objectives, each of you as graduate students of the University of Calgary, play a pivotal role in the University's goal to be one of the top five research universities in Canada. I look forward to seeing the strides we will make this year together towards academic and personal excellence.

The GSA knows that this cannot be done alone, and we are here to provide you with resources for academic and holistic support, as listed in the GSA section of the Graduate Calendar.

The GSA strives to improve the quality of experience for all graduate students at the university. Our programs are built around three foundational pillars: Development, Transparency and Engagement.

1. Development of the GSA's programs and ability to support its members, as well as individual student development and growth in their academic and career pursuits.
2. Transparency means open access to GSA policies, and finances, as well as ensuring that students can readily access necessary university policies, supports and services.
3. Engagement of our members in GSA and university programs and opportunities, consultation of members in policy and program development, and showcasing of top members to the broader community.

As the GSA endeavour to enhance your graduate experience, we know that you are the driver of change. We welcome your input and suggestions.

I would like to take this opportunity to introduce my team, and your elected executive team for the 2014-15 Academic Year.

President: Sarah Akierman
VP External: Chris Carlile
VP Academic: Cari Gulbrandsen
VP Student Life: Aamir Rafiq
VP Finance & Services: Michael Webster

The team and I have wonderful plans in the works for this academic year. You will see enhanced DGA support, expansion of our employer liaison program to include internship & mentorship programs, a newly renovated Last Defence Lounge (LDL), as well as integrated front end service delivery with our co-located office with the Faculty of Graduate Studies on the 2nd floor of MacKimmie Tower.

During your time at the University of Calgary, I strongly encourage you to get involved - that starts by signing up for UToday through University Relations, and by reading the weekly GSA News & Views and the Faculty of Graduate Studies GradPost. I challenge you to embrace new opportunities: try something new and pursue your passions. Become part of the GSA and UCalgary community.

On behalf of the entire GSA executive, the GRC and all the GSA staff, welcome to the University of Calgary. We hope you have a wonderful and productive year. For more information, please check out our website at: http://www.gsa.ucalgary.ca.

Regards,

Sarah V. Akierman
GSA President 2014-15

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

The online Graduate Calendar is the official University Graduate Calendar. The Calendar is available in electronic form on our website: http://grad.ucalgary.ca/.

Calendar Production

The University of Calgary extends its gratitude to all those dedicated individuals who contributed time and effort towards this Calendar.

Editors: Lorita Chiu, Faculty of Graduate Studies and Carol Poland, Enrolment Services

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Calgary, Alberta, Canada
T2N 1N4

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Web address: http://www.ucalgary.ca

A limited number of complimentary copies of this Calendar are available to some public institutions.
Please contact 403.220.6642 or calendar@ucalgary.ca.

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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 Graduate 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, in either its printed or electronic form, 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, lock-outs, 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.

The Graduate Calendar is available online in electronic form on the Faculty of Graduate Studies website at: http://grad.ucalgary.ca/. The online Calendar is the official University Calendar.

Faculty of Graduate Studies General Information

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.

Contact Information:

Location: MacKimmie Tower 213

Faculty number: 403.220.4938

Fax: 403.289.7635

Email address: graduate@ucalgary.ca

Website: http://grad.ucalgary.ca/

Student information: Enquiries concerning graduate programs should be directed to the unit offering the program. The Faculty website contains direct links to units offering graduate programs: http://grad.ucalgary.ca/prospective/graduate-programs.

Faculty of Graduate Studies

Dean:

Lisa Young

Associate Deans:

Eloise Carr (Students)

Julie Deans (International/Foothills Programs)

Lisa Hughes (Policy)

George Shimizu (Scholarships)

Assistant Dean:

Dave Hansen (Supervisory Development)

Office Staff:

Gillian Robinson, Senior Director, Strategic Operations

Susan Larsen, Executive Assistant to the Vice-Provost and Dean

Lorita Chiu, Policy and International Specialist

Tara Christie, My GradSkills Program

Tom Liu, Graduate Recruitment Specialist

Chantelle Sonnleitner, Communications Coordinator

Cathie Stiven, Manager, Graduate Awards

Jamie Pryde, Team Lead, Graduate Scholarship

Erin Coburn, Graduate Scholarship Officer

Tess Murphy, Graduate Scholarship Officer

Cameron Vanderwey, Graduate Scholarship Officer

Joan Tetrault, Administrative Assistant, Graduate Awards

Jennifer de Roaldes, Manager, Admissions and Records

Corey Wilkes, Team Lead, Graduate Admissions and Registrations

Robin Hawes, Graduate Program Officer

Catalina Kovacs, Graduate Program Officer

Calvin Lac, Graduate Program Officer

Shannon Mahoney, Graduate Program Officer

Pauline Fisk, Administrative Coordinator

Monica Gollaz, Faculty Administrative Officer

TBA, Faculty Administrative Assistant

Ngaire King, Administrative Assistant, Dean's office

Graduate Students' Association (GSA)

The Graduate Students' Association (GSA) was formed in 1967 with the aim of promoting and serving the intellectual, cultural and social interests of graduate students of the University. The GSA is dedicated to enhancing the experience of all graduate students and represents the collective interests of over 6,000 graduate students to the university, the Calgary community, and all levels of government. Find out more about your GSA at: http://www.gsa.ucalgary.ca/.

GSA Membership

The membership of the GSA consists of active members, affiliate, associate members and honorary members. All students registered as full- or part-time graduate students in the Faculty of Graduate Studies, or in the Credit Certificate and Diploma Program are active members. Active members must pay the annual GSA fee, and automatically become members of The Last Defence Lounge.

UCalgary Qatar Graduate Students' Association (UCQ GSA)

The UCQ GSA provides separate membership to, and represents graduate students at the UCalgary Qatar (UCQ) campus. UCQ GSA is affiliated with the GSA. The GSA is proud to extend our services, including DGA support, representation on UCalgary committees, and representation in appeals to UCQ graduate students. Please note that although UCQ GSA is affiliated with the GSA, the memberships are separate and differ from other forms of GSA membership and thus the GSA's Collective Agreement and bargaining do not extend to UCQ GSA members.

GSA Executive

The affairs of the GSA are managed by an executive body called the Board of Directors or (BoD) which is elected each spring for a one-year term. The positions include: President, Vice-President Academic, Vice-President Student Life and Vice-President Finance and Services. According to section B.6 (Graduate Calendar) GSA Executive can qualify for an extra year of study without penalty. The four executives and their team of staff and senior student volunteers support our members and advance the Association goals.

To serve our members, each executive is responsible for specifics aspects of your Associations:

The President is the official spokesperson of the Association and your chief advocate to membership, the university, all levels of government, and the broader community. The President is also the GSA appointee to the Alberta Graduate Council (AGC) albertagrads.ca, which advocates graduate student interests to the provincial government.

The Vice-President Academic (VPA) is generally responsible for all matters pertaining to GSA or university academic affairs, this includes oversight of the Graduate Assistantship (Non-) Teaching GA(N)Ts, GSA Awards, joint oversight of the Ombudsperson, and consultation on tuition & fees.

The Vice-President Student Life (VPSL) is responsible for all issues and matters relating to Departmental Graduate Student Associations (DGAs), oversight of the GSA's Last Defence Lounge (LDL), the GSA's International students' chair, and all member relations including communication and events.

The Vice-President Finance & Services (VPF&S) is generally responsible for all GSA services, including oversight of the GSA's Health & Dental plan, the GSA's employer liaison program (ELP), collaboration with MyGrad Skills and all student workshops; the VP (F&S) is also responsible for oversight of the GSA's finances including GSA's Quality Money allocation, and emergency student loans.

Feel free to contact the GSA executives via:

President: pres@gsa.ucalgary.ca or 403.220.3501

VP Academic: vpa@gsa.ucalgary.ca

VP Student Life: vpsl@gsa.ucalgary.ca

VP Finance & Services: vpfs@gsa.ucalgary.ca

Graduate Representative Council (GRC)

The Graduate Representative Council (GRC) meets regularly throughout the year reviews and monitors GSA policies, practices and activities as reported by the BoD at each GRC meeting. In addition, it ratifies the GSA's annual draft budget. GRC meetings are an opportunity to network and catch up on all the important happenings across campus. Every department in every faculty is guaranteed one or more GRC representatives based on departmental graduate enrolment figures. Representatives are normally elected by their department's graduate students in the fall term to liaise between the GSA and their Departmental Graduate Associations (DGAs). It is the GRC that gives direction to the elected Executive body.

Departmental Graduate Associations (DGAs)

Through the GSA, each department of the university is able to form a Departmental Graduate Association (DGA). Some of the benefits of joining a DGA are: start-up grants, the ability to apply for group funding, and a discount for DGA functions at The Last Defence Lounge. Many departments already have DGAs and the GSA encourages you to join yours—not only because it allows you to network within your department, but it fosters a stronger sense of community for graduate students. If your department doesn't have a DGA and you'd like to form one, the process is quite simple: just stop by the GSA main office for more information or visit: http://www.gsa.ucalgary.ca.

Graduate Student Orientation

Graduate Orientation is a free orientation session given for new September and January graduate student registrants. While it is not mandatory, the GSA highly recommends that all new graduate students attend—even if they're U of C undergraduate alumni—in order to learn about the U of C graduate program, the GSA, and countless other services and opportunities provided to graduate students. Plus, it gives graduate students a chance meet other graduate students. For more information on Graduate Orientation, please visit: http://www.ucalgary.ca/orientation/graduate.

Graduate Student Representation (External and Internal)

GSA representatives, including both the GSA executive and GRC representatives, sit as full voting members on most major committees of the university. As well, graduate students at the University of Calgary belong to provincial and national student organizations, such as the Alberta Graduate Council (AGC), the Western Canadian Alliance of GSA's (WCA-GSA) and the Graduate Group of 15 (GU15).

The GSA Office and The Last Defence Lounge (LDL)

The GSA main office is located on the second floor of the MacKimmie Tower (MT 214) which houses all of the GSA's operations, including the health and dental plan. The Last Defence Lounge, a members-only lounge to which all members of the university community, and their guests are welcome, is located on the third floor of the MacEwan Student Centre. Simply show your UCID to gain access to the lounge. There is no charge for membership. Please note, proof of age ID may also be required. For the latest lounge news, from events to daily specials, please visit: http://www.lastdefencelounge.ca.

GSA Health & Dental Plan

The GSA provides its active members access to a comprehensive extended Health and Dental Plan. Through enrolment in a graduate program at the university and paying of fees, active members are automatically enrolled in the GSA's extended Health & Dental plan. The plan encompasses a wide variety of coverage at competitive rates and allows students to access critical services—from antibiotics and psychiatry to naturopathy and dental work.

To opt-out of the GSA's Health & Dental plan, active members must provide proof of alternate coverage and complete the opt out form, details provided here: http://gsa.ucalgary.ca/services/optingout.html.

For additional information about the Health & Dental plan please visit http://gsa.ucalgary.ca/services/health.html.

GSA Services

The GSA provides many key services to graduate students, including the health & dental plan (details above), access to numerous university services and resources, as well are proud to run the Employer Liaison Program (ELP) to help graduate students attain their desired career goals – whether this means re-entering industry after graduation or continuing on with academe. To contact the ELP Co-ordinator email: careers@gsa.ucalgary.ca. The University of Calgary also has an Ombudsperson available as a neutral party to help guide students through U of C policy and answer any questions they may have about their rights as students. To contact the U of C Ombudsperson, please email: ombuds@ucalgary.ca. Through the GSA, graduate students also have access to GSA bursaries and awards, various academic and professional skills workshops, and much, much more. To access a complete list of GSA services, visit the GSA website.

If you ever have questions or need help, please don't hesitate to stop by the main office—the GSA is here to help you!

GSA Contact Information:

The Graduate Students' Association
214, MacKimmie Tower
2500 University Drive NW
Calgary AB
T2N 1N4
Tel: 403.220.5997
Fax: 403.282.8992
http://www.gsa.ucalgary.ca

GSA Office Hours:

Monday & Wednesday 12 (noon) - 5 pm
Tuesday, Thursday & Friday 10 am - 3 pm

Academic Schedule

The University operates three terms during the academic year:

Fall Term	**13 weeks**	**September to December**
Winter Term	**13 weeks**	**January to April**
Summer Term	**13 weeks**	**May to August**
Spring Intercession	6 to 7 weeks	May to June
Summer Intercession	6 weeks	July to August

Graduate Academic Schedule 2014-2015

Note: For a complete listing of dates applicable to the 2014 Summer Term, please refer to the 2014 Spring and Summer website: http://springsummer.ucalgary.ca/.

September 2014

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

October 2014

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

November 2014

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30						

December 2014

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

January 2015

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				1	2	3
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11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

February 2015

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1	2	3	4	5	6	7
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15	16	17	18	19	20	21
22	23	24	25	26	27	28

March 2015

S	M	T	W	T	F	S
1	2	3	4	5	6	7
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15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

April 2015

S	M	T	W	T	F	S
			1	2	3	4
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12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

May 2015

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10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31						

June 2015

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30				

July 2015

S	M	T	W	T	F	S
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

August 2015

S	M	T	W	T	F	S
						1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Lectures Begin
Last Day to Drop Courses
Fee Payment Deadlines
No Lectures
Lectures End
Last Day to Add Courses
Exam Days

SEPTEMBER, 2014

1 Monday	• Labour Day. University closed.
2 Tuesday	• Fall Term begins.
2-6 Tuesday-Saturday	• Block Week.
6 Saturday	• Last day to withdraw with permission from Fall Term Block Week courses.
8 Monday	• FALL TERM LECTURES BEGIN (except Block Week courses).
19 Friday	• Last day to drop full courses and Fall term half courses. • No refunds for full courses (Multi-term) or Fall Term half courses after this date.
22 Monday	• Last day to add or swap full courses and Fall term half courses. • Last day for change of registration from audit to credit or credit to audit.
26 Friday	• Fee payment deadline for Fall term full and half courses. • **Thesis-based degrees:** Last day for master's and doctoral students to submit all required forms to the Faculty of Graduate Studies, and the theses/ dissertations to the Vault to be eligible for November 2014 Convocation.

OCTOBER, 2014

13 Monday	• Thanksgiving Day, University closed (except Taylor Family Digital Library, Law, Medical, Gallagher and Business Libraries). No lectures.

NOVEMBER, 2014

8-11 Saturday-Tuesday	• Reading Days. No lectures.
10 Monday	• Fall Convocation.
11 Tuesday	• Remembrance Day (Observed). University Closed (except Taylor Family Digital Library, Law, Medical, Gallagher and Business Libraries). No lectures.

DECEMBER, 2014

5 Friday	• FALL TERM LECTURES END. (For practicum students, the length of the term may be extended.) • Last day to withdraw with permission from Fall Term half courses.
8-18 Monday-Thursday	• Fall Term Final Examinations and consolidated end-of-term tests in full courses.
25-31 Thursday-Wednesday	• Holiday Observance. Term Break. University Closed.
31 Wednesday	• Last day to submit Application for Graduation for all degrees and diplomas to be conferred for February 2015. • **Course-based students**: Deadline for completion of all degree requirements to be eligible for February 2015 Degree Conferral.

JANUARY, 2015

1 Thursday	• New Year's Day. University Closed.
2 Friday	• Winter Term Begins.
5-9 Monday to Friday	• Block Week. • Lectures begin in Block Week courses.
9 Friday	• Last day to withdraw with permission from Block Week courses.
12 Monday	• WINTER TERM LECTURES BEGIN (except Block Week courses).
23 Friday	• Last day to drop Winter Term half courses. • No fee refunds for Winter Term half courses after this date.
26 Monday	• Last day to add or swap Winter Term half courses. • Last day to change registration from audit to credit or credit to audit.
30 Friday	• Fee payment deadline for Winter Term fees. • Spring and Summer term Schedule of Classes will be available mid-January. • **Thesis-based students**: Last day to submit all required forms to the Faculty of Graduate Studies, and the theses/ dissertations to the Vault to be eligible for February 2015 Degree Conferral and not have fees assessed for Winter 2015. • Visit the Spring and Summer website at http://springsummer.ucalgary.ca/.

FEBRUARY, 2015

1 Sunday	• Last day to submit Application for Degree for all degrees and diplomas to be conferred at May and Spring (June) Convocations (see Graduation in Academic Regulations section of this calendar).

15-22 Sunday to Sunday	• Reading Week. No lectures. University open (except Family Day).
16 Monday	• Alberta Family Day, University closed (except Taylor Family Digital Library, Law, Medical, Gallagher and Business Libraries). No lectures. • Spring and Summer Term registration for continuing students begins early February. • Visit the Spring and Summer website at http://springsummer.ucalgary.ca/.

MARCH, 2015

	• Spring and Summer Term registration for Open Students and Visiting students begins early March. • Visit the Spring and Summer website at http://springsummer.ucalgary.ca/.

APRIL, 2015

1 Wednesday	• **Veterinary Medical Sciences, Law & Leaders in Medicine Graduate Students**: Last day to submit all required forms to the Faculty of Graduate Studies, and the theses/dissertations to the Vault to be eligible for May 2015 Convocation.
3 Friday	• Good Friday, University closed (except Taylor Family Digital Library, Law, Medical, Gallagher and Business Libraries).
15 Wednesday	• WINTER TERM LECTURES END. (For practicum students, the length of the term may be extended.) • Last day to withdraw with permission from full courses or Winter Term half courses.
16 Thursday	• Last day to register for Spring term first-term half courses, six week and thirteen-week courses (Multi-Term) courses with pre-session study.
18-29 Saturday-Wednesday	• Winter Term Final Examinations.
30 Thursday	• Winter Term ends. • **Course-based degrees:** Deadline for completion of all degree requirements to be eligible for June 2015 Convocation. • **Thesis-based degrees:** Last day for master's and doctoral students to submit all required forms to the Faculty of Graduate Studies, and the theses/dissertations to the Vault to be eligible for June 2015 Convocation.

MAY, 2015

7 Thursday	• May Convocation for Faculties of Law, Medicine and Veterinary Medicine.
14 Thursday	• SPRING TERM LECTURES BEGIN
18 Monday	• Victoria Day. University closed. No lectures.
DATES TO BE DETERMINED	• Last day for registration and changes of registration for Spring term first-term half courses, six-week and thirteen-week courses (Multi-term) (without pre-session study). • No fee refunds for withdrawals from Spring term first-term half courses, six week and thirteen-week courses (Multi-term) after this date.
DATES TO BE DETERMINED	• Fee payment deadline for Spring term fees for first-term, six week, thirteen-week and second-term courses. • **Thesis-based students:** Last day to complete all degree requirements (including submission of theses/dissertations) to not have fees assessed for Spring 2015.

JUNE, 2015

4 Thursday	• First-term lectures in Spring Term end. • Last day to withdraw with permission from first-term half courses in Spring term.
5 Friday	• First-term final examinations for Spring Term. • Last day for registration and changes of registration for Summer Term courses (with pre-session study).
8 Monday	• Lectures begin for the second-term of Spring Term.
DATES TO BE DETERMINED	• Last day for registration and changes of registration for Spring Term second-term half courses (without pre-session study). • No fee refunds for withdrawals from Spring Term second-term half courses after this date. • **All graduate students**: Last day to complete all degree requirements (including submission of theses/dissertations) to not have fees assessed for Summer 2015.
8-12 Monday to Friday	• Spring (June) Convocation for all faculties except Law, Medicine and Veterinary Medicine.
26 Friday	• SPRING TERM LECTURES END. • Last day to withdraw with permission from full courses, half courses given over a six-week period and second-term half courses in Spring Term.
27; 29-30 Saturday; Monday-Tuesday	• Spring Term Final Examinations except first-term courses.

JULY, 2015

1 Wednesday	Canada Day, University closed.
2 Thursday	SUMMER TERM LECTURES BEGIN.
3 Friday	• Last day for registration and changes of registration (without pre-session study) first-term and six-week courses. • No fee refunds for withdrawals from Summer Term first-term half courses and six-week courses after this date.

DATE TO BE DETERMINED	• Fee payment deadline for Summer Term first-term half courses, six-week and second-term courses.
22 Wednesday	• First-term lectures end in Summer Term. • Last day to withdraw with permission from first-term half courses in Summer Term.
23 Thursday	• First-term final examinations for Summer Term.
24 Friday	• Lectures begin for the second-term of Summer Term.
DATE TO BE DETERMINED	• Last day for registration and change of registration for Summer Term second-term (without pre-session study). • No fee refunds for withdrawals from Summer Term second-term half courses and six-week courses after this date.

AUGUST, 2015

3 Monday	• Alberta Heritage Day. University closed. No lectures.
14 Friday	• SUMMER TERM LECTURES END. • Last day to withdraw with permission from full courses, half courses given over a six-week period and second-term half courses in Summer Term. • Last day to withdraw with permission from thirteen-week courses (Multi-term) offered from May 14 to August 14.
15 Saturday	• Last day to submit Application for Degree for all degrees and diplomas to be conferred at Fall Convocation (see Graduation in Academic Regulations section of this calendar).
17-19; Monday-Wednesday	• Final Examinations for Summer Term except first-term courses.
31 Monday	• **Course-based degrees**: Deadline for completion of all degree requirements to be eligible for November 2015 Convocation.

Faculty of Graduate Studies Degrees Information

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Summary of Degree Programs

The Faculty of Graduate Studies administers programs leading to the degrees of:

Doctor of Education (EdD)
Doctor of Philosophy (PhD)
Master of Architecture (MArch)
Master of Arts (MA)
Master of Biomedical Technology (MBT)
Master of Business Administration (MBA)
Master of Communications Studies (MCS)
Master of Disability and Community Studies (MDCS)
Master of Counselling (MC)
Master of Education (MEd)
Master of Engineering (MEng)
Master of Environmental Design (MEDes)
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 Planning (MPlan)
Master of Public Policy (MPP)
Master of Science (MSc)
Master of Social Work (MSW)
Master of Strategic Studies (MSS)

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, MPP/MBA, MBT/MBA, MSW/MBA, MSc/MBA, PhD/MBA, MD/Master's and MD/PhD.

The University of Calgary also provides opportunities for excellent doctoral students to undertake doctoral studies in collaboration with other universities nationally and internationally through the Doctoral Cotutelle Program. A doctoral cotutelle is a PhD degree designed, supervised and examined by faculty from two universities and jointly awarded by both universities. Visit http://grad.ucalgary.ca/prospective/graduate-programs/cotutelle for more information.

Information and application packages are available from the relevant graduate programs.

Leaders In Medicine

The Leaders in Medicine program at the University of Calgary offers students the

Degrees Offered

ANTH	ARKY	ART	BISI	BMEN	CHEM	CMCL	CMD	CMSS	CPSY	CPSC	DRAM	ECON	EDER
PhD	PhD	MFA	PhD	PhD	PhD	PhD	PhD	PhD	PhD	PhD	MFA	PhD	PhD
MA	MA	-	MSc	MSc	MSc	MA	MSc	MSS	MSc	MSc	-	MA	EdD
-	-	-	-	MEng	-	MCS	-	-	-	-	-	-	MA
-	-	-	-	-	-	-	-	-	-	-	-	-	MSc
-	-	-	-	-	-	-	-	-	-	-	-	-	MEd
EDPS	**ENCH**	**ENCI**	**ENEL**	**ENGO**	**ENME**	**ENGL**	**EVDS**	**FISL**	**GEOG**	**GLGP**	**GRST**	**GSEA**	**HIST**
PhD	PhD	PhD	PhD	PhD	PhD	PhD	PhD	MA	PhD	PhD	PhD	MA	PhD
MSc	MSc	MSc	MSc	MSc	MSc	MA	MArch	-	MA	MSc	MA	-	MA
MC	MEng	MEng	MEng	MEng	MEng	-	MEDes	-	MSc	-	-	-	-
MEd	-	-	-	-	-	-	MPlan	-	MGIS	-	-	-	-
IGP	**KNES**	**LAW**	**LING**	**MDBC**	**MDBT**	**MDCV**	**MDCH**	**MDGI**	**MDIM**	**MDMI**	**MDNS**	**MDSC**	**MGMT**
PhD	PhD	LLM	PhD	PhD	MBT	PhD	PhD	PhD	PhD	PhD	PhD	PhD	PhD
MA	MSc	JD/MBA	MA	MSc	MBT/MBA	MSc	MSc	MSc	MSc	MSc	MSc	MSc	MBA
MSc	MKin	JD/MPP	-	-	-	-	MDCS	-	-	-	-	-	JD/MBA
-	-	-	-	-	-	-	-	-	-	-	-	-	MBT/MBA
-	-	-	-	-	-	-	-	-	-	-	-	-	MPP/MBA
													MSW/MBA
MTST	**MUSI**	**NURS**	**PHIL**	**PHAS**	**POLI**	**PSYC**	**PPOL**	**RELS**	**SEDV**	**SOCI**	**SOWK**	**VMS**	
PhD	PhD	PhD	PhD	PhD	PhD	PhD	MPP	PhD	MSc	PhD	PhD	PhD	
MSc	MA	MN/NP	MA	MSc	MA	MSc	MPP/JD	MA	-	MA	MSW/MBA	MSc	
-	MMus	PMNP	-	-	-	-	MPP/MBA	-	-	-	MSW	-	
-	-	MN	-	-	-	-	-	-	-	-	-	-	

opportunity to earn simultaneously both a Doctor of Medicine (MD) degree and a graduate degree (PhD, MSc, MA, MBA, etc.). The objective of Leaders in Medicine is to train clinicians for a diverse range of careers ranging from academic medical research to the design, management and implementation of health care delivery systems. Individuals trained in Leaders in Medicine can expect to develop a unique academic approach to their clinical experiences as well as bring a clinical perspective to their research.

Students in Leaders in Medicine will be jointly enrolled in the MD program and in any of the graduate programs offered by the Faculty of Graduate Studies. Although the most common graduate programs participating in Leaders in Medicine are the eight offered by the Faculty of Medicine (Biochemistry and Molecular Biology; Cardiovascular/Respiratory Sciences; Community Health Sciences; Gastrointestinal Sciences; Immunology; Medical Science; Microbiology and Infectious Diseases; Neuroscience), students from other programs, including Philosophy and Engineering, have taken part.

Students wishing to apply to Leaders in Medicine should have an excellent academic record and strong motivation towards a career in academic medicine. Previous research experience is highly desirable. Applicants must apply separately to the Faculty of Medicine for the MD program and to the selected graduate program in the Faculty of Graduate Studies, and be recommended for admission by each program. Prospective applicants must also complete a supplemental application for the Leaders in Medicine program: forms may be obtained from the Graduate Sciences Education Office (Faculty of Medicine). Students normally apply for the combined degree program during the first two years of either the MD or the graduate program. Expected completion time is five years for the MD/Masters programs and seven years for MD/PhD programs. Maximum completion time is six years for the MD/Masters program and eight years for the MD/PhD program.

For more information, contact:

Leaders in Medicine, Health Sciences Centre, Room G321

Telephone: 403.210.9572

Fax: 403.210.8109

Email: mdgrad@ucalgary.ca

or visit the website:
http://www.ucalgary.ca/jointMDPhD

Master of Social Work/Master of Business Administration (MSW/MBA)

The Master of Social Work/Master of Business Administration (MSW/MBA) program is designed to prepare students for competent and visionary management of human service organizations. This program is available only to full-time, course-based Master's students in the Leadership in the Human Services specialization in the Faculty of Social Work. The combined program shortens the time for completion of the two degrees from three academic years to two 12-month years. See the program descriptions for the Faculty of Social Work and the Haskayne School of Business for further information.

Master of Biomedical Technology/Master of Business Administration (MBT/MBA)

The Master of Biomedical Technology/Master of Business Administration (MBT/MBA) program provides students with managerial skills as well as essential scientific skills and competencies for successful careers in biotechnology business. The combined degree program is targeted at graduate students who are interested in a dual skill set to prepare them for biotechnology jobs in industry, research and government at all levels from the bench to the boardroom. The combined degree allows students to obtain both degrees in a shorter time frame than would be possible taking each degree separately. See the program descriptions for the Master of Biomedical Technology program and the Haskayne School of Business for further information.

Juris Doctor/Master of Business Administration (JD/MBA)

The Juris Doctor/Master of Business Administration (JD/MBA) program enables students to complete an undergraduate degree in law while studying for a graduate degree in business. This program is open only to students enrolled in the Haskayne MBA program on a full-time basis. See the program descriptions for the Faculty of Law and the Haskayne School of Business for further information.

Master of Public Policy/Juris Doctor (MPP/JD)

The MPP/JD program is normally restricted to full-time study. It allows students to obtain both degrees in a significantly shorter time frame than if they are taken separately. Please consult the Public Policy program or the Law Program for more information.

Master of Public Policy/Master of Business Administration (MPP/MBA)

Students admitted to the MPP/MBA will focus on courses for the MBA during the first year and on MPP courses in year two. Typically, the remaining courses required will be completed in the first term of year three. Please consult the MBA Admissions Officer or the Public Policy Program Manager for more information.

Interdisciplinarity at University of Calgary

Interdisciplinary Specializations

Most graduate programs include some interdisciplinary work. The following interdisciplinary specializations have been formalized by the programs involved to facilitate the study and research capability:

Biological Anthropology

Anthropology, Archaeology and Medical Science

Clinical Research

Kinesiology, Medicine, Nursing, Social Work

Energy and Environmental Systems

Engineering, Environmental Design, Management, Law, Sciences, Social Sciences

Engineering, Energy & Environment

Chemical and Petroleum Engineering, Civil Engineering, Electrical and Computer Engineering, Geomatics Engineering, Mechanical and Manufacturing Engineering

Environmental Engineering

Chemical and Petroleum Engineering, Civil Engineering, Electrical and Computer Engineering, Geomatics Engineering, Mechanical and Manufacturing Engineering

Israel Studies (Pending Termination)

History, Political Science, English, Religious Studies and Centre for Military and Strategic Studies

Medical Imaging

Biomedical Engineer, Electrical and Computer Engineering, Medical Science, Neuroscience, Psychology, Physics and Astronomy

Reservoir Characterization

Chemical and Petroleum Engineering and Geology and Geophysics

Please see the section on "Interdisciplinary Specializations" for more information.

Interdisciplinary Program

Computational Media Design

Faculty of Science, Environmental Design; and Departments of Computer Science, Art and Music

Credit Certificate and Diploma Programs

The Faculty of Graduate Studies administers programs leading to certificates and diplomas in Educational Research, Educational Psychology, Law, Nursing, Radiation Oncology Physics and Social Work. The programs provide those who wish to continue their advanced education with an opportunity to acquire additional academic credentials in specific areas. These credentials may be used for credit toward a future degree. The graduate certificate and diploma programs will also be valuable to those who have completed a graduate degree but desire or require further credentials or knowledge and skills beyond their degree.

Please see Program entries in this Calendar for contact information regarding certificate and diploma programs.

Admissions

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There is no general right of admission to Graduate Programs. Each department 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. There is no right to appeal admission decisions.

A.1 Qualifications

Applicants must hold or obtain the following minimum qualifications before the Faculty will give consideration to admission:

1. A four-year baccalaureate degree or its equivalent from the University of Calgary or a recognized institution. Degrees and grades from foreign 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 10 full-course equivalents. 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 for exceptions and details.

Note: In exceptional circumstances, individuals who do not meet formal academic requirements but who have significant life achievements may be considered for admission to some graduate programs. The candidate must provide the relevant graduate program with evidence demonstrating a potential to undertake successfully the proposed program of studies. Such candidates are advised to make early contact with the graduate program. In all such cases, the decision whether or not to admit rests with the Dean of the Faculty of Graduate Studies.

2. Proficiency in the English language is essential for the pursuit and successful completion of graduate programs at the University of Calgary. Prior to admission to the Faculty of Graduate Studies, an applicant whose primary language is not English may fulfill the English language proficiency requirement in one of the following ways:

a) By writing the Test of English as a Foreign Language (TOEFL) and obtaining a score of at least 550 (written test) or 80 (Internet-based test)[1]. Applications may be obtained from the TOEFL website: www.ets.org/toefl. When requesting that official test results are forwarded to the University of Calgary, indicate the institution code 0813 and the code appropriate to the graduate program, as listed on the TOEFL website.

b) By writing the academic test format of the International English Language Testing System (IELTS) and obtaining a minimum score of 7.0. IELTS materials can be obtained from IELTS Publications, UCLES, 1 Hills Road, Cambridge CB1 2EU, UK.

c) By writing the Michigan English Language Battery (MELAB) test and obtaining a score of 80. The MELAB test includes a written composition, a listening test, and a test of grammar, vocabulary, and reading comprehension. An optional speaking test is also available. The University of Calgary is a testing site for the MELAB. For information, visit http://www.ucalgary.ca/registrar/exams/externalexams.

d) By successfully completing the Tier 3 of the English for Academic Purposes (EAP) program and achieving a minimum grade of "B" in the EAP Tier 3 Academic Writing & Grammar and a minimum grade of "C" in both EAP Tier 3 Reading Comprehension & Proficiency and EAP Tier 3 Listening Comprehension & Oral Fluency. For information, see http://www.education.ucalgary.ca/eap/ or contact English for Academic Purposes, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4. Telephone: 403.220.3485; fax: 403.210.8554; email: eapp@ucalgary.ca.

e) By completing the Pearson Test of English (PTE) and obtaining a score of at least 59[1].

The department or graduate program may waive the English proficiency-testing requirement in certain circumstances, such as the possession of a baccalaureate degree or its academic equivalent from a recognized institution in which the language of instruction is English. Contact the graduate program to which you plan to apply for further information.

Students who do not meet admission standards and wish to pursue graduate work are advised to enrol in the equivalent of a full year (a minimum of three graded full-course equivalents) at the senior undergraduate level in order to improve their academic record to acceptable admission standards (a grade of "B" or higher in every course). **Students are advised to discuss this option with the appropriate graduate program before embarking on such a course.** All such courses represent "make-up" work and cannot be used for advanced credit towards a graduate degree program. Successful completion of "make up" work does not guarantee admission to a graduate program.

[1] Some programs require scores higher than the Faculty of Graduate Studies minima. See program listings for specific details.

A.2 Application for Admission

Applications for admission to the Faculty should be submitted through the online application system, which can be accessed through program websites. No assurance can be given that applications received after the deadlines noted in the "Application Deadline" section of the appropriate program section of this Calendar will be processed in time to permit the applicant to register for the following session. Specific instructions for applicants are included with the application.

All applications to the Faculty of Graduate Studies of the University of Calgary must include the following:

a) A non-refundable application fee for each application to a graduate degree program. $100 for Canadian citizens or Permanent Residents, $130 for international students with a study permit. Refer to the Faculty of Graduate Studies website for information on paying your application fee (http://grad.ucalgary.ca/prospective/admissions/application-fee).

b) Official transcripts from all post-secondary institutions attended.

c) Official MELAB, TOEFL, IELTS, GMAT, PTE, GRE scores and/or other requirements of the program for which application is being made.

d) Endorsement from the Head of the Department. It is the responsibility of the department or graduate program concerned to ensure that the applicant is, in all relevant respects, acceptable to the department and that the student's proposed program is aligned with the availability of resources for adequate supervision and research, with departmental research objectives, and with program balance, as appropriate.

Please see program entries in this Calendar for any additional program requirements, including details on reference letters.

Normally, an appropriate letter of recommendation is one written by an independent individual who can provide an assessment of the applicant's background and capabilities with respect to the prospective program. Letters from friends, family members, colleagues, people currently registered in a graduate degree program, or general reference letters that are not written in support of the person's application to the particular graduate program are not acceptable. An applicant currently registered in a graduate degree program, or who has recently completed a graduate degree program, will normally submit one letter of reference from his/her program supervisor. Unless the applicant has been out of school for more than four years, at least one letter, and preferably both, should be by an academic. A reference

from a non-academic source should come from a person who has had direct supervisory experience of the applicant.

All graduate programs have limited enrolment capacities. Meeting the minimum requirements does not guarantee admission.

If, at any time it is discovered that a student was admitted on the basis of falsified documents or information, the admission will immediately be declared null and void and future admission will be denied.

Note: Advanced credit must be requested at the time of application for admission. See "A.6 Advanced Credit".

Students will not normally be permitted to register in a University of Calgary degree or diploma program while simultaneously working toward another degree or diploma at the University of Calgary or at another institution. Joint degree programs and cotutelle admissions are an exception to this regulation.

A.3 Admission Categories

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 degree in an area not sufficiently represented by one graduate program may be admitted both to a home program and a conjoint program in an interdisciplinary area of study, if one exists. The student should submit an application form and fee, along with official transcripts and letters of reference to the intended home graduate program. The prospective home program will liaise with the conjoint program. Contact the prospective home graduate program for further details.

Special Case Admission

Special case admission may be used when resources are available to admit a student to undertake graduate studies, but no appropriate program exists. Contact the relevant department for details.

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 full program fees during their time as a qualifying student. These program fees are in addition to the standard program fees assessed upon transfer to regular student status. A qualifying student in a course-based program will pay tuition fees for the extra required courses on a per-course basis.

Conditional Admission for Language Upgrading

An international student holding a scholarship from his/her government may be offered admission into a graduate program conditional on successful completion of the English for Academic Purposes program. In order to be admitted, the student must successfully complete Tier 3 of the EAP program by achieving a grade of "B" or higher in EAP 190 and a grade of "C" or better in all other EAP courses. Programs may require a higher level of achievement, which will be set out in the letter of conditional admission. Eligible students who are offered conditional admission must complete the EAP program within one year; after this time the conditional offer of admission is revoked.

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 his/her 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

General

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. Note that students with practicum requirements may not be eligible to apply for an exchange.

An exchange student must submit the appropriate application/approval form (http://grad.ucalgary.ca/current/managing-my-program/studying-at-another-university).

An exchange student pays tuition fees at the home institution when this is written into the specific exchange agreement, and applicable general fees at the University of Calgary.

If there is no reciprocal fee agreement, the exchange student pays applicable tuition and general fees at the University of Calgary.

Exchange student status does not guarantee admission to graduate programs at the University of Calgary. An exchange student who wishes to apply to a graduate program at the University of Calgary must do so in the usual manner.

Western Deans' Agreement

The Western Deans' Agreement covers graduate students from the following universities:

Athabasca University

British Columbia Institute of Technology

Brandon University

Concordia University College of Alberta

Royal Roads University

Simon Fraser University

Thompson Rivers University

University of Alberta

University of British Columbia

University of Calgary

University of Lethbridge

University of Manitoba

University of Northern British Columbia

University of Regina

University of Saskatchewan

University of Victoria

A graduate student registered in the Faculty of Graduate Studies at one university may apply for student status at a university listed above by completing the appropriate application that requires the approval of the Graduate Program Director, and the Faculty of Graduate Studies at both the student's home and host universities. Applications should be received in the Faculty of Graduate Studies at the host institution three months before the beginning of the term at the University of Calgary.

The student pays tuition and general fees at the home university and applicable general fees at the host institution.

The student is responsible for arranging for an official transcript to be sent from the host institution to the home institution when the course(s) has been completed.

Each home institution has regulations regarding the maximum number of transfer credits permitted. Further information is available at http://grad.ucalgary.ca/current/managing-my-program/studying-at-another-university/western-deans.

Canadian Graduate Student Research Mobility Agreement

The Canadian Graduate Student Mobility Agreement, initiated by the Canadian Association of Graduate Schools (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 under this agreement provided they are not taking courses at the host institution. Incidental fees may be charged. A faculty member at the host institution must agree to supervise

and take responsibility for the visiting graduate research student during his/her stay. It is recognized that it is the responsibility of the visiting student to find a supervisor at the host institution.

For further information, see the Faculty of Graduate Studies website at http://grad.ucalgary.ca/current/managing-my-program/studying-at-another-university/cags.

A.4 Retention of Student Records

Graduate student files are kept electronically in the Faculty of Graduate Studies. All application documents submitted to the Faculty of Graduate Studies become the property of the University of Calgary and cannot be returned to the student.

When applying for admission to another program, an applicant who completed a graduate degree from the University of Calgary must submit original transcripts of post-secondary education institutions attended as required by the program or the Faculty of Graduate Studies, and appropriate letters of reference as required by the program.

A.5 Offer of Admission

An offer of admission to a graduate program shall specify the program to which the student is admitted in terms of available programs as specified in this Calendar. Any more detailed terms of admission applying to a particular offer shall be specified in the offer. Graduate programs will supply a program specification including the terms of admission to the Faculty of Graduate Studies when recommending that a student be admitted or admitting on behalf of the Faculty of Graduate Studies, and will ensure that copies of any documents cited in the specification are lodged with the Faculty of Graduate Studies.

The program specification shall include any full-time requirements, and other relevant program components. It shall also include any offer of funding and any conditions related to that funding, from the program.

An offer of admission to a prospective student who will attend for a qualifying year must include the courses the prospective student is expected to take to upgrade his or her background to enter the program proper. The offer must include the information that these courses, and the tuition paid during the qualifying year, will not count toward the degree program. No fee credit is given for courses that are taken as a qualifying student.

A student may request that the graduate program defer admission for up to one full year. Deferral is not automatic, and terms of the offer of admission may change. The request must be endorsed by the Graduate Program Director, and the prospective supervisor, where applicable.

If, during a student's program, a change in the program is mutually agreed upon by the student and the graduate program, the program may be changed from that specified as part of the offer of admission, but such variation will not come into effect until it is approved by the Faculty of Graduate Studies. The Change of Program or Status form must be completed and submitted to the Faculty of Graduate Studies for approval. (http://grad.ucalgary.ca/current/managing-my-program/registration).

A.6 Advanced Credit

Courses for which advanced credit is being sought must be from a recognized institution and not have been used for any degree or diploma accreditation. They must be graded, graduate level courses, and the graded level of performance must be equivalent to a "B" grade or higher standing at the University of Calgary.

Advanced credit is not normally given for courses taken more than five years before admission to the current graduate degree program or for courses taken for the purposes of qualifying for admission.

Course-based programs: The student must request advanced credit in writing at the time of application for admission. This request must be endorsed by the Graduate Program Director and submitted to the Faculty of Graduate Studies with the admission recommendation. The total of advanced credit and transfer credit may not exceed either one-third of the program or two full-course equivalents, whichever is less.

Thesis-based programs: Application for credit should be made to the graduate program at the time of admission, so that the graduate program can take previous work into account when specifying a student's program.

A.7 Readmission

A student who withdrew or was withdrawn from program and wishes to be readmitted to the program must apply for readmission to the graduate program, with submission of official transcripts for any academic work done since departure and a fee of $180.

If readmission is granted, program requirements and completion time will be stipulated in the offer of readmission. Assessment of requirements for degree completion will take into consideration the relevance of work completed during the initial registration and current program requirements.

A fee assessment, taking into account the completed and remaining requirements and time in the student's program, will be made as part of the offer of readmission.

A.8 Reactivation

A student who has been withdrawn for failure to register and who wishes to reactivate his/her registration, must submit a Faculty of Graduate Studies Application for Reactivation of Registration (http://grad.ucalgary.ca/current/managing-my-program/registration) and a $180 fee. The student's supervisor and Graduate Program Director must sign the registration form, indicating their willingness to reinstate the student. Reactivation may only take place within four months of the student's annual registration month, and the student will be responsible for fees for the entire term. If the student wishes to return to program after the four-month period has passed, the student must apply for readmission for the next session to which the program will admit students (see A.7 Readmission).

Awards and Financial Assistance for Graduate Students

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The University of Calgary is very proud of its Graduate Student Awards program. In addition to recognizing academic achievement, scholarships are important in helping to bridge the gap between the rising cost of attending university and limited student income. Attracting top national and international students to the University of Calgary continues to be a very high priority.

We are extremely pleased that our donors share our commitment to graduate student awards, and we appreciate the financial support offered by all of our valued donors.

Full-time students registered in a graduate degree program at the University of Calgary are eligible for awards and financial assistance.

Scholarship information, application forms and instructions are found through the searchable awards database on the web at http://grad.ucalgary.ca/awards.

Additional information is available from your program. Because this award list is published a considerable time before the opening of the session, the University reserves the right to make whatever changes circumstances may require, including cancellation or addition of particular awards.

I. University Assistantships

University Graduate Assistantships are governed by the Collective Agreement between the Governors of the University of Calgary and the Graduate Students' Association. Each year teaching units have varying numbers of graduate assistantships available to be awarded on the basis of merit. Students interested in such appointments should contact their Graduate Program Administrator for information about eligibility, application deadlines and procedures. The stipends indicated are subject to change without notice. Appointments are available from most units in which graduate programs are offered. Categories of appointment include Graduate Assistantships (Teaching and Non-Teaching).

Graduate Assistantships (GA, Teaching/ Non-teaching)

A Graduate Assistantship (Teaching) is an appointment made to assist with the instructional responsibilities of departments or faculties. GA(T)s are appointed to provide teaching or instructional service, which might encompass lecturing assistance, laboratory supervision, office hours, grading assignments, tutorial direction, assistance in preparation of demonstration and instructional aids, and other related academic duties.

A Graduate Assistantship (Non-Teaching) is an appointment made to assist departments and/or professors with non-teaching responsibilities. The duties of a GA(NT) may include, for example, collecting research data, interviewing research subjects, bibliographic work or general research services.

Remuneration paid to Graduate Assistants must comply with the Collective Agreement or the regulations of the agency providing the funds. The stipend is listed in the Collective Agreement.

Research Assistantships (Scholarship)

A graduate student employed as a Research Assistant builds academic experience by assisting with a research project, with duties similar to those described above for a Graduate Assistantship (Non-Teaching). Research Assistant appointments are funded from the research support accounts for University faculty who select and recommend graduate students for such appointments. The stipends vary. This type of support is arranged directly between graduate students and their prospective supervisors.

II. Project Employment

This is funded from a research account to provide a direct service in connection with a faculty member's research. This research is normally not related to the student's program or area of research. The service provided is normally supervised by someone other than the student's supervisor and is treated as regular employment.

III. Sessional Instructorships

A department or faculty may appoint a graduate student as a Sessional Instructor to teach a course as Instructor of Record. Sessional Instructor appointments are Term Certain Appointments covered under the Collective Agreement between the Governors of the University of Calgary and the University of Calgary Faculty Association (http://www.ucalgary.ca/hr/). Normally, a student may not be a Sessional Instructor for more than one half course or one full course at any one time.

IV. Dean's Entrance Scholarships (DES)

Awarded to Canadian or international students with excellent academic records and potential who will be entering a doctoral program at the University of Calgary. Successful candidates must be registered full-time in the Faculty of Graduate Studies at the time of tenure. Students receiving this award must hold or apply for major awards from such funding agencies as: NSERC, SSHRC, CIHR and Alberta Innovates, if eligible.

Graduate programs allocate these awards, and students should check with their Graduate Program Administrator for application procedures.

V. Faculty of Graduate Studies Scholarships (FGSS)

To be eligible for a Faculty of Graduate Studies Scholarship, students must be registered full-time in the Faculty of Graduate Studies in a thesis program at the University of Calgary. Graduate programs allocate these awards, and students should check with the program administrator for application procedures.

VI. Graduate Students' Association Bursaries

The Graduate Students' Association makes available bursaries of up to $1,000 per year to students who at the time of tenure will be registered in a graduate program at the University of Calgary and can demonstrate financial need. Application forms are available from the Graduate Students' Association, MacKimmie Tower, Room 214, telephone 403.220.5997. Contact the GSA office for further information.

VII. Government Financial Assistance

The provincial and federal governments make assistance available to students in the form of loans. Students must be Canadian citizens or permanent residents of Canada and provide sufficient evidence that financial assistance is essential to enable the student to continue her/his education. The amount of assistance varies. Students should contact their provincial funding office directly to obtain detailed information about the student loans, grants and bursaries offered through their province. Links to the out of province government loan websites are available from the Student Awards and Financial Aid website: www.ucalgary.ca/awards/.

VIII. International Students

International students planning to do graduate work at the University of Calgary are eligible to apply for Graduate Assistantships and FGS scholarships. International students are also eligible to apply for a number of Canadian scholarship programs. Detailed

information is found on the Graduate Award website at http://grad.ucalgary.ca/awards.

IX. Awards Offered by Government, Industry and Others

Many foundations, companies, professional organizations and other agencies offer financial support to graduate students. A number of international, national and provincial organizations award scholarships and fellowships, tenable at this and other universities. Details about many of these awards are available from the Graduate Award website at http://grad.ucalgary.ca/awards.

X. University Research Grants - Committee (URGC) - Thesis/ Dissertation Research Grants

The University Research Grants Committee recognizes that there are instances where standard funding for thesis research available through a program or faculty may not be adequate to meet certain special needs that are essential to the completion of a particular thesis research project.

The primary purpose of the URGC Thesis/ Dissertation Research Grant program is to assist graduate students with *exceptional* or *unanticipated* costs that are essential to the completion of their thesis/dissertation projects, but that *could not reasonably be anticipated* when their project was approved. The expenses must be beyond the means of the student, laboratory or department. These awards are not intended to provide basic project funding. These awards are competitive. To be eligible, applicants must be registered full-time in a research (thesis) based program leading to a master's or doctoral degree from the University of Calgary. Graduate students applying for Thesis/Dissertation Research Grants must have their thesis/dissertation project approved by the department.

An application guide and the application form may be found at http://www.ucalgary.ca/research/tools/FPAforms.

The maximum amount of awards:

$1,000 for master's students

$1,500 for doctoral students

Further information is available through the Office of Research Services, Main Floor, 3512 33 St. NW, University Research Park, Calgary, Alberta. Telephone 403.220.6354.

XI. Conference Travel Grant

Graduate Student Travel Awards are made to assist graduate students in presenting the results of their thesis research at significant scientific or scholarly meetings, and equally, to provide students with an opportunity to gain experience in conference presentation and to meet colleagues in universities and industries who will be of importance to their future career.

Canadian and permanent residents will apply through the Faculty of Graduate Studies. Information and the application form may be found at http://grad.ucalgary.ca/awards.

International students will apply through the Office of Research Services Main Floor, 3512 33 St. NW, University Research Park Calgary, Alberta. Telephone: 403.220.6354.

XII. Awards in the Faculty of Graduate Studies

The Faculty of Graduate Studies Scholarship Committee awards the scholarships, bursaries and fellowships listed here.

Details of all awards administered by the Faculty of Graduate Studies can be found on the Graduate Awards website and in the searchable Graduate Award Database at http://grad.ucalgary.ca/awards.

Scholarships and fellowships are awarded on the basis of academic standing and demonstrated potential for advanced study and research. Normally, master's students in the first two years of program and doctoral students in the first four years of program are eligible to hold scholarships. If, in the opinion of the Graduate Scholarship Committee, a suitable candidate cannot be found, it reserves the right not to award any one or any number of scholarships in any year. Unless otherwise stated, awards are for one year only. The value and terms of the awards are subject to change without notice.

For off-campus tenure of awards, written requests, endorsed by the supervisor and Graduate Program Director, for off-campus tenure of awards should be submitted to the Dean of Graduate Studies.

Notification of award is sent electronically to successful candidates as soon as possible after the adjudication. All award winners are asked to accept or decline the offer through the Student Centre as soon as possible and no later than the deadline stated in the notification of award. All award payments begin in September unless otherwise stated in the terms of reference.

Should it become known that a student is unqualified for any reason, the University reserves the right to terminate the award(s) and funds already paid out must be returned.

The following payment schedule applies to all awards in the Faculty of Graduate Studies, unless the terms of reference of the award specify otherwise.

Amount of Award	Payment
Up to $2,500	One lump sum payment
$2,501 to $6,000	Paid in equal monthly installments over four months
$6,001 to $10,000	Paid in equal monthly installments over eight months
Awards over $10,000	Paid in equal monthly installments over twelve months

If a student has a successful final oral examination during the tenure of a scholarship, the award will be terminated at the end of the month in which the thesis is submitted to the Faculty of Graduate Studies, unless otherwise specified in the terms of reference of the award, or at the date of the termination of the award, whichever comes first.

No student can receive a total of more than the minimum Tri-Council scholarship value (currently $17,300 for master's and $20,000 for doctoral) from awards made in the Graduate Award Competition and Program Recommended Awards.

A student holding external awards with a total value equal to or greater than the minimum Tri-Council scholarship is not eligible for funding from the Graduate Award Competition and Program Recommended Awards.

A student who is awarded both a University of Calgary scholarship (or combination of awards) and an external award equal to or greater than the amount stated above must take up the external award at the earliest possible date and decline the University of Calgary scholarship(s) effective on that same date. In such a case, a student may include the offer of the forfeited award on a curriculum vitae.

Travel awards and funds awarded by programs from their Graduate Student Support allocation are not subject to this limit. Program recommended awards in a program with an approved fee differential are not subject to the limits described above and may be combined for an individual student, up to the minimum Tri-Council amount plus the difference between the tuition charged and regular base tuition.

Before accepting other forms of awards or remuneration, especially those involving service, students must check with the Graduate Scholarship Office, to ensure that acceptance of the award does not affect the holder's full-time registration status.

Students holding multiple year funding must submit a Scholarship Progress Report to the Faculty of Graduate Studies Scholarship Office not later than the end of the eleventh month of the registration year.

Adjudication Process	Method of Application
Izaak Walton Killam Pre-Doctoral Scholarships	Online application: http://grad.ucalgary.ca/awards. Supporting documents sent to the graduate program in which the student will be registered. Contact the Graduate Program Administrator for more information.
Open Doctoral Scholarship	Online application: http://grad.ucalgary.ca/awards. Supporting documents sent to the graduate program in which the student will be registered. Contact the Graduate Program Administrator for more information.
Recommended by Program	Variable, check the terms of reference http://grad.ucalgary.ca/awards with the Graduate Program Administrator for details.
Special Awards	Online application: http://grad.ucalgary.ca/awards. Supporting documents sent to the graduate program in which the student will be registered. Contact the Graduate Program Administrator for more information.

Bursary	Online application: http://grad.ucalgary.ca/awards. Supporting documents sent to the graduate program in which the student will be registered. Contact the Graduate Program Administrator for more information. NOTE: Applicants must show financial need commensurate with the value of the award.

Full terms of reference for each award are available through the Graduate Award Database, found at http://grad.ucalgary.ca/awards.

Graduate Scholarship Office

University of Calgary

MacKimmie Tower, Room 213

2500 University Drive NW

Calgary AB T2N 1N4

Important note: Scholarship payments cannot be made if the student has not registered for the upcoming academic year. Students who have been awarded scholarships and other awards should register as soon as possible to ensure timely payment.

Fees and Expenses

Fees

All graduate students pay both general and tuition fees each year. The tuition fees listed below are effective 1 May 2014 to 30 April 2015, and are subject to change without notice.

Tuition Fees

All students are assessed tuition fees. Tuition and general fees must be paid no later than the deadline date indicated for the annual registration month. For information on how to pay your fees, please visit the Enrolment Services website at http://www.ucalgary.ca/registrar/fees.

Thesis-based students: All students in the first year of a thesis-based degree (master's or doctoral) program are assessed program fees.

All students in a Doctor of Philosophy degree are assessed program fees until the term immediately following successful completion of a candidacy exam (Spring/Summer are counted as one term). In all subsequent years, students will be assessed continuing fees. All program and continuing fees are pro-rated over four terms: one-third in Fall, one-third in Winter, one-sixth in Spring and one-sixth in Summer as posted on the FGS website at: http://grad.ucalgary.ca/current/tuition.

Tuition	Canadian and Permanent Residents	International Students
Program Fee for PhD and Masters (except MBA)	$5,593.50	$12,695.88
MBA Thesis	$11,463.12	$25,293.24
Continuing Fees	$1,627.38	$3,693.48

Visiting Students who take courses are assessed general fees and tuition fees on a per course basis. Visiting students who are doing research but are not taking courses are assessed part-time general fees and a tuition fee equivalent to one graduate half course, unless participating in the Canadian Graduate Student Research Mobility Agreement. See A.3 Admission Categories for further information.

Course-based students: Students in most course-based master's programs pay tuition fees on a per course basis, in the first and in subsequent years. Students in course-based programs are assessed tuition fees by course, based on the level of the course. Some programs may charge additional program fees, refer to the Program-Specific Fee table. At the time of annual registration, each student is assessed a registration deposit equivalent to the fee for a graduate half-course, whether or not the student has registered in a course. This registration deposit is required to maintain registration in the student's program. The fee is credited to the first course the student takes in the registration year.

Please note that differential fees are assessed for MBA courses offered by the Haskayne School of Business, for undergraduate courses in the Faculty of Medicine and for undergraduate courses in the Faculty of Law. 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 normal program or continuing fees.

Course-based Tuition	Canadian/ Permanent Residents	International Students
Graduate Half-Course Fee (except MBA)	$714.78	$1,622.64
Graduate Full-Course Fee (except MBA)	$1,429.56	$3,245.28
MBA Half-Course Fee – Total without market modifier**	$1,302.33	$2,880.78
MBA Half-Course Fee – Total with market modifier**	$1,623.12	$2,880.78

Students who audit courses pay half the above course fees. For courses with a differential fee assessment, for example, MBA courses, a student who audits a course pays half the current course fee and half the current differential fee.

***The Government approved market modifier for the MBA program was implemented in Fall of 2011 with MBA students admitted in or after Fall 2011 being assessed the higher of the fees as noted above. Students who are enrolled in a program other than MBA taking MBA courses offered by the Haskayne School of Business will be assessed the MBA Half-Course fee differential with market modifier beginning Fall 2011 regardless of year in program.*

International Students: Students who are not Canadian citizens or permanent residents of Canada are required to pay a differential fee. The required additional fees must be paid at the same time as the regular tuition and general fees.

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. A change in a student's immigration status will not alter the student's fee assessment unless appropriate notification is submitted to Faculty of Graduate Studies on or before the deadline date for payment of fees for the current term.

Academic Staff, Postdoctoral 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 from Enrolment 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.

General Fees

All graduate students are assessed general fees, which are subject to change without notice, each year.

General fees are assessed yearly and on a per term basis. See the “General Fees” charts on page 22.

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.

Program-Specific Fees

In addition to the program-specific fees listed below, courses offered off-campus or through distance delivery methods may have tuition charges that differ from the normal tuition policy.

For additional information on fees and payment plans please see: http://grad.ucalgary.ca/current/tuition.

See the “Program-Specific Fees” chart on page 23.

For additional information on fees and payment plans please see: http://grad.ucalgary.ca/current/tuition.

Transfers between Course-based and Thesis-based Master’s Programs

A student transferring from a thesis-based route to a course-based route within a program will be assessed according to the tuition policy for course-based programs from the first term of registration in the course-based program.

General Fees Chart (Assessed Yearly)

	Full-Time	Part-Time	
Graduate Students' Association (GSA)	$146.52	$121.52	All students
Group Insurance	$11.00		Full-time students only
Extended Health Insurance/ Dental Insurance*	$283.52/$231.64		Each student is responsible for his/her 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 his/her name and UCID on it, is submitted to the GSA online (http://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.
Graduate Bursary Donation	$10.00	$10.00	Optional Must Opt-out in writing through the Faculty of Graduate Studies before the Fee Payment deadline of your Annual Registration by emailing graduate@ucalgary.ca.
TOTAL	$682.68	$131.52	

**Must Opt-out online, or by sending the appropriate form and documentation to the Graduate Students Association before the Fee Payment deadline of your Annual Registration.*

General Fees Assessed on a Per Term Basis

	Full-Time			Part-Time			
	Spring/ Summer* 2014	Fall 2014	Winter 2015	Spring/ Summer* 2015	Fall 2015	Winter 2016	
UPASS	$117.00	$120.00	$120.00				Full-time students only
Athletics		$24.65	$24.64		$24.65	$24.64	
Campus Recreation	$35.90	$35.91	$35.90	$35.90	$35.91	$35.90	
Student Services Fee	$150.00	$150.00	$150.00	$50.00	$50.00	$50.00	
TOTAL	$302.90	$330.56	$330.54	$85.90	$110.56	$110.54	

**Spring registrants will be charged the Spring/Summer amount in May; Summer registrants will be charged the Spring/ Summer amount in July; Fall and Winter registrants will be charged the Spring/Summer amount in May. All Spring/Summer services are available May 1st and expire on August 31st. For additional information on fees and payment plans please see: http://grad.ucalgary.ca/current/tuition.*

A student who has completed five or fewer half-courses or equivalent in a course-based route will be assessed program fees for one year from the date of transfer to a thesis route within the program. Continuing fees will be assessed for subsequent years. A student who has completed six or more half-courses or equivalent in a course-based route will be assessed continuing fees from the date of transfer into a thesis-based route within the program.

Courses Taken Extra-to-Program

A student, in a thesis-based or a course-based program, who wishes to take a course that is extra to his/her degree program, will be assessed extra fees per course in addition to the regular graduate tuition assessment.

Extra-to-program courses will not count toward the current graduate degree, but students should be aware that they will be included in all grade point average calculations on the transcript.

Registration in any course is subject to departmental approval.

Any appeals regarding fee assessment must be made to the Senior Director, Strategic Operations (graduate@ucalgary.ca) within six months of the fee assessment.

Fee Adjustments and Refunds

Students have until the posted deadline dates to make course additions and deletions without penalty. Please refer to the Academic Schedule for these dates.

Students who make course changes after the posted deadline will be assessed a $60.00 late fee for each Change of Course Registration form processed.

After the fee payment deadline, a student may withdraw from a course up to the last day of lectures, but no refund of any portion of the tuition fees will be made.

Course-based students who withdraw from program after the fee payment deadline for his/her annual registration year will have the registration deposit assessed whether or not the student has registered in a course for that term. If the student withdraws before the fee payment deadline for his/her annual registration year, the registration deposit for that year will be refunded. Course-based students who withdraw from a course before the posted deadline will receive a refund of the tuition fees only if he/she has already taken at least one half course within that registration year.

Thesis-based students who withdraw from individual courses will not have any changes made to their fee assessment for the year.

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.

General fees are not refunded following the fee payment deadline.

Payment and Collection of Fees

For information on how to pay your fees, please visit http://www.ucalgary.ca/registrar/fees.

Graduate students receiving funding through the University of Calgary may apply for a Payment Plan which arranges the fee payment to be spread over a period of time. For more information and eligibility, visit: http://grad.ucalgary.ca/current/tuition.

Students may pay their fees by online banking, cheque, money order, debit card or cash. Visit the Enrolment Services website for further information: http://www.ucalgary.ca/registrar/fees.

- If fees are paid from some form of student assistance, it is the responsibility of the student to advise the Fee Advisor and to produce a letter from the source of the assistance as confirmation. This must be done before the fee payment deadline to avoid penalty. For a list of other options for payment of fees, such as Sponsorship, or Scholarships or Bursaries, please visit: http://www.ucalgary.ca/registrar/fees/loans_otherfunding.
- If fees are to be paid from government student loans, Enrolment Services must certify the loan funding and remit any tuition owing to the University of Calgary on or before the term fee deadline in order for fees to be deferred for thirty days beyond the fee deadline. For more information please visit: http://www.ucalgary.ca/registrar/fees/loans_otherfunding.
- Students receiving disbursement of their student loan in one installment may have both Fall and Winter Term fees deducted from the single installment plus any other outstanding debts appearing on the student account. Students receiving disbursement of their loan in two installments will have Fall Term fees deducted

from the first installment and Winter Term fees deducted from the second installment.

If financial assistance is refused, fees must be paid by the term fee deadline, and may accrue late interest if not paid on time. It should be noted that students will not have their registration cancelled if financial assistance is refused and such students will be liable for all tuition and general fees owing for the term.

General fees must be paid no later than the term fee deadline indicated in the Academic Schedule for the student's annual registration term.

Program and continuing fees are collected as follows:

4/12 in Fall

4/12 in Winter

2/12 in Spring

2/12 in Summer

Delinquent Student Accounts

This policy applies to any student enrolled in a graduate program at the University of Calgary. A student who is having difficulty meeting his/her financial obligations is encouraged to consult with Enrolment Services, or the Wellness Centre.

Any student with an overdue debt to any unit of the University of Calgary, including any administrative department and the Graduate Students' Association, will not be allowed to register or receive transcripts of grades, and may be denied access to other University services until the outstanding account is settled in full, or in exceptional circumstances, an acceptable arrangement has been made.

Program-Specific Fees Chart

	Canadian/ Permanent Resident	International
Executive MBA (per 8 month year)	$28,160.00	$28,160.00
Executive MBA (Global Energy)	$106.050.00	$106.050.00
Graduate Programs in Education		
EdD (Distance Delivery)		
Year 1 - 4 (per 12 month year) Program Fee	$11,221.00	$14,540.55
Continuing fees from Year 5 onwards at registration anniversary	$4,041.00	$5,233.81
Certificate (Distance Delivery)		
Continuing fees from Year 2 onwards at registration anniversary	$1,212.00	$1,212.00
Diploma (Distance Delivery)		
Continuing fees from Year 3 onwards at registration anniversary	$1,212.00	$1,212.00
Master of Education (Distance Delivery)		
Continuing fees from Year 4 onwards at registration anniversary	$1,212.00	$1,212.00
Distance 1 half course (3 units)	$1,212.00	$1,212.00
Master of Education – Educational Psychology		
Continuing Fees from Year 4 onwards at anniversary	$1,164.00	
Master of Counselling (Distance Delivery)		
Annual Program Fee	$1,578.00	N/A
1 half course (3 units)	$1,212.00	N/A
Post-Bachelor's Diploma – Educational Psychology		
One-time fee on admit term	$488.00	
Master of Disability and Community Studies		
Community Rehabilitation per half course	$1,212.00	
Master of Architecture		
Foundation Year (Fall + Winter term)	$5,386.00	$12,225.60
Program Annual Fee	$7,218.00	$16,386.96
Master of Public Policy		
Program Full-Time Annual Fee	$20,492.88	$30,739.35
Program Part-Time Annual Fee	$10,246.44	$15,369.68
MPP Half-Course Fee (For students not in MPP program)	$1,615.98	$2,424.02
MSC in Sustainable Energy Development		
SEDV (per Course)	$1,785.00	$2,782.87
Faculty of Law		
Undergraduate (per half course)	$1,026.24	$3,410.82
Graduate Level (700+)	$714.78	$1,622.64
Environmental Design Continuing students registered pre-2009		
Program Fee (up to and including the fifth term of registration)	$2,797.00	$6,347.94
Continuing Fees – after the fifth term of registration	$814.00	$1,846.64

Academic Regulations

The general regulations apply to all graduate students. Regulations specific to particular degree programs are outlined in the individual program, found in the Program Descriptions section.

Notices of any changes in regulations are available from the program office. It is the student's responsibility to be familiar with the regulations and deadlines of the Faculty of Graduate Studies as stated herein, in the Faculty of Graduate Studies Handbook of Supervision and Examination, in the Graduate Student Appointments Schedule and, for thesis-based students, in the Thesis Guidelines (http://grad.ucalgary.ca/current/thesis).

Notes:

1. Students are advised to consult with their Graduate Program Director and Graduate Program Administrator regarding all aspects of their graduate programs.

2. All graduate students registering or re-registering must have contacted their supervisors and programs to discuss their programs of study within the first two weeks of their annual registration month.

3. All graduate courses listed in this Calendar are tentative and subject to the availability of instructors and student interest and in some instances are only offered in alternate years. Students should consult a current timetable before registering.

B.1 Registration

Each year of the program, no later than the deadline date for the annual registration month, each graduate student must register using the online Student Centre at MyUofC (https://my.ucalgary.ca). Students enrolled in thesis-based master's or doctoral programs will be considered full-time unless the program Calendar entry allows for part-time registration and specific approval is given to an individual student.

A complete guide to registration is available online at www.ucalgary.ca/registrar. Please visit this website for detailed system instructions as well as up-to-date course registration information.

Students should always consult with their graduate programs concerning course selection. Refer to the deadlines in the Academic Schedule at the beginning of this Calendar.

Thesis-based students complete an annual progress report in May each year. Course-based students should consult their program administrator for program requirements.

Students wishing to audit courses must consult with their graduate program and complete a Change of Course Registration form.

Following registration, it is the student's responsibility to verify course registration and fee assessment using the online Student Centre at MyUofC (https://my.ucalgary.ca). Questions regarding registration should be directed to the appropriate graduate program or the Faculty of Graduate Studies.

Students must maintain continuous registration and pay the appropriate fees until all degree requirements have been completed. A student who does not register by the appropriate deadline date will be withdrawn for failure to register. Information about readmission or reactivation appears in sections A.7 and A.8 of this Calendar.

Students in course-based programs must take a minimum of one half course per registration year. If a student in a course-based program does not take a minimum of one half course during a registration year, the student will be required to withdraw from program. It is expected that students in course-based programs will complete at least half of the required courses in the first two years of the program.

B.2 Transfer Credit

Students currently registered in a graduate degree program at the University of Calgary may receive credit for courses taken at other recognized institutions.

Program and Faculty of Graduate Studies' approval of these arrangements must be obtained before the courses begin.

Course-based programs: Transfer credit and any advanced credit received upon entrance to the program may not exceed one third of the program or two full-course equivalents, whichever is less.

In order to receive transfer credit, students must arrange for official transcripts showing the courses taken and grades achieved to be sent from the other institution to the Faculty of Graduate Studies. Courses for which transfer credit is being sought must be from a recognized institution and not have been used for any degree or diploma accreditation. They must be graded, graduate level courses, and the graded level of performance must be equivalent to a "B" grade or higher standing at the University of Calgary. Transfer credit is not granted for courses for which the graded level of performance is equivalent to "B-" or lower.

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B.3 Student Status

B.3.a) Research (Thesis)-Based Programs

Students registered in Master's Thesis and Doctoral Programs will be considered full-time unless their program formally offers a part-time option, by listing the option under their respective program entry in this calendar and approves the student for a part-time registration status.

It is understood that full-time students will normally work an average of 40 hours per week on program-related activities. Program-related activities include course work, systematic reading, laboratory or other research work related to the production of thesis proposals and/or defence of thesis and thesis proposals, field work, and study for candidacy examinations.

A graduate student may arrange to undertake a portion of the full-time requirement at another institution or in the field. Requests for permission to undertake such full-time external student research must be submitted well in advance to the Graduate Program Director for approval.

B.3.b) Course-Based Programs

B.3.b) i. Course Work Minima

Course-based graduate programs normally consist of at least six full-course equivalents taken at the graduate level. Audited courses do not count towards the fulfillment of program requirements.

B.3.b) ii. Full-time Students

Students will be considered full-time if they enrol in six or more half-course equivalents per annual registration.

B.3.b) iii. Part-time Students

In order to remain eligible for part-time status, students may enrol in no more than five half-course equivalents per annual registration.

Enrolment in additional courses will require a change in status to full-time enrolment. A change from part-time to full-time status will require program approval indicating satisfactory progress for full- time registration. It will also require that students pay the full-time general fees for the full year retroactive to their anniversary registration date.

Part-time enrolment status must be approved by the graduate program.

B.3.c) Change of Registration or Status

Course changes must be done through the online Student Centre at MyUofC and will be considered until the deadlines listed in the Academic Schedule of this Calendar.

Course changes after the posted deadline must be done on a Faculty of Graduate Studies Change of Course Registration form and a $60 late registration fee will be charged.

Registration to audit a course must be done on a Faculty of Graduate Studies Change of Course Registration form.

Changes to full-time/part-time status subsequent to the posted deadline must be submitted to the Faculty of Graduate Studies on a Change of Program or Status form. Forms are available on the Faculty of Graduate Studies website at: http://grad.ucalgary.ca/current/managing-my-program/registration.

B.3.d) Fees and Registration Status for GSA Executives

Students volunteering in an executive role with the Graduate Students' Association (GSA) shall be registered as a full time student and noted as having GSA responsibilities for the length of their term with the GSA.

During their term with the GSA, Executives are released from course, research, and teaching responsibilities in proportion to the expectations of their role with the GSA. Related funding may be deferred.

B.4 Program Transfers

Program transfers must take place before a student's third annual registration. Students should consult the supervisor and Graduate Program Director. Current time in program will be credited; course credit is given at the discretion of the program.

It is the student's responsibility to check the fee implications of the transfer.

Doctoral students who have transferred from another institution must pass a candidacy examination at the University of Calgary. An exception may be made if a candidacy examination equivalent to that at the University of Calgary has been successfully completed at another university.

B.5 Withdrawals

B.5.a) Course Withdrawal

A graduate student may withdraw online from a course in which he/she is registered via the online Student Centre at MyUofC, any time up to and including the deadline dates given in the Academic Schedule section of this Calendar. Students are not permitted to withdraw online more than once from the same course. Tuition fees will be refunded only if the student drops a course on or before the last day to drop courses for that term according to the academic schedule.

Note: All withdrawals after the posted deadline will be recorded on the student transcript.

B.5.b) Program Withdrawal

A student wishing to withdraw from the Faculty of Graduate Studies should complete a Graduate Withdrawal form, available at http://grad.ucalgary.ca/current/managing-my-program/withdrawal.

Fees for subsequent terms will be cancelled upon withdrawal notification.

A student in a course-based program who withdraws from a program without having taken a course during the year will not be refunded the tuition fee assessment of the equivalent of a graduate half course fee for the registration year unless the student withdraws from program before the fee payment deadline in his/her annual registration month.

When a student withdraws from the Faculty of Graduate Studies, it is the student's responsibility to ensure that all outstanding fees are paid.

After a required withdrawal from a graduate program at the University of Calgary, a student may not apply to another graduate program at the University of Calgary until a year after the final decision to require withdrawal has been made.

Students under academic review will not be permitted to withdraw during the review process.

B.6 Time Limits

Except where noted in the detailed program descriptions, students in thesis-based programs at the master's level must complete all degree requirements within four registration years.

Students in course-based master's programs must complete all degree requirements within six registration years.

It is expected that students completing a master's degree on a full-time basis will complete the degree within half the time allowed.

Students in doctoral programs must complete all degree requirements within six registration years, although it is expected that most candidates will complete requirements within four years.

B.6.a) Program Extensions

If a student needs longer than the regulation time allowed to complete a program, an extension to program may be granted on the basis of a recommendation from the Graduate Program Director that specifies the grounds for the extension and provides a detailed schedule for the completion of the program. Forms can be found on the Faculty of Graduate Studies website: http://grad.ucalgary.ca/current/managing-my-program/registration.

B.6.a) i. Program Extensions for GSA Executive Members

Graduate programs must take the service by GSA Executive members into consideration in assessing the student's progress in the annual progress report. On request, the Faculty of Graduate Studies will grant GSA Executive members extensions to time in program of up to one year per year in office.

During a students' tenure while volunteering in an Executive role with the GSA, said student Executive shall pay continuing fees regardless of time in program.

B.7 Leave of Absence

The Leave of Absence policy was created to assist graduate students who require a leave from their program. Such leaves are granted for reasons such as:

- Bereavement
- Care-giving responsibilities
- Maternity
- Medical requirements
- Military service
- Parental responsibilities
- Political service

Leaves of absence may be granted for a minimum of one term and up to one year. Such requested leaves must be approved by the student's home graduate program. Proper documentation must be supplied when applicable (e.g., medical leaves).

The home program may grant requests for leaves of absence for a minimum of one term up to a maximum of one year; any requests for renewal beyond a year must be approved by the Faculty of Graduate Studies. The total length of leave time with renewal must not exceed two (2) years for master's, graduate certificates and graduate diploma's students and three (3) years for doctoral students. During a leave of absence, students are not expected to work on their graduate programs. The time on leave will not count as time in program, i.e., a doctoral student who completes two years and then takes a one year leave of absence,

will still have four years to complete degree requirements.

Application for a leave of absence should be made in advance of the anticipated leave, or as soon as possible after the event necessitating the leave occurs. While it is often difficult to anticipate the need for a leave, it is helpful if the beginning and end of the leave coincide with the beginning and end dates of a term. All supporting documents (e.g., medical notes) need to be submitted along with the request form. Although programs/departments can grant leaves that do not exceed a total length of one year, all approved requests are required to be submitted to the Faculty of Graduate Studies for the purpose of record keeping.

During an approved leave of absence of up to one year, all Faculty of Graduate Studies (FGS) administered scholarship funding is deferred until the student returns to full-time registration. Students should be aware that supervisory and/or funding arrangements other than FGS-administered scholarships cannot in general be guaranteed on return from a leave. It is the student's responsibility to ensure that the proposed leave is compatible with the regulations of any granting agency from which funding would normally be received during the leave period, and that such agencies are informed of the proposed leave. Students on student loan programs should clarify the consequences that a leave will have on their repayment status; information about education financing in Alberta can be found at http://www.alis.gov.ab.ca/ec/fo/studentsfinance/students-finance.html. International students should consult the International Student Centre and immigration authorities regarding their immigration status during the proposed leave.

Information on fee assessments during an approved leave can be found at http://grad.ucalgary.ca/current/managing-my-program/leave.

B.7 a) Leave of Absence Procedure

The student should discuss the leave and its implications with the supervisor and any other appropriate people, e.g., members of the supervisory committee.

1. If it is a first-time request, and the total length of the leave is less than one year, submit the completed and signed *Application for Leave of Absence* form to the student's home graduate program for approval. (See http://grad.ucalgary.ca/current/managing-my-program/leave).
2. If the total length of the leave on the student's record is beyond a year, any renewals must be approved by the Faculty of Graduate Studies. The completed and signed *Application for Leave of Absence* form must be forwarded to the Faculty of Graduate Studies for Approval.

B.7 b) Maternity Leave

In the case of a maternity leave which interrupts funding, the Faculty of Graduate Studies will provide funding for up to 4 months at the rate of $1,000 per month for those months in which no other funding is being received. Thus, if a mother is receiving 1 month of maternity leave pay under the GSA Collective Agreement, the Faculty of Graduate Studies will pay for 3 months. Submission of a Leave of Absence form with maternity leave submitted as the reason for the leave, will trigger a review by the Faculty of Graduate Studies of the student's eligibility for these funds.

C. Combined and Interdisciplinary Degrees

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 approved students may be registered simultaneously in two programs. The requirements for both degrees must be completed before the student can graduate. The University of Calgary presently offers the following combined degree programs: JD/MBA, JD/MPP, MPP/MBA, MSW/MBA, MBT/MBA, MSc/MBA, PhD/MBA, MD/Master's degree, and MD/PhD. Information and application packages are available from the relevant graduate programs.

D. Interdisciplinary Degrees

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 of reference to the proposed home program, which will liaise with the proposed conjoint program.

E. Academic Standing

E.1 Distribution of Grades

Graduate Grading System for Course Final Grades

Grade	Grade Point Value	Graduate Description
A+	4.00	Outstanding
A	4.00	Excellent - superior performance showing comprehensive understanding of the subject matter.
A-	3.70	Very good performance
B+	3.30	Good performance
B	3.00	Satisfactory performance
B-	2.70	Minimum pass for students in the Faculty of Graduate Studies
C+	2.30	All grades below "B-" 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	

E.2 Student Standing

Normally, a student who displays poor academic standing will be required to withdraw from the program unless the program recommends otherwise, and said recommendation is approved by the Dean of Graduate Studies.

Poor academic standing is defined by any one, or combination, of the following conditions:

1. A student who receives a "C+" or lower in any one course.
2. Thesis-based students in the Faculty of Graduate Studies, who do not maintain a GPA within the last 12 months of at least 3.00 at the May reviewing period.
3. Course-based students in the Faculty of Graduate Studies who do not maintain an annual GPA of at least 3.00. The GPA for course-based students will be calculated each year at the time of their registration anniversary.

When any instance of poor academic standing arises, the Program must submit a notice informing the Dean of Graduate Studies of its recommendation. If the program permits the student to retake a failed course, the second grade will replace the initial grade in the calculation of the GPA, and both grades will appear on the transcript.

A student must have a cumulative GPA of at least 3.00 in order to graduate.

A graduate program may recommend to the Faculty of Graduate Studies that a student be required to withdraw for lack of satisfactory progress in either course work or research.

The Faculty of Graduate Studies, after consultation with the graduate program and/or supervisory committee concerned, may initiate the withdrawal of a student.

Final grades may be accessed through the online Student Centre at MyUofC (https://my.ucalgary.ca).

F. Student Progress

Annual Progress Report

Each thesis-based graduate student must file an annual progress report with his or her graduate program during the month of May every year. Delinquent students may be denied registration.

The annual progress report is accessed from the online Student Centre at MyUofC (https://my.ucalgary.ca).

G. Examinations

Please refer to the main University of Calgary Calendar for general examination regulations.

In addition to the University of Calgary examination regulations, each student must satisfy all examination requirements, as noted in the Faculty of Graduate Studies Handbook of Supervision and Examination section of this Calendar. The handbooks are also available on the Graduate Studies website at http://grad.ucalgary.ca/current/managing-my-program/examinations.

H. Language

Except in certain courses in the language departments, the language of instruction at the University of Calgary is English.

Theses must be submitted in English, except in the German Graduate Program, the Department of French, Italian and Spanish and in the French program in the Werklund School of Education.

There is no Faculty of Graduate Studies requirement for proficiency in any language other than English. Individual graduate programs, however, may have their own requirements as set out in the Programs of Study section in this Calendar.

I. Supervisors/Advisors

I.1 Thesis-based Programs

All students in thesis-based programs leading to graduate degrees are required to have a supervisor or an advisor. Students arriving on campus may be assigned an interim advisor until they have had an opportunity to become familiar with the Faculty members and their research interests, but must have a permanent supervisor or advisor no later than one year after initial registration.

These students must have an approved supervisor prior to their second annual registration date. No student will be permitted a second annual registration without having an approved supervisor. See Faculty of Graduate Studies Handbook of Supervision and Examination in this calendar.

I.2 Course-based Programs

Although the Faculty of Graduate Studies does not require the formal appointment of a Supervisor in course-based programs, a Faculty Advisor or a Supervisor may be appointed by the program. Please see individual program listings for details.

I.3 Conflict of Interest

There is potential for conflict of interest when a student's relationship with a supervisor, or with others who are in a position to influence academic decisions, is more than a strictly academic one. There may also be a conflict of interest with implications for a student's program when a student is at the same time a Board appointee or in a support staff position. In order to avoid conflict of interest and protect privacy, graduate students are not permitted to evaluate other graduate students who are registered in the same program for the same degree.

IN ANY CASE WHERE CONFLICT OF INTEREST IS POSSIBLE, THE DEAN OF GRADUATE STUDIES MUST BE NOTIFIED IN WRITING.

Specific measures may be taken to address specific situations; for instance, there may be special requirements for the composition and procedures of examining committees.

Further details regarding the Graduate Studies Policy on Conflict of Interest can be found at: http://grad.ucalgary.ca/current/policies-forms/conflict-interest.

J. Research and Theses

J.1 Research and Ethics Approval

All research involving human subjects, animals or biohazards must receive ethics clearance from the appropriate University of Calgary Research Ethics Board. There are two Conjoint Research Ethics Boards, the Conjoint Health Research Ethics Board for the Faculties of Kinesiology, Medicine and Nursing, and the Conjoint Faculties Research Ethics Board for all other Faculties.

The appropriate department or Faculty ethics review committee first reviews research proposals involving human subjects. After the department or Faculty ethics review committee is satisfied, the proposal is sent to the appropriate Conjoint Research Ethics Board with a recommendation for approval.

Graduate students should consult with their departments or graduate programs, and review the Research Ethics site at http://www.ucalgary.ca/research/ethics for information about the ethics approval process.

J.2 Theses

Complete information on the formatting, printing, submission and distribution of the thesis is contained in the Faculty of Graduate Studies Thesis Guidelines, available at http://grad.ucalgary.ca/current/thesis.

Once all the examiners have signed the approval pages, the student must submit the signed original approval page, a Departmental Clearance for Convocation for Thesis Students form that is appropriately signed, a Thesis Submission Cover Sheet and a Library and Archives Canada Non-Exclusive Licence to Reproduce Theses form, to the Faculty of Graduate Studies. The thesis must be submitted electronically to the University of Calgary Theses Repository, the Vault: http://theses.ucalgary.ca/. All theses will be harvested by the Library and Archives Canada.

Note: Copies of the thesis approval or ethics approval pages with signatures should not be included in the thesis. They need to be submitted as supporting documents.

If required by the program, the student is responsible for the costs of printing and binding the required number of copies of the thesis, and for having the required number of copies bound.

Note: Effective September 28, 2012, all theses must be submitted electronically to the University of Calgary Theses Repository, the Vault: http://theses.ucalgary.ca/.

Students must continue to pay the appropriate tuition and general fees until all degree requirements, including the submission of the thesis to the Faculty of Graduate Studies, have been completed.

J.3 Copyediting

Students may hire an editor to copyedit their theses, unless their program's calendar entry prohibits copyediting. The student, supervisor and editor must abide by the following regulations:

1. Prior to hiring a copy editor, permission from the supervisor(s) must be obtained. An agreement outlining the permitted scope of editing must be signed by the student and the supervisor(s).

2. A disclosure statement is required in the thesis (e.g., a sentence in the preface or acknowledgment stating that the thesis has been professionally edited).

3. Under no circumstances should the copyediting alter the content, structure or contribution of the thesis.

Students must check their program's regulations in the Faculty of Graduate Studies Calendar to see if copyediting is permitted before hiring a copy editor.

K. Graduation

The various deadline dates pertaining to Convocation are set out in the Academic Schedule. Students are strongly advised to acquaint themselves with these dates.

K.1 Application for Graduation

All students who expect to have their degrees or diplomas conferred must complete an online Application for Graduation, available through the online Student Centre at MyUofC (https://my.ucalgary.ca). Students who do not complete an Application for Graduation before the posted deadlines will not be cleared to graduate. The deadlines for degree conferral are December 31 for Winter, February 1 for Spring (May and June) and August 15 for Fall.

At the time of the application, students will also be asked if they wish to attend the Convocation Ceremony (http://www.ucalgary.ca/registrar/grad).

K.2 Convocation Requirements

In order to be cleared to graduate, thesis-based students must successfully pass a final thesis oral examination, submit an electronic copy of the thesis to the University of Calgary Theses Repository, the Vault: http://theses.ucalgary.ca/, a University of Calgary Partial Copyright Licence, and a Department Recommendation for Convocation Clearance form to the Faculty of Graduate Studies, and fulfill graduate program requirements for the submission of thesis copies.

If a student has not been cleared to graduate before the student's next annual registration date, the student must register. If the student does not register, the student will be withdrawn for failure to register. When the student subsequently applies for re-admission to graduate, the student will

be assessed fees retroactive to the date of withdrawal.

L. Appeals

The University recognizes that there are instances when a student may wish to challenge University decisions about grades or academic policy. When a dispute arises, every effort should be made to resolve the issues informally rather than resort to a formal appeal. If, however, a formal appeal is necessary, the student should follow the Appeals Procedures that are described below.

Appeals for reappraisal of graded term work, reappraisal of final grades, and other academic appeals are pursued through the teaching Faculty (the Faculty offering the course).

The Faculty of Graduate Studies Appeals Committee hears appeals against rulings by the Dean of Graduate Studies, or designate.

The following general guidelines define the routes of appeal in different areas.

General Principles

1. Reappraisals of term and final grades occur at the department/Faculty level that originated those decisions, e.g., within the teaching Faculty.
2. Appeals of grade reappraisals and other such academic decisions will be first handled at the level of appeal closest to the level at which the decision was made.
3. Appeals against Faculty of Graduate Studies decisions or regulations will be handled through the Faculty of Graduate Studies.
4. Students must begin the reappraisal/appeal process at the appropriate level and proceed through successive levels of appeal in order, and with no omissions.
5. At every level, students should attempt, to the utmost of their ability, to present their arguments as effectively and as fully as possible. Mere dissatisfaction with a decision is not sufficient grounds for the appeal of a grade or other academic decision.
6. The General Faculties Council's Student Academic Appeals Committee will hear an appeal only if there is a credible allegation of: (a) bias, or (b) unfair procedures at a lower level of appeal, or (c) substantial new evidence which could not have been presented at an earlier stage.
7. Students may obtain help in understanding the appeals process and in writing appeal letters from the Graduate Students' Association.

L.1 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 paper re-graded as follows. The student shall discuss the work with the instructor within fifteen days of being notified about the mark or of the item's return to the class. If not satisfied, the student shall immediately take the matter to the head of the department offering the course who will arrange for a reassessment of the work within the next fifteen days. Students in faculties without a departmental structure should take the matter to the Dean or the appropriate associate/assistant Dean of the Faculty offering the course. The result of that reassessment should be given to the student in writing.

The reappraisal of term work may cause the grade to be raised, lowered or to remain the same. There is no limit to the number of times that a student may request a reappraisal of term work.

L.1.a) Teaching Faculty Appeals Committee

Reappraisal of term work is generally settled at the departmental level. If the student is not satisfied with the decision and wishes to appeal, the student shall address a letter of appeal to the Dean of the Faculty offering the course within fifteen days of the unfavourable decision. In the letter, the student must clearly and fully state the decision being appealed, the grounds for appeal and the remedies being sought, along with any special circumstances that warrant an appeal of the reappraisal. The student should include as much written documentation as possible.

At this stage the Dean of the Faculty offering the course, at his or her discretion, may attempt to resolve the situation without proceeding to the Faculty Appeals Committee. If the matter is not resolved to the student's satisfaction, the appeal letter will be sent to the Faculty Appeals Committee.

The teaching Faculty Appeals Committee will not hear the appeal if the appeal letter does not detail the decision being appealed, grounds for appeal and outcome sought by the student, or if the chair of the Faculty Appeals Committee decides that sufficient grounds do not exist. If the appeal is to be heard and if the student has not already received a copy, the student is advised to request from the Dean's office, a copy of the principles and procedures that govern the Faculty Appeals Committee for that Faculty. These procedures will detail the composition of the committee, the right of the student to have an advocate at the hearing, how the hearing will be conducted, and other information.

The Faculty Appeals Committee will report its decision to uphold or deny the appeal in writing to the Dean of the Faculty, the Registrar and the appellant as quickly as possible.

L.1.b) Reappraisal of a Final Grade

In the reappraisal of a final grade, the only elements that will be considered are the grading of the final examination, if any, together with a recalculation of the weighted components that make up the final mark. An exception may occur when an instructor evaluates a piece of graded term work or other component at the end of the session; that grade may also be considered in a reappraisal of final grade.

A student wishing a reappraisal of an individual final grade should first attempt to examine the final examination at the department or Faculty office. Then the student shall obtain a Request for Reappraisal of Final Grade form from the Registrar's Office. On that form the student is required to indicate exactly what error was made in marking the examination and/or in computing the final grade and where the error can be found. The form will not be processed and the reappraisal will not take place unless the student provides a detailed rationale that outlines where and for what reason an error is suspected.

Students wishing a reappraisal of a final grade (excluding Law courses) must submit their request by the following dates: Fall Session - March 1, Winter Session - June 30, Spring Session - August 15, Summer Session - October 15.

The reappraisal form shall be sent/brought to the Registrar who shall 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 staff. Normally, the department/Faculty will respond to a Request for Reappraisal of Final Grade within thirty days of its initiation. After the reappraisal is completed, the department shall return the form to the Registrar who shall inform the student in writing of the result of any request for reappraisal.

Students should be aware that the grade being reappraised may be raised, lowered or may remain the same. A student may request a reappraisal of final grade only twice in one academic year (July 1 - June 30).

Procedures for appealing a final grade reappraisal beyond the departmental level are detailed above in Appeals - Faculty Appeals Committee, and are the same for a final grade as for a piece of graded term work.

L.2 Appeals Against Faculty of Graduate Studies Rulings

Faculty of Graduate Studies Appeals Committee

If a student wishes to appeal a Faculty of Graduate Studies ruling (e.g., the requirement to withdraw for academic reasons, the denial of continued registration, the denial of the right to graduate, specific requirements by the Faculty for the completion of a degree/course of study), the student shall address a letter of appeal to the Chair of the Graduate Studies Appeals Committee within fifteen days of the unfavourable decision.

In the letter of appeal, the student must clearly and fully state the ruling/decision being appealed, the grounds for appeal and the remedies being sought, together with all supporting evidence or documentation, if any. Mere dissatisfaction with a ruling is not sufficient grounds for an appeal.

In the process of deciding to initiate an appeal, the student may seek the assistance of the Graduate Students' Association.

If the appeal letter does not detail the decision being appealed, the grounds for appeal

and the outcome sought by the student, or if the Chair of the Faculty Appeals Committee decides that sufficient grounds do not exist, the appeal will not be heard. If the appeal is to be heard and the student has not already received a copy, the student is advised to request from the Dean's office, a copy of the principles and procedures that govern the Faculty Appeals Committee. These procedures will detail the composition of the committee, the right of the student to have an advocate at the hearing, how the hearing will be conducted, and other information. This information can be found on the Faculty of Graduate Studies website: http://grad.ucalgary.ca/current/managing-my-program/appeal.

The Faculty Appeals Committee shall report, in writing, its decision to uphold or deny the appeal, to the Dean of Graduate Studies and the appellant as quickly as possible.

Please see the Faculty of Graduate Studies website for additional details on the procedures for appeals to the Faculty of Graduate Studies Appeals Committee: http://grad.ucalgary.ca/current/managing-my-program/appeal.

L.3 General Faculties Council's Student Academic Appeals Committee

Procedures for appealing a final grade reappraisal beyond the Faculty Appeals Committee level are detailed below in Appeals - General Faculties Council's Student Academic Appeals Committee, and are the same for a final grade as for a piece of graded term work.

L.3.a) General Faculties Council's Student Academic Appeals Committee

This committee hears appeals of decisions made by Faculty Appeals Committees on matters of academic concern to students. The General Faculties Council's Committee will hear an appeal only if there is reason to believe that the Faculty Appeals Committee showed bias, unfair procedures, or if there is substantial new evidence that could not have been presented to a Faculty Appeals Committee. Grades obtained in courses completed by the student in the appeals process will not be considered as new evidence. Before the General Faculties Council's Committee will accept an appeal, the chair of that committee must be satisfied that departmental and Faculty appeals procedures have been fully utilized.

Students wishing to make an appeal to the Student Academic Appeals Committee must do so within fifteen days of the unfavourable decision from the Faculty Appeals Committee. A letter of appeal should be sent to the General Faculties Council's Committee (Administration Building, Room 127), and must indicate the decision being appealed, the grounds for appeal (i.e., alleged bias, alleged unfair procedures, or substantial new information), and the remedies being sought by the student, together with all supporting documentation. The appeal letter should also state the levels of appeal that have already been utilized.

The General Faculties Council's Committee will not hear the appeal if the chair decides that sufficient grounds do not exist.

A student whose appeal is to be heard by the General Faculties Council's Committee is entitled to obtain from the Secretary to General Faculties Council the principles and procedures governing the General Faculties Council's Committee. These procedures will detail the composition of the committee, the right of the student to have an advocate, how the hearing will be conducted and other information.

The committee will normally give fifteen days written notice of a hearing to the appellant and to the head of the academic unit against whose office the appeal is being made. Normally, the General Faculties Council's Committee will hear an appeal within thirty days of its acceptance. The chair of the General Faculties Council's Committee will convey the committee's findings in writing to the appellant, the respondent, the Secretary to General Faculties Council and the Registrar.

For more specific information and other principles governing student academic appeals, the Secretary to General Faculties Council should be consulted.

L.4 Academic Appeals

1. The Appeals Process - In the case of appeal of a grade, the appeal should be to the Appeals Committee of that Faculty offering the course. A student who is placed on probation, suspended, or expelled from the Faculty of Graduate Studies, may appeal that decision, or any other Faculty of Graduate Studies ruling, to the Faculty of Graduate Studies Appeals Committee. The appeal, which must be initiated within fifteen days of the receipt of the letter from the Dean or his/her delegate, shall be in writing, addressed to the chairperson of the appropriate committee, and shall state specifically (a) the decision which is being appealed, (b) the grounds for the appeal, (c) the remedy being sought.
2. Sufficient Grounds - A student must satisfy the Appeals Committee that there are sufficient grounds for appeal. The principles applicable to an appeal to a Faculty Committee are those of fairness as set down in relation to the Student Academic Appeals Committee of General Faculties Council that are filed with the Secretary to General Faculties Council. It is recognized that the specific procedures used to attain fairness may vary from one Faculty to another.
3. Appeal from a Faculty Appeals Committee - Where a student is unsuccessful in an appeal to a Faculty Appeals Committee, he/she may appeal that decision to the Student Academic Appeals Committee of General Faculties Council, subject to the principles and procedures of the General Faculties Council's Committee as approved by General Faculties Council and filed with the Secretary to General Faculties Council.
4. Notification to the Registrar - When an appeal has been lodged by a student, the Registrar shall be notified by the chairperson of the Faculty Appeals Committee or General Faculties Council's Committee, as the case may be, of that fact, and of the disposition of the case by that body.
5. The Position of a Student Launching an Appeal Against Suspension or Expulsion - Where a student's appeal against suspension or expulsion is accepted for hearing and is under consideration by an appeals committee, a student shall be granted tentative registration and permitted to attend classes. If the appeal succeeds, the student will be officially registered and assessed fees retroactively to the beginning of the session.
6. The Position of a Student Whose Appeal Against Suspension or Expulsion is Unsuccessful - In cases in which the student has been allowed to attend classes pending the disposition of an appeal and the appeal fails, the original date of the suspension or expulsion stands.
7. The Effect on a Student's Permanent Record - Where a student has been suspended, expelled or placed on disciplinary probation and does not launch an appeal within fifteen days, or his/her appeal is unsuccessful, the notation "suspended or expelled from or placed on disciplinary probation by the Faculty of Graduate Studies, for academic misconduct" will be entered on the student's permanent record upon receipt of such notice by the Registrar from the Dean of the Faculty.

Where a student is suspended or expelled prior to the completion of the session, the symbols RW (required to withdraw) will be entered in the grade column on the student's record in the courses in which he or she was registered for that session except for the course(s) in which an "F" grade has been given as a penalty. Where a student is suspended or expelled after the completion of a session the final grade will be entered on the student's record in the courses in which he or she was registered for that session except for the course(s) in which an "F" grade has been given as a penalty.

A student's record will be cleared of the notation "placed on disciplinary probation for academic misconduct" when the probationary period has been completed, or upon completion of a degree program, or after three years have elapsed, whichever comes first. A student's record will be cleared of the notation "suspended for academic misconduct" at the time of readmission to the same Faculty, upon readmission to and completion of a degree program in another Faculty, or after three years have elapsed, whichever comes first. At the time the record is cleared of the notation, the "RW" symbols will be changed to "W", but any "F" grades,

as given because of plagiarism, cheating or other academic misconduct, will remain "Fs." A student's record will not be cleared of the notation "expelled for academic misconduct." These regulations also apply to students on probation, suspension or expulsion for non-academic misconduct (see below).

L.5 Further Information About Other Appeals and Petitions to the University

It is expected that the procedures outlined above will be sufficient to deal with any student appeal. Students should note, however, that the current University Act, Section 45(2) states: "Subsection (1) does not take away or impair the right of any student or group of students to petition any of the governing bodies of the University in respect of any matter, but such petition shall be in writing and shall be transmitted to the governing body through the president of the university."

The Board of Governors has approved principles and guidelines to guide its Student Discipline Appeal Committee in considering student petitions. However, the Board of Governors recognizes that the General Faculties Council is the final body of appeal with respect to academic matters including, but not limited to, grades, examinations, refusal of continued registration, or the requirement to withdraw from the University for academic reasons. The Student Discipline Appeal Committee will not attempt to evaluate the merits of any course or program grade, or of any other decision relating to an academic matter. The Board of Governors and the Student Discipline Appeal Committee of the Board of Governors do not have any jurisdiction to determine petitions received from students pursuant to section 26(1) and 31(1) of the Post-Secondary Learning Act, where the petitions are in relation to courses offered and marked at an educational institution other than the University of Calgary, notwithstanding that the course may be credited toward a University of Calgary degree program.

A petition to the Board of Governors must be forwarded in writing to the University Secretary. The nature of the petition and the remedies sought by the petitioner(s) shall be clearly stated in a letter, and all supporting evidence or background materials included. If the Student Discipline Appeal Committee finds that the case has merit, the matter may be returned directly to the appropriate jurisdiction for a rehearing. In the case of substantially academic matters, referral will be to General Faculties Council for its determination as to the appropriate level of jurisdiction. The Student Discipline Appeal Committee may allow a hearing if it accepts jurisdiction in the matter and deems the facts to warrant such a hearing.

The Student Discipline Appeal Committee will not hear a petition for any remedy that may be obtained through existing appeal procedures within the University before those appeal procedures have been fully utilized, nor will academic decisions be set aside on the basis of minor irregularities in procedure.

In the case of a petition challenging a decision of the University body on procedural grounds such as breaches of natural justice or fairness, the Student Discipline Appeal Committee will normally refer the issue back to the level of appropriate jurisdiction for a rehearing and new determination of the question. In the case of a petition challenging a decision in which the student is denied permission to register, the student shall not be registered while the petition is before the Board.

For more specific information on the principles and procedures governing student petitions to the Board of Governors, the Secretary to the Board of Governors should be consulted.

L.6 Continued Registration While Under Appeal

Students who appeal academic decisions to the teaching Faculty Appeals Committee or the General Faculties Council's Student Academic Appeals Committee have the right to continue their registration and to attend classes during the appeal process. The student is required to pay all fees. If the appeal fails, the student's registration will be cancelled, regardless of the date, and all fees refunded in full. Students petitioning the Board of Governors are not permitted to register while under petition.

M. Statement of Intellectual Honesty

Intellectual honesty is the cornerstone of the development and acquisition of knowledge. Knowledge is cumulative and advances are predicated on the contributions of others. In the normal course of scholarship these contributions are apprehended, critically evaluated, and form 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 his/her 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.

N. Statement on Principles of Conduct

N.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.

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

The University seeks to create and maintain a positive and productive learning and working environment, that is, an environment in which there is:

- Respect for the dignity of all persons
- Fair and equitable treatment of individuals in our diverse community
- Personal integrity and trustworthiness
- Respect for academic freedom
- Respect for personal and University property

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:

1. that a positive and productive learning and working environment is created and maintained
2. that conflicts and concerns are addressed in a positive, timely, reasonable, and effective manner
3. that persons within their jurisdiction are informed of their rights and responsibilities with respect to conduct

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

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.

The University undertakes to ensure that the protection afforded by the principles of

natural justice is extended to all members of the University community.

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.)

O. Student Misconduct

A single offence of cheating, plagiarism, or other academic misconduct, on academic work may lead to disciplinary probation or a student's suspension or expulsion from the Faculty if it is determined that the offence warrants such action.

O.1 Plagiarism/Cheating/Other Academic Misconduct

O.1.a) 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 him or her 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.

O.1.b) Penalties

1. Failing Grade - A student may be given a failing grade in either an exercise or course in which that student is found guilty of plagiarism, cheating or other academic misconduct. Except in circumstances in which leniency is warranted, this penalty will only be applied in conjunction with one or other of the other penalties mentioned in this section. In situations in which a student is registered in a Faculty other than that in which the course is given, this is the only penalty that shall be applied by the host Faculty. A student may not avoid a failing grade by withdrawing from the course.
2. Disciplinary Probation - When a student is placed on disciplinary probation, he or she is entitled to proceed with a degree or other academic program, but only on condition that the registration will be forfeited and the student suspended or expelled, if he or she is found guilty of a further academic offence. A student who is placed on disciplinary probation is eligible to continue in the Faculty in the normal way after the satisfactory completion of his or her probationary period. This penalty shall be applied by the Faculty in which the student is registered at the time of the offence.
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 his/her eligibility for readmission. This penalty shall be applied by the Faculty in which the student is registered at the time of the offence.
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.
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.

O.1.b) i. Penalties and Their Application

1. In cases in which the Dean and/or Faculty is satisfied that 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.
2. In cases in which the Dean and/or Faculty is satisfied that an offence has been committed, but doubt is left as to the existence of a clear intention to deceive or otherwise commit an academic offence, the normal penalty will be probation.
3. In cases where a student is found guilty of more than a single offence, the normal penalty will be expulsion from the Faculty, and in the most serious cases, expulsion from the University.

O.2 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 Drivers 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 his/her delegate.

A student who is not able to provide acceptable proof of identity may be permitted to continue the examination provided that he or she undertakes 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 his/her 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 his/her course or courses to the Dean of his/her Faculty, or his/her delegate, and to his/her 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 his/her 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, his/her delegate, the appropriate Faculty disciplinary body, the Faculty Appeals Committee and the General Faculties Council's Committee to Hear and Determine Student Academic Appeals.

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 his/her 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 He/She is Registered at the Time of the Offence - In cases in which a student registered in the Faculty of Graduate Studies is accused of plagiarism, cheating or other academic misconduct, the Dean of Graduate Studies shall be advised of the incident, its circumstances, and its disposition within the host Faculty, and where appropriate shall take disciplinary action within his/her 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 his/her delegate.

6. The Disposition of Cases by the Faculty of Graduate Studies – When a graduate student is found guilty of plagiarism, cheating or other academic misconduct by the teaching Faculty, the student may appeal an unfavourable decision to the General Faculties Council's Committee to Hear and Determine Student Academic Appeals. When the student accepts the ruling of an appeals committee, or when all avenues of appeal of academic misconduct are exhausted, the Dean of Graduate Studies will make a ruling on the student's registration in the Faculty of Graduate Studies. The Dean of Graduate Studies or his/her delegate shall place on probation, suspend, or expel from the Faculty of Graduate Studies. The probation, suspension, withdrawal or expulsion will be confirmed in writing to the student, 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 by a copy of the letter. On 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 Appeals below.

P. 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 his/her 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, impersonation and conspiracy (impersonating another student by agreement and writing his/her 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.

Q. Non-Academic Misconduct Policy

Purpose

1. The goal of this policy is to provide a clear and transparent process for managing and addressing non-academic misconduct and to do so in a manner that is centralized and follows the principles of natural justice.

The primary objective is to ensure that appropriate Student behaviour is maintained in a diverse educational environment. For more information, visit http://ucalgary.ca/conduct.

R. 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.

R.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.

R.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 that are applicable to those disciplines and activities that 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. In the Faculty of Graduate Studies, scholarly integrity applies to any scholarly activity undertaken in or identified with the University of Calgary.

S. Sexual Harassment

The University of Calgary recognizes its moral and legal responsibilities to protect its students, staff and Faculty against sexual harassment and has established a Sexual Harassment Policy and related procedures to deal with this serious issue.

S.1 Definition

The simple definition of sexual harassment is "unwanted sexual attention." Any type of conduct that emphasizes the sexuality, gender or sexual orientation of an individual and creates for them an offensive, intimidating or hostile learning, working or living environment is sexual harassment. The harassment is more serious if submission to or acceptance of such behaviours is made either an implicit or explicit condition of an individual's employment or academic status.

Sexual harassment may take various forms. It includes but is not limited to the following: verbal abuse or threats of a sexual nature; unwelcome remarks, jokes, innuendos or taunting about a person's sex (often linked with references to the body, attire, age or marital status of the individual); the display of pornographic, sexually offensive or derogatory pictures; unnecessary and unwelcome physical conduct such as touching, patting, pinching; unwelcome sexual invitations or requests, usually of a persistent nature; sexual assault. Gender harassment or sexism may also be one form of sexual harassment.

Sexual harassment has both males and females as its victims and perpetrators. It can occur between members of the opposite sex or of the same sex. Although sexual harassment often occurs where there is a real or perceived power imbalance, it can also occur amongst peers.

S.2 Advice and Information

Individuals with a concern regarding a possible occurrence of sexual harassment

have the following mutually non-exclusive alternatives to assist them: (a) If possible, immediate personal strategies should be utilized such as informing the alleged harasser (either in person or by letter) that such behaviour is offensive and requesting an end to the perceived harassment. Frequently, this assertive stance curtails further incidents. (b) If this is not possible or productive, someone who is empowered to investigate allegations of sexual harassment should be contacted: the Sexual Harassment Advisor at 403.220.4086 or the appropriate Dean or administrative equivalent who supervises the alleged harasser. In cases where physical assault has occurred, the complaint may also be lodged with Calgary Communities Against Sexual Abuse (CCASA) at 403.237.5888 or the Calgary Police at 403.266.1234. Whatever routes are taken, every effort should be made to document precisely what has transpired.

Complaints of sexual harassment do not have to enter a formal investigative and disciplinary procedure simply because an individual has chosen to speak to the Sexual Harassment Advisor. Individuals are free to simply make a report of the incident to the Advisor. These reports are useful for statistical purposes and assist in directing educational initiatives. Individuals wishing to pursue the matter can file a written complaint with the Advisor who will then attempt to affect an "informal resolution" to the problem. Informal resolutions usually involve the Advisor consulting with the two parties either individually or together. The end result must be satisfactory to all parties. If an informal resolution fails or is inappropriate, a formal hearing may be held on any written complaint of sexual harassment where there is no other negotiated or legislated procedure to pursue a complaint against the alleged offender.

Due to the nature of the issue of sexual harassment, the policy and procedures are regularly revised and updated. Persons seeking information on this issue are therefore encouraged to contact the Sexual Harassment Advisor to obtain a copy of the latest official document. The Advisor is located on the second floor of the Math Sciences Building, Room 263 and may be reached by telephone at 403.220.4086.

Additional information is available on the web at http://www.ucalgary.ca/sexualharassment/.

T. Policy of Support for Persons with Life Threatening Communicable Illnesses

The University recognizes that persons suffering from life threatening communicable illnesses have a right and a responsibility to continue in their regular work or academic pursuits as long as they are capable of carrying out the duties and obligations associated with those pursuits; and recognizes that individuals who contract a life threatening communicable illness, including AIDS, are entitled to continue in their employment or studies provided that the health, safety and well being of others are not endangered.

The University is guided in the application of this policy by current research findings and medical advice relevant to the individual case.

All members of the University community are urged to recognize the responsibility they have for ensuring that those with such illnesses are treated in a caring and supportive manner.

U. Vacation

Graduate students are entitled to two weeks of annual vacation. The two weeks of vacation do not include statutory holidays or days designated by the University as closed.

U.1 Vacation Time and Scholarships

Graduate students holding twelve month scholarships are entitled to two weeks of vacation during the twelve month period. The two weeks of vacation do not interrupt the payment of the scholarship.

U.2 Vacation Time and Employment

In keeping with the Alberta Employment Standards Code and the Alberta Employment Standards Regulations, graduate students employed by the university or by a member of the academic staff at the university, are entitled to two weeks of vacation time after twelve months of employment or prior to competing a full twelve months of employment if the employer agrees. In the case of graduate student employees who have already received payment in lieu of vacation (for example, as a graduate assistant/teaching/non-teaching), the time off will be without pay.

Handbook of Supervision and Examination

Preamble

This handbook contains the rules, guidelines and procedures of the Faculty of Graduate Studies that pertain to the administration of graduate programs and to the appointment of graduate supervisors. While the rules are stated in fixed or absolute terms, it is intended that they be administered with some degree of flexibility and, to that end, the Dean of Graduate Studies and his/her designates are empowered to grant exceptions, extensions and variances, upon written request and explanation. Requests, whether from students or faculty members, should be made over the signature of the Graduate Coordinator of the program concerned.

The Head of a Department, Director of an interdisciplinary program or, in the case of non-departmentalized faculties, the Dean of the Faculty, is responsible for graduate programs. However, this responsibility is normally delegated to a Graduate Coordinator. In this document, for the sake of clarity in describing common practice, the Graduate Coordinator is referred to as the person responsible for the graduate program.

Please note that in this document “the Dean” refers to the Dean of Graduate Studies unless otherwise noted. The Handbook of Supervision and Examination is published as part of the Graduate Calendar. Changes made to the regulations during the year are indicated in the official online Calendar.

Part I: Course-based Master's Degree

Approved by Graduate Council November 9, 2009.

1. Supervision

Although the Faculty of Graduate Studies does not require the formal appointment of a Supervisor, programs may appoint a Faculty Advisor or a Supervisor. The latter must meet Faculty of Graduate Studies requirements for graduate supervision. Those requirements are outlined in Supervisory Policy http://grad.ucalgary.ca/current/managing-my-program/supervision.

2. Judgment of Student Performance

If a student’s grades do not meet the Calendar requirements (see Calendar, Student Standing), the Faculty of Graduate Studies will notify the program of this. In addition, the program may independently judge that a student’s performance is not satisfactory. In either case, it is the responsibility of the Graduate Program Director to promptly notify the student in writing that performance is below an acceptable level. A student will be required to withdraw from the Faculty of Graduate Studies for reasons of unsatisfactory performance unless the program recommends otherwise.

3. Research Component and Exit Requirements

The Campus Alberta Quality Council requires a research component for all Course-based Master's programs, and states that this requirement can be satisfied in a variety of ways, for example, by "one or more research courses in the program," or a capstone course that focuses "on the integration and application of the knowledge acquired." The programs may also "culminate in a comprehensive examination involving an examination committee."[1] The Faculty of Graduate Studies operates in accordance with CAQC guidelines, and requires that the nature of the research component and the form of any comprehensive examination must be identified in program regulations that are approved by the General Faculties Council Graduate Academic Program Subcommittee.

[1]All quotations are from the CAQC handbook: Quality Assessment and Assurance (http://www.caqc.gov.ab.ca/caqc-handbook.aspx).

Transfers

4.0 Transfers at the Master's Level

4.1 Application for Change of Area of Specialization

A student requires approval of both the Graduate Program Director and the Dean of the Faculty of Graduate Studies to transfer from one area of specialization to another, while remaining within the degree program.

4.2 Transfers from Course-based Master’s Degree to Thesis-based Master’s Degree

A student requires approval of both the Graduate Program Director and the Dean of the Faculty of Graduate Studies to transfer from a Course-based Master’s Degree to a Thesis-based Master’s Degree.

4.3 Transfers to Doctoral Programs

4.3.1 Transfer from Master’s to Doctoral Programs

Program Heads may recommend outstanding Master’s students for transfer to the doctoral program. Such recommendations must be endorsed by the proposed doctoral Supervisor and accompanied by the names of members of the proposed doctoral supervisory committee. The transfer must be approved by the Dean of Graduate Studies.

4.3.2 Course and Examination Requirements

Courses credited in the prior Master’s program will be taken as fulfilling doctoral requirements where applicable, in accordance with program requirements for required doctoral course work. All students transferring from Master’s to doctoral programs will be required to sit the doctoral candidacy examination.

4.3.3 Time Limits on Transfers

Transfers from Master’s to doctoral programs must be completed within twenty-four months of the student’s initial registration in the Faculty of Graduate Studies. All transfer students must attempt the candidacy examination within thirty-six months of first registration in the Faculty of Graduate Studies.

Part II: Thesis-based Master's Degree

Approved by Graduate Council April 2, 2009.

SUPERVISORS AND SUPERVISORY COMMITTEES

1.0 Selection of a Supervisor

1.1 General Advice to Students

All students must have either an interim advisor or an approved Supervisor at the time of first registration, and a permanent Supervisor no later than the second annual registration. It would help the student in program planning if the selection of a Supervisor were completed as quickly as possible. Students are encouraged to think about and select their areas of specialization as early as possible, and preferably before beginning the program.

1.2 Supervisor Selection

The initial selection of a Supervisor should be by mutual agreement between student and faculty member, and approved by the Graduate Program Director. Difficulties or conflicts in selecting or recommending a Supervisor should be referred promptly to the Dean by any of the persons involved.

1.2.1 Supervisor Eligibility Requirements

Continuity of supervision throughout a graduate program is important to a student’s success. Normally, faculty members with Continuing Board appointments in the professorial ranks are chosen as Supervisors. However, there are occasions when it is to the student’s advantage for a program to recommend the appointment of a Supervisor who does not have a Continuing Board appointment. For example, an individual who holds an appointment that is Specific Term (Contingent, Limited Term, Term Certain), Clinical or Adjunct, or Honorary, or has Emeritus status, or is from outside the University, may be appointed Supervisor. In cases such as these, the Faculty of Graduate Studies requires assurance that the

proposed Supervisor will be able to provide continuity.

The proposed Supervisor must understand the commitment expected in terms of time and funding and be familiar with current graduate program and Faculty of Graduate Studies regulations. The Graduate Program Director must ensure that supervision will be provided for the probable time period required for the completion of the degree program.

If the proposed Supervisor is someone from outside the graduate program who does not have a Continuing Board appointment, a Co-supervisor must be appointed.

The Supervisor should be currently active in research in an area related to the student's interest. Faculty members working on their own graduate degrees cannot be approved in any supervisory capacity without special dispensation from the Dean.

1.2.2 Conflict of Interest

The relationship between Supervisor and student is an academic one. Where other relationships exist or develop that might give the appearance of conflict of interest they must be immediately reported to the Graduate Program Director who can consult with an Associate Dean or the Dean if the Graduate Program Director is unable to resolve the situation. (See Graduate Studies Conflict of Interest Policy: http://grad.ucalgary.ca/current/policies-forms/conflict-interest).

1.3 Appointment of Co-supervisor

In addition to those cases noted above in which it is required that a Co-supervisor be appointed, a Co-supervisor may be appointed by the Graduate Program Director upon the written recommendation of the Supervisor and agreement of the student. A postdoctoral fellow as defined in the Postdoctoral Fellow Policy may be appointed a Co-Supervisor.[2]

[2]The Postdoctoral Fellow Policy http://www.ucalgary.ca/postdoc/files/postdoc/University%20Policy.pdf defines a PDF as "An individual, normally within 5 years of completion of a doctoral degree or 10 years of completion of an MD, DDS, DVM or equivalent, who is engaged in a temporary and defined period of mentored advanced training to enhance the professional skills and research independence needed to pursue his or her chosen career path." The Postdoctoral Fellow Policy mandates that "assistance with the supervision of graduate students" requires "the agreement of the Faculty Supervisor."

1.4 Supervisor or Co-supervisor from Outside the Department, Program, or Faculty

A Supervisor or Co-supervisor may be from a department, program, or faculty other than the student's home department, program, or faculty. The recommendation must be endorsed by the student. The faculty member's home program should be notified by the relevant Graduate Program Director whenever the faculty member is asked to supervise or co-supervise outside the home program. Such an "external" Supervisor or Co-supervisor must agree to be responsible to the Graduate Program Director of the student's home department in all matters related to the supervisory responsibilities.

1.5 Continuity of Supervision

Students are entitled to continuity of supervision. In the case of the resignation from the University, illness or death of the Supervisor, the Graduate Program Director must make immediate arrangements to provide continuity of supervision pending the appointment of a new Supervisor.

1.6 Supervisor Selection and Approval Deadlines

Regular students are required to have approved Supervisors within twelve months of initial registration. A student admitted as a special case admission must have an approved Supervisor before admission.

2.0 Responsibilities of Supervisors

2.1 Knowledge of Rules and Procedures

Supervisors should be familiar with the rules and procedures of the Faculty of Graduate Studies and program regulations and requirements.

2.2 Meetings between Student and Supervisor

A student and Supervisor have a shared responsibility to meet on a regular basis.

2.3 The Role of the Supervisor

The supervisor should act both as a general academic mentor, with emphasis on guidance, instruction, and encouragement of scholarship and research, and as a judge of the student's performance. Because of their own involvement in research and related professional activities, Supervisors should provide professional guidance and research stimulation to their students. A fundamental duty of the Supervisor is to impart to the student the skills necessary to plan and conduct original research.

Specifically, the Supervisor should:

- Work with the student to establish a realistic timetable for the completion of the various requirements of the program of study; discuss with the student and establish mutual expectations for the student's vacation time (students are entitled to two weeks of vacation during the twelve month period, Visit the Academic Regulations for more details: http://www.ucalgary.ca/pubs/calendar/grad/current/gs-u.html);
- Develop a relationship with the student conducive to research and intellectual growth;
- Guide the student in the pursuit of knowledge and provide constructive criticism in support of the highest standards of research and professional development.

2.4 Participation of Supervisor in Thesis Preparation

The Supervisor is expected to provide frequent and prompt comments on drafts of the thesis and should attempt to be critically constructive and encouraging but the thesis must be the creation of the student.

2.5 Supervisory Provision for Leave of Absence

(Approved by FGS Council: June 4, 2009)

A program and Supervisor must ensure that the student is provided with adequate supervision during a Supervisor's leave, potentially through the appointment of an interim Supervisor. Students should be informed well in advance about the Supervisor's plans for forthcoming leaves of absence. With current means of communication, continued supervision while on a research and scholarship leave is the expectation for faculty members. These arrangements must be communicated in writing to the Graduate Program Director, who bears the responsibility for ensuring continuity of supervision for students in his/her graduate program.

2.5.1 Interim Supervisory Arrangements

When an interim Supervisor is appointed to cover a period of a Supervisor's absence, the regular Supervisor retains final responsibility for the adequate supervision of the student. Faculty members approved as interim Supervisors must indicate in writing to the Graduate Program Director their willingness to accept responsibility for the day-to-day supervision of such students.

2.6 The Supervisor and Setting up Examinations

The Supervisor is responsible for scheduling the thesis oral examination.

2.7 Suggested Procedures in the Event of Problems between Graduate Students and Their Supervisors

Students should first try to resolve problems with Supervisors by talking to the Supervisor. Supervisory Committee members might be able to give helpful advice in this situation. Problems that are not resolved in this fashion should be discussed with the Graduate Program Director, and then the Department Head or equivalent. If it appears that a solution cannot be reached, the student and/or the Graduate Program Director may consult the Faculty of Graduate Studies for advice about a resolution to the matter.

2.8 Procedures for the Curtailment of Supervisory Duties

The Dean of Graduate Studies approves the initial appointment of a faculty member to supervisory duties. If a complaint is made against a Supervisor, the Dean will first discuss the matter with the Department Head or equivalent, and then with the faculty member concerned. The issue may be resolved informally. If the Dean decides that a more formal approach is needed to resolve the dispute, the Dean will inform both the Head and the faculty member of his/her conclusions in writing. If the result of the Dean's investigation is curtailment of the supervisory duties of the faculty member, the Dean will inform the faculty member in writing.

2.9 Requirements for a Master's Supervisory Committee

A Supervisory Committee at the Master's level is not normally appointed unless required by the program or requested by the Graduate Program Director.

The Faculty of Graduate Studies will recognize a formal Supervisory Committee at the Master's level once an Appointment of Supervisor/Supervisory Committee form is filed. A Master's Supervisory Committee will be governed by the rules applying to doctoral Supervisory Committees (see Article 3.0 in Handbook of Supervision and Examination Part III: Doctor of Philosophy / Doctor of Education Degree).

Members of a Supervisory Committee should provide support to both the student and the Supervisor by expanding the range of expertise and experience available to advise and assess the student. Members should provide constructive criticism and discussion of the student's ideas, methods and performance as the program develops; should be accessible to the student for consultation and discussion; should suggest other sources of information to the student; and must participate in examinations and in periodic meetings with the student and provide regular assessment of the student's progress as required by the program regulations.

THE MASTER'S THESIS

3.0 Thesis Quality Requirements

The thesis should demonstrate that the candidate is acquainted with the published literature in the subject of the thesis; that appropriate research methods have been used; and that appropriate levels of critical analysis have been applied. The research embodied in the thesis should make some original contribution to knowledge in the field.

The general form and style of thesis may differ from program to program, but a thesis should be a coherent document. This means that if a thesis contains separate manuscripts, there needs also to be introductory and concluding chapters that explain how these separate manuscripts fit together into a unified body of research. If previously published materials are included, it should be made clear what exactly is the student's own work and what the contribution of other researchers is.

While it is expected that a portion of the thesis could be the basis for a publication, the Supervisor and examiners should recognize that even an excellent thesis may not be perfect in all respects. "Perfection" is not a prerequisite for acceptance of the thesis as a "partial fulfillment of the requirements for a degree." The thesis may vary in quality from passable to outstanding.

The University's policy governing Integrity in Scholarly Activity applies to the Master's thesis. Plagiarism and fabrication or falsification of research data in a Master's thesis will be considered academic misconduct. (See Plagiarism/Cheating/Other Academic Misconduct section in this Calendar).

EXAMINING COMMITTEES, EXAMINATIONS AND STANDARDS

4.0 Standards of Performance

4.1 Judgment of Student Performance

Supervisors and Graduate Program Directors must inform students on a regular basis about their academic progress. If a student's performance is judged to be below an acceptable level, this judgment should be expressed to the student formally and in writing at as early a stage in the program as possible. A student may be required to withdraw from the Faculty of Graduate Studies for reasons of "unsatisfactory progress" (see also section 5.3).

4.2 Annual Progress Report

The Supervisor and each continuing student must jointly submit an annual progress report on the student's performance. This form must be signed by the Supervisor, the Graduate Program Director, and the student, and must be forwarded to the Faculty of Graduate Studies. The student must sign the report after the Supervisor and the Graduate Program Director have completed their comments to acknowledge that he/she has reviewed these comments.

5.0 Faculty of Graduate Studies Examinations

5.1 Faculty Examination Requirements

Care should be taken to distinguish between Faculty of Graduate Studies examinations and Departmental or Program examinations. The Faculty of Graduate Studies requires a final oral examination of theses. Examiners may participate by teleconference or videoconference (including Voice over Internet Protocol services): telephone backup must be available for video conference examinations. Any requirement for a written comprehensive examination is at the discretion of the department.

5.2 Faculty Regulations for Thesis Examinations

The thesis oral examination is an examination of the Faculty of Graduate Studies. No changes in the composition of examination committees may be introduced without prior approval from an Associate Dean of Graduate Studies or the Dean of Graduate Studies.

5.2.1 Rescheduling of Thesis Examinations

The faculty of Graduate Studies must be informed of minor changes in the scheduling of the examination (e.g., for illness or weather). Programs are allowed to postpone the examinations by up to two weeks after the scheduled date. Postponements of more than two weeks from the original date can be considered in exceptional circumstances and will require approval of the Dean of Graduate Studies.

5.2.2 Cancellation of Thesis Examinations

A scheduled examination may be cancelled under exceptional circumstances with the approval of the Dean of Graduate Studies.

5.3 Program Examination Requirements and Standards

Program requirements may include examinations that are in addition to the Faculty of Graduate Studies requirements. Programs are entitled to set their own standards of adequate performance in such examinations, provided these are not in conflict with Faculty of Graduate Studies standards. When a student fails to meet either Faculty or program standards, the program may recommend to the Dean of Graduate Studies that the student be required to withdraw (see also section 4.2).

5.4 Communication of Examination Requirements to Students

Programs should provide their students, as early as possible, with information about the precise nature and form of program examinations and tests.

6.0 Thesis Oral Examinations

6.1 Right of Student to Submit and Defend Thesis

A student who has successfully completed all Faculty of Graduate Studies and program requirements has the right to submit and defend a thesis even if doing so may be contrary to the advice of the Supervisor.

6.2 Composition of the Thesis Oral Examination Committee

The thesis oral examination committee shall consist of the student's Supervisor and at least two other examiners, one of whom shall be external to the student's home department or program. If there is a Co-supervisor but not a formal Supervisory Committee, two other examiners are still required, one of whom shall be external to the program. If there is a formal Supervisory Committee, only one additional examiner external to the program is required. The composition of the committee must be recommended by the Graduate Program Director and approved by the Dean of Graduate Studies.

6.2.1 The External Examiner

The external examiner must meet the following criteria:

If from within the University of Calgary, must have a Board appointment outside the student's program but within the professorial ranks, and have expertise in the student's research area or a closely related field;

If external to the University of Calgary, must have a well-established research reputation, expertise in the area of the student's research, and experience in evaluating theses at a graduate level.

In addition, the external examiner must:

Not have collaborated with the supervisor in the last five years;

Not be related to the student, nor have worked with the student;

Not have been a supervisor in the student's department or program for the last three years.

An external examiner who does not meet all the criteria is not necessarily precluded from serving on the examining committee, but the Graduate Program Director must provide the Dean of Graduate Studies with a memo explaining the circumstances. Non-Board appointees to examination committees may be designated as external examiners with the approval of the Dean of Graduate Studies.

6.2.2 Non-Board Appointees on Examination Committees

Persons who are not Board appointees of the University of Calgary may be approved to serve on thesis oral examination committees. A recommendation to the Dean of Graduate Studies by the Graduate Program Director for such an appointment must be accompanied by a curriculum vitae.

6.2.3 The Neutral Chair

The examination is chaired by a neutral member of the academic staff appointed by the Graduate Program Director. He/she is not a member of the examining committee and is non-voting.

6.2.4 Responsibilities of the Supervisor and the Neutral Chair

The Supervisor arranges scheduling of the examination. The Neutral Chair presides over the thesis oral examination and reports the results to the student. The Neutral Chair gives the report to the Graduate Program Director who ensures that it is submitted to the Faculty of Graduate Studies within 24 hours of the examination.

6.3 Composition of Examination Committee for Re-take of Thesis Oral Examination

Normally, the composition of the examination committee will remain the same. Upon the recommendation of the Graduate Program Director and approval of the Faculty of Graduate Studies, an examiner may be replaced.

The deadlines for the recommendation of the examination committee are as for the original examination.

7.0 Scheduling the Thesis Oral Examination

7.1 Supervisor Responsibility

The Supervisor is responsible for scheduling the thesis oral examination.

7.2 Notice of Thesis Oral Examination

The official Notice of Thesis Oral Examination form, indicating the title of the thesis, the time and place of the examination, the names of the recommended examiners, and confirming that the candidate has completed all program requirements, endorsed by the Graduate Program Director, must be received in the Faculty of Graduate Studies office at least four weeks prior to the time of the examination. The membership of the examination committee must be approved by the Faculty of Graduate Studies.

7.2.1 Posting the Notice of Thesis Oral Examination

A Notice of Thesis Oral Examination form, bearing the names, but not signatures of the student, the Supervisor, the Graduate Program Director and the Dean of Graduate Studies, or designate, must be posted at least two weeks before the date of the examination. The Graduate Program Director must ensure that copies of the Notice are sent to the student and to members of the examination committee.

7.2.2 Student Approval of Designated Area of Specialization

The format of the University degree parchment presented to successful candidates shows the degree, the department or area of study, and the approved area of specialization. Students should ensure that the approved area of specialization identified on the Notice of Thesis Oral Examination form is correct, before it is sent to the Faculty of Graduate Studies.

7.3 Form of Thesis

The thesis submitted to the members of the examination committee for final examination must be in all respects a final, complete copy and not a draft.

7.4 Thesis to Examiners

The student must ensure that the thesis is in the hands of the examiners at least three weeks prior to the proposed date of the oral examination. The examination begins when the thesis is distributed. The examiners should not discuss the thesis or their evaluation of it with each other (or anyone else) prior to the oral examination. The Examiner's Report is considered a confidential document and must not be shared with the candidate or the other examining committee members before the final decision of the examining committee.

7.5 Suspicion of Academic Misconduct

If an examiner suspects that academic misconduct, including plagiarism or fabrication/falsification of data, has occurred in the thesis, he/she must notify the Dean of Graduate Studies immediately. The examination will then be suspended until such time as the Dean or his/her designate determines whether academic misconduct has occurred and what penalties will be applied. Depending on the Dean/designate's determination, the exam may proceed as scheduled, be rescheduled, or be cancelled.

7.6 Format of Final Thesis Oral Examination

Normally, final thesis oral examinations are open, but only the examiners may question the student.

The examiners' deliberations are private and confidential. Only the Neutral Chair, the examining committee, and, if present, the Department/Program Head and the Dean of Graduate Studies or the Dean's Representative may be present.

8.0 Conduct of Thesis Oral Examination

8.1 Examiner's Report on Thesis

(Approved by FGS Council: Nov. 2, 2009)

Before the oral examination, each examiner is required to prepare an assessment of the thesis on the official Examiner's Report on Thesis form. The oral examination cannot proceed until all of the Examiners' Reports are submitted to the Neutral Chair. These assessments are to be submitted to the Neutral Chair of the examination committee before the oral examination begins. The assessments are CONFIDENTIAL: they are not to be made available to the student or to the examination committee before the final recommendation of the examination committee. After the examination, the Neutral Chair should submit the reports to the Graduate Program Director who ensures that they are forwarded to the Faculty of Graduate Studies. After the examination, the graduate program must make the Examiners' Reports available to the student, upon request.

8.2 Examination Regulations

8.2.1 Formal Examination

The oral examination is a formal examination, not an informal discussion with the candidate.

8.2.2 Questioning of the Candidate

No one other than an examiner (as identified on the Notice of Thesis Oral Examination form) is allowed to question the candidate. All examiners must be given an opportunity to question the candidate early in the examination, e.g., by rounds of questioning.

8.2.3 Length of Examination

The oral examination should not exceed two hours. This does not include deliberation time of the committee.

8.2.4 Editorial Comments on Thesis

Examiners' editorial comments on the thesis should not be discussed at the oral examination. It is recommended that each examiner hand the student a list of any such comments for post-examination final thesis revisions.

8.3 Suggested Examination Procedures

8.3.1 Opening Summary

It is common practice to ask the student to present a brief (up to fifteen minutes) opening summary of the thesis. Although this is not mandatory, students may appreciate the opportunity to introduce their research work and summarize its significance.

8.3.2 Questions to the Candidate

Questions to the candidate should be relevant to the subject matter of the thesis, and should be clearly and succinctly phrased in order to minimize doubt in the candidate's mind as to what is being asked. The student should be given reasonable time to answer. If the student has understood the question but cannot answer, the examiner should pass to another question and not attempt to extract an answer by prolonged interrogation. The Neutral Chair should guard against

any tendency of examiners to interact with each other instead of concentrating on the examination of the candidate.

9.0 Post Thesis Oral Examination Procedures

9.1 Provisional Recommendations

At the end of the thesis oral examination, everyone except the Neutral Chair, the members of the examination committee, the Department/Program Head or designate and the Dean of Graduate Studies and/or Dean's representative, is required to withdraw from the room. Before any discussion of the candidate's performance, each examiner must identify, by secret ballot, whether he/she favours recommending a pass or fail on each of the thesis and the oral defence. This procedure provides the committee with a frame of opinion upon which a full discussion of the student's performance may then be based.

9.2 Official Examiners' Discussion

Following a count of the straw vote the Neutral Chair will facilitate a post-examination discussion in which the Department/Program Head and the Dean of Graduate Studies or their representatives may participate although they have no vote. At the conclusion of the discussion, each examiner must write his/her final recommendation on the official Report of Final Master's Thesis Oral Examination form. Unanimous decisions are required for both the thesis and the oral defence. If the examiners are unable to achieve unanimity regarding one or both components, there must be no further discussion regarding that component of the examination and the Neutral Chair must immediately inform the Dean of "lack of unanimity". The final decision will be at the discretion of the Dean of Graduate Studies.

9.3 Recommendation of Examination Committee

Thesis oral examinations are designed to establish a level of achievement consistent with the standards of the Faculty of Graduate Studies as outlined in section 3, "Thesis Quality Requirements." The following section (9.4) defines the official Faculty recommendations to the Dean of Graduate Studies respecting outcomes of thesis oral examinations. In each case, the committee recommendation must be reported to the Dean on the official Report of Final Master's Thesis Oral Examination form within one working day of the completion of the examination. Immediately following the conclusion of the examination, the Neutral Chair must report the outcome to the student.

9.4 Recommendations

Thesis examinations must be judged to be either acceptable or unacceptable with respect to the thesis itself and, with respect to the oral defence, if the thesis is judged acceptable.

9.4.1 Recommendation for the Thesis

If the unanimous final decision is that the thesis conforms to the requirements for a Master's thesis (see section 3) then all members of the examination committee shall sign the signature page except the Supervisor, who will sign after reviewing and approving any necessary minor corrections on behalf of the committee.

If the unanimous final decision is that the underlying research reported in the thesis is judged to be sound, but the presentation of or analysis in the research requires attention that one or more members of the examination committee wish to review personally, then those members will not sign the approval page until they have seen and approved the revisions. Other members of the committee should sign immediately after the examination. The Report of the examination should specify who has withheld his/her signature.

If the examining committee unanimously determines that the underlying research is not acceptable, then the examination committee recommends a failed thesis to the Dean of Graduate Studies. The final decision will be at the discretion of the Dean of Graduate Studies. Should the Dean of Graduate Studies uphold the recommendation of "fail", the candidate will have a second opportunity to present and defend an acceptable thesis. No judgment should be made on the oral defence, because the revised thesis will need to be defended anew.

If the examiners fail to arrive at a unanimous final recommendation, the Neutral Chair must adjourn discussion on this component of the examination, and that same day inform the Dean of Graduate Studies of "lack of unanimity." The final decision will be at the discretion of the Dean of Graduate Studies.

For either a unanimous decision to fail the thesis or a lack of unanimity, within five working days the Neutral Chair must submit a written report to the Dean of Graduate Studies, describing the examination procedures and copy it to the Graduate Program Director. Within five working days, each examination committee member must provide a confidential written report to the Dean of Graduate Studies explaining the reasons for his/her recommendation and copy it to the Graduate Program Director and the Supervisor. After consultation with the Supervisor, the Graduate Program Director then summarizes the essential points in a written report to the student, copied to the Supervisor.

In the case of a failed thesis, whether by committee or Dean's decision, only one re-submission will be allowed and a new defence will be required. In view of the magnitude of the revisions required, a second oral exam must be held no sooner than six months and no later than twelve months from the date of the first examination. This new examination will normally be conducted by the original examination committee.

In reporting the results of the second examination, the committee will be limited to recommending either pass or fail. A recommendation for "fail" requires that each examiner submit within five working days a confidential written report to the Dean of Graduate Studies, copied to the Graduate Program Director, and the Supervisor detailing the reasons for his/her assessments. Within five working days, the Neutral Chair must also submit a written report of the examination procedures to the Dean of Graduate Studies, copied to the Graduate Program Director. If the Dean of Graduate Studies upholds the recommendation to fail, the student will be required to withdraw from the Faculty of Graduate Studies.

9.4.2 Recommendation for the Oral Defence

If the unanimous final decision is that the oral defence is acceptable, the recommendation regarding the oral defence is a pass.

If the examining committee unanimously determines that the oral defence is not acceptable, then the examining committee recommends a failed oral defence to the Dean of Graduate Studies. The final decision will be at the discretion of the Dean of Graduate Studies. Should the Dean of Graduate Studies uphold the recommendation of "fail", the candidate will be allowed a second, final attempt to present an acceptable oral defence of the thesis.

If the examiners fail to arrive at a unanimous final recommendation, the Neutral Chair must adjourn discussion on this component of the examination, and that same day inform the Dean of Graduate Studies of "lack of unanimity." The final decision will be at the discretion of the Dean of Graduate Studies.

For either a unanimous decision to fail the oral defence or a lack of unanimity, within five working days the Neutral Chair must submit a written report to the Dean of Graduate Studies, describing the examination procedures and copy it to the Graduate Program Director. Within five working days, each examination committee member must provide a confidential written report to the Dean of Graduate Studies explaining the reasons for his/her recommendation and copy it to the Graduate Program Director and the Supervisor. After consultation with the Supervisor, the Graduate Program Director then summarizes the essential points in a written report to the student, copied to the Supervisor.

In the case of a failed oral defence, whether by committee or Dean's decision, the candidate will be given only one further opportunity to present an acceptable defence. The second oral examination will be scheduled and normally heard by the original examination committee not later than six months from the date of the first examination. Any necessary revisions to the thesis must be completed by the candidate and approved by the committee before the second oral examination is scheduled.

In reporting the results of the second oral examination, the committee will be limited to recommending either pass or fail. A recommendation for "fail" requires that each examiner submit within five working days a confidential written report to the Dean of Graduate Studies, copied to the Graduate Program Director, and the Supervisor

detailing the reasons for his/her assessments. Within five working days, the Neutral Chair must also submit a written report of the examination procedures to the Dean of Graduate Studies, copied to the Graduate Program Director. If the Dean of Graduate Studies upholds the recommendation to fail, the student will be required to withdraw from the Faculty of Graduate Studies.

9.5. Dean's Action in Lack of Unanimity

When the Neutral Chair of a thesis oral examination does not report a unanimous recommendation, the Dean of Graduate Studies may consult with the Graduate Program Director, the Supervisor, and the examiners before making a decision. At his/her discretion, the Dean of Graduate Studies may consult with the student as well. A decision should normally be made within seven business days of receiving the required post-examination reports, and all persons involved informed in writing of the result of the decision.

9.6 Exam Procedural Irregularities

Any procedural irregularities should be reported to the Dean of Graduate Studies within 5 working days of the examination date, regardless of the outcome of the exam.

9.7 Convocation Clearance

The names of the candidates who have successfully completed the final thesis oral examination will not be added to the convocation list until the Faculty of Graduate Studies receives two unbound copies of the thesis and a Departmental Clearance Form. Students will continue to be assessed continuing fees until cleared for convocation.

9.8 Delay in Public Release of Theses

The University of Calgary is a publicly funded institution and much of our research is sponsored by government funding. As such, the University has an obligation to ensure that this research is available for the benefit of the public at large, for example, through the University of Calgary's online repository. However, in some circumstances where it would be detrimental to the author or the sponsor of the thesis research to have the thesis made publicly available immediately upon completion, the copyright owner of a thesis may request that it be withheld from public distribution for a period of time. Valid reasons to withhold a thesis from public distribution include:

1. A contract between the research sponsor and the University specifies a period of confidentiality (normally up to two years; proof of contract is required);

2. Applying for a patent (normally up to two years; proof of application is required);

3. Enabling publication in a scholarly venue (normally up to five years; a publication plan is required);

4. Publishing of the creative portion of a creative work (normally up to five years with the possibility of extending to duration of copyright; supporting document such as proof of contract, letters from the publisher are required). Controlled access to the complete thesis will be available through the University of Calgary Archives after the initial withhold period.

A Thesis Withhold Form may be obtained from the Faculty of Graduate Studies. Once the appropriate signatures have been obtained, and the Dean of Graduate Studies has approved the request, the copyright owner of the thesis, the department and the University of Calgary Archives will receive copies of the form. Once the withhold period expires the thesis will be sent to Library and Archives Canada, and will also be made available to the public. In the event that a withhold is requested to be released earlier than scheduled, a memo must be supplied explaining the reasons for such a request and must demonstrate consent from all related parties.

TRANSFERS

10.0 Transfers at the Master's Level

10.1 Application for Change of Area of Specialization

A student requires approval of both the Graduate Program Director and the Dean of the Faculty of Graduate Studies to transfer from one area of specialization to another, while remaining within the degree program.

10.2 Transfers from Thesis-based Master's Degree to Course-based Master's Degree

A student requires approval of both the Graduate Program Director and the Dean of the Faculty of Graduate Studies to transfer from a Thesis-based Master's Degree to a Course-based Master's Degree.

11.0 Transfers to Doctoral Programs

11.1 Transfer from Master's to Doctoral Programs

Program Heads may recommend outstanding Master's students for transfer to the doctoral program. Such recommendations must be endorsed by the proposed doctoral Supervisor and accompanied by the names of members of the proposed doctoral supervisory committee. The transfer must be approved by the Dean of Graduate Studies.

11.2 Course and Examination Requirements

Courses credited in the prior Master's program will be taken as fulfilling doctoral requirements where applicable, in accordance with program requirements for required doctoral course work. All students transferring from Master's to doctoral programs will be required to sit the doctoral candidacy examination.

11.3 Time Limits on Transfers

Transfers from Master's to doctoral programs must be completed within 24 months of the student's initial registration in the Faculty of Graduate Studies. All transfer students must attempt the candidacy examination within 36 months of first registration in the Faculty of Graduate Studies.

Part III: Doctor of Philosophy/Doctor of Education Degree

(Approved by Graduate Council April 2, 2009)

1.0 Selection of a Supervisor

1.1 General Advice to Students

All students must have either an interim advisor or an approved Supervisor at the time of first registration, and a permanent Supervisor no later than the second annual registration. It would help the student in program planning if the selection of a Supervisor were completed as quickly as possible. Students are encouraged to think about and select their areas of specialization as early as possible, and preferably before beginning the program.

1.2 Supervisor Selection

The initial selection of a Supervisor should be by mutual agreement between student and faculty member, and approved by the Graduate Program Director. Difficulties or conflicts in selecting or recommending a Supervisor should be referred promptly to the Dean by any of the persons involved.

1.2.1 Supervisor Eligibility Requirements

Continuity of supervision throughout a graduate program is important to a student's success. Normally, faculty members with Continuing Board appointments in the professorial ranks are chosen as Supervisors. However, there are occasions when it is to the student's advantage for a program to recommend the appointment of a Supervisor who does not have a Continuing Board appointment. For example, an individual who holds an appointment that is Specific Term (Contingent, Limited Term, Term Certain), Clinical or Adjunct, or Honorary, or has Emeritus status, or is from outside the University, may be appointed Supervisor. In cases such as these, the Faculty of Graduate Studies requires assurance that the proposed Supervisor will be able to provide continuity.

The proposed Supervisor must understand the commitment expected in terms of time and funding and be familiar with current graduate program and Faculty of Graduate Studies regulations. The Graduate Program Director must ensure that supervision will be provided for the probable time period required for the completion of the degree program.

If the proposed Supervisor is someone from outside the graduate program who does not have a Continuing Board appointment, or is from outside the University of Calgary, a Co-supervisor must be appointed.

The Supervisor should be currently active in research in an area related to the student's interest. Faculty members working on their own graduate degrees cannot be approved in any supervisory capacity without special dispensation from the Dean.

1.2.2 Conflict of Interest

The relationship between Supervisor and student is an academic one. Where other relationships exist or develop that might give the appearance of conflict of interest they must be immediately reported to the Graduate Program Director who can consult with an Associate Dean or the Dean if the Graduate Program Director is unable to resolve the situation. (See Graduate Studies Conflict of Interest Policy: http://grad.ucalgary.ca/current/policies-forms/conflict-interest).

1.3 Appointment of Co-supervisor

In addition to those cases noted above in which it is required that a Co-supervisor be appointed, a Co-supervisor may be appointed by the Graduate Program Director upon the written recommendation of the Supervisor and agreement of the student. The role of the Co-supervisor in this case is to provide supplementary guidance, instruction and research stimulation on a regular or extensive basis.

1.4 Supervisor or Co-supervisor from Outside the Department, Program, or Faculty

A Supervisor or Co-supervisor may be from a department, program, or faculty other than the student's home department, program, or faculty. The recommendation must be endorsed by the student. The faculty member's home program should be notified by the relevant Graduate Program Director whenever the faculty member is asked to supervise or co-supervise outside the home program. Such an "external" Supervisor or Co-Supervisor must agree to be responsible to the Graduate Program Director of the student's home department in all matters related to the supervisory responsibilities.

2.0 Responsibilities of Supervisors

2.1 Knowledge of Rules and Procedures

Supervisors should be familiar with the rules and procedures of the Faculty of Graduate Studies and program regulations and requirements.

2.2 Meetings between Student and Supervisor

A student and Supervisor have a shared responsibility to meet on a regular basis.

2.3 The Role of the Supervisor

The Supervisor should act both as a general academic mentor, with emphasis on guidance, instruction, and encouragement of scholarship and research, and as a judge of the student's performance. Because of their own involvement in research and related professional activities, Supervisors should provide professional guidance and research stimulation to their students. A fundamental duty of the Supervisor is to impart to the student the skills necessary to plan and conduct original research.

Specifically, the Supervisor should:

- Work with the student to establish a realistic timetable for the completion of the various requirements of the program of study; discuss with the student and establish mutual expectations for the student's vacation time (students are entitled to two weeks of vacation during the twelve month period, Visit the Academic Regulations for more details: http://www.ucalgary.ca/pubs/calendar/grad/current/gs-u.html);
- Develop a relationship with the student conducive to research and intellectual growth;
- Guide the student in the pursuit of knowledge and provide constructive criticism in support of the highest standards of research and professional development.

2.4 Participation of Supervisor in Thesis Preparation

The Supervisor is expected to provide frequent and prompt comments on drafts of the thesis and should attempt to be critically constructive and encouraging but the thesis must be the creation of the student.

2.5 Supervisory Provision for Leave of Absence

(Approved by FGS Council: June 4, 2009)

A program and Supervisor must ensure that the student is provided with adequate supervision during a Supervisor's leave, potentially through the appointment of an interim Supervisor. In doctoral programs, the interim Supervisor should be a member of the Supervisory Committee. Students should be informed well in advance about the Supervisor's plans for forthcoming leaves of absence. With current means of communication, continued supervision while on a research and scholarship leave is the expectation for faculty members. These arrangements must be communicated in writing to the Graduate Program Director, who bears the responsibility for ensuring continuity of supervision for students in his/her graduate program.

2.5.1 Interim Supervisory Arrangements

When an interim Supervisor is appointed to cover a period of a Supervisor's absence, the regular Supervisor retains final responsibility for the adequate supervision of the student. Faculty members approved as interim Supervisors must indicate in writing to the Graduate Program Director their willingness to accept responsibility for the day-to-day supervision of such students.

2.6 The Supervisor and Setting up Examinations

The Supervisor is responsible for scheduling the candidacy examination and the thesis oral examination.

2.7 Suggested Procedures in the Event of Problems between Graduate Students and Their Supervisors

Students should first try to resolve problems with Supervisors by talking to the Supervisor. Supervisory Committee members might be able to give helpful advice in this situation. Problems that are not resolved in this fashion should be discussed with the Graduate Program Director, and then the Department Head or equivalent. If it appears that a solution cannot be reached, the student and/or the Graduate Program Director may consult the Faculty of Graduate Studies for advice about a resolution of the matter.

2.8 Procedures for the Curtailment of Supervisory Duties

The Dean of Graduate Studies approves the initial appointment of a faculty member to supervisory duties. If a complaint is made against a Supervisor, the Dean will first discuss the matter with the Department Head or equivalent, and then with the faculty member concerned. The issue may be resolved informally. If the Dean decides that a more formal approach is needed to resolve the dispute, the Dean will inform both the Head and the faculty member of his/her conclusions in writing. If the result of the Dean's investigation is curtailment of the supervisory duties of the faculty member, the Dean will inform the faculty member in writing.

3.0 Doctoral Supervisory Committee

3.1 Composition of the Supervisory Committee

The Supervisor and Graduate Program Director must inform the Faculty of Graduate Studies of the Supervisory Committee composition no later than three months after the appointment of the Supervisor.

The Supervisory Committee should be constituted by the Supervisor in consultation with the student. It will normally consist of the Supervisor and two members, and must be approved by the Graduate Program Director and sent to the Faculty of Graduate Studies for information. Committee members may be external to the student's program. At least one of the members of the Supervisory Committee should have had supervisory experience at the doctoral level. If a Co-supervisor and a Supervisor are appointed, the Supervisory Committee will require two other members. Postdoctoral fellows are eligible to serve as committee members. A postdoctoral fellow whose supervisor is on the student's supervisory committee is not eligible to serve as a member of the examination committee. In such cases, the supervisory committee must include an additional member who is eligible to serve as an examiner.

3.2 Non-Board Appointees on Supervisory Committee

Persons who are not Board appointees of the University of Calgary may be approved to serve on supervisory committees. A recommendation to the Dean by the Graduate Program Director for such an appointment must be accompanied by a curriculum vitae.

3.3 Duties of a Supervisory Committee

Members of a doctoral Supervisory Committee should provide support to both the student and the Supervisor by expanding the range of expertise and experience available to advise and assess the student. Members should provide constructive

criticism and discussion of the student's ideas, methods and performance as the program develops; should be accessible to the student for consultation and discussion; should suggest other sources of information to the student; and must participate in examinations and in periodic meetings with the student and provide regular assessment of the student's progress as required by the program regulations.

THE DOCTORAL THESIS

4.0 Thesis Quality Requirements

The doctoral thesis must embody original work conducted while in program, and must constitute a significant contribution to knowledge. It should contain evidence of critical understanding of the relevant literature. The material embodied in the thesis should merit publication.

The general form and style of thesis may differ from program to program but a thesis should be a coherent document. This means that if a thesis contains separate manuscripts, there needs also to be introductory and concluding chapters that explain how these separate manuscripts fit together into a unified body of research. If previously published materials are included, it should be made clear what exactly is the student's own work and what the contribution of other researchers is.

While it is expected that the thesis could be the basis for a publication, the Supervisor and examiners should recognize that even an excellent thesis might not be perfect in all respects. 'Perfection' is not a prerequisite for acceptance of the thesis as a "partial fulfillment of the requirements for the degree". The thesis may vary in quality from passable to outstanding.

Plagiarism and fabrication or falsification of research data in a doctoral thesis will be considered academic misconduct. (See Plagiarism/Cheating/Other Academic Misconduct section in this Calendar).

For information on formatting, printing, binding and distribution of theses, see the Thesis Guidelines at http://grad.ucalgary.ca/current/thesis.

EXAMINING COMMITTEES, EXAMINATIONS AND STANDARDS

5.0 Standards of Performance

5.1 Judgment of Student Performance

Supervisors and Graduate Program Directors must inform students on a regular basis about their academic progress. If a student's performance is judged to be below an acceptable level, this judgment should be expressed to the student formally and in writing at as early a stage in the program as possible. A student may be required to withdraw from the Faculty of Graduate Studies for reasons of "unsatisfactory progress" (see also section 6.2).

5.2 Annual Progress Report

The Supervisor and each continuing student must jointly submit an annual progress report on the student's performance. This form must be signed by the Supervisor, the Graduate Program Director, and the student, and must be forwarded to the Faculty of Graduate Studies. The student must sign the report after the Supervisor and the Graduate Program Director have completed their comments to acknowledge that he/she has reviewed these comments.

6.0 Faculty of Graduate Studies Examinations

6.1 Faculty Examination Requirements

The Faculty of Graduate Studies requires that candidates for doctoral degrees sit both an oral candidacy examination and a thesis oral examination. Examiners may participate by teleconference or video conference (including Voice over Internet Protocol services); telephone backup must be available for video conference examinations.

6.1.1 Faculty Regulations for Candidacy Oral Examinations

Candidacy oral examinations are examinations of the Faculty of Graduate Studies. No changes in the composition of the examination committee may be introduced without prior approval from an Associate Dean of Graduate Studies or the Dean of Graduate Studies. The faculty of Graduate Studies must be informed of minor changes in the scheduling of the examination (e.g., for illness or weather). Programs are allowed to postpone the examinations by up to two weeks after the scheduled date. Postponements of more than two weeks from the original date can be considered in exceptional circumstances and will require approval of the Dean of Graduate Studies.

6.1.2 Faculty Regulations for Thesis Examinations

The thesis oral examination is an examination of the Faculty of Graduate Studies. No changes in the composition of examination committees may be introduced without prior approval from an Associate Dean of Graduate Studies or the Dean of Graduate Studies.

6.1.3 Rescheduling of Thesis Examinations

The faculty of Graduate Studies must be informed of minor changes in the scheduling of the examination (e.g., for illness or weather). Programs are allowed to postpone the examinations by up to two weeks after the scheduled date. Postponements of more than two weeks from the original date can be considered in exceptional circumstances and will require approval of the Dean of Graduate Studies.

6.1.4 Cancellation of Thesis Examinations

A scheduled examination may be cancelled under exceptional circumstances with the approval of the Dean of Graduate Studies.

6.2 Program Examination Requirements and Standards

Program requirements may include examinations that are in addition to the Faculty of Graduate Studies requirements. Programs are entitled to set their own standards of adequate performance in such examinations, provided these are not in conflict with Faculty of Graduate Studies standards. When a student fails to meet either Faculty or program standards, the program may recommend to the Dean of Graduate Studies that the student be required to withdraw. (See also section 5.1).

6.3 Communication of Examination Requirements to Students

Programs should provide their students, as early as possible, with information about the precise nature and form of program examinations and tests.

7.0 Admission to Candidacy

Admission to candidacy is an acknowledgement that a student is fully prepared to devote his/her full attention to the dissertation research. For admission to candidacy, the Faculty of Graduate Studies requires that (1) all mandatory course work has been completed, (2) an oral candidacy examination has been successfully passed, and (3) a dissertation research proposal has been approved by the student's Supervisory Committee. Exceptions may apply to Students in Clinical Psychology, Educational Psychology and the Doctor of Education programs. Programs may require the examination and proposal to be completed in any order, including approval of the proposal within the examination.

Although the oral candidacy examination is the official Faculty of Graduate Studies examination, graduate programs have the option of adding a written component. If there is a written component, the period during which the written examination and the oral examination are conducted must not exceed one month. The written examination should be circulated among the examiners and may serve as a basis for questioning at the oral. If the student fails the written component of the candidacy examination, the oral examination should still go ahead as scheduled in order to give the candidate an opportunity to defend the written answers, as well as deal with other questions. If an examiner suspects plagiarism or other academic misconduct in the written document, he/she must report this to the Dean of Graduate Studies immediately. For further information, review Guidelines: Chairing Oral Thesis and Candidacy Examinations, at http://grad.ucalgary.ca/current/managing-my-program/examinations.

7.1 Rationale for Candidacy Examinations

The candidacy examination should focus on the background knowledge of students in their discipline, as well as their preparedness to conduct research of high quality in their particular fields of study.

7.2 Program Guidelines and Regulations

Although the candidacy examination is a Faculty of Graduate Studies examination, individual programs determine the precise

requirements. All programs must have written guidelines describing the examination regulations and the timing of the dissertation research proposal relative to the candidacy examination. These guidelines and regulations must be given to doctoral students as soon as they enter the program.

7.3 Assessment of the Candidacy Examinations

Assessment of the candidacy examination must take place immediately following the completion of the oral candidacy examination. This assessment should be based on the candidate's overall performance in all components of the examination.

7.4 Candidacy Examination and Course Work

All required course work must have been completed prior to the candidacy examination. Normally, no further course work may be required of a student who has successfully completed the candidacy examinations, but a student may elect to complete additional courses subject to approval by the Graduate Program Director. Exceptions may apply to Students in Clinical Psychology, Educational Psychology and the Doctor of Education programs.

7.5 Deadlines for Admission to Candidacy

A student entering a doctoral program with a completed Master's degree must attempt the candidacy examinations and submit a research proposal acceptable to the Supervisory Committee no later than twenty-eight months after initial registration in the doctoral program. A student entering a doctoral program with a bachelor's degree, or transferring into a doctoral program from a Master's program before the Master's program is completed, must attempt the candidacy examinations and submit a research proposal acceptable to the Supervisory Committee no later than thirty-six months after initial registration in the Faculty of Graduate Studies.

7.6 Establishing the Candidacy Examination Committee

A written recommendation to the Dean of Graduate Studies on the composition of the candidacy examination committee must be received in the Faculty of Graduate Studies office at least four weeks before the scheduled date of the examination. The committee will not be approved by the Faculty of Graduate Studies earlier than three months before the planned examination date.

7.7 Composition of the Candidacy Examination Committee

Normally, the Candidacy Examination Committee consists of the Supervisory Committee plus two additional members recommended by the Graduate Program Director who shall ensure that no conflict of interest exists between the student or the Supervisor and the additional members of the examination committee. A Post doctoral fellow whose supervisor is on the supervisory committee may not serve on the examination committee. (See Graduate Studies Conflict of Interest Policy: http://grad.ucalgary.ca/current/policies-forms/conflict-interest.) Normally, the Supervisor is a voting member, but a graduate program may choose to have the Supervisor attend as a non-voting observer. The Graduate Calendar notes programs that have chosen this option.

7.7.1 Neutral Chair of the Candidacy Examination Committee

The examination is chaired by a member of the academic staff appointed by the Graduate Program Director. The Neutral Chair is not a member of the examining committee and is non-voting.

7.7.2 Responsibilities of the Supervisor and the Neutral Chair

The Supervisor arranges scheduling of the examination. The Neutral Chair presides over the candidacy examination and reports the results to the student. The Neutral Chair gives the report to the Graduate Program Director, who ensures that it is submitted to the Faculty of Graduate Studies within 24 hours of the examination.

7.7.3 Non-Board Appointees on Examination Committee

Persons who are not Board appointees of the University of Calgary may be approved to serve on candidacy examination committees. A recommendation to the Dean by the Graduate Program Director for such an appointment must be accompanied by a curriculum vitae.

7.8 Notice of Candidacy Oral Examination

The official Notice of Candidacy Oral Examination form must be received in the Faculty of Graduate Studies office at least four weeks before the time of examination. The form identifies the time and place of the examination, the names of the recommended members of the examination committee, and by the signature of the Graduate Program Director confirms that the candidate has completed course requirements. Exceptions may apply to Students in Clinical Psychology, Educational Psychology and the Doctor of Education programs. The membership of the examination committee must be approved by the Faculty of Graduate Studies.

7.9 Attendance at Candidacy Oral Examinations

The candidacy oral examination is a formal examination limited to the examination committee and the student. The Dean of Graduate Studies or Dean's representative and the Department Head or equivalent, or designate, may attend without prior notice.

8.0 Conduct of Candidacy Oral Examination

8.1 Examination Regulations

No one other than a member of the examination committee is allowed to question the candidate. All examiners should be given an opportunity to question the candidate during the early part of the examination, e.g., by rounds of questioning.

8.2 Suggested Examination Procedure

Questions to the candidate should be clear and succinct. The student should be given reasonable time to answer. If the student has understood the question and cannot answer, the examiner should pass to another question and not attempt to extract an answer by prolonged interrogation, or by leading the candidate. The chair should guard against any tendency of examiners to interact with each other instead of concentrating on the examination of the candidate.

8.3 Length of Examination

The candidacy examination should not exceed two hours. This does not include the deliberation time of the Committee.

9.0 Post Candidacy Oral Examination Procedures

9.1 Official Examiners' Discussion

At the end of the candidacy examination, the student is asked to withdraw from the room. If the program has chosen to allow the Supervisor to attend the examination as a non-voting observer, at the end of the candidacy examination the student and the Supervisor are asked to withdraw from the room. Before any discussion of the candidate's performance, each examiner must identify, by secret ballot, which recommendation (pass/fail) he/she favours. This procedure provides the committee with a frame of opinion upon which to base a full discussion of the student's performance. The examiners then conduct a post-examination discussion, in which the Department Head or equivalent, or designate (e.g., Graduate Program Director), and the Dean of Graduate Studies or the Dean's representative may participate, although they have no vote.

9.2 Recommendation of the Candidacy Examination Committee

After the final vote, each examiner must record a recommendation of pass or fail on the official Faculty of Graduate Studies Report of Candidacy Oral Examination form. Every effort should be made to reach a unanimous recommendation. Should the outcome of the final vote include one negative vote, the candidate will pass. Should the outcome include two or more negative votes, the committee's recommendation to the Dean of Graduate Studies will be "fail".

The final decision will be at the discretion of the Dean of Graduate Studies. Should the Dean of Graduate Studies uphold the recommendation of "fail", the student will be allowed a re-take of the examination. Within five working days of the failed examination, the Neutral Chair must submit a written report of the examination procedures to the Dean of Graduate Studies and copy it to the Graduate Program Director. Within five working days of the examination each committee member must provide a confidential written report to the Dean of Graduate Studies explaining the reasons for his/her vote and copy it to the Graduate Program Director

and the Supervisor. After consultation with the Supervisor, the Graduate Program Director then summarizes the essential points to the student, copied to the Supervisor.

The Neutral Chair must inform the student of the committee's recommendation immediately following the vote of the examination committee. The Neutral Chair will record the final recommendation of pass or fail on the Report of Candidacy Oral Examination form which must be submitted to the Dean of Graduate Studies within one working day of the completion of the examination.

9.3 Re-take of Candidacy Examination

Only one re-take of a candidacy examination will be permitted. The re-take must take place no sooner than two months and no later than six months from the date of the first examination. Normally the composition of the committee will remain the same. In reporting the results of the second examination, the committee will be limited to recommending either a pass (i.e., no more than one negative vote), or fail. A recommendation of "fail" requires that, within five working days, each examiner must submit a confidential written report to the Dean of Graduate Studies, copied to the Graduate Program Director and the Supervisor, detailing the reasons for his/her vote. Within five working days, the Neutral Chair must also submit a written report of the examination procedures to the Dean of Graduate Studies, copied to the Graduate Program Director. If the Dean of Graduate Studies upholds the recommendation to fail, the student will be required to withdraw from the Faculty of Graduate Studies.

10.0 Thesis Oral Examinations

10.1 Right of Student to Submit and Defend Thesis

A student who has successfully completed all Faculty of Graduate Studies and program requirements has the right to submit and defend a thesis even if doing so may be contrary to the advice of the Supervisor.

10.2 Composition of the Thesis Oral Examination Committee

The thesis oral examination committee shall consist of the student's Supervisory Committee and at least two other examiners, one of whom shall be external to the student's home program and the other external to the University. A Post doctoral fellow whose supervisor is on the supervisory committee may not serve on the examination committee. The composition of the committee must be approved by the Dean, upon the recommendation of the Graduate Program Director. The Dean may approve a recommendation that the examiner external to the University not attend the thesis oral examination in person, but participate electronically, by teleconference or videoconference. In rare cases, the Dean may approve a recommendation that the examiner external to the University not participate in the oral examination in person, but furnish the examination committee with a list of questions to be put to the candidate together with a detailed appraisal of the thesis. When acting in this capacity, the examiner external to the University is designated the external reader.

10.2.1 Examiner External to the University

The Graduate Program Director must recommend the examiner external to the University to the Dean at least six weeks before the proposed date of the examination on the form Approval of External Examiner or Reader, accompanied by a curriculum vitae. For further guidelines on external examiners and readers, refer to http://grad.ucalgary.ca/current/managing-my-program/examinations.

10.2.2 Relationship of the Examiner External to the University to the Student

In order to ensure impartiality, the proposed Examiner must not be a close personal friend of the candidate's Supervisor, have collaborated with the Supervisor in the last five years, be closely related to the candidate, nor have worked with the candidate, and must not have been a Supervisor in the candidate's graduate program for the last three years. If any of the criteria are not met, the proposed Examiner is not necessarily precluded from serving, but the graduate program must clearly explain the circumstances to the Faculty of Graduate Studies.

10.2.3 Non-Board Appointees on Examination Committees

Persons who are not Board appointees of the University of Calgary may be approved to serve on thesis oral examination committees. A recommendation to the Dean of Graduate Studies by the Graduate Program Director for such an appointment must be accompanied by a curriculum vitae.

10.2.4 The Neutral Chair

The examination is chaired by a neutral member of the academic staff appointed by the Graduate Program Director. He/she is not a member of the examining committee and is non-voting.

10.2.5 Responsibilities of the Supervisor and the Neutral Chair

The Supervisor arranges scheduling of the examination. The Neutral Chair presides over the thesis oral examination and reports the results to the student. The Neutral Chair gives the report to the Graduate Program Director who ensures that it is submitted to the Faculty of Graduate Studies within 24 hours of the examination.

10.3 Composition of Examination Committee for Re-take of Thesis Oral Examination

Normally, the composition of the examination committee will remain the same. Upon the recommendation of the Graduate Program Director and approval of the Faculty of Graduate Studies, an examiner may be replaced.

10.3.1 Appointment of Examination Committee for Re-take of Examination

The Notice of Thesis Oral Examination must be received in the Faculty of Graduate Studies office at least four weeks prior to the time of the examination. Should a new examiner external to the University be recommended, the Faculty of Graduate Studies must receive the recommendation at least six weeks before the proposed date of the examination on the form Approval of External Examiner or Reader, accompanied by a curriculum vitae.

11.0 Scheduling the Thesis Oral Examination

11.1 Supervisor Responsibility

The Supervisor is responsible for all steps in setting up the thesis oral examination.

11.2 Notice of Thesis Oral Examination

The official Notice of Thesis Oral Examination form, indicating the title of the thesis, the time and place of the examination, the names of the recommended members of the examination committee, and confirming that the candidate has completed all program requirements to proceed to oral examination, endorsed by the Graduate Program Director, must be received in the Faculty of Graduate Studies office at least four weeks prior to the time of the examination. Exceptions in the completion of all degree requirements may be made for students in Doctor of Education Programs (EdD), Clinical Psychology (CPSY) and Educational Psychology (EDPS). The membership of the examination committee must be approved by the Faculty of Graduate Studies.

11.2.1 Posting the Notice of Thesis Oral Examination

A Notice of the Thesis Oral Examination form, bearing the names, but not signatures of the student, the Supervisor, the Graduate Program Director and the Dean of Graduate Studies, or designate, must be posted at least two weeks before the date of the examination. The Graduate Program Director must ensure that copies of the Notice are sent to the student and to members of the examination committee.

11.2.2 Student Approval of Designated Area of Specialization

The format of the University degree parchment presented to successful candidates shows the degree, the department or area of study, and the approved area of specialization. Students should ensure that the approved area of specialization identified on the Notice of the Thesis Oral Examination form is correct, before it is sent to the Faculty of Graduate Studies.

11.3 Form of Thesis

The thesis submitted to the members of the examination committee for final examination must be in all respects a final, complete copy and not a draft.

11.4 Thesis to Examiners

The student must ensure that the thesis is in the hands of the examiners (including the examiner external to the University) at least three weeks prior to the proposed date of the oral examination. The examination begins when the thesis is distributed. The examiners should not discuss the thesis or their evaluation of it with each other (or anyone else) prior to the oral examination. The Examiner's Report is considered a confidential document and must not be shared with the candidate or the other examining committee members before the final decision of the examining committee.

11.5 Suspicion of Academic Misconduct

If an examiner suspects that academic misconduct, including plagiarism or fabrication/falsification of data, has occurred in the thesis, he/she must contact the Dean of Graduate Studies immediately. The examination will then be suspended until such time as the Dean or his/her designate is able to determine whether academic misconduct has occurred and what penalties will be applied. Depending on the Dean/designate's determination, the exam may proceed as scheduled, be rescheduled, or be cancelled.

11.6 Format of Final Thesis Oral Examination

Normally, final thesis oral examinations are open, but only the examiners may question the student. The examiners' deliberations are private and confidential. Only the Neutral Chair, the examining committee, and, if present, the Department/Program Head and the Dean of Graduate Studies or the Dean's Representative may be present.

12.0 Conduct of Thesis Oral Examination

12.1 Examiner's Report on Thesis

(Approved by FGS Council: Nov. 2, 2009)

Before the oral examination, each examiner is required to prepare an assessment of the thesis, on the official Examiner's Report on Thesis form. The oral examination cannot proceed until all of the Examiners' Reports are submitted to the Neutral Chair. These assessments are to be submitted to the Neutral Chair of the examination committee before the oral examination begins. The assessments are CONFIDENTIAL: they are not to be made available to the student or to the examination committee before the final recommendation of the examination committee. After the examination, the Neutral Chair should submit the reports to the Graduate Program Director who ensures that they are forwarded to the Faculty of Graduate Studies. After the examination, the graduate program must make the Examiners' Reports available to the student, upon request.

12.2 Examination Regulations

12.2.1 Formal Examination

The oral examination is a formal examination, not an informal discussion with the candidate.

12.2.2 Questioning of the Candidate

No one other than an examiner (as identified on the Notice of Thesis Oral Examination form) is allowed to question the candidate. All examiners must be given an opportunity to question the candidate early in the examination, e.g., by rounds of questioning.

12.2.3 Length of Examination

Ordinarily, the oral examination should not exceed two hours. This does not include deliberation time of the committee.

12.2.4 Editorial Comments on Thesis

Examiners' editorial comments on the thesis should not be discussed at the oral examination. It is recommended that each examiner hand the student a list of any such comments for post-examination final thesis revisions.

12.3 Suggested Examination Procedures

12.3.1 Opening Summary

It is common practice to ask the student to present a brief (up to fifteen minutes) opening summary of the thesis. Although this is not mandatory, students may appreciate the opportunity to introduce their research work and summarize its significance.

12.3.2 Questions to the Candidate

Questions to the candidate should be relevant to the subject matter of the thesis, and should be clearly and succinctly phrased in order to minimize doubt in the candidate's mind as to what is being asked. The student should be given reasonable time to answer. If the student has understood the question but cannot answer, the examiner should pass to another question and not attempt to extract an answer by prolonged interrogation. The chair should guard against any tendency of examiners to interact with each other instead of concentrating on the examination of the candidate.

13.0 Post Thesis Oral Examination Procedures

13.1 Provisional Recommendations

At the end of the thesis oral examination, everyone except the Neutral Chair, the members of the examination committee, the Department/Program Head or designate and the Dean of Graduate Studies and/or Dean's representative, is required to withdraw from the room. Before any discussion of the candidate's performance, each examiner must identify, by secret ballot, whether he/she favours recommending a pass or fail on each of the thesis and the oral defence. This procedure provides the committee with a frame of opinion upon which a full discussion of the student's performance may then be based.

13.2 Official Examiners' Discussion

Following a count of the straw vote the Neutral Chair will facilitate a post-examination discussion, in which the Department/Program Head and the Dean of Graduate Studies or their representatives may participate, although they have no vote. At the conclusion of the discussion, each examiner must write his/her final recommendations on the official Report of Doctoral Thesis Examination form. Unanimous decisions are required for both the thesis and the oral defence. If the examiners are unable to achieve unanimity regarding one or both components, there must be no further discussion regarding that component of the examination and the Neutral Chair must immediately inform the Dean of Graduate Studies of "lack of unanimity." The final decision will be at the discretion of the Dean of Graduate Studies.

13.3 Recommendation of Examination Committee

Thesis oral examinations are designed to establish a level of achievement consistent with the standards of the Faculty of Graduate Studies as outlined in section 4, "Thesis Quality Requirements." The following section (13.4) defines the official Faculty recommendations to the Dean of Graduate Studies respecting outcomes of thesis oral examinations. In each case, the committee recommendations must be reported to the Dean on the official Report of Doctoral Final Examination form within one working day of the completion of the examination. Immediately following the conclusion of the examination, the Neutral Chair must report the outcome to the student.

13.4 Recommendations

Thesis examinations must be judged to be either acceptable or unacceptable with respect to the thesis itself and, with respect to the oral defence, if the thesis is judged acceptable.

13.4.1 Recommendation for the Thesis

If the unanimous final decision is that the thesis conforms to the requirements for a doctoral thesis (see section 4) then all members of the examination committee shall sign the signature page except the Supervisor, who will sign after reviewing and approving any necessary minor corrections on behalf of the committee.

If the unanimous final decision is that the underlying research reported in the thesis is judged to be sound, but the presentation of or analysis in the research requires attention that one or more members of the examination committee wish to review personally, then those members will not sign the approval page until they have seen and approved the revisions. Other members of the committee should sign immediately after the examination. The Report of the examination should specify who has withheld his/her signature.

If the examining committee unanimously determines that the underlying research is not acceptable, then the examination committee recommends a failed thesis to the Dean of Graduate Studies. The final decision will be at the discretion of the Dean of Graduate Studies. Should the Dean of Graduate Studies uphold the recommendation of "fail", the candidate will have a second opportunity to present and defend an acceptable thesis. No judgment should be made on the oral

defence, because the revised thesis will need to be defended anew.

If the examiners fail to arrive at a unanimous final recommendation, the Neutral Chair must adjourn discussion on this component of the examination, and that same day inform the Dean of Graduate Studies of 'lack of unanimity.' The final decision will be at the discretion of the Dean of Graduate Studies.

For either a unanimous decision to fail the thesis or a lack of unanimity, within five working days the Neutral Chair must submit a written report to the Dean of Graduate Studies, describing the examination procedures and copy it to the Graduate Program Director. Within five working days, each examination committee member must provide a confidential written report to the Dean of Graduate Studies explaining the reasons for his/her recommendation and copy it to the Graduate Program Director and the Supervisor. After consultation with the Supervisor, the Graduate Program Director then summarizes the essential points in a written report to the student, copied to the Supervisor.

In the case of a failed thesis, whether by committee or Dean's decision, only one re-submission will be allowed and a new defence will be required. In view of the magnitude of the revisions required, a second oral exam must be held no sooner than six months and no later than twelve months from the date of the first examination. This new examination will normally be conducted by the original examination committee.

In reporting the results of the second examination, the committee will be limited to recommending either pass or fail. A recommendation for 'fail' requires that each examiner submit within five working days a confidential written report to the Dean of Graduate Studies, copied to the Graduate Program Director, and the Supervisor detailing the reasons for his/her assessments. Within five working days, the Neutral Chair must also submit a written report of the examination procedures to the Dean of Graduate Studies, copied to the Graduate Program Director. If the Dean of Graduate Studies upholds the recommendation to fail, the student will be required to withdraw from the Faculty of Graduate Studies.

13.4.2 Recommendation for the Oral Defence

If the unanimous final decision is that the oral defence is acceptable, the recommendation regarding the oral defence is a pass.

If the examining committee unanimously determines that the oral defence is not acceptable, then the examining committee recommends a failed oral defence to the Dean of Graduate Studies. The final decision will be at the discretion of the Dean of Graduate Studies. Should the Dean of Graduate Studies uphold the recommendation of 'fail', the candidate will be allowed a second, final attempt to present an acceptable oral defence of the thesis.

If the examiners fail to arrive at a unanimous final recommendation, the Neutral Chair must adjourn discussion on this component of the examination, and that same day inform the Dean of Graduate Studies of 'lack of unanimity.' The final decision will be at the discretion of the Dean of Graduate Studies.

For either a unanimous decision to fail the oral defence or a lack of unanimity, within five working days the Neutral Chair must submit a written report to the Dean of Graduate Studies, describing the examination procedures and copy it to the Graduate Program Director. Within five working days, each examination committee member must provide a confidential written report to the Dean of Graduate Studies explaining the reasons for his/her recommendation and copy it to the Graduate Program Director and the Supervisor. After consultation with the Supervisor, the Graduate Program Director then summarizes the essential points in a written report to the student, copied to the Supervisor.

In the case of a failed oral defence, whether by committee or Dean's decision, the candidate will be given only one further opportunity to present an acceptable defence. The second oral examination will be scheduled and normally heard by the original examination committee not later than six months from the date of the first examination. Any necessary revisions to the thesis must be completed by the candidate and approved by the committee before the second oral examination is scheduled.

In reporting the results of the second oral examination, the committee will be limited to recommending either pass or fail. A recommendation for 'fail' requires that each examiner submit within five working days a confidential written report to the Dean of Graduate Studies, copied to the Graduate Program Director, and the Supervisor, detailing the reasons for his/her assessments. Within five working days, the Neutral Chair must also submit a written report of the examination procedures to the Dean of Graduate Studies, copied to the Graduate Program Director. If the Dean of Graduate Studies upholds the recommendation to fail, the student will be required to withdraw from the Faculty of Graduate Studies.

13.5 Dean's Action in Lack of Unanimity

When the Neutral Chair of a thesis oral examination does not report a unanimous recommendation, the Dean of Graduate Studies may consult with the Graduate Director, the Supervisor, and the examiners before making a decision. At her/his discretion, the Dean of Graduate Studies may consult with the student as well. A decision should normally be made within seven business days of receiving all the required post-examination reports, and all persons involved informed in writing of the result of the decision.

13.6 Exam Procedural Irregularities

Any procedural irregularities should be reported to the Dean of Graduate Studies within 5 working days of the examination date, regardless of the outcome of the exam.

13.7 Convocation Clearance

The names of the candidates who have successfully completed the final thesis oral examination will not be added to the convocation list until the Faculty of Graduate Studies receives two unbound copies of the thesis and a Departmental Clearance Form. Students will continue to be assessed continuing fees until cleared for convocation.

13.8 Delays in Public Release of Theses

The University of Calgary is a publicly funded institution and much of our research is sponsored by government funding. As such, the University has an obligation to ensure that this research is available for the benefit of the public at large, for example, through the University of Calgary's online repository. However, in some circumstances where it would be detrimental to the author or the sponsor of the thesis research to have the thesis made publicly available immediately upon completion, the copyright owner of a thesis may request that it be withheld from public distribution for a period of time. Valid reasons to withhold a thesis from public distribution include:

1. A contract between the research sponsor and the University specifies a period of confidentiality (normally up to two years; proof of contract is required)
2. Applying for a patent (normally up to two years; proof of application is required)
3. Enabling publication in a scholarly venue (normally up to five years; a publication plan is required)
4. Publishing of the creative portion of a creative work (normally up to five years with the possibility of extending to duration of copyright; supporting document such as proof of contract, letters from the publisher are required). Controlled access to the complete thesis will be available through the University of Calgary Archives after the initial withhold period.

A Thesis Withhold Form may be obtained from the Faculty of Graduate Studies. Once the appropriate signatures have been obtained, and the Dean of Graduate Studies has approved the request, the copyright owner of the thesis, the department and the University of Calgary Archives will receive copies of the form. Once the withhold period expires the thesis will be sent to Library and Archives Canada, and will also be made available to the public. In the event that a withhold is requested to be released earlier than scheduled, a memo must be supplied explaining the reasons for such a request and must demonstrate consent from all related parties.

TRANSFERS

14.0 Transfers Within Program

14.1 Application for Change of Area of Specialization

A student may apply through the graduate program to the Dean for permission to transfer from one area of specialization to another

while remaining within the degree program. Such application must be made prior to the candidacy examination.

15.0 Transfers to Master's Programs

15.1 Transfer from Doctoral to Master's Program

A transfer from a doctoral program to a Master's program, within closely related areas of specialization, may be recommended where, in the opinion of the Graduate Program Director and the Supervisor, such a transfer is in the best interest of the student. Such application should normally be made before the candidacy examination. Transfers may be approved if the student is unsuccessful in the candidacy oral examination on the first attempt. The Dean of Graduate Studies and the Graduate Program Director of the Master's program to which the student transfers must approve the transfer.

15.2 Course and Examination Requirements

Courses credited to the doctoral program may be accepted as fulfilling Master's course requirements where applicable, in accordance with program regulations for required Master's course work. Such a student must complete all requirements for the Master's degree.

15.3 Time Limits on Transfers

Transfers from a doctoral to a Master's program should normally be completed no later than the beginning of the student's third annual registration year. All transfer students must complete the Master's degree program within their fourth registration year.

Part IV: Policy Governing the Relationship Between Supervisor and Student

Introduction

This document addresses the nature of supervisory relationships between graduate students and their Supervisors at the University of Calgary and clarifies the mutual obligations of all parties involved in the graduate supervision process. This document applies to supervisory relationships in both thesis and, where applicable, course-based programs. This document is divided into two parts. Part One outlines the responsibilities of the Faculty of Graduate Studies (FGS), the graduate program, the Supervisor, and the student. Part Two focuses upon the process that should be followed if conflicts arise between a student and Supervisor.

PART ONE

The Faculty of Graduate Studies

Specific responsibilities of the Faculty of Graduate Studies with regard to graduate supervision are as follows:

a) to act as an advocate for graduate students and graduate programs within and outside the university, and to seek to establish and maintain a climate which promotes academic excellence and expeditious completion of graduate programs;

(b) to offer mechanisms for the resolution of graduate student/Supervisor disputes and other supervisory issues which cannot be settled at the program level;

(c) to advise regarding intellectual property, publication of materials, equity issues, scholarly integrity and other relevant policies and procedures at the University of Calgary.

The Graduate Program

The role of the graduate program is to create a supportive environment within which scholarly work by graduate students can prosper, to provide available resources to support graduate students, and to resolve problems in an expeditious manner. Specific responsibilities are as follows:

(a) to make available to faculty and students a graduate student handbook or collected documents that include current course information, areas of expertise of faculty members, program requirements, funding policies, teaching assistantships, appeal mechanisms, and procedures for progress and completion of Master's and doctoral programs;

(b) to make available to students relevant non-confidential information on potential Supervisors (e.g., number of current graduate students, funding, time to completion of previous students);

(c) to set up procedures that match students and Supervisors, with the matching to be completed as quickly as possible and in all cases within twelve months of initial registration; a student should not be admitted unless an appropriate Supervisor is available;

(d) to make available a mail delivery point and, wherever possible, desk space;

(e) to monitor progress of the student through ensuring that Annual Progress Reports are completed on time, and to ensure that the student and Supervisor understand that the Annual Progress Report is a critical component of documenting whether the student's performance is satisfactory;

(f) to inform FGS promptly should there be unresolved concerns about either the Supervisor's effectiveness or the student's performance;

(g) to establish clear and fair procedures for such matters as funding, teaching assistantships, and examinations;

(h) to ensure compliance with University of Calgary policies regarding ownership and utilization of data;

(i) to ensure that supervising arrangements are made when research supervisors are absent;

(j) to ensure that the graduate program is free from harassment and discrimination, and that the program's policies and procedures can accommodate diverse student needs and special circumstances;

(k) to ensure that international students and their Supervisors are made aware of current legislative requirements as defined by Citizenship and Immigration Canada (http://www.cic.gc.ca/) so that applicable student visas and employment authorizations are applied for in a timely fashion and maintained throughout the period of registration in the program;

(l) to ensure that current information is made available to eligible students in regard to deadlines and procedures for awarding graduate and postdoctoral fellowships, GAT's, GTF's, and other graduate funding;

(m) to encourage the interaction of graduate students with other students and faculty, and the development of a professional identity through research seminars, posting of conferences, and other means;

(n) to maintain an atmosphere conducive to creativity and productivity, and to provide mechanisms for resolving problems which may arise between graduate students and their Supervisors or members of Supervisory Committees;

(o) to provide an avenue whereby students can inform the program of areas where it might be improved.

The Supervisor

The role and responsibilities of the Supervisor are outlined in Article 2 of the Doctoral and Master's Thesis-based Handbooks. Specific practices constituting good supervision include the following:

(a) to assist the student with the selection and planning of a suitable and manageable research topic with due consideration of the resources necessary for completion of the research project;

(b) to accommodate reasonable demands (e.g., teaching assistantships) or special circumstances or needs of the student that affect the student's progress;

(c) to be accessible to the student for consultation and discussion of the student's academic progress and research. The frequency of the meetings will vary according to the discipline and the nature and stage of the project, but normally interaction, which may be electronic, should occur at least once per month;

(d) to respond in a timely manner to written work submitted by the student with constructive suggestions for improvement. The turnaround time for comments on written work should not normally exceed three weeks;

(e) to achieve consensus and resolve differences when there is conflicting advice or when there are different expectations on the part of co-supervisors or members of the Supervisory Committee;

(f) to be familiar with the rules and procedures of the Faculty of Graduate Studies, and the graduate program, including the chronological sequence of events and deadline dates in a student's program;

(g) to assist the student to be aware of current program requirements, deadlines, sources of funding, and general expectations of examinations;

(h) to help ensure that the research environment is safe, healthy and free from harassment, discrimination and conflict;

(i) to encourage the student to make presentations of research results within the University and to outside scholarly or professional bodies as appropriate;

(j) to acknowledge the contributions of the student in presentations and in published material, including joint authorship, if appropriate;

(k) to discuss with the student the Intellectual Property Checklist (available at http://grad.ucalgary.ca/current/managing-my-program/supervision) and conform to University and other policies regarding intellectual property, scholarly integrity, and other policies applicable to the research environment.

The Student

In undertaking a graduate program, graduate students make a commitment to devote the time, effort and energy necessary to engage in scholarship. Students should demonstrate initiative in their research, recognize that their Supervisors are responsible for providing guidance as well as evaluating their performance, and be receptive to suggestions and criticisms about their scholarly performance. Whether in a course-based or thesis-based program, students must comply with the rules, procedures and standards in place in the program and at the University and should be familiar with the regulations regarding academic and non-academic matters as per the University Calendars. Specific responsibilities are as follows:

(a) to gain the background knowledge and skills needed to pursue the research project successfully;

(b) to work with the Supervisor on the establishment of a realistic timetable for the completion of the various requirements of the program of study, and to adhere to the timetable and to meet deadlines;

(c) to meet with the Supervisor and Supervisory Committee when requested and to report fully and regularly on progress and on results, and to consider and respond to advice and criticisms received from the Supervisor and the other members of the Supervisory Committee. The frequency of meetings with the Supervisor will vary according to the discipline and the nature and stage of the project, but normally interaction, which may be electronic, should occur at least once per month;

(d) to work with the Supervisor to ensure that appropriate ethics approval is obtained prior to conducting research on animals or humans;

(e) to provide accurate and honest reporting of research results and to uphold ethical norms in research methodology and scholarship;

(f) to discuss with the Supervisor the Intellectual Property Checklist (available at http://grad.ucalgary.ca/current/managing-my-program/supervision) and conform to University, and other policies regarding intellectual property, scholarly integrity, and other policies applicable to the research environment;

(g) to discuss with the Supervisor faculty and program requirements, including those related to deadlines, thesis or dissertation style, course requirements, and conflict of interest;

(h) to discuss with the Supervisor the responsible use of resources, and to assist in obtaining additional resources for the research;

(i) to bring to the attention of the Supervisor other responsibilities and the estimated time commitment (e.g., teaching assistantships) or special circumstances or needs that affect program progress;

(j) to bring to the attention of the Supervisor any matters of conflicting advice or expectations on the part of members of the Supervisory Committee;

(k) to recognize that the Supervisor and other members of the Supervisory Committee may have other teaching, research and personal obligations which may preclude immediate responses;

(l) to work with the Supervisor to meet agreed performance standards and deadlines of the funding organization when financing has been provided under a contract or grant;

(m) to acknowledge the contributions of the Supervisor and others in presentations and in published material, including joint authorship, if appropriate;

(n) to help ensure that the research environment is safe, healthy and free from harassment, discrimination and conflict;

(o) to act responsibly upon conclusion of the project by leaving a clean work space, returning borrowed materials, and providing the Supervisor with appropriate documentation of software, data, experimental procedures so that others may continue the research.

PART TWO

Resolving Problems Between Students and Supervisors

The relationship between the student and Supervisor is central to graduate education, and is normally close and long-lasting. If the relationship between a student and a Supervisor breaks down, the program has a responsibility to mediate. This is more likely to be successful if attended to as early as possible. Since it is the responsibility of the Graduate Program Director to arrange for the necessary consultation and mediation, the Graduate Program Director should be consulted as soon as the conflict becomes apparent. If supervision problems cannot be resolved within the graduate program, the relevant Associate Dean and/or Dean of the Faculty of Graduate Studies may assist.

Should no satisfactory resolution be obtained through consultation and mediation, the Graduate Program Director may, with well documented and justifiable reasons, recommend that the Supervisor be changed.

It is the responsibility of the graduate program and the Faculty of Graduate Studies to ensure that the student receives an opportunity for an academic experience that includes the proper supervision of the student's program and thesis (if applicable). Although the graduate program delivers the academic and supervisory component, the Faculty of Graduate Studies must work closely with all parties to ensure that the responsibilities are met. If the best arrangements of the graduate program and the Faculty of Graduate Studies fail to meet the expectations of the student, then no more can be done within that graduate program and the student may decide that the supervisory arrangement is untenable. At such time, the option to apply to another graduate program should be explored or, if that fails, the student may choose to withdraw without prejudice.

It may be that the student is unwilling to accept the supervision provided, or wishes to switch topics from that which was originally indicated at the time of admission. The graduate program and the Faculty of Graduate Studies have no responsibility to agree to alternate supervisory arrangements if they cannot reasonably be accommodated. The graduate program should consult with the Faculty of Graduate Studies and then inform the student clearly about what supervisory arrangements will, or will not, be provided. The graduate program should also clarify whether changing the Supervisor requires approval of a new thesis proposal. If the student disagrees, the option to withdraw or apply to another graduate program without prejudice remains open. If the student chooses to continue but refuses to accept the supervision provided, then the student is not fulfilling the academic requirement of having a Supervisor (or Supervisory Committee). Therefore, the student may, on academic grounds, be required to withdraw. This is a serious action, and should not be taken unless the graduate program and the Faculty of Graduate Studies have explored with the student all other reasonable solutions.

In some cases, there may be no academic reason for requiring a student to withdraw, but the student's actions (e.g., disruptive or abusive behaviour) may lead to the breakdown of effective supervision. In such instances, the graduate program shall refer to the University policy on Non-Academic Misconduct or other University policies.

Acknowledgements

This section benefitted significantly from the University of British Columbia document entitled Guidelines for the Various Parties involved in Graduate Student Thesis Research and the University of Alberta's FGSR Graduate Manual.

Program Descriptions

Anthropology ANTH

Contact Information

Location: Earth Sciences Building, Room 620

Program number: 403.220.6517

Fax: 403.284.5467

Email address: boydj@ucalgary.ca

Web page URL: http://anth.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based

Specialization:

- Biological Anthropology (Interdisciplinary)*

**See the Calendar section on Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) A minimum grade point average of 3.30 or higher on a four-point scale.

b) An example of the applicant's written work: a term paper, research paper or other writing which the applicant considers representative of his or her best work.

c) A concise statement outlining the applicant's academic interests and reasons for wishing to pursue graduate work in this Department. The thesis research area should be clearly identified.

d) Completion of Departmental Information form.

e) Two letters of reference.

Doctor of Philosophy

a) A minimum grade point average of 3.40 or higher on a four-point scale.

b) Two letters of reference.

3. Application Deadline

The deadline for the submission of complete applications is February 1 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to the required level for admission.

5. Program/Course Requirements

In addition to the Faculty requirements, the Department requires:

Master of Arts

Candidates for the MA degree are normally required to complete a minimum of two full-course equivalents in Anthropology at the 600 level. At the discretion of the Graduate Studies Committee, students with deficient background may be required to take a total of two and one half full-course equivalents of course work in Anthropology. The following courses are required of all master's students: Anthropology 603, 605, 611 or 613, 631 or 635.

Doctor of Philosophy

a) A specialization of either primatology, or social and cultural anthropology.

b) Anthropology 701, a reading course in the student's substantive area. Beyond that, the supervisory committee will individually tailor each student's course requirements to the student's particular needs.

c) For social and cultural anthropology, fieldwork outside the student's broad cultural milieu for a minimum of one year. Students in primatology will be required to collect primary data via experimental and/or observational research on wild or captive primate populations for a period of not less than twelve months.

d) Demonstrated proficiency in a language other than English. Normally, in the course of the doctoral program, competent faculty in other Departments will evaluate the student's linguistic competence, principally in reading and writing.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599, which are considered undergraduate courses.

8. Time Limit

Expected completion time is two years for the Master of Arts degree and four years for the Doctor of Philosophy degree. Maximum completion time is four years for the Master of Arts degree and six years for the doctoral degree.

9. Supervisory Assignments

A supervisor is assigned to each student upon entering the program.

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10. Required Examinations

The doctoral candidacy examination has a written and an oral component, and examines areas of knowledge determined by the supervisory committee in consultation with the student.

Questions on the research proposal will not be included in the oral candidacy examination.

Final thesis oral examinations are open.

11. Research Proposal Requirements

Students are required to submit and successfully defend a research proposal fourteen months after initial registration. The defence is open to interested faculty members and graduate students of the Anthropology Department.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance in the form of research and teaching assistantships is available to qualified students. Information on awards can be obtained from the Department office or in the Awards and Financial Assistance section of this Calendar. All students are strongly encouraged to seek external financial assistance for the program, as the Department of Anthropology cannot guarantee the availability of financial assistance.

Students applying for the Open Scholarship Competition must submit their applications to the Department by January 25.

14. Other Information

A complete description of the rules and regulations, and the facilities available to Anthropology graduate students, is available on line at: http://anth.ucalgary.ca/graduate.

15. Faculty Members/Research Interests

Faculty members and their research interests can be found at http://anth.ucalgary.ca/people.

Archaeology ARKY

Contact Information

Location: Earth Sciences Bldg., Room 806

Program number: 403.220.5227

Fax: 403.282.9567

Email address: nethier@ucalgary.ca

Web page URL: http://arky.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based

Specialization:

- Biological Anthropology (Interdisciplinary)*

**See the Calendar section on Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

a) A specimen of relevant written work (an honours essay, term paper, or seminar essay bearing the grade and initials of the supervising professor, the analysis chapter of a Master of Arts thesis or a published article where the applicant is the sole or senior author).

b) A concise statement setting forth the reasons for wishing to pursue graduate work in this department.

c) An up-to-date curriculum vitae.

d) A 3.30 grade point average in the last two years of program or over the last ten full-course equivalents.

e) Two letters of reference from individuals able to evaluate academic potential.

3. Application Deadline

The deadline for the submission of complete applications is January 15 for September admission.

4. Advanced Credit

The Department does not normally give advanced credit.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) Normally, two full-course equivalents including one of the following, as determined by the student's evaluation committee: Archaeology 615 or 617.

b) One of: Archaeology 615 or 617.

c) Two courses, which may include: Anthropology 605, Archaeology 601, a course in human osteology, or other courses as determined by the student's evaluation committee.

d) One of: Archaeology 625, 627, 631, 633, 635.

d) A season of fieldwork or the equivalent.

Doctor of Philosophy

a) Normally, three full-course equivalents in Archaeology.

b) For those without a Master of Arts degree, normally four full-course equivalents.

Note: The number of courses required of each student may vary according to each student's particular needs as determined by the supervisory committee.

c) Unless previously satisfied, Archaeology 601 and one of the following: Archaeology 615 or 617.

d) Two of: Archaeology 625, 627, 631, 633, 635.

e) Anthropology 605 or its equivalent.

Other courses will be required as determined by the student's evaluation committee.

f) A research proposal approved by a committee consisting minimally of three members of his or her supervisory committee, and by the Graduate Program Director. This must be submitted within twenty months of entering the program.

g) A reading ability in a foreign language acceptable to the Department. The student's supervisory committee will decide the manner of demonstrating this ability.

Requirements (a) through (g) must be completed before sitting the written and oral components of the candidacy examination.

h) Normally, two seasons of fieldwork. However, students specializing in laboratory-based topics, like physical anthropology, may substitute an approved program of laboratory work for one of the fieldwork seasons.

6. Additional Requirements

During the first two weeks in program, each student will undergo an evaluation. This is not an examination but an assessment of academic background. The specific regulations and procedures covering evaluations and examinations are on file in the Department Office and are available to students. It is the responsibility of every student to become familiar with these regulations.

Fieldwork may be counted towards fulfillment of the full-time study and research requirement.

7. Credit for Undergraduate Courses

Normally only courses at the 500 level or higher may be taken for credit toward a graduate program. No more than two courses may be at the 500 level.

8. Time Limit

Expected completion time is two years for the Master of Arts degree and four years for the Doctor of Philosophy degree. Maximum completion time is four years for the Master of Arts degree and six years for the doctoral degree.

9. Supervisory Assignments

The Department assigns an interim advisor to each student upon arrival. At any time before the end of the first year of studies, each student must select a faculty member to serve as supervisor. The interim advisor may become the supervisor.

Doctoral supervisory committees may be appointed at any time during the first year of studies, but no later than three months after the appointment of the supervisor. The supervisor, in consultation with the student, selects the committee.

10. Required Examinations

Questions on the research proposal will not be included in the oral candidacy examination.

Final thesis oral examinations are open.

11. Research Proposal Requirements

Within twenty months of entering the program, the student, with the supervisor's advice, develops a thesis research proposal. This is then transmitted to the student's supervisory committee for agreement and to the Graduate Program Director for approval and placed on file.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance in the form of research and teaching assistantships may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to the Department by January 15.

Funding is provided to students so that they can concentrate on their courses and research. Therefore, a graduate student is not allowed to work for more than 15 hours a week while holding departmental funding. Failure to abide by this policy will result in a decrease in or cancellation of departmental funding.

14. Other Information

The Department has laboratories equipped for anthropometric and osteological analysis, faunal analysis, and microbotanical and geoarchaeological research. A number of teaching and comparative archaeological and zooarchaeological collections are maintained. Field equipment including survey, photographic and camping equipment is available.

15. Faculty Members/Research Interests

The active research interests of current faculty members can be found at

http://arky.ucalgary.ca/contact-us/directory.

Note: Individual specializations are also listed in the Department's Graduate Brochure, published annually, and available upon request from the Department.

Art ART

Contact Information

Location: Art Building 612

Program number: 403.220.6260

Fax: 403.289.7333

Email address: artgrad@ucalgary.ca

Web page URL: http://art.ucalgary.ca/graduate

1. Degrees and Specializations Offered

Master of Fine Arts (MFA), thesis-based

Students applying for the MFA degree offered by the Department of Art may choose to identify one of the following formal specializations:

Specializations:

- Sculpture
- Printmaking
- Photography
- Painting
- Drawing
- Media art and technology

Applicants interested in a master of arts degree or a doctoral degree in Art on a special case basis should review the program's website to determine any additional requirements or restrictions, and then, if appropriate, contact the graduate program representative. Information on the Faculty of Graduate Studies Special Case Policy can be found at http://grad.ucalgary.ca/prospective/admissions/special-case.

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

a) A four-year Bachelor of Fine Arts degree or equivalent qualification.

b) A portfolio of 20 recent works presented in jpeg format on disk.

c) A three to five page written statement of intent.

d) Two reference letters.

3. Application Deadline

The deadline for the submission of complete applications is January 15 for September admission.

4. Advanced Credit

Not applicable.

5. Program/Course Requirements

The program core for all Master of Fine Arts students is a minimum of four full courses. Within the first twelve months of the program each student must complete one full-course equivalent 600-level studio course; one half-course equivalent 600-level graduate seminar, and Art 601 and 605. One half-course equivalent 600-level graduate seminar and one full-course equivalent 600-level studio course must be completed in the second twelve months of the program. In some circumstances, the Department may require a student to complete more than the four mandatory full courses.

6. Additional Requirements

Additional requirements for the Master of Fine Arts degree include an exhibition of the student's work, a supporting paper, and an oral examination.

7. Credit for Undergraduate Courses

Not applicable.

8. Time Limit

Expected completion time for the Master of Fine Arts degree is two years. Maximum completion time is four years.

9. Supervisory Assignments

Each new student is assigned an interim advisor to assist in the planning of the academic program and in orienting the student to the Department's physical and academic resources. A permanent supervisor is appointed by January 1 of the first academic year of registration. The approval of a permanent supervisor, by the Graduate Program Director, is made after consultation with the student. Supervisors work closely with students in all phases of the program; they have the principal responsibility in assessing the student's performance, and advising the Department Head of the student's progress.

10. Required Examinations

Final thesis oral examinations are open.

11. Research Proposal Requirements

Not applicable.

12. Special Registration Information

The program requires an initial registration as a full-time graduate student for two consecutive years. A minimum of twenty-four months of full-time study is usually necessary to complete the degree requirements.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards see the Awards and Financial Assistance section of this calendar.

Students applying for scholarships must submit their applications to the Department of Art by January 15.

14. Other Information

The Department has extensive facilities for drawing, painting, sculpture, digital and silver-based photography, printmaking, and media arts.

15. Faculty Members/Research Interests

Faculty members and their research interests can be found at http://art.ucalgary.ca/contact-us/directory.

Biological Sciences BISI

Contact Information

Location: Biological Sciences Building, Room 186

Program number: 403.220.6623

Fax: 403.289.9311

Email address: biograd@ucalgary.ca

Web page URL: http://www.bio.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Specializations:

- Biochemistry
- Biophysical Chemistry
- Cell Biology
- Developmental Biology
- Ecology
- Environmental Microbiology
- Evolutionary Biology
- Molecular Microbiology
- Physiology
- Structural Biology
- Host-Pathogen Interactions

- Energy and Environmental Systems (Interdisciplinary Specialization)*

**See the Calendar section on Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to Faculties of Graduate Studies and Science requirements, the Department requires:

a) A minimum grade point average of 3.20 on a four-point scale during the last two full years or equivalent.

b) For students required to provide proof of proficiency in English; a TOEFL score of 580 (written test), or 92 (Internet-based test), or an IELTS score of 7.5, or a MELAB score of 82, or a PTE score of 64.

c) A concise statement outlining the applicant's research interests and reasons for wishing to attend the University of Calgary.

d) Three academic reference letters and the required reference form.

Exceptional students may apply to a PhD program without an MSc recognized by the Faculty of Graduate Studies. In such cases, requirements in addition to those outlined above include: a four-year BSc or equivalent degree from a recognized institution with a minimum GPA of 3.60 (four-point scale) during the last two full years; and a full-year research project with a minimum grade of 3.70.

Transfer from a MSc to a PhD program is allowed for students who have successfully completed all courses required for the MSc degree, and who have demonstrated outstanding research ability and potential to their Supervisory Committee. Normally, evidence of this ability will include, but not be limited to, a grade point average of 3.60 for the courses completed during the MSc program.

3. Application Deadline

Deadlines for submission of complete applications for students with international transcripts:

May 1 for September admission

September 1 for January admission

January 1 for May admission

Deadlines for submission of complete applications for students with Canadian or U.S. transcripts:

June 1 for September admission

October 1 for January admission

March 1 for May admission

4. Advanced Credit

Not applicable.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Science requirements, the Department requires:

a) Completion of a minimum of one full-course equivalent for both the Master of Science and doctoral programs. Students transferring from the MSc program to the PhD program will be required to take a minimum of one half course in addition to work already completed. Please note that graduate courses must be chosen in consultation with the supervisor and approved by the Graduate Program Director. Course requirements may include courses offered by other Departments.

b) Completion of the appropriate number of Biology 601 Research Seminar courses in addition to (a) above.

c) Presentation of a Departmental Pre-Defence seminar on the results of the thesis research.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

At least one-half of a graduate student's coursework must be at the 600 level or higher.

Only when appropriate to a student's program may graduate credit be received for courses numbered 500-599, which are considered undergraduate courses. Courses below the 500 level will not be accepted for graduate credit.

8. Time Limit

Expected completion time is two years for the Master of Science degree and four years for the Doctor of Philosophy degree. Maximum completion time is four years for the Master of Science degree and six years for the Doctor of Philosophy degree.

9. Supervisory Assignments

Applicants normally contact specific faculty members about possible supervision. The Department does not accept students unless at least one faculty member has indicated a willingness to act as supervisor. For both MSc and PhD programs, the supervisor, in consultation with the student, selects a Supervisory Committee consisting of the supervisor and at least two other faculty members whose research experience will be beneficial to the student's graduate program.

10. Required Examinations

Doctoral Candidacy Examinations have a written component followed by an oral component. Doctoral candidates are given three weeks to complete a critical review essay and either a simulated research proposal or a focused essay, as determined by the Examination Committee. All written and oral components of the Candidacy Examination will focus on the student's field of specialization, as identified previously by the Examination Committee. One week after the submission of the written answers, the oral component will take place.

The oral candidacy exam will be based on the written essays and general research knowledge. Questions on the research proposal will not be included in the oral candidacy examination.

Final Thesis Examinations are required at both the Master of Science and doctoral level. A public "Exit" Seminar preceding the examination is required.

11. Research Proposal Requirements

Both Master of Science and doctoral students must present a written research proposal to their Supervisory Committees no later than twelve months after initial registration in program.

12. Special Registration Information

A request to transfer from the Master of Science program to the doctoral program may be made no later than twenty-four months after initial registration. Students who transfer will be required to take one additional half course, regardless of course work completed before the transfer, and are expected to meet the 36-month deadline for the candidacy examination.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for the Open Scholarship Competition must submit their scholarship applications to the Department of Biological Sciences by the appropriate deadline. Please contact georges@ucalgary.ca for further information.

14. Other Information

None.

15. Faculty Members/Research Interests

The research interests of current faculty members can be found at http://bio.ucalgary.ca/research/index.html.

Biomedical Engineering BMEN

Contact Information

Location: ENA 121C

Program number: 403.220.3835

Fax: 403.210.8119

Email address: bmegrad@ucalgary.ca

Web page URL: http://www.ucalgary.ca/bme/graduate

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Master of Engineering (MEng), thesis-based

Specialization:

- Medical Imaging (Interdisciplinary)*

**MSc and PhD degrees only. See the Calendar section on Interdisciplinary Specializations for further information.*

The curriculum is designed for students with degrees in Engineering, Medicine, Physical Sciences, or Life Sciences. Background experience and qualifications, as well as areas of interest of the applicants will be taken into account at the time of admission. The appropriateness of the undergraduate preparation of the applicant must be supported by the proposed supervisor(s). Students in the

MSc and PhD degree programs are normally considered full-time.

2. Admission Requirements

In addition to Faculty of Graduate Studies, the program requires: minimum GPA requirements are 3.00 for the MEng (thesis-based) program, 3.20 for the MSc program, and 3.50 for the PhD program, all on a four-point scale.

For admission to the MEng (thesis-based), MSc or PhD program, students must provide two reference letters with their application package.

For admission to the MEng (thesis-based) program, students must have an approved four-year undergraduate degree in engineering.

MEng (thesis-based), MSc and PhD students can only be accepted upon identification of one or more approved Biomedical Engineering Graduate Program supervisors who are willing to supervise and fund the applicant (funding for MSc and PhD students only).

International students are required to demonstrate proficiency in the English language, in accordance with the guidelines of the Faculty of Graduate Studies. All students must meet the admission requirements of both the Faculty of Graduate Studies and the Biomedical Engineering Graduate Program.

Transfer of appropriately qualified MSc students directly into the PhD program is encouraged. Students wishing to transfer must do so between 8 and 16 months of first registration. For transfer a minimum GPA (over a minimum of three half-course equivalents, including Biomedical Engineering 612 (or 601) and 614 (or 603)) of 3.50 is required. In addition, a research proposal, approved by the supervisory committee, must be submitted to the Biomedical Engineering Graduate Program. Applications for transfer must be supported by both the supervisor and the supervisory committee.

3. Application Deadline

Students applying for MSc and PhD programs may be admitted for September, January, or May. Students applying for the MEng (thesis-based) program may be admitted for September start only. For all programs, deadlines are three months prior to the start of the semester (i.e., June 1 for September admission, etc.) for students holding a degree from a recognized Canadian or U.S. University, and six months prior to the start of the semester (i.e., March 1 for September admission, etc.) for students holding a degree from another recognized international University.

4. Advanced Credit

Credit may be granted with approval of the Biomedical Engineering Graduate Program. Advanced standing will not be granted for Biomedical Engineering 612 or 614.

5. Program/Course Requirements

Master of Science/Doctoral of Philosophy

For a Master of Science degree, all students are required to take a minimum of four half courses as approved by the Biomedical Engineering Graduate Program. Note the sequence of Biomedical Engineering 611 and 612 as well as Biomedical Engineering 613 and 614 each count as one half-course equivalent.

For a Doctor of Philosophy, two further half courses are required beyond the Master of Science requirements. For students who transfer from an MSc program, six graduate half courses are required beyond the BSc, or equivalent, degree.

All MSc and PhD students are required to take two half-course equivalents of Core Courses plus a BME program seminar course (either Biomedical Engineering 605 or 607). The Core Courses are offered as quarter courses (Biomedical Engineering 611, 612, 613 and 614). Students who have an acceptable MSc degree and can demonstrate that they have covered equivalent material to Biomedical Engineering 611 and 613 may opt out of one or both of these courses but must replace these two quarter courses with an elective half course to meet the overall course requirements.

Other courses may be chosen from the listing of Additional Courses or approved courses from other departments (see website for most recent information: http://www.ucalgary.ca/bme/graduate). Other relevant courses, not on the Additional course list or Program's website, require the approval of the supervisor and the Biomedical Engineering Graduate Program. Students may be required to take senior undergraduate courses as deemed by their Supervisory Committee, but graduate credit will only be granted for senior undergraduate courses as approved by the Biomedical Engineering Graduate Program.

In addition to the course requirements, all MSc and PhD students are required to complete a research project and to submit a written thesis in compliance with the regulations of the Faculty of Graduate Studies.

Medical Imaging Specialization

This specialization is open to MSc and PhD students and requires completion of a course sequence in Medical Imaging plus additional specialization requirements (see MEDI entry). MSc students must take a minimum of two courses (the core and a foundational course). PhD students would take three courses (including the core, a foundational and an elective course). PhD students previously completing the MSc Specialization in Medical Imaging will be required to complete one elective course in medical imaging. These requirements are in addition to the core program requirements of the BME Graduate Program. The Medical Imaging courses would count towards BME Graduate Program elective courses.

Master of Engineering (thesis-based)

For a Master of Engineering (thesis-based), normally eight half courses are required, in accordance with the rules of the Biomedical Engineering Graduate Program and the Faculty of Graduate Studies.

All Master of Engineering (thesis-based) students are required to take two half-course equivalents of Core Courses plus a BME program seminar course (either Biomedical Engineering 605 or 607) plus a project management course at the graduate level (usually Civil Engineering 691), a health economics course at the graduate level (usually Economics 679) and a clinical trials and biomanufacturing course at the graduate level (usually Medical Science 669). The Core Courses are offered as quarter courses (Biomedical Engineering 611, 612, 613 and 614). One of the remaining three courses must be chosen from the Additional Courses approved by the Biomedical Engineering Graduate Program for Master of Engineering (thesis-based) students (see website for most recent information: http://www.ucalgary.ca/bme/graduate). The remaining two courses must include at least one Biomedical Engineering or Engineering course.

In addition to the course requirements, all Master of Engineering (thesis-based) students are required to complete a research project and to submit a written thesis in compliance with the regulations of the Faculty of Graduate Studies.

Core Courses

1. Biomedical Engineering 611 - Fundamentals of Biomedical Engineering – Core Areas

2. Biomedical Engineering 612 - Fundamentals of Biomedical Engineering – Research Areas

3. Biomedical Engineering 613 - Frontiers of Biomedical Engineering – Scientific Communication

4. Biomedical Engineering 614 - Frontiers of Biomedical Engineering – Research Methods

Note that the four listed core course are quarter courses, though the intention is that most students would take Biomedical Engineering 611 and 612 sequentially in the Fall Term, and Biomedical Engineering 613 and 614 sequentially in the Winter Term. Biomedical Engineering 611/612 and 613/614 may be taken out of sequence for students first registering in the Winter Term.

Additional Courses

1. Biomedical Engineering 605 – Research Seminars of Biomedical Engineering

2. Biomedical Engineering 607 – Research Seminars of Biomedical Engineering

3. Biomedical Engineering 609 – Anatomy and Physiology for Biomedical Engineers

4. Biomedical Engineering 619.XX – Special Problems in Biomedical Engineering

Additional Courses for MEng (thesis-based)

1. Medical Science 668 – Biotechnology Commercialization

2. Medical Science 672 – Biotechnology Business Aspects

3. Medical Science 658.02 – Health Economics II

Additional Courses in Theme 1: Bioelectrical Engineering

1. Electrical Engineering 663 - Numerical Electromagnetic Field Computation

2. Electrical Engineering 631 - System Identification and Parameter Estimation

3. Electrical Engineering 665 - Bioelectromagnetism

Additional Courses in Theme 2: Biomechanics

1. Biomedical Engineering 619.02 – Special Topics in Biological Tissue System Mechanics

2. Civil Engineering 651 - Finite Element Modelling

3. Civil Engineering 653 – Theory and Application of the Finite Element Method

4. Mechanical Engineering 653 - Continuum Mechanics

5. Mechanical Engineering/Kinesiology/Medical Science 663 - Advanced Biomechanics (Muscle)

Additional Courses in Theme 3: Cell and Tissue Engineering (Biomaterials)

1. Chemical Engineering 659 – Advanced Cell and Tissue Engineering

Additional Courses in Theme 4: Medical Imaging

1. Electrical Engineering 697 - Digital Image Processing

2. Medical Science 689.01– Medical Imaging Techniques

3. Medical Science 689.02– Advanced Magnetic Resonance Imaging

4. Medical Science 689.03– Advanced Medical Image Processing

5. Medical Science 689.04 - Advanced Molecular Imaging

Additional Biomedical Engineering related courses may be listed under other departmental listings - see website for most recent information: http://www.ucalgary.ca/bme/graduate.

Courses are listed by theme, but students are not restricted to taking courses from within a theme. The supervisor and supervisory committee should be consulted for course selection. Courses not listed under Additional Courses or on the list at http://www.ucalgary.ca/bme/graduate require the approval of the Biomedical Engineering Graduate Program. Directed studies courses require approval of the Biomedical Engineering Graduate Program.

6. Additional Requirements

Not applicable.

7. Credit for Undergraduate Courses

Graduate credit may be given for 500-level courses. No more than one half course of credit will be allowed in MSc/PhD or MEng (thesis-based) program as approved by the supervisory committee, and the Biomedical Engineering Graduate Program.

8. Time Limit

In accordance with the Faculty of Graduate Studies regulations, the expected completion time for the MEng (thesis-based) degree is 18 months, for the MSc is 24 months and for the PhD is 48 months. Students transferring from the MSc to the PhD program are expected to complete studies within 60 months. Funding in the MSc and PhD programs may not be available after these expected completion times.

9. Supervisory Assignments

MSc and PhD students need a supervisor for admission to the program. A supervisory committee, approved by the Biomedical Engineering Graduate Program, will be established by the supervisor immediately upon entry into the MSc or PhD program. MEng (thesis-based) students will choose a supervisor in consultation with the Biomedical Engineering Graduate Program for admission to the program.

The supervisory committee will advise on course selection and research topic for the student. The supervisory committee will usually be cross-disciplinary, as required by the student's research topic and deemed necessary by the supervisor in consultation with the Biomedical Engineering Graduate Program. The supervisory committee will recommend transfer to the PhD program for MSc students and certify the background preparation for PhD students prior to scheduling of the candidacy exam. All students will follow the guidelines of the Biomedical Engineering Graduate Program regarding supervision, frequency of committee meetings, course changes, thesis or project proposals, candidacy examinations, etc. as outlined in the Student Handbook. Membership on candidacy and examination committees requires the approval of the Biomedical Engineering Graduate Program.

10. Required Examinations

A written research proposal will be required before the oral candidacy exam can be completed. Prior to the oral candidacy exam, the supervisory committee must review and approve the written research proposal and assess the appropriateness of background preparation of the student. The oral candidacy examination is to focus on two areas: 1) the proposed research project, and 2) the preparation of the candidate and the ability of the candidate to carry out research at the doctoral level. The oral candidacy exam must be completed within 16 months of first registration as a PhD student for direct entry with an MSc, and within the first 20 months for students who transfer from an MSc to PhD program.

A public lecture, scheduled by the Biomedical Engineering Graduate Program, is required immediately prior to MEng, MSc and PhD final thesis oral examinations.

The supervisor is a non-voting member of the oral candidacy committee, and is a voting member of the final thesis oral examination committee.

11. Research Proposal Requirements

PhD students must present a written research proposal to the supervisor and to the Biomedical Engineering Graduate Program no later than twelve months after initial registration. Current practice is for MSc and PhD students to enrol in Biomedical Engineering 614, which requires completion and oral presentation of a research proposal. The proposal, with an approval of the supervisor and the co-ordinator of Biomedical Engineering 614, must be sent to the Biomedical Engineering Graduate Program to be placed in the student's file.

12. Special Registration Information

None.

13. Financial Assistance

Students in MSc and PhD programs will not be admitted without funding from an interested supervisor. Please see the Biomedical Engineering Graduate Program handbook for more details.

Students in the MEng (thesis-based) program do not receive funding, but may be eligible for awards or financial assistance.

For information on awards, see the Awards and Financial Assistance section of this Calendar.

14. Other Information

A Master of Science, Master of Engineering, or Doctor of Philosophy in Biomedical Engineering does not entitle graduates to a designation of Professional Engineer. The title of Engineer, or Professional Engineer, is restricted to those who are members of a Provincial engineering association.

Please see the Biomedical Engineering Graduate Program website for the latest version of the Handbook of Policies and Procedures at http://www.ucalgary.ca/bme/graduate.

15. Faculty Members/Research Interests

Faculty members in this program are based in the Schulich School of Engineering, and the faculties of Kinesiology, Medicine, Veterinary Medicine and Science. Many BME faculty are cross-appointed to multiple departments. Information about BME faculty research can be found at http://www.ucalgary.ca/bme/graduate.

Chemistry CHEM

Contact Information

Location: Science A Building, Room 229

Program number: 403.220.6252

Fax: 403.284.1372

Email address: gradinfo@chem.ucalgary.ca

Web page URL:
http://www.chem.ucalgary.ca/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

PhD and MSc programs are available for full-time study only.

For a list of supported research areas, please see section 15.

2. Admission Requirements

In addition to Faculties of Graduate Studies and Science admission requirements, the Department requires:

Master of Science and Doctor of Philosophy

a) Two reference letters with reference forms. Letters and forms must bear the referee's signature and the letter must be printed on official letterhead from the referee's institution and sent in a sealed envelope or from an institutional email account. The reference form is available from http://www.ucalgary.ca/chem/grad/apply.

An appropriate letter of recommendation is one written by an individual who can provide an assessment of the applicant's background and capabilities with respect to our department. An applicant currently registered in a graduate degree program, or who has recently completed a graduate degree program, must submit one letter of reference from his/her program supervisor.

b) For applicants required to prove proficiency in English, a TOEFL score of 580 (written test), 93 (Internet-based test), an IELTS score of 7.5, a MELAB score of 83, or a PTE score of 64.

Master of Science

For applicants with a Bachelor of Science (BSc) degree:

a) A four-year degree or its equivalent.

b) An admission grade point average of 3.00 or better on a four-point scale.

Doctor of Philosophy

For applicants with a Bachelor of Science (BSc) degree:

a) A four-year Honours degree or its equivalent.

b) An admission grade point average of 3.70 or better on a four-point scale.

For applicants with a Master of Science (MSc) degree:

a) A Master of Science degree recognized by the Faculty of Graduate Studies.

b) An admission grade point average of 3.30 or better on a four-point scale.

3. Application Deadline

Deadlines for submission of complete applications for students with international transcripts:

March 1 for September admission

July 1 for January admission

November 1 for May admission

Deadlines for submission of complete applications for students with Canadian transcripts:

July 1 for September admission

November 1 for January admission

March 1 for May admission

4. Advanced Credit

Advanced credit for graduate courses taken as an unclassified student, or qualifying student may be given for courses in which the student obtains a grade of “B” or higher.

A reduction in course requirements may be given for students who completed graduate courses at other institutions. This will be determined on program entry and after consultation with the research supervisor and the graduate office.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Science requirements, the Department requires:

Master of Science

a) Three half-course equivalents (500-level or above). Normally a minimum of two half courses will be Chemistry courses.

Doctor of Philosophy

a) Four half-course equivalents (500-level or above) for students entering with a four-year Honours BSc degree or equivalent. Normally, a minimum of three half courses will be Chemistry courses.

b) A minimum of one and a maximum of four half courses for students entering with an MSc degree or equivalent. The number of half courses will be determined by consultation between the student, the supervisor, and the Graduate Director.

Students who transfer to the doctoral program will be given credit for courses taken in the MSc program.

Copyediting

The department does not allow copyediting in students’ theses.

6. Additional Requirements

Each student must participate in the Department’s Chemistry 601 and 603 Research Seminars in each year he/she is registered in a graduate program.

A Master of Science student planning to apply for a transfer to a doctoral program must notify his/her supervisory committee at least one month before the committee meeting which takes place at the end of the student’s first year in program.

7. Credit for Undergraduate Courses

At least one-half of a graduate student’s course work must be at the 600 level or higher and only where appropriate to a student’s program will graduate credit be given for courses numbered 500-599, which are considered undergraduate courses. In addition to course prerequisites, consent of the department is required.

8. Time Limit

Expected completion time is two years for the Master of Science degree and four for the Doctor of Philosophy degree. Maximum completion time is four years for the Master of Science degree and six years for the doctoral program.

9. Supervisory Assignments

Students are assigned an interim advisor (currently the Graduate Director) upon first registration in a program and must choose a permanent supervisor before the fifth month in program. Students in both the MSc and PhD programs must also choose two additional faculty members to serve as supervisory committee members.

10. Required Examinations

Doctoral students are required to complete written and oral candidacy examinations. Further details may be obtained from the Department’s Handbook of Graduate Studies available at: http://www.ucalgary.ca/chem/handbook.

The oral examination component will include questions on the research proposal. Final thesis oral examinations are open.

11. Research Proposal Requirements

Students will submit a draft research proposal two to four months before the oral candidacy examination. Within one week of receiving the proposal, the supervisory committee and one additional member of the Department will meet with the student to decide the sub-discipline on which the student will be examined during the candidacy exam. The written component will consist of the finalized version of the research proposal, which is to be submitted 30 days before the oral examination. The proposal is limited to 25 pages (10 on background, 10 on proposed work, and 5 on original extensions of the work). Feedback on the proposal will be provided to the student prior to the oral examination; however, the assessment of the candidate’s overall performance will be determined by the oral examination only.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance is normally available to all qualified students in the form of Teaching Assistantships and Trust funded Assistantships. Assistantship funding is not normally available beyond twenty-eight months in a master’s program and fifty-two months in a doctoral program.

For further information on awards, see the Awards and Financial Assistance section of this calendar.

14. Other Information

None.

15. Faculty Members/Research Interests

Supported areas of research: Analytical, Applied, Bio-Organic, Bio-Physical, Electrochemistry, Environmental, Inorganic, Materials, Organic, Organometallic, Physical, Polymer, and Theoretical Chemistry.

These areas do not constitute formal divisions, and the thesis research may cut across the traditional lines.

The faculty members in the Department and their specific research interests can be found at http://www.chem.ucalgary.ca.

Communication and Culture CMCL

Contact Information

Location: Social Sciences Building, Room 222

Program number: 403.220.5623

Fax: 403.210.8164

Email address: gradprog@ucalgary.ca

Web page URL:
http://comcul.ucalgary.ca/graduate

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based

Master of Communications Studies (MCS), course-based

The MA and MCS degrees may be completed on a full-time or a part-time basis.

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Graduate program in Communication and Culture requires:

Master of Arts

a) A statement of research intent (250-500 words).

b) Two samples of written work.

c) A detailed curriculum vitae.

d) A completed baccalaureate degree in Communications Studies, Culture Studies or related field.

e) Two Reference Letters and two completed Reference Forms.

Master of Communications Studies

The Department is not currently accepting applications to the Master of Communications Studies.

a) A statement of research intent (250-500 words).

b) Two samples of written work.

c) A detailed curriculum vitae.

d) A completed baccalaureate degree in Communications Studies or related field.

e) Two Reference Letters and two completed Reference Forms.

Note: Master's students must take three half-course equivalents in each of fall and winter terms in the first year of their program to be considered full-time. There is no assurance of consideration for funding for part-time students.

Doctor of Philosophy

a) A statement of research intent (500-1000 words).

b) Two samples of written work.

c) A detailed curriculum vitae.

d) Completed baccalaureate and master's degrees in Communications Studies, Culture Studies, or equivalent.

e) Two Reference Letters and two completed Reference Forms.

3. Application Deadline

The deadline for the submission of complete applications is January 15 for September admission.

4. Advanced Credit

Advanced credit may be granted to students admitted to the MCS and PhD programs. Approval of the Graduate Program Director is required.

Advanced credit is not available to MA applicants.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Graduate Program in Communication and Culture requires the following:

Master of Arts (six half-course equivalents)

a) Three half-course equivalents: Communication and Culture 601, 613 and 615.

b) Three half-course equivalent electives.

c) One half-course equivalent elective may be selected from other graduate programs; one half-course equivalent elective may be Communication and Culture 711, Directed Studies.

Master of Communications Studies (ten half-course equivalents)

a) Three half-course equivalents: Communication and Culture 601, 605, and 615.

b) Five elective half-course equivalents.

c) One half-course equivalent may be selected from other graduate programs; one half-course equivalent elective may be Communication and Culture 711, Directed Studies.

d) Two half-course equivalents: Communication and Culture 790, Master's Project.

Doctor of Philosophy (six half-course equivalents)

a) Three half-course equivalents: Communication and Culture 601, 615 or equivalent, and 713.

b) Three half-course equivalent electives.

c) One half-course equivalent elective may be selected from other graduate programs; one half-course equivalent elective may be Communication and Culture 711, Directed Studies.

Note: PhD students who can show that they have taken Communication and Culture 601 or equivalent may substitute an elective.

6. Additional Requirements

Not applicable.

7. Credit for Undergraduate Courses

Credit for undergraduate courses toward a master's program will be given only in the case of the course being developed for graduate-level work. Students in the doctoral program will not be given credit for undergraduate courses.

8. Time Limit

Expected completion time is two years of full-time study or three years of part-time study for the Master of Arts degree and the Master of Communications Studies degree; and four years for the Doctor of Philosophy degree. Maximum completion time is four years for the Master of Arts degree, and six years for the Master of Communications Studies and Doctor of Philosophy degrees.

9. Supervisory Assignments

An interim advisor is assigned by the program in the first year. The student must choose a thesis supervisor by the beginning of the second year.

Master of Communications Studies

The Program Director or designate is the assigned interim advisor for the first two years of the student's program for full-time and part-time students. The Program Director or designate is the supervisor for part-time students continuing past two years in the program. In the student's Communication and Culture 790 project year, the project supervisor may or may not be the permanent supervisor of record.

Doctor of Philosophy

By June of the first year in program, the student must submit his/her proposed field of research and the name of his/her proposed supervisor for approval by the program. The supervisory committee must be appointed no later than three months after the appointment of the supervisor.

10. Required Examinations

Doctor of Philosophy - Doctoral candidacy examinations have a written and an oral component. Students have three weeks to write papers in three areas relevant to their proposed research. The student's supervisory committee sets the areas and the examination questions in consultation with the candidacy committee. The oral examination takes place one week after the completion of the written papers.

Final thesis oral examinations are open.

11. Research Proposal Requirements

Students whose research involves human subjects must receive approval from the University of Calgary Conjoint Faculties Research Ethics Board before beginning data collection.

Master of Arts – Thesis supervisor must approve proposal.

Master of Communications Studies – Project supervisor(s) must approve proposal.

Doctor of Philosophy – In consultation with the supervisory committee, before the candidacy examinations, each doctoral student is required to submit a preliminary thesis proposal that may serve as an additional basis for questioning. A more detailed, Final Thesis Proposal (including an Application for Ethics Approval where relevant), approved by the supervisory committee must be submitted to the graduate director within six months of the successful completion of the candidacy examination.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on Awards, see the Awards and Financial Assistance section of this Calendar (http://www.grad.ucalgary.ca/awards).

Students applying for the Graduate Awards Competition must submit their applications to the Department of Communication and Culture Graduate Programs Office by January 15.

14. Other Information

Inquiries concerning specific questions about the program and degree requirements should be directed to: Department of Communication and Culture, Graduate Programs, Social Sciences 222, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4.

15. Faculty Members/Research Interests

The active research interests of current faculty can be found at http://comcul.ucalgary.ca/grad/facultyexpertise.

Note: Courses that are considered electives will be offered on the basis of student needs and contingent upon the availability of staff resources.

Communications Studies COMS

Effective September 1, 2013, the Communication Studies program was replaced by graduate program in Communication and Culture. Please refer to the new program entry for further information.

Computational Media Design CMD

Contact Information

Location: Information and Communications Technology Building, Room 602

Program number: 403.220.7495

Fax: 403.284.4707

Email address: cmd@ucalgary.ca

Web page URL: http://www.cmd.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc)

These degrees are offered jointly through the Department of Computer Science, Faculty of Science; Faculty of Environmental Design; and Department of Art and School of Creative and Performing Art – Music, Faculty of Arts.

Students may register in the MSc and PhD programs as part-time students only with permission from the CMD Steering Committee.

2. Admission Requirements

In addition to Faculty of Graduate Studies admission requirements, the CMD program requires two reference letters dated within twelve months of the date of application and:

Master of Science

a) While applicants from any discipline will be considered, undergraduate degrees in Computer Science, Arts, Music, or Design are favoured. Starting CMD with a background in one area is possible, but background in two areas is preferred.

b) For applicants required to provide proof of proficiency in English, a TOEFL score of 600 (written test), 250 (computer-based test) or 100 (Internet-based test), or an IELTS score of 7.5 or a minimum MELAB score of 84 or above is required.

c) For students applying with degrees from outside Canada, GRE scores are required. GRE General score of at least 600 verbal and 750 quantitative and either 720 analytical (old test format) or 5.5 (new test format).

d) A single page statement of interest. This is not a proposal but a declaration of interest in interdisciplinary research in art, design or music and computer science.

e) Applicants must submit a portfolio that provides up to ten examples of their research and creative work. This may include any combination of academic publications and reports, images, video, audio recordings, musical scores, documentation of installations, and written works. Applicants may provide a URL to portfolio items that cannot be uploaded through the application system.

f) A demonstrated interest in interdisciplinary research in art, design or music and computer science.

Doctor of Philosophy

a) All the admission requirements for a Master of Science (above).

b) A master's degree from a recognized institution. For exceptional students applying directly to the PhD program with a bachelor degree, all the requirements for a Master of Science (above) apply, plus demonstrated exceptional research and/or creative ability. These direct entry students will be considered on a case-by-case basis.

c) A curriculum vitae.

3. Application Deadline

Deadlines for the submission of complete applications:

1 February for September admission

1 May for January admission

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

Graduate courses must be chosen in consultation with the supervisor(s) and approved by the CMD Director.

Students are required to achieve a grade of at least "B" in all courses taken to fulfill CMD course requirements.

Seminar Requirement: Students are required to give a CMD seminar presentation on a topic related to their graduate research/creative practice.

Master of Science

a) Course Requirement:

- Computational Media Design Research Methodology (half-course equivalent).
- One Computer Science graduate-level half-course equivalent.
- One graduate-level half-course equivalent from Art, Environmental Design or Music, and
- Two additional graduate-level half-course equivalents, for a total of five half-course equivalents.
- Additional courses can be required on a case-by-case basis.

b) Supervision as specified in section 9.

c) A Master's Thesis Proposal as specified in section 11.

d) Master's Thesis.

e) Master's Thesis Oral Examination as specified in section 11.

Doctor of Philosophy

a) Course Requirements: At least three graduate-level half-course equivalents must be taken while the student is enrolled as a PhD student in Computational Media Design at the University of Calgary.

b) Breadth Requirements:

- Computational Media Design Research Methodology (half-course equivalent)
- Two Computer Science graduate-level half-course equivalents
- Two graduate-level half-course equivalents from Art, Environmental Design and/or Music, and
- Three additional graduate-level half-course equivalents, for a total of eight half-course equivalents.

c) An alternative breadth program that satisfies the student, the supervisor(s), the supervisory committee, and the CMD Director may be proposed in special cases.

d) Supervision as specified in Section 9.

e) PhD Candidacy examination as specified in Section 10.

f) PhD Thesis.

g) PhD Thesis oral examination as specified in Section 10.

Exit requirements: MSc students

a) CMD MSc course requirements (see above).

b) Original research and/or creative practice body of work, appropriately scoped for an interdisciplinary MSc.

c) A seminar on the research and/or creative practice body of work conducted during the CMD MSc.

d) CMD MSc thesis and thesis defence (see sections 10 and 11 below).

Exit requirements: PhD students

a) CMD PhD course requirements (see above).

b) CMD PhD candidacy exam (see section 10 below).

c) Original research and/or creative practice body of work, appropriately scoped for an interdisciplinary PhD.

d) A seminar on the research and/or creative practice body of work conducted during the CMD PhD.

e) CMD PhD thesis and thesis defence (see sections 10 and 11 below).

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Undergraduate courses will not be considered for advanced standing in the CMD program. Permission that at most one half-course at the 500 level be included as part of the course work requirement must be sought. This must be recommended by the supervisor(s) and approved by the CMD Director on the appropriate form.

8. Time Limit

MSc maximum time: 4 years; expected completion time 2 years.

PhD maximum time: 6 years: expected completion time 4 years.

9. Supervisory Assignments

For simplifying the explanations in this document and for the purposes of CMD requirements, Arts (Art and Music) and Environmental Design are considered as one unit and referred to as Arts and Design. Generally, students are admitted to a specific research area and supervisor. Sometimes students are admitted to a specific lab or research area only, and are assigned an interim advisor.

Appointment of the Supervisor(s): CMD students will have an interim supervisor and interim co-supervisor appointed on their acceptance letter. Between the supervisor and the co-supervisor the disciplines of Computer Science and Arts and Design will be covered. Students may seek a change in research area or supervisor after admission. The student must find a permanent supervisor and a permanent co-supervisor within six months of the start of the program. Such a change must be satisfactory to the student, and supported by the supervisors and must be approved by the CMD Director. The role of the supervisor is to take responsibility for overall guidance, instruction, and research/creative practice supervision. The role of the co-supervisor in this case is to provide supplementary guidance, instruction and research stimulation on a regular and extensive basis.

Doctoral Supervisory Committee: Composition of the Doctoral Supervisory Committee. The Doctoral Supervisory Committee should be constituted by the supervisor and co-supervisor in consultation with the student and must be approved by the CMD Director and sent to the Faculty of Graduate Studies for confirmation. It will consist of the supervisor and co-supervisor, and two additional members. The two additional committee members may be external to the student's program. At least one of the members of the Supervisory Committee should have had supervisory experience at the doctoral level. Exceptions to this will be considered on an individual basis.

10. Required Examinations

Final thesis oral examinations are open examinations.

Master's Thesis Oral Examination

This exam will be conducted as specified by the Faculty of Graduate Studies. A thesis component that describes research conducted and/or body of creative work completed is required to complete the program. Graduating students will have to demonstrate skills and expertise in Computer Science and Arts and Design. CMD encourages research and creative work that incorporates aspects of both Computer Science and Art and Design, thus there is recognition for and appreciation of a thesis that represents an interdisciplinary balance between the fields.

The Internal Examiner will be from the CMD faculty membership, that is the set of faculty members actively engaged in the CMD program. The External Examiner will be from outside the CMD membership and the supervisor/co-supervisors academic units (i.e., the Faculty of Science, Department of Art and School of Creative and Performing Arts – Music within the Faculty of Arts, or Faculty of Environmental Design).

PhD Thesis Oral Examination

This exam will be conducted as specified by the Faculty of Graduate Studies. A thesis that describes the research conducted and/or the body of creative work completed is required to complete the PhD in the CMD program. The thesis will set the research/work in its literary and new media context and present evidence that the work is worthy of either publication or external recognition. Graduating students will have to have demonstrated skills and expertise in Computer Science and Arts and Design. CMD encourages research and creative work that incorporates aspects of both Computer Science and Art and Design, thus there is recognition for and appreciation of a thesis that represents an interdisciplinary balance between the fields.

The CMD PhD student's Internal Examiner will be a Faculty member from University of Calgary but outside the CMD membership. The CMD PhD student's External Examiner will be an international expert in the research/creative practice area of the student's research. Normal Faculty of Graduate Studies rules about conflicts apply.

PhD Candidacy Exam

The CMD PhD Candidacy Exam is composed of:

a) A Reading List: The scope of the candidacy exam is defined by a reading list. This reading list is prepared by the student and the student's supervisor(s) in consultation with the student's supervisory committee. This reading list must be approved at least two months before the written and oral candidacy examinations. The reading list may contain, but is not limited to, relevant literature, musical scores, musical performances, and works of art.

b) A Research Proposal (see section 11).

c) A Written Exam: The CMD written examinations are taken by the candidate after course work is completed, and after approval of the doctoral proposal, and before the oral candidacy examination. The CMD written exam must be approved by the CMD Director, and consists of a take-home examination (normally 6-10 days).

d) A Candidacy Oral Exam: The candidate's reading list, completed written exam, together with research proposal, must be submitted to the examination committee at least 10 working days in advance of the candidacy oral exam. These documents form the basis for the candidacy oral exam. The examination committee consists of the supervisory committee, plus one examiner from the CMD faculty membership, that is the set of faculty members actively engaged in the CMD program, and one examiner from outside the CMD membership and the supervisor/co-supervisors academic units (i.e., the Faculty of Science, Department of Art and School of Creative and Performing Arts – Music within the Faculty of Arts, or Faculty of Environmental Design).

11. Research Proposal Requirements

A research proposal is required for master's students. The proposal must be approved by both the supervisor and co-supervisor no later than twelve months after starting the program.

At the doctoral level, a research proposal, approved by the student's supervisory committee, must be submitted to the CMD Director at least one week before the departmental written exam begins. The research proposal will contain an abstract, a literature survey (including an analysis of the literature), an overview of the proposed research and creative work, a plan for completing the proposed research and creative work, and references.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards see the Awards and Financial Assistance section of the calendar. Successful applicants may be offered departmental teaching assistantships and/or research assistantships in their offer letter.

Students applying for scholarships must submit their applications as appropriate according to the requirements of the scholarships.

14. Other Information

None.

15. Faculty Members/Research Interests

Information on faculty research interests may be found at: http://www.cmd.ucalgary.ca/people/.

Registration in all graduate courses requires the approval of the Computational Media Design Director. CMD students are eligible to take any course in Computer Science, Arts, and Environmental Design, provided they have the necessary prerequisites.

Computer Science CPSC

Contact Information

Location: Information and Communications Technology Building, Room 602

Program number: 403.220.6015

Fax: 403.284.4707

Email address: cpscappl@ucalgary.ca

Web page URL:
http://www.cpsc.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Students may register in the MSc and PhD programs as part-time students only with permission from the department.

Specialization

- Software Engineering (MSc students only)*

**The specialization is offered jointly through the Department of Computer Science and the Department of Electrical and Computer Engineering.*

2. Admission Requirements

In addition to Faculties of Graduate Studies and Science requirements, the department requires two appropriate letters of reference dated within twelve months of the date of application and:

Master of Science

a) An undergraduate background of either:

A four-year bachelor's degree or equivalent in Computer Science from a recognized institution with a minimum GPA of 3.30 in the last two years (i.e., last 20 half-course equivalents) of the undergraduate program

OR

A four-year bachelor's degree or equivalent from a recognized institution with a minimum GPA of 3.30 in the last two years (i.e., last 20 half-course equivalents) of the undergraduate program.

In addition, candidates must have an undergraduate course at the 3rd or 4th year level in each of the following computer science areas:

- Theory of Computation
- Software Engineering
- Systems (Operating Systems, Compilers, Distributed Systems, Networking)
- Application (Artificial Intelligence, Graphics, Databases, etc.)

The cumulative GPA for these courses must be at least 3.30.

Post-degree Computer Science courses may be considered in calculating the GPA. Exceptions to the GPA requirements may be considered for students with either:

- Demonstrated research excellence, or
- GRE General scores of at least 600 verbal and 750 quantitative and either 720 analytical (old test format) or 5.5 (new test format).

b) For applicants required to provide proof of proficiency in English, a TOEFL score of 600 (written test) or 100 (Internet-based test), or an IELTS score of 7.5 or above, or a MELAB score of 84 or above, or a PTE score of 70 or above.

c) For students applying with degrees from outside Canada, GRE scores are generally expected and will be considered.

Master of Science degree with a Specialization in Software Engineering (thesis-based)

Students applying for entry to the Master of Science with a specialization in Software Engineering will be assessed on qualification as in (a) above, but with a GPA of 3.00 and at least three years relevant experience in the software industry following the bachelor's degree.

Doctor of Philosophy

For students applying with a Master of Science degree, all the requirements for a Master of Science (above) apply, plus a thesis-based Master of Science degree from a recognized institution with a minimum GPA of 3.30.

For exceptional students applying with a Bachelor of Science degree, all the requirements for a Master of Science (above) apply, plus a four-year Honours degree or its equivalent from a recognized institution with a minimum GPA of 3.70 and demonstrated research ability.

3. Application Deadline

The deadline for completed applications is February 1 for September admission, and May 1 for January admission. Later applications may be accepted from those who are Canadian citizens or permanent residents or who have been awarded major scholarships if places are available.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

Graduate programs must be chosen in consultation with the supervisor and approved by the Computer Science Graduate Affairs Committee. In addition to the Faculties of Graduate Studies and Science requirements, the Department requires:

Master of Science (thesis-based)

a) Course Requirements: Computer Science 699, plus:

b) Four additional half-course equivalents. At least two half courses must be graduate-level computer science courses (labelled CPSC or SENG) and at most one half course can be an undergraduate course numbered at the 500 level.

We recommend that students who are considering continuing on to a doctoral program or entering certain career paths, select courses that demonstrate some breadth across Computer Science (see PhD Breadth Requirements for courses).

c) Seminar Requirement: Students are required to give a department seminar presentation on a topic related to their graduate research.

Master of Science degree with a Specialization in Software Engineering (thesis-based)

a) Course Requirements: Computer Science 699, plus:

b) Four half-course equivalents. At least three of these half-course equivalents must be taken from the approved SENG list (available from the Department), and at most one half course can be an undergraduate course numbered at the 500 level.

We recommend that students who are considering continuing on to a doctoral program or entering certain career paths, select courses outside the Approved SENG list that demonstrate some breadth across Computer Science (see PhD Breadth Requirements for courses).

c) Seminar Requirement: Students are required to give a department seminar presentation on a topic related to their graduate research.

Doctor of Philosophy

a) Course Requirements: Students will be required to have achieved at least a grade of "B" in at least eight half courses beyond the requirements for an undergraduate degree before completion of the PhD degree. At least three of these must be taken while the student is enrolled as a PhD student in Computer Science at the University of Calgary. Of the eight half courses, at least six must be graduate-level courses, with the remaining two courses being either graduate-level courses or advanced (500-level) undergraduate courses. At least four of the required courses must be taken from a degree-granting Computer Science Department. In addition to the above courses, Computer Science 699 or equivalent experience is required and does not count toward the minimum eight half courses above.

b) Breadth Requirements: The above courses must be taken from multiple research

areas. Not more than six courses in one research area is counted toward the minimum eight half courses. Courses in the intersection of two or more areas are counted in the area with the most completed course credits. The current research areas are: Artificial Intelligence and Multi-Agent Systems, Bioinformatics and Biological Computations, Computer Graphics, Computer Vision and Image Processing, Database, HCI and Visualization, Networks and Systems, Security, Theory and Foundations, Scientific Computing, Software Engineering, Other areas in Computer Science, External to Computer Science. Courses outside Computer Science must be approved by the student's supervisor. Credits for courses external to the Department of Computer Science are only given on condition that no Computer Science course which covers similar content is counted toward the required eight courses. These courses will be counted toward the appropriate areas in Computer Science.

c) Seminar Requirement: Students are required to give a department seminar presentation on a topic related to their graduate research.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

For MSc programs, at most one half course at the 500 level may be taken as part of the course work requirement. This must be recommended by the supervisor and approved by the Graduate Director.

For PhD programs, at most two half courses at the 500 level may be taken as part of the course work requirement; at most one of these taken while registered in the current PhD program. This must be recommended by the supervisor and approved by the Graduate Director on the normal Doctor of Philosophy Course Approval Form (form available from the Department).

8. Time Limit

Expected completion time is two years for thesis-based Master of Science. Expected completion time for doctoral students entering with a master's degree is four years, and five years for a student transferring to the doctoral program without a master's degree.

9. Supervisory Assignments

Generally, students are admitted to a specific research area and supervisor. Sometimes students are admitted to a specific lab or research area only and are assigned an interim advisor. In the latter case, the student must find a permanent supervisor within six months of the start of the program. Students may seek a change in research area or supervisor after admission. Such a change must be satisfactory to the student, and to the proposed new supervisor. Provided this change meets any current supervisory load constraints, this change will be supported and approved by the Graduate Program Director.

Doctoral students select their supervisory committee members in consultation with their permanent supervisors.

10. Required Examinations

There is an oral candidacy examination in the doctoral program within the first 28 months of the program but after all course requirements are fulfilled. The scope of the oral candidacy exam is defined by a reading list, the candidate's research proposal and a single-authored scientific paper on a topic approved by the supervisory committee. The reading list is prepared by the student's supervisor in collaboration with the supervisory committee, and given to the student at least two months before the oral candidacy exam. The candidate must have written the scientific paper while enrolled in the PhD program. The supervisory committee must have approved the paper before the oral candidacy exam is scheduled. The candidate's research proposal together with the reading list and the scientific paper must be submitted to the examination committee when the oral candidacy exam is scheduled (at least one month before the oral candidacy exam). The oral candidacy exam may include questions from the scientific paper, the proposal, and the reading list.

Final thesis oral examinations are open.

11. Research Proposal Requirements

At the master's level research proposal requirements are determined by the supervisor.

At the doctoral level, a research proposal must be approved by the student's supervisory committee before the oral candidacy exam is scheduled. The research proposal will contain an abstract, a literature survey (including an analysis of the literature), an overview of the proposed research, a plan for completing the proposed research, and references.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards see the Awards and Financial Assistance section of this Calendar. Successful applicants may be offered departmental teaching assistantships and/or research assistantships in their offer letter.

Students should contact the department for information on scholarship deadlines.

14. Other Information

None.

15. Faculty Members/Research Interests

Information on faculty research interests may be found at: http://www.cpsc.ucalgary.ca/Research/.

Culture and Society CUSP

Effective September 1, 2013, the Culture and Society program was replaced by graduate program in Communication and Culture. Please refer to the new program entry for further details.

Drama DRAM

Contact Information

Location: Craigie Hall D 100

Program number: 403.220.5313

Fax: 403.292.6925

Email address: dramgs@ucalgary.ca

Web page URL: http://scpa.ucalgary.ca

1. Degrees and Specializations Offered

Master of Fine Arts (MFA) (thesis-based)

Students will generally be accepted and registered on a full-time basis. Part-time registration will be considered on an individual basis.

Specializations:

- Directing
- Design/Technical
- Playwriting
- Theatre Studies

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, Drama requires:

a) A baccalaureate degree that has clearly included a major emphasis in the study of drama with study at the undergraduate level in the proposed area of specialization. Deficiencies of background may be corrected during a year of study as a qualifying student.

b) A written application including a biographical outline of the applicant's studies and experience in theatre and a statement of intent outlining proposed projects in Drama. When the applicant intends to study in the Design/Technical specialization, a portfolio of drawings and design work is required. Applicants to the Playwriting specialization must submit a portfolio of original creative writing. Applicants to the Theatre Studies specialization must submit samples of their written work. Directing applicants must submit a selected portfolio that might include reviews, photographs and/or video clips of productions directed.

c) Two letters of reference.

3. Application Deadline

The deadline for the submission of complete applications is January 15 for September admission. In exceptional circumstances, at the discretion of the Graduate Committee, January admission may be possible. Inquiries should be addressed to the Graduate Director and all admission materials submitted to Drama by October 15 for consideration.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, Drama also specifies the following requirements:

All candidates must take a minimum of four full graduate courses, including Drama 605. All candidates must complete a thesis.

Courses required for specific specializations are described below:

a) **Directing** candidates must enrol in Drama 610, 647 and 649 in the first year.

b) **Design/Technical** candidates must enrol in at least four of the decimalized series that includes Drama 623, 625, 627 and 629. Candidates must complete, to the satisfaction of an examining committee, a portfolio and an oral review relating to their design work at the completion of the first three full courses. Details concerning the portfolio and procedures to be followed in case of failure are on file in the Drama office.

c) **Playwriting** candidates must enrol in Drama 671 and 673 in the first year. Drama 647 and 649 are also required courses.

d) **Theatre Studies** candidates must enrol in Drama 647 and 649 in the first year.

6. Additional Requirements

a) For **Directing** candidates, the thesis will consist of the direction of a full-length play and a supporting paper that reflects critically on the production and on the process of its creation.

b) For **Design/Technical** candidates, the thesis will consist of the design of a full-length production in two of the following areas: scene design, costume design, light design, sound design. Technical Direction may serve as one of the areas. Pictorial material and a supporting paper that reflects critically upon the production and the process of its creation are also required.

c) For **Playwriting** candidates, the thesis will consist of a full-length play and a supporting paper that reflects critically on the play and the process of its creation.

d) For **Theatre Studies** candidates, the thesis will be a substantial scholarly research paper that may be in some cases informed by a creative performance project.

7. Credit for Undergraduate Courses

Drama may give credit for undergraduate courses at the 500 level at the discretion of the supervisor and graduate committee. No more than half of a student's program may be done at the undergraduate level.

8. Time Limit

The Master of Fine Arts degree must be completed within four years.

9. Supervisory Assignments

The graduate committee assigns a supervisor after discussion with the student.

10. Required Examinations

Final thesis oral examinations are open.

11. Research Proposal Requirements

Research proposals are formulated by the student in consultation with the supervisor and approved by the graduate committee. The committee will follow the University's policies on ethical conduct in research in its review of proposals.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of the Graduate Calendar. Students applying for scholarships must submit their applications to Drama by February 1.

14. Other Information

None.

15. Faculty Members/Research Interests

The interests and research specialties of the staff can be found at http://scpa.ucalgary.ca.

Economics ECON

Contact Information

Location: Social Sciences Building, Room 454

Program number: 403.220.6064

Fax: 403.282.5262

Email address: econgrad@ucalgary.ca

Web page URL: http://econ.ucalgary.ca/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based and course-based

Specialization:

- Health Economics

There is a requirement of full-time study for the course-based and thesis-based Master of Arts and doctoral programs.

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) A minimum of four full-course equivalent economics courses. These must include the equivalent of Economics 395/495/497 (econometrics), Economics 387/389 (mathematics for economists), Economics 557 (senior microeconomics), and Economics 559 (senior macroeconomics), with at least a "B" average in senior economics courses.

b) Three reference letters.

Doctor of Philosophy

a) The requirements listed above for the Master of Arts program. Doctoral candidates may require greater proficiency in Mathematics.

b) A Master of Arts degree in Economics or its equivalent, with a high level of proficiency in Microeconomic Theory, Macroeconomic Theory, and Econometrics. If courses have been taken more than five years ago, students may be required to upgrade their knowledge in these fields.

c) Three reference letters.

3. Application Deadline

Deadline for submission of complete applications is January 15 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts (thesis-based)

a) For students holding an Honours Economics degree with credits in Economics 387, 389, 395, 495, 497, 557, and 559 or their equivalents, the completion of three full graduate courses in Economics. Such students may be able to complete the degree in one year. In special cases the Department may allow students to substitute one full or two half courses from a related discipline for one of the elective graduate courses in Economics.

b) For students without an Honours Economics degree or students whose Honours degree in Economics does not include the undergraduate courses specified in (a) or their equivalents, the completion of such courses as are required to raise their competence to the appropriate level. Graduate course requirements for such students are the same as in (a). Such students may be able to complete the degree in two years.

c) The completion of Economics 615, 657, and 659 unless one or more of them is explicitly exempted by the requirements for a specialization.

d) Successful completion and examination of the MA thesis (in accord with examination procedures of the Faculty of Graduate Studies).

Master of Arts (course-based)

The departmental academic requirements for the course-based Master of Arts degree are comparable to those for the thesis-based Master of Arts specified above. The differences in the course-based program are:

a) The thesis requirement is replaced by two additional full graduate courses (making a total of five full courses).

b) The number of full courses from a related discipline are increased to one and one-half of the elective graduate courses in Economics.

c) A research paper. The topic may be a limited empirical research project, a critical review of the literature in a particular area, or a critical analysis of a theoretical or important policy problem.

d) An exit requirement consisting of a research defence in an open conference and if unsuccessful a comprehensive written examination.

Master of Arts (thesis-based or course-based) with a Specialization in Health Economics

a) The completion of Economics 679 and 681 as two of the six half courses required in the thesis-based program, or as two of the ten half courses required in the course-based program.

b) Students may be excused from the requirement that they take Economics 659. However, if they are contemplating continuing on to a doctoral program, they are cautioned that most doctoral programs will require a course that is equivalent to Economics 659.

Doctor of Philosophy

The Department of Economics requires that doctoral students take twelve half courses. Required courses include two courses each in econometrics, Economics 615 and 715, microeconomic theory, Economics 657 and 757, and macroeconomic theory, Economics 659 and 759. In addition, students must take six half courses in "field" areas. Doctoral students must also write a second-year research paper. See the department website for further information. Students are also recommended to take a non-credit one-week course in the Fall Session Block Week (the week prior to the start of classes) of the first year in Mathematical Economics. The Department allows for the possibility that master's-level courses and course work taken at other institutions may be substituted for some of the required doctoral courses. Decisions concerning course substitutions and the transferability of graduate courses from other institutions are made on a case-by-case basis. Students are advised that the comprehensive theory examinations, which are required of all doctoral students, include material from the core courses listed above.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Credit is not given for undergraduate courses.

8. Time Limit

Expected completion time for students studying on a full-time basis is two years for the Master of Arts thesis-based and one year course-based, and four years for the Doctor of Philosophy. Maximum completion time is four years for the Master of Arts (thesis-based and course-based) and six years for the Doctor of Philosophy.

9. Supervisory Assignments

The process by which students are matched with supervisors is an informal one, based on mutual research interest.

10. Required Examinations

Doctor of Philosophy

Doctoral students are required to pass a written comprehensive examination in each of Microeconomic Theory and Macroeconomic Theory. Each examination will be three hours long. These examinations shall be scheduled in May of their first year. In August, students who fail one or more of the comprehensive theory examinations shall be given a second opportunity to pass those examinations they failed. Students who do not pass their comprehensive theory examinations by the second sitting shall be required to withdraw from the program.

Doctoral students must pass an Oral Candidacy examination. The examination is based on general research knowledge, the second-year research paper and the thesis research proposal.

Students who do not pass their oral candidacy examination by the twenty-eighth month of their program shall be required to withdraw from the program.

11. Research Proposal Requirements

Doctoral students are required to have a thesis proposal approved by the department before the candidacy examination.

12. Special Registration Information

Not applicable.

13. Financial Assistance

Financial assistance is available to qualified students. For information on awards, please see the Awards and Financial Assistance section of this Calendar. Students applying for scholarships must submit their applications to the Department by February 1.

To be eligible for funding beyond the first year, a student must pass all comprehensive theory examinations by the beginning of classes of their second year. To be eligible for funding beyond the Fall Term of the third year, a student must receive a passing grade on their second-year research paper and their oral candidacy examination by the beginning of Winter Term in their third year.

14. Other Information

Graduate students must obtain a grade standing of "B" or better in graduate course work. A grade of "B-" or less will trigger a departmental review of the student's suitability for the graduate program and may result in a loss of funding

15. Faculty Members/Research Interests

The active research interests of the current faculty can be found at: http://econ.ucalgary.ca/contact-us/directory.

Education Graduate Programs

Contact Information

Location: Education Tower, Room 114

Program number: 403.220.5675

Toll free in Canada 877.623.0292

Fax: 403.282.3005

Email address: gpe@ucalgary.ca

Web page URL: http://werklund.ucalgary.ca/gpe/

Educational Psychology (EDPS)

Contact Information

Location: Education Tower, Room 114

Program number: 403.220.5675

Toll free in Canada: 877.623.0292

Fax: 403.282.3005

Email address: gpe@ucalgary.ca

Web page URL: http://werklund.ucalgary.ca/gpe/

Specializations Offered

Counselling Psychology

School and Applied Child Psychology

Educational Psychology offers master's and doctoral programs in both Counselling Psychology (CP) and School and Applied Child Psychology (SACP). At the master's level we offer both thesis-based degrees (MSc) and course-based degrees (MEd & MC). Both degree streams prepare students for roles as psychologists and counsellors though further steps (and possibly, courses) will be required to meet professional registration requirements.

Note: The Doctoral Program in Counselling Psychology has been granted accreditation by the Canadian Psychological Association (CPA).

Counselling Psychology (PhD)

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD) Counselling Psychology - on campus

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements, entry requirements for the CP PhD program include:

a) A completed thesis-based master's degree in Counselling Psychology or equivalent from an approved university, with a minimum grade point average of 3.50 in the master's program. If coursework from an applicant's master's program is not equivalent to courses from the Master of Science in Counselling Psychology at the University of Calgary, the student will be required to take additional courses within the doctoral program to ensure equivalent training.

b) Two senior undergraduate or one graduate half-course in (i) biological bases of behaviour, (ii) cognitive-affective bases of behaviour, (iii) social bases of behaviour, and (iv) individual behaviour.

c) One senior undergraduate or one graduate half-course in the historical and scientific foundations of general psychology.

d) If all of the prerequisite courses for admission to the PhD program in Counselling Psychology have not been completed at the time of application, students who have up to two full-course equivalents in deficiencies may still be admitted, but the prerequisite courses will need to be completed before the doctoral candidacy examination.

e) A typed curriculum vitae and a concise rationale (500 words or less) for the application.

f) Three references, including two academic references, one of which is normally from the former thesis advisor.

3. Application Deadline

The deadline for the submission of complete applications to all programs is December 1 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies requirements, the degree program requires the following:

Students who have completed the prerequisites in the areas of (a) biological bases of behaviour, (b) cognitive-affective bases of behaviour, (c) social bases of behaviour, (d) individual behaviour, (e) historical and scientific foundations of general psychology, and (f) the courses and thesis, are required to complete:

a) Two (2) doctoral-level full-course equivalents normally including: Educational Psychology 731, 742, and one half-course in research methods.

b) A non-credit research seminar.

c) Candidacy examination.

d) Dissertation.

e) A twelve-month full-time internship: Educational Psychology 788.

Students who are deficient in prerequisites will be required to take additional courses in their programs once admitted. A student may be deficient in up to two full-course equivalents, which must be completed before the PhD candidacy examination.

Course content addresses theory, research, and practice in the domains identified by the Canadian Psychological Association (CPA) for accreditation of doctoral programs in professional psychology.

Detailed information on program and core course requirements can be obtained from the Werklund School of Education's Graduate Programs Office.

6. Additional Requirements

Applied experience is an asset.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

The Doctor of Philosophy degree should be completed in four years. Maximum completion time allowed for the Doctor of Philosophy degree is six years.

9. Supervisory Assignments

An interim advisor is assigned to each first-year student in a thesis-based program. Students are responsible for initiating discussions with potential permanent supervisors and are expected to have finalized supervisory arrangements by their second annual registration.

10. Required Examinations

Candidacy

Candidacy must be completed within 28 months from the program start date.

Admission to candidacy is an acknowledgement that a student is fully prepared to devote his/her full attention to the dissertation research. For admission to candidacy, the Faculty of Graduate Studies requires that (1) all mandatory course work has been completed, (2) an oral candidacy examination has been successfully passed, and (3) a dissertation research proposal has been approved by the student's Supervisory Committee. For further information, please consult the Graduate Programs in Education website: http://werklund.ucalgary.ca/gpe/programs/doctor-philosophy-phd-counselling-psychology under program requirements.

Dissertation

The doctoral thesis is the focus of the degree program. In consultation with the supervisor, the student should formulate an appropriate thesis topic as early as possible in the program because the thesis proposal affects the choice and number of courses needed in order to complete the program.

11. Research Proposal Requirements

Information on research proposals is available through the interim advisor/supervisor.

Ethics approval is required for all research projects involving the use of human subjects, before data collection begins. Prior to submitting an ethics application, students must complete Ethical Conduct for Research Involving Humans: A Concise, Online Tutorial, http://www.ucalgary.ca/research/ethics/CORE_Tutorial, and attach the certificate issued upon completion to the ethics application form.

To initiate the ethics approval process, the student must submit a copy of the application (available on the Research Services website) to the Conjoint Faculties Research Ethics Board or the Conjoint Health Research Ethics Board.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships for September admission must submit their scholarship applications to the Graduate Programs in Education office by the preceding February 1.

Graduate Programs in Education also provides assistance for students through teaching assistantships, graduate research scholarships and other scholarships. Application forms and deadline information for these awards can be obtained from Graduate Programs in Education.

14. Other Information

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Research interests of faculty members and adjunct faculty can be found at: http://werklund.ucalgary.ca/contact-us/directory/1-46929.

School and Applied Child Psychology (PhD)

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD) School and Applied Child Psychology - on campus

2. Admission Requirements

In addition to the Faculty of Graduate Studies and Education requirements, entry requirements for the PhD degree in School and Applied Child Psychology include:

a) A completed thesis-based master's degree in School and Applied Child Psychology or equivalent from an approved university, with a minimum grade point average of 3.50 in the master's degree. If coursework from an applicant's master's degree is not equivalent to courses from the Master of Science in School and Applied Child Psychology at the University of Calgary, the student will be required to take additional courses within the doctoral degree to ensure equivalent training but these prerequisite courses will need to be completed before the doctoral candidacy examination.

b) A typed curriculum vitae and a concise rationale (500 words or less) for the application.

c) Three references, including two academic references, one of which is normally from the former thesis advisor.

Additional Requirements:

d) A list of any academic awards, achievements, honours or other distinctions you have received. Itemize the monetary amount and the total.

e) A list of all publications and conference presentations you have on your résumé and

specify whether the work was peer reviewed or non-peer reviewed.

f) Information about any financial support for your degree in the form of an award, sponsorship, or other. Please indicate the dollar amount and duration of the support, and when it is to start.

g) A list of any professional school psychology experience you have had (employment or volunteer). Please specify full-time or part-time and for how long. If part-time, please specify how many hours per week.

h) A short statement of your research experience (approximately 200 words) with respect to your previous research experience and the research you would like to pursue in this degree.

3. Application Deadline

The deadline for the submission of complete applications is December 1 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies requirements, the degree program requires the following:

a) A minimum of 11 doctoral-level half-course equivalents (5.5 FCE) comprised of 7 half-course equivalent content courses and 4 half-course equivalent practicum courses (normally Educational Psychology 691, 731, 732, 760, 761.XX, 761.XX, 761.XX, 762, 764, 766, 621, 798);

b) Comprehensive examination;

c) Candidacy;

d) A twelve-month (min. 1600 hours) full-time internship; and

e) Dissertation.

Students entering the degree following completion of a master's degree outside the degree may be required to take additional master's courses to ensure equivalency to the Master of Science degree in School and Applied Child Psychology at the University of Calgary. A student may be deficient in no more than two half courses, which must be completed before the doctoral candidacy.

Detailed information on core course requirements can be obtained from the Werklund School of Education, Graduate Programs in Education website http://werklund.ucalgary.ca/gpe/.

Note: First year students are assigned an interim advisor who will assist with course selection.

6. Additional Requirements

Applied experience is an asset. PhD students are expected to undertake clients from the University of Calgary Applied Psychological and Educational (UCAPES) clinic and supervise MSc students in the on-campus practicum courses under the guidance of a qualified professional.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

The Doctor of Philosophy degree should be completed in four years. Maximum completion time allowed for the Doctor of Philosophy degree is six years.

9. Supervisory Assignments

Students are responsible for initiating discussions with potential permanent supervisors and are expected to have finalized supervisory arrangements by their second annual registration.

10. Required Examinations

Candidacy

Candidacy must be completed within 28 months from the program start date. The required Comprehensive Examination must be completed before the candidacy. Admission to candidacy is an acknowledgement that a student is fully prepared to devote his/her full attention to the dissertation research. For admission to candidacy, the Faculty of Graduate Studies requires that (1) all mandatory course work has been completed, (2) an oral candidacy examination has been successfully passed, and (3) a dissertation research proposal has been approved by the student's Supervisory Committee. For further information, please consult the Graduate Programs in Education website.

Dissertation

The doctoral thesis is the focus of the degree program. In consultation with the supervisor, the student should formulate an appropriate thesis topic as early as possible in the program because the thesis proposal affects the choice and number of courses needed in order to complete the program.

11. Research Proposal Requirements

Information on research proposals is available through the interim advisor/supervisor.

Ethics approval is required for all research projects involving the use of human subjects, before data collection begins. Prior to submitting an ethics application, students must complete Ethical Conduct for Research Involving Humans: A Concise, Online Tutorial, http://www.ucalgary.ca/research/ethics/CORE_Tutorial, and attach the certificate issued upon completion to the ethics application form.

To initiate the ethics approval process, the student must submit a copy of the application (available on the Research Services website) to the Conjoint Faculties Research Ethics Board or the Conjoint Health Research Ethics Board.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships for September admission must submit their scholarship applications to the Graduate Programs in Education office by the preceding February 1.

Graduate Programs in Education also provides assistance for students through teaching assistantships, graduate research scholarships and other scholarships. Application forms and deadline information for these awards can be obtained from Graduate Programs in Education.

14. Other Information

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Research interests of faculty members and adjunct faculty can be found at: http://werklund.ucalgary.ca/contact-us/directory/1-46929.

Counselling Psychology (MSc)

1. Degrees and Specializations Offered

Master of Science (MSc) Counselling Psychology - on campus

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements, entry requirements for the CP Master of Science program include:

a) A four-year undergraduate degree with a minimum grade point average of 3.00 over the courses taken during the last two years of study.

b) Normally, a minimum of three full-course equivalents in Educational Psychology and/or Psychology. This must include:

- Two undergraduate statistics courses (Note: For those who completed a psychology degree at the University of Calgary, Psychology 312 acts as an equivalent);
- A senior undergraduate psychology or educational psychology course in the area of Communication Skills in Guidance and Counselling, or its equivalent, Communication Skills – Interpersonal and Verbal Facilitation;
- A senior undergraduate Psychology or Educational Psychology course in each of learning theory, developmental psychology, and personality theory.

c) A curriculum vitae and a concise rationale for the application (500 words or less).

d) Two academic references one of which is from the undergraduate honours supervisor, if applicable.

e) One optional supplementary practice supervisor reference.

f) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test) or 92 (Internet-based test) or a MELAB score of 82 or an IELTS score of 7.0.

3. Application Deadline

The deadline for the submission of complete applications is December 1 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies requirements, the MSc Counselling Psychology program requires the following:

a) Eight (8) 600-level full-course equivalents (including 500 hours of practicum experience equivalent to 1.5 full courses): Educational Psychology 614, 609, 618 or 611, 615, 617 or 682.01, 621, 623, 625, 627, 631, 640, 641 or 643, 691.04 and 691.05, 695.06, and one half course elective from Educational Psychology 637, 639, 693.35 and 693.43.

b) A thesis.

c) A non-credit research seminar.

Course content addresses theory, research, and practice in the domains identified by the CPA Standards for Accreditation of Counsellor Education Programs.

Detailed information on core course requirements can be obtained from the Graduate Programs in Education website http://werklund.ucalgary.ca/gpe/.

6. Additional Requirements

Applied experience is an asset.

7. Credit for Undergraduate Courses

Graduate Programs in Education do not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

The Master of Science requires two years of full-time study to complete. Maximum time allowed for completion of the Master of Science degree is four years.

9. Supervisory Assignments

An interim advisor is assigned to each first-year student in a thesis-based program. Students are responsible for initiating discussions with potential permanent supervisors and are expected to have finalized supervisory arrangements by their second annual registration.

10. Required Examinations

The thesis requirement includes an oral examination.

Information on examinations is provided on the Graduate Programs in Education website.

11. Research Proposal Requirements

Information on research proposals is available through the interim advisor/supervisor.

Ethics approval is required for all research projects involving the use of human subjects, before data collection begins. Prior to submitting an ethics application, students must complete Ethical Conduct for Research Involving Humans: A Concise, Online Tutorial, http://www.ucalgary.ca/research/ethics/CORE_Tutorial, and attach the certificate issued upon completion to the ethics application form.

To initiate the ethics approval process, the student must submit a copy of the application (available on the Research Services website) to the Conjoint Faculties Research Ethics Board or the Conjoint Health Research Ethics Board.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships for September admission must submit their scholarship applications to the Graduate Programs in Education by the preceding February 1.

Graduate Programs in Education also provides assistance for students through teaching assistantships, graduate research scholarships and other scholarships. Application forms and deadline information for these awards can be obtained from Graduate Programs in Education.

14. Other Information

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Research interests of faculty members and adjunct faculty can be found at: http://werklund.ucalgary.ca/contact-us/directory/1-46929 and from Graduate Programs in Education.

School and Applied Child Psychology (MSc)

1. Degrees and Specializations Offered

Master of Science (MSc) School and Applied Child Psychology - on campus

2. Admission Requirements

In addition to Faculties of Graduate Studies and Education requirements, entry requirements for the Master of Science degree in School and Applied Psychology specialization include:

a) Honours degree in Psychology (or equivalent) is preferred, however applicants with a degree in Psychology and previous experience in the Psychological field will be considered, with a grade point average of 3.00 (equivalent to a "B" or 70 per cent in many universities) over the courses taken during the last two years of study.

b) A curriculum vitae and statement of research and professional interests including the specification of a prospective research supervisor from among current faculty.

c) Two academic references, one of which is normally from the undergraduate honours supervisor, if applicable.

d) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test) or 92 (Internet-based test) or a MELAB score of 82 or an IELTS score of 7.0.

e) Prior to admission, the most promising applicants may be interviewed to evaluate their understanding of and motivation for entry into the field of School and Applied Child Psychology.

Additional Requirements:

f) A short statement of intent (approximately 500 words) indicating your reasons for wanting to pursue graduate work in this degree.

g) A list of any academic awards, achievements, honours or other distinctions you have received. Itemize the monetary amount and the total.

h) A list of all publications and conference presentations you have on your résumé and specify whether the work was peer reviewed or non-peer reviewed.

i) Information about any financial support for your degree in the form of an award, sponsorship, or other. Please indicate the dollar amount and duration of the support, and when it is to start.

j) A list of any professional school psychology experience you have had (employment or volunteer). Please specify full-time or part-time and for how long. If part-time, please specify how many hours per week.

k) A short statement of your research experience (approximately 200 words) with respect to your previous research experience and the research you would like to pursue in this degree.

3. Application Deadline

The deadline for the submission of complete applications is December 1 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies and Education requirements, the MSc SACP degree program requires the following:

a) Fourteen half-course equivalents (7 FCE) including a minimum of 400 practicum hours comprised of 12 half-course equivalent content courses and 2 half-course equivalent practicum courses (normally Educational

Psychology 614, 609, 618, 651, 653, 654, 655, 659, 662, 663, 665, 669, 683, 685.

b) A thesis.

6. Additional Requirements

Applied experience is an asset.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

The Master of Science requires two years of full-time study to complete. Maximum completion time is four years.

9. Supervisory Assignments

An interim advisor is assigned to each first-year student in a thesis-based program. Students are responsible for initiating discussions with potential permanent supervisors and are expected to have finalized supervisory arrangements by their second annual registration.

10. Required Examinations

Information on examinations is provided on the Graduate Programs in Education website.

11. Research Proposal Requirements

Ethics approval is required for all research projects involving the use of human subjects, before data collection begins. Prior to submitting an ethics application, students must complete Ethical Conduct for Research Involving Humans: A Concise, Online Tutorial, http://www.ucalgary.ca/research/ethics/CORE_Tutorial, and attach the certificate issued upon completion to the ethics application form.

To initiate the ethics approval process, the student must submit a copy of the application (available on the Research Services website) to the Conjoint Faculties Research Ethics Board or the Conjoint Health Research Ethics Board.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships for September admission must submit their scholarship applications to the Graduate Programs in Education by the preceding February 1.

Graduate Programs in Education also provides assistance for students through teaching assistantships, graduate research scholarships and other scholarships. Application forms and deadline information for these awards can be obtained from Graduate Programs in Education.

14. Other Information

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Research interests of faculty members and adjunct faculty can be found at: http://werklund.ucalgary.ca/contact-us/directory/1-46929 and from Graduate Programs in Education.

Counselling Psychology (MEd)

1. Degrees and Specializations Offered

Master of Education (MEd) Counselling Psychology - on campus

Please note that we are not admitting students to the MEd in Counselling Psychology this year.

Counselling Psychology (MC)

1. Degrees and Specializations Offered

Master of Counselling (MC) Counselling Psychology - blended/online

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements, entry requirements for the Master of Counselling (MC) program include:

a) A minimum of three (3) half courses in Psychology or Educational Psychology, including one course each in human development and learning. In addition, applicants are required to have a senior undergraduate Psychology or Educational Psychology course in the area of Communication Skills in Guidance and Counselling, or its equivalent, Communication Skills – Interpersonal and Verbal Facilitation.

b) A curriculum vitae and a concise rationale for the application (500 words or less).

c) Two references; either academic or practice supervisor.

d) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test) or 92 (Internet-based test) or a MELAB score of 82 or an IELTS score of 7.0.

e) Paid employment or volunteer work in counselling-related and research-related roles will be an asset.

3. Application Deadline

The deadline for the submission of complete applications is December 1 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies requirements, the MC Counselling Psychology program requires the following:

a) A total of fifteen (15) half courses, from which thirteen (13) are content and two (2) are practicum courses.

Content Courses:

Educational Psychology 602: Counselling Theories and Professional Practice

Educational Psychology 604: Professional Ethics in Applied Psychology

Educational Psychology 610: Research Methodology in Counselling

Educational Psychology 616: Assessment Theory and Practice

Educational Psychology 622: Developing and Sustaining a Working Alliance with Clients

Educational Psychology 624: Cultural and Social Justice Issues in Professional Practice

Educational Psychology 626: Group Interventions and Processes

Educational Psychology 630: Foundations of Career Counselling

Educational Psychology 638: Counselling Interventions for Client Change

Educational Psychology 646: Processes of Learning

Educational Psychology 648: Lifespan Human Development

Educational Psychology 664: Psychological Approaches to Health

Educational Psychology 670: Final Project Portfolio

Practicum Courses:

Educational Psychology 642: Counselling Practicum I

Educational Psychology 644: Counselling Practicum II

6. Additional Requirements

Applied experience is an asset.

Applicants to the Master of Counselling should have reasonable computer literacy because portions of the program are delivered online.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

The Master of Counselling can be completed in three years of full-time study, but students may take up to six years to complete the degree on a part-time basis.

9. Supervisory Assignments

An academic advisor is assigned to students in the course-based Master of Counselling.

10. Required Examinations

None.

11. Research Proposal Requirements

None.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships for September admission must submit their scholarship applications to the Graduate Programs in Education office by the preceding February 1.

Graduate Programs in Education also provides assistance for students through teaching assistantships, graduate research scholarships and other scholarships. Application forms and deadline information for these awards can be obtained from Graduate Programs in Education.

14. Other Information

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Research interests of faculty members and adjunct faculty can be found at: http://werklund.ucalgary.ca/contact-us/directory/1-46929 and from Graduate Programs in Education.

School and Applied Child Psychology (MEd)

1. Degrees and Specializations Offered

Master of Education (MEd) School and Applied Child Psychology – blended/online

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements, entry requirements for the SACP Master of Education program include:

a) A completed bachelor's degree in Education or Psychology with a grade point average of 3.00 (equivalent to a "B" or 70 per cent in many universities) over the courses taken during the last two years of study.

b) A minimum of 30 credits (10 half courses) completed in psychology is required prior to application.

c) A curriculum vitae and a concise rationale for the application (500 words or less).

d) Two letters of reference.

e) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test) or 92 (Internet-based test) or a MELAB score of 82 or an IELTS score of 7.0.

f) Prior to admission, the most promising applicants may be interviewed to evaluate their understanding of and motivation for entry into the field of School and Applied Child Psychology.

3. Application Deadline

The deadline for the submission of complete applications is December 1 for May admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies requirements, the MEd SACP program requires a total of 20 half courses (inclusive of a minimum of 600 practicum hours and a 1200 hour internship):

a) SACP specialization courses: Educational Psychology 602, 604, 635, 650, 651, 652, 654, 656, 657, 658, 660, 674, 675, 676, and 684.

b) Three required research courses: Educational Psychology 612.01, 612.02, and 612.03.

c) Final Project Portfolio: Educational Psychology 698 A/B - equivalent to 2 half courses. Educational Psychology 684 is the students' capstone course and is evaluated as an exit portfolio. Educational Psychology 684 must be taken as the final course (or concurrently with final courses) prior to the internship.

Detailed information on core course requirements can be obtained from Graduate Programs in Education website.

6. Additional Requirements

Applied experience is an asset.

Applicants to the Master of Education in School and Applied Child Psychology should have reasonable computer literacy as portions of the programs are delivered online.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

The Master of Education School and Applied Child Psychology program can be completed in three years of full-time study but students may take up to six years to complete the degree on a part-time basis.

9. Supervisory Assignments

An academic advisor is assigned to students in the course-based Master of Counselling program.

10. Required Examinations

None.

11. Research Proposal Requirements

None.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships for September admission must submit their scholarship applications to the Graduate Programs in Education office by the preceding February 1.

Graduate Programs in Education also provides assistance for students through teaching assistantships, graduate research scholarships and other scholarships. Application forms and deadline information for these awards can be obtained from Graduate Programs in Education.

14. Other Information

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Research interests of faculty members and adjunct faculty can be found at: http://werklund.ucalgary.ca/contact-us/directory/1-46929 and from Graduate Programs in Education.

Educational Research (EDER)

Contact Information

Location: Education Tower, Room 114

Program number: 403.220.5675

Toll free in Canada 877.623.0292

Fax: 403.282.3005

Email address: gpe@ucalgary.ca

Web page URL: http://werklund.ucalgary.ca/gpe/

1. Degrees and Specializations Offered

Degrees Offered

Graduate Programs in Education offers Doctor of Philosophy (PhD), Doctor of Education (EdD), Master of Arts (MA), Master of Science (MSc), and Master of Education (MEd) degrees in six areas of Specialization, as noted below. The Doctor of Philosophy degree program is normally intended to prepare scholars for careers in research and teaching. The Doctor of Education degree program is normally intended for practicing professionals in education-related situations. The Master of Arts and Master of Science are equivalent thesis-based research degrees that prepare students for further research. The Master of Education is a course-based professional degree.

Specializations Offered

Adult Learning

This Specialization is informed by a rich heritage rooted in a commitment to human, community and social development. As a hub of interdisciplinarity, the focus of graduate studies within this Specialization is on adult learning and adult education. Our graduate students draw from multiple and diverse contexts and interest areas, which include: traditional post-secondary and continuing education; business and industry; NGOs; community development and international organizations. (PhD, EdD, MA, MEd)

Curriculum and Learning

Graduate students will have opportunities to understand how interpretive disciplines in curriculum and emergent theories of learning offer meaningful and potentially transforming ways of thinking about schooling, knowledge, research, teaching/learning, and the nature of pedagogical relationships. Curriculum and Learning encompass issues of content, context, and teaching in both formal and non-formal educational settings. Students can explore contemporary themes of curriculum and learning, including issues of globalization, gender, culture, power, traditions of wisdom, ecology in education, and the ideas and practices of social justice, examined from social, cultural, historical, political, discursive, ecological and other interpretive perspectives. (PhD, EdD, MA, MSc, MEd)

Interdisciplinary Studies

This Specialization is informed by an academic shift from a generalist notion of interdisciplinarity, in which a single individual is expected to have a mastery of a range of domains, towards one understood in terms of teams of specialists with varied, but compatible and complementary expertise. Upon becoming familiar in two Specialization topic areas, this Specialization area provides graduate students with competencies to connect and integrate these topic areas. (MEd)

Languages and Diversity

Contemporary society is marked by linguistic and cultural diversity. Educational Studies in Languages and Diversity at the graduate level prepares students to understand and conduct research on various dimensions of linguistic and cultural diversity, especially as they relate to the acquisition, use (sociolinguistics), teaching, and learning of languages. Other topics of interests are: language policies, bilingualism, language assessment, multiliteracy, identities and so on. This Specialization is opened to applicants from a broad array of regions/countries. This program will be of interest to prospective educators and researchers in the areas of English as an Additional Language (EAL), English as a Second Language (ESL), Éducation francophone, French as a second language, Bilingual and Multilingual Education, and all other topics related to languages. (PhD, EdD, MA, MEd)

Leadership

This Specialization prepares researchers and practitioners for the analysis and resolution of issues and problems related to educational policy and leadership specifically related to: the direction and management of schools; school systems; post-secondary institutions; and both governmental bodies and non-governmental organizations concerned with public and private education. Graduates in this Specialization will be well placed to pursue administrative and research-related careers with an understanding of organizational change in the field of educational leadership and policy. (PhD, EdD, MA, MEd)

Technology

As our theories about knowledge change in concert with rapid advancements in educational technology, graduate students in educational technology need to consider the cultural, social, political and economic implications for learners and for learning in diverse contexts. Educational technology seeks to balance the practice of education and research in education; as a hands-on, minds-on discipline that emphasizes knowing and doing, our graduate programs provide active learning and mentoring opportunities that engage students with both the cognitive and technological tools of their discipline. Graduate students will develop in-depth competency in educational research methods, comprehensive understanding of the educational technology field and its research methods, and be able to propose, design and carry out supervised research and inquiry in the field of educational technology. (PhD, EdD, MA, MEd)

Graduate Programs Online

Graduate Programs in Education offers online graduate programs via the web and other multi-media components to local, regional, national, and international communities. Programs include thesis-based Doctor of Education (EdD), and course-based Master of Education (MEd), Graduate Diploma and Graduate Certificate. Topics within each of these are offered in direct response to the needs of working professionals in a variety of settings, including administrators, program directors, and deans in colleges and institutes of technology.

Contact: gpe@ucalgary.ca or 403.220.5675 or toll free in Canada (877) 623-0292.

Doctor of Philosophy (PhD)

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD) – on campus

Please note: This degree requires a two year residency. Students must be available during the day to attend research seminars, courses, and to perform teaching and research related duties at the university campus for the first two years of their program.

2. Admission Requirements

In addition to the Faculty of Graduate Studies admission requirements, Graduate Programs in Education requires:

a) A thesis-based master's degree in an appropriate field. Outstanding applicants holding master's degrees without thesis may be considered.

b) A minimum grade point average of 3.50 on a four-point scale in a master's degree program.

c) A written statement indicating the applicant's reasons for wishing to pursue a graduate program.

d) Where appropriate, candidates will be expected to have, or to obtain, relevant practical experience in their area of specialization.

e) For applicants required to prove proficiency in English, a TOEFL score of 580 (written test), 93 (Internet-based test), a MELAB score of 82 or an IELTS score of 7.0.

f) Two reference letters.

Admission Portfolio

Applicants to the Doctor of Philosophy program are encouraged to submit an Admission Portfolio containing examples of their work. The purpose of the Admission Portfolio is to give applicants the opportunity to provide additional documentation that demonstrates their suitability and qualification for doctoral studies. The Admission Portfolio is particularly relevant for program applicants who do not hold a thesis-based master's degree.

The Doctoral Admission Portfolio may contain the following:

a) Thesis (if applicable).

b) Reports.

c) Research grants or scholarships.

d) Articles.

e) Curriculum documents.

f) Non-print materials, (e.g. multimedia).

g) Evidence of relevant prior learning (see below).

h) Personal statement documenting research skills and interests.

The Doctoral Admission Portfolio must include a Table of Contents and an Executive Summary that outlines the contents of the Portfolio.

Relevant Prior Learning Considerations

In exceptional circumstances, individuals who do not meet formal academic requirements but who have significant life achievements may be considered for admission to the program. The candidates must provide Graduate Programs in Education with evidence demonstrating a potential to undertake successfully the proposed program of studies. Such candidates are advised to make early contact with Graduate Programs in Education, and supply additional supporting documents as part of their application package, such as:

a) Evidence of personal continuing education/training.

b) Results in these continuing education efforts.

c) Experience in a field related to the aspired degree.

d) Evidence of successful management of people, resources, finances, situations.

e) Increasing or varying responsible positions in organizations related to the aspired degree.

f) Work-related products, e.g. reports, programs of learning or training, handbooks, videos, manuals, workshops, seminars.

g) Evidence of personal growth in knowledge, understanding, management skills, and intellectual resources.

h) Evidence of innovation.

i) Evidence of leadership, co-ordination.

3. Application Deadline

The deadline for the submission of complete applications to all programs is December 1 for September admission.

4. Advanced Credit

The applicant must make advanced credit request as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma, or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the requirements of the Faculty of Graduate Studies, Graduate Programs in Education requires that students be available on campus for the first two years of their program.

a) Three 600- or 700-level half courses in research methods;

b) Additional graduate courses or seminars as required by the student's Specialization (see below);

c) Candidacy examination; and

d) Dissertation.

- Adult Learning requires three half courses selected from Educational Research 735.
- Curriculum and Learning requires Educational Research 782, and two additional half courses selected from either Educational Research 784 or 786.
- Languages and Diversity requires three half courses selected from Educational Research 768.
- Technology requires Educational Research 771, and two half courses at the 700 level in technology.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

Expected completion time for full-time students is four years with a maximum completion time of six years.

9. Supervisory Assignments

A supervisor is normally appointed at the time of admission.

10. Required Examinations

Candidacy

Candidacy must be completed within 28 months from the program start date.

Admission to candidacy is an acknowledgement that a student is fully prepared to devote his/her full attention to the dissertation research. For admission to candidacy, the Faculty of Graduate Studies requires that (1) all mandatory course work has been completed, (2) an oral candidacy examination has been successfully passed, and (3) a dissertation research proposal has been approved by the student's Supervisory Committee. For further information, please consult the Graduate Programs in Education website.

Dissertation

The doctoral thesis is the focus of the degree program. In consultation with the supervisor, the student should formulate an appropriate thesis topic as early as possible in the program because the thesis proposal affects the choice and number of courses needed in order to complete the program.

Information on research proposals is available through the interim advisor/supervisor.

Ethics approval is required for all research projects involving the use of human subjects, before data collection begins. Prior to submitting an ethics application, students must complete Ethical Conduct for Research Involving Humans: A Concise, Online Tutorial, http://www.ucalgary.ca/research/ethics/CORE_Tutorial, and attach the certificate issued upon completion to the ethics application form.

To initiate the ethics approval process, the student must submit a copy of the application (available on the Research Services website) to the Conjoint Faculties Research Ethics Board or the Conjoint Health Research Ethics Board.

11. Research Proposal Requirements

Consult the Graduate Programs in Education website.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar. Students applying for scholarships must submit their applications to Graduate Program in Education by February 1.

14. Other Information

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Current faculty members and their areas of interest can be found at http://werklund.ucalgary.ca/contact-us/directory/1-46929.

Doctor of Education (EdD)

1. Degrees and Specializations Offered

Doctor of Education (EdD) – blended/online

2. Admission Requirements

In addition to the Faculty of Graduate Studies admission requirements, Graduate Programs in Education requires:

a) A course or thesis-based master's degree in an appropriate field.

b) A minimum grade point average of 3.50 on a four-point scale in a master's degree program.

c) A written statement indicating the applicant's reasons for wishing to pursue a graduate program.

d) Candidates will be expected to have, or obtain, relevant practical experience in their area of specialization.

e) For applicants required to prove proficiency in English, a TOEFL score of 580 (written test), 93 (Internet-based test), a MELAB score of 82 or an IELTS score of 7.0.

f) Two reference letters.

Admission Portfolio

Applicants to the Doctor of Education program are encouraged to submit an Admission Portfolio containing examples of their work. The purpose of the Admission Portfolio is to give applicants the opportunity to provide additional documentation that demonstrates their suitability and qualification for doctoral studies. The Admission Portfolio is particularly relevant for program applicants who do not hold a thesis-based master's degree.

The Doctoral Admission Portfolio may contain the following:

a) Thesis (if applicable).

b) Reports.

c) Research grants or scholarships.

d) Articles.

e) Curriculum documents.

f) Non-print materials, e.g., multimedia.

g) Evidence of relevant prior learning (see below).

h) Personal statement documenting research and professional skills and interests.

The Doctoral Admission Portfolios must include a Table of Contents and an Executive Summary that outlines the contents of the Portfolio.

Relevant Prior Learning Considerations

In exceptional circumstances, individuals who do not meet formal academic requirements but who have significant life achievements may be considered for admission to the program. The candidates must provide Graduate Programs in Education with evidence demonstrating a potential to undertake successfully the proposed program of studies. Such candidates are advised to make early contact with Graduate Programs in Education, and supply additional supporting documents as part of their application package, such as:

a) Evidence of personal continuing education/training.

b) Results in these continuing education efforts.

c) Experience in a field related to the aspired degree.

d) Evidence of successful management of people, resources, finances, situations.

e) Increasing or varying responsible positions in organizations related to the aspired degree.

f) Work-related products, e.g. reports, programs of learning or training, handbooks, videos, manuals, workshops, seminars.

g) Evidence of personal growth in knowledge, understanding, management skills, and intellectual resources.

h) Evidence of innovation.

i) Evidence of leadership, co-ordination.

3. Application Deadline

The deadline for the submission of complete applications to all programs is December 1 for July admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma, or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

The EdD is a three-year cohort-based program consisting of:

a) Course work;

b) Candidacy examination; and

c) Dissertation.

Year 1 - is designed primarily to develop students' competencies as critical consumers of educational research, and skills to conduct practitioner-inquiry. As outlined within the program to which the student has applied, first year students must complete:

a) Two (2) half courses in research: Participatory Methodology in Education (Educational Research 701.09), and either Design-Based Research (Educational Research 701.07) or Action Research (Educational Research 701.08).

b) Two (2) half courses in the Specialization area to which the student has applied.

Year 2 - is designed to engage students in an in-depth analysis of an identified problem of practice through diverse academic disciplines (e.g., leadership, adult learning, etc.). Specialization coursework exposes students to context specific best practices and cutting edge research and emphasizes the application of theory and research to practice within collaboratories of practice. As outlined within the program to which the student has applied, students must complete:

a) Two (2) half courses in the Specialization area.

b) Two (2) half courses in Specialization's Collaboratory of Practice (Educational Research 707 and 708).

c) Candidacy examination.

Year 3 - is designed to support students in synthesizing their Year 2 inquiry projects into a dissertation. Students work collaboratively with faculty and practitioners from their field to complete a dissertation that addresses a contemporary issue in education. As outlined within the program to which the student has applied, students must complete:

a) Ethics approval (see below);

b) Dissertation Seminar I;

c) Dissertation Seminar II; and

d) Doctoral Dissertation.

Ethics approval is required for all research projects involving the use of human subjects, before data collection begins. Prior to submitting an ethics application, students must complete Ethical Conduct for Research Involving Humans: A Concise, Online Tutorial, http://www.ucalgary.ca/research/ethics/CORE_Tutorial, and attach the certificate issued upon completion to the ethics application form.

To initiate the ethics approval process, the student must submit a copy of the application (available on the Research Services website) to the Conjoint Faculties Research Ethics Board or the Conjoint Health Research Ethics Board.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

Expected completion for students in the EdD program is three years with a maximum completion time of six years.

9. Supervisory Assignments

An interim supervisor is normally appointed at the time of admission.

10. Required Examinations

Candidacy

A portfolio will be prepared by the student to demonstrate his/her knowledge of the Field of Study and preparedness to conduct research in this field. The portfolio consists of three components:

a) Research Proposal: A written research proposal that contains in-depth analysis of the key components and relationships germane to a problem of practice that will form the basis for the dissertation work. The essay will include:

- A discussion of the proposed problem of practice and its significance and potential to contribute to the field;
- A multi-dimensional graphic ("concept map") that provides a conceptual lens that will be used to frame the problem of practice – a lens that includes specific references to the theoretical and research-based literature and to the data and information collected for the course-based projects in each of the core courses;
- A concise review of the background literature;
- Methods to be applied to the examination of the problem of practice; and
- A timetable and, if appropriate, discussion of such matters as funding, field logistics, scheduling, and so on.

The proposal must be well thought-out, carefully written and edited, and finished with appropriate references and illustrations.

b) Papers Written: The second component of the portfolio is an appendix that includes final copies of the papers written in each of the core specialization courses.

c) Reflective Self-Analysis: the final component of the portfolio, candidates include a reflective, self-analysis of how their thinking as an educational professional has changed over the course of the program.

The candidacy exam consists of examination of the portfolio assessed according to criteria articulated in a rubric and an oral examination of the research proposal within 28 months from the program start date.

Dissertation

The doctoral thesis is the focus of the degree program. In consultation with the supervisor, the student will undertake a thematic or field-based thesis (see course descriptions for further information).

11. Research Proposal Requirements

The Research Proposal is the first component of the portfolio and will be examined as part of the candidacy process.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to Graduate Programs in Education by February 1.

14. Other Information.

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Current faculty members and their areas of interest can be found at http://werklund.ucalgary.ca/contact-us/directory/1-46929.

Master of Arts or Master of Science (MA/MSc)

1. Degrees and Specializations Offered

Master of Arts or Master of Science – on campus

Please note: This degree requires a one year residency. Students must be available during the day for research seminars, courses and research related duties for the first year of their program.

2. Admission Requirements

In addition to the Faculty of Graduate Studies admission requirements, Graduate Programs in Education requires:

a) A written statement indicating the applicant's reasons for wishing to pursue a graduate program.

b) For students required to prove proficiency in English, a TOEFL score of 580 (written test) or 237 (computer-based test), or 93

(Internet-based test), a MELAB score of 82 or an IELTS score of 7.0.

c) Two reference letters.

d) Admission to Technology Specialization requires a 3.50 GPA.

3. Application Deadline

The deadline for the submission of complete applications to all programs is December 1 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma, or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the requirements of the Faculty of Graduate Studies, Graduate Programs in Education requires students to be available on campus for the first year of their program.

a) Two (2) 600-level half courses in research methods;

b) Additional graduate courses or seminars as required by the student's Specialization (see below);

c) A non-credit research seminar; and

d) A dissertation.

Additional graduate courses or seminars as required by Specializations as follows:

- Adult Learning – Four (4) half courses from Educational Research 635.
- Curriculum and Learning – Three (3) half courses: Educational Research 682, 687, 688; and 2 half courses as determined by the supervisor in consultation with the student from either Educational Research 689 or 693 or equivalent.
- Languages and Diversity – Three (3) half courses from Educational Research 668 and any additional courses as determined by the supervisor in consultation with the student.
- Technology – Six (6) half courses within the Specialization consisting of the following: Two (2) half courses (Educational Research 679.31 and 671); and four (4) half courses selected from the Technology course offerings; and any additional courses as determined by the supervisor in consultation with the student.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

Expected completion time for full-time students is two years in thesis-based master's programs. Maximum completion time is four years for thesis-based master's programs.

9. Supervisory Assignments

An interim supervisor is normally appointed at the time of admission.

10. Required Examinations

Final thesis oral examination.

11. Research Proposal Requirements

Questions on research proposals are not examined during the oral examination.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to the Graduate Programs in Education by February 1.

14. Other Information.

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Current faculty members and their areas of interest can be found at http://werklund.ucalgary.ca/contact-us/directory/1-46929.

Master of Education (MEd)

There are two distinct routes toward the Master of Education (MEd) degree: 1) Master of Education: Specialization route and 2) Master of Education: Interdisciplinary route.

Master of Education: Specialization Route

1. Degrees and Specializations Offered

Master of Education: Specialization Route

The MEd, Specialization Route, is a course-based degree program which provides students with a systematic understanding of knowledge, and a critical awareness of current problems and/or new insights, much of which is at, or informed by, the forefront of their academic discipline, field of study or area of professional practice in one specialization area.

For current topic areas being offered and program delivery format, please consult the website http://werklund.ucalgary.ca/gpe/.

2. Admission Requirements

In addition to the Faculty of Graduate Studies admission requirements, Graduate Programs in Education requires:

a) A University of Calgary four-year baccalaureate degree or an equivalent degree from a recognized institution. Degrees and grades from foreign institutions are evaluated for their equivalency to those of the University of Calgary.

b) A minimum GPA of 3.00 (on the University of Calgary four-point system). This is based on the last two years of the undergraduate degree consisting of a minimum of 10 full-course equivalents.

c) A written statement indicating the applicant's reasons for pursuing a graduate program in Graduate Programs in Education.

d) Candidates will be expected to have a minimum of two years of teaching experience OR alternative professional experience.

e) For students required to prove proficiency in English, a TOEFL score of 580 (written test) or 237 (computer-based test), or 93 (Internet-based test), a MELAB score of 82 or an IELTS score of 7.0 is required. The test must have been taken within the last two years. Proficiency may also be met by successful completion of Level III of the English for Academic Purposes (EAP) program.

f) Two reference letters.

Relevant Prior Learning Considerations

In exceptional circumstances, individuals who do not meet formal academic requirements but who have significant life achievements may be considered for admission to the program. The candidates must provide the relevant graduate program with evidence demonstrating a potential to undertake successfully the proposed program of studies. Such candidates are advised to make early contact with Graduate Programs in Education, and supply additional supporting documents as part of their application package, such as:

a) Evidence of personal continuing education/training.

b) Results in these continuing education efforts.

c) Experience in a field related to the aspired degree.

d) Evidence of successful management of people, resources, finances, situations.

e) Increasing or varying responsible positions in organizations related to the aspired degree.

f) Work-related products, e.g. reports, programs of learning or training, handbooks, videos, manuals, workshops, seminars.

g) Evidence of personal growth in knowledge, understanding, management skills, and intellectual resources.

h) Evidence of innovation.

i) Evidence of leadership, co-ordination.

3. Application Deadline

February 1 for a July admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma, or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

The MEd Specialization route is a two-year, cohort-based, course-based program.

a) A minimum of three (3) research courses consisting of: Research Methodology in

Education (Educational Research 603.21), Program & Practice Evaluation (Educational Research 603.24), and Writing Educational Research (Educational Research 603.23); and

b) Nine (9) half courses as outlined in the student's area of Specialization.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

Expected completion time is two years. Maximum completion time is six years for a course-based master's program.

9. Supervisory Assignments

An academic advisor is assigned to students in the course-based Master of Education program.

10. Required Examinations

None.

11. Research Proposal Requirements

None.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to Graduate Programs in Education by February 1.

14. Other Information

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Current faculty members and their areas of interest can be found at http://werklund.ucalgary.ca/contact-us/directory/1-46929.

Master of Education: Interdisciplinary Route

1. Degrees and Specializations Offered

Master of Education: Interdisciplinary Route

Graduate Certificate, Graduate Diploma, Master of Education (CCDP)

For current topic areas and program delivery format, please consult the website http://werklund.ucalgary.ca/gpe/.

This degree consists of a three-stage laddering structure: Graduate Certificate, Graduate Diploma, and the Master of Education. That is, it may be possible for students to "ladder" with full academic and fee credit from a two full-course equivalent Graduate Certificate into a Graduate Diploma requiring an additional two full-course equivalents, and from there into a Master of Education program requiring another two full-course equivalents. A direct entry into a four full-course equivalent Graduate Diploma may be possible with the approval of Graduate Programs in Education.

2. Admission Requirements

In addition to the Faculty of Graduate Studies admission requirements, the Office of Graduate Programs in Education requires:

a) A University of Calgary four-year baccalaureate degree or an equivalent degree from a recognized institution. Degrees and grades from foreign institutions are evaluated for their equivalency to those of the University of Calgary.

b) A minimum GPA of 3.00 (on the University of Calgary four-point system). This is based on the last two years of the undergraduate degree consisting of a minimum of 10 full-course equivalents.

c) For students required to prove proficiency in English, a TOEFL score of 580 (written test) or 237 (computer-based test), or 93 (Internet-based test), a MELAB score of 82 or an IELTS score of 7.0 is required. The test must have been taken within the last two years. Proficiency may also be met by successful completion of Level III of the English for Academic Purposes (EAP) program.

3. Application Deadline

Normally March 15 for a July start date; however, please note that there may be instances that vary from these dates. Students should consult the Graduate Program in Education website http://werklund.ucalgary.ca/gpe/ for specific application deadlines and start dates. Students following the MEd Interdisciplinary laddered structure route must apply at each stage; first, to the Graduate Certificate, then to the Graduate Diploma and finally to the MEd, within 5 years between each stage.

4. Advanced Credit

The applicant must make advanced credit requests as part of the application process. Credit will not be given for course work taken as part of another completed degree/diploma, or for courses taken to bring grade point average to a required level for admission.

5. Program/Course Requirements

Topics for the Graduate Certificate and Graduate Diploma courses are designed in response to the professional community and therefore change year to year. For topics being offered for Graduate Certificates and Graduate Diplomas, please consult the Graduate Programs in Education website http://werklund.ucalgary.ca/gpe/interdisciplinary-med.

The final year of the Interdisciplinary MEd is a prescribed one-year course-based program consisting of:

a) Three (3) half courses in research, consisting of: Research Methodology in Education (Educational Research 603.21), Program & Practice Evaluation (Educational Research 603.24), and Writing Educational Research (Educational Research 603.23); and

b) One (1) half course, Collaboratory of Practice (Educational Research 692).

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Graduate Programs in Education does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

The expected completion time is one year for each of the program components in the laddering structure to a maximum of two years for the Graduate Certificate, Graduate Diploma and Master of Education. Students taking more than one year to complete the four courses within a topic area will be required to pay continuing fees.

9. Supervisory Assignments

An academic advisor is assigned to students in the course-based Master of Education program.

10. Required Examinations

None.

11. Research Proposal Requirements

None.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to Graduate Programs in Education by February 1.

14. Other Information

For further information contact Graduate Programs in Education, http://werklund.ucalgary.ca/gpe/.

15. Faculty Members/Research Interests

Current faculty members and their areas of interest can be found at http://werklund.ucalgary.ca/contact-us/directory/1-46929.

Graduate Certificate: Bridge to Teaching

1. Graduate Certificate: Bridge to Teaching

Graduate Programs in Education offers a Graduate Certificate: Bridge to Teaching for foreign-trained, experienced teachers whose first language is not English and who require additional advanced course credits in order to teach in K-12 schools in Alberta. Bridge to Teaching is a full-time program with 18 senior graduate course credits in education, including practicum. All courses need to be taken in a prescribed sequence, over one school year (September to April). For

additional information please consult: http://werklund.ucalgary.ca/gpe/.

2. Admission Requirements

Requirements for admission to the Bridge to Teaching Certificate include:

a) A four-year baccalaureate degree in Education or an equivalent degree from a recognized institution, with a grade point average of at least 3.00 or equivalent.

b) A letter from an evaluator at Alberta Education's Professional Standards Branch. For further information, go to http://education.alberta.ca/teachers/certification.aspx.

c) Language Proficiency Requirement:

i. An overall score of 93 with a minimum score of 27 in the speaking component on TOEFL (the Internet-based Test of English as a Foreign Language); OR

ii. A minimum overall band average of 8.0 with no band below 7.0 on the International English Language Test System (IELTS—Academic Module); OR

iii. Graduation from Tier 3 of the English for Academic Purposes Program (EAP) at the University of Calgary.

d) One official transcript from all post-secondary institutions attended.

e) A successful interview with the Program Co-ordinator for Bridge to Teaching.

Note: Completion of English for Academic Purposes for Teachers is highly recommended prior to program start (see http://werklund.ucalgary.ca/eap/ for more information). Exceptions may be granted by the Associate Dean, Graduate Programs in Education, and the Program Co-ordinator.

3. Application Deadline

The deadline for submission of complete applications is May 1 for September admission.

For program information and application procedures, please visit the Graduate Programs in Education website at: http://werklund.ucalgary.ca/gpe/.

4. Advanced Credit

N/A.

5. Program Requirements

A total of 18 course credits including 10 weeks of practicum.

Required Courses:

Semester 1

Educational Research 696.01 Innovation in Education

Educational Research 696.02 Teaching in Alberta I

Educational Research 696.03 Practicum Seminar I

Semester 2

Educational Research 696.04 Learning with Technology

Educational Research 696.05 Teaching in Alberta II

Educational Research 696.06 Practicum Seminar II

Notes:

- Failure to attend the term to which a student has been admitted will result in the admission being rescinded.
- Failure to successfully complete the practicum component will result in withdrawal from the program.

General Notes:

- Completion of the Bridge to Teaching Certificate may not fulfill the requirements for teacher certification in Alberta.
- The Bridge to Teaching courses are recognized by the Professional Standards Branch of Alberta Education as fulfilling the requirements for 18 credits in Education coursework at the advanced level, and 10 weeks of supervised student teaching placement (practicum) in an Alberta classroom.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

N/A.

8. Time Limit

Expected completion time is eight (8) months.

Engineering Programs ENGG

Contact Information

Location: Schulich School of Engineering, Room C202

Program number: 403.220.5738

Fax: 403.284.3697

Email address: schulich@ucalgary.ca

Web page URL:
http://schulich.ucalgary.ca/graduate

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Master of Engineering (MEng), thesis and course-based

Areas: Chemical and Petroleum, Civil, Electrical and Computer, Geomatics, and Mechanical and Manufacturing Engineering.

In addition, the Schulich School of Engineering offers PhD, MSc, and MEng degrees with interdisciplinary specializations in Environmental Engineering and Energy & Environment.

The University of Calgary and the University of Alberta offer a joint Biomedical Engineering Program. Further information on all programs and specializations is provided under individual separate listings in this Calendar.

Master's thesis and doctoral graduate students are normally admitted as full-time students. The Head of the Department or designate may however, approve requests for registration as part-time or transfer from a full-time to a part-time status.

2. Admission Requirements

The Schulich School of Engineering has established common minimum student admission requirements for all its graduate programs, with the exception of students with project management background entering the Manufacturing Engineering program. Departments and graduate programs may have additional requirements over and above those of the Schulich School of Engineering.

In addition to the Faculty of Graduate Studies requirements, the Schulich School of Engineering minimum requirements are as follows:

Master's Programs

a) BSc degree or equivalent.

b) A minimum admission grade point average of 3.00 on a four-point scale or equivalent.

c) Holders of BSc or equivalent degrees in Science, Medicine, Kinesiology or other Engineering, if accepted, may be required to take additional senior undergraduate engineering courses. These courses will not be counted for credit toward their graduate program. Holders of bachelor's degrees from disciplines other than Engineering, Science, Medicine or Kinesiology are required to complete a minimum of 10 make-up undergraduate engineering half courses with a minimum GPA of 3.00 on a four-point scale before admission.

d) Two reference letters.

In exceptional circumstances, students who do not meet the entrance requirements (but have BSc degrees in the same or equivalent Engineering discipline and a GPA of at least 2.70) may be considered for admission after upgrading requirements have been met. These include a minimum of 6 make-up half courses, or 3 make-up half courses if they have acceptable industrial experience, with a minimum grade of 3.00 on a four-point scale in each course. At least 4 or 2 of these half courses, respectively, must be graduate-level courses.

Doctor of Philosophy

a) MSc degree, or transfer from MSc program, or, in exceptional cases, BSc degree or equivalent.

b) A minimum admission grade point average of 3.50 on a four-point scale or equivalent.

c) Transfer from MSc to PhD program is allowed only after the successful completion of all courses required for the MSc degree with a minimum GPA of 3.50.

d) Two reference letters.

Holders of MSc or equivalent degrees in Science, Medicine, Kinesiology or other Engineering, if accepted, may be required to take additional senior undergraduate Engineering courses. These courses will not count for credit toward their doctoral program.

3. Application Deadline

See departmental, program and specialization sections.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process, in consultation with the proposed supervisor and the Graduate Director. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission. Students who receive advanced course credit when admitted to a master's program may be able to accelerate the completion of their degree.

5. Program/Course Requirements

The Schulich School of Engineering has established common minimum program/course requirements for all its graduate programs. Departments and graduate programs may have additional requirements over and above those of the Schulich School of Engineering.

In addition to Faculty of Graduate Studies requirements, the Schulich School of Engineering minimum requirements are as follows:

Master of Engineering (course-based)

A minimum of ten half courses, of which at least six must be graduate courses.

Master of Engineering (thesis-based)

A minimum of four graduate half courses.

Master of Science

A minimum of four graduate half courses.

Doctor of Philosophy

A minimum of two graduate half courses beyond the Master of Science course requirements. For students who transfer from an MSc program, 6 graduate half courses beyond the BSc, or equivalent, degree.

All Degree Programs

After consultation with the supervisor and the Graduate Director, courses outside the Department or the University may be approved towards the degree requirements.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

See Section 5.

8. Time Limit

Typical completion times are two years for full-time students in a master's program and three to four years in a doctoral program. The Master of Engineering (course-based) can be completed in one year. Maximum completion times are four years for a Master of Science and a Master of Engineering (thesis-based), and six years for a Master of Engineering (course-based) or doctoral program.

9. Supervisory Assignments

Supervisors and supervisory committees are assigned according to the Faculty of Graduate Studies Handbook of Supervision and Examination and are approved by the Department Head or the Graduate Director.

10. Required Examinations

MEng (course-based) Comprehensive Examination

None.

MEng (thesis-based) MSc Final Oral Examination

The thesis examination is oral. In addition to Faculty of Graduate Studies regulations, the Schulich School of Engineering requires the examining committee to consist of a minimum of four voting members: the supervisor, one member external to the student's department of study, and two other members. The examination is chaired by a neutral chair (non-voting), proposed by the Department Head or Graduate Director. The examining committee must be approved by the Faculty of Graduate Studies.

The student shall make a public twenty-minute presentation of his/her thesis research, normally immediately before the oral examination. Examining committee members should attend this presentation but should refrain from asking questions. The maximum allowable two-hour examination period does not include the time spent on student presentation.

Doctoral Candidacy Examinations

The candidacy examination is oral. In addition to Faculty of Graduate Studies regulations, the Schulich School of Engineering requires the examining committee to consist of a minimum of five voting members: the supervisory committee members and two additional members (one of them external to the program). The examination is chaired by a Neutral Chair, who is recommended by the Department Head or Graduate Director. The examining committee must be approved by the Faculty of Graduate Studies.

The student's background knowledge in his/her field of engineering and in-depth knowledge in his/her chosen research specialization is examined. At the discretion of the department, (i) the candidacy examination may have a written (minimum three hours) component, as well, given no more than seven days before the oral defence; and (ii) the student may make a presentation at the beginning of the oral candidacy examination. Questions on the research proposal will be included in the oral candidacy examination, unless otherwise specified under the individual Engineering Program entry.

Doctoral Final Oral Examination

The thesis defence examination is oral. The examining committee consists of a minimum of five voting members: the supervisory committee members, one member outside the student's department of study, and one member from outside the University of Calgary. The examination is chaired by a neutral chair (non-voting), proposed by the Department Head or Graduate Director. The examining committee must be approved by the Faculty of Graduate Studies.

The student shall make a public twenty-minute presentation of his/her thesis research, normally immediately before the oral examination. Examining committee members should attend this presentation but should refrain from asking questions during the presentation. The maximum allowable two-hour examination period does not include the time spent on student presentation.

Thesis oral examinations are open.

11. Research Proposal Requirements

See departmental, program and specialization sections.

12. Special Registration Information

None.

13. Financial Assistance

Candidates are typically admitted either self-funded or with financial support provided by an interested supervisor or the department. For information on awards, see the Awards and Financial Assistance section of this Calendar. Students applying for scholarships must submit their applications to the Department by February 1.

14. Other Information

Students enrolled in any of the engineering graduate programs may opt, in addition to their normal required course load, to undertake an international project outside Canada. The duration of the project should be between 4 and 6 months. Upon successful completion (on a credit/fail basis) of Engineering 689, the statement "International Graduate Internship Project" will appear on the parchment. The course is not repeatable for credit.

15. Faculty Members/Research Interests

See departmental, program and specialization sections.

Engineering, Chemical and Petroleum ENCH

Contact Information

Location: Schulich School of Engineering, Room B212

Program number: 403.220.4802

Fax number: 403.284.4852

Email address: chemandpetenggrad@ucalgary.ca

Web page URL: http://www.eng.ucalgary.ca/chemical/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Master of Engineering (MEng), thesis-based and course-based

For registration status of thesis-based graduate students, see "Engineering Programs".

Specializations:

- Chemical Engineering
- Petroleum Engineering
- Biomedical Engineering (thesis-based only)

- Environmental Engineering (Interdisciplinary)*
- Energy and Environment (Interdisciplinary)*
- Energy and Environmental Systems (Interdisciplinary, thesis-based only)*

The following specializations are offered only to course-based MEng degrees:

- Petroleum Reservoir Engineering
- Petroleum Exploration Engineering
- Reservoir Characterization (Interdisciplinary)*

**See the Calendar section on Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to the requirements of the Faculty of Graduate Studies and the Schulich School of Engineering, the Department requires:

Master of Engineering with Specialization in Petroleum Engineering

- A bachelor's degree in Chemical, Oil and Gas, or Petroleum Engineering

Exceptionally, students with a bachelor's degree in another branch of Engineering and substantial experience in the petroleum industry may be considered for admission.

Doctor of Philosophy

See "Engineering Programs".

3. Application Deadline

Deadlines for submission of complete applications for admission to MEng thesis-based, MSc and PhD:

September admission: March 15 (International applicants), July 15 (Canadian and Permanent Resident applicants)

January admission: July 15 (International applicants), November 15 (Canadian and Permanent Resident applicants)

May admission: November 15 (International applicants), March 15 (Canadian and Permanent Resident applicants)

Deadlines for submission of complete applications for admission to MEng course-based:

September and January admission: March 15 (All applicants)

4. Advanced Credit

See "Engineering Programs".

5. Program/Course Requirements

See "Engineering Programs".

6. Additional Requirements

The Department has established the following two graduate courses as required courses for the Master of Science and doctoral degrees:

Experimental Design and Error Analysis (Chemical Engineering 701)

Advanced Mathematical Methods in Engineering (Chemical Engineering 703)

Regardless of their specialization, all Master of Science students must take at least one of these two required courses while all doctoral students must take both required courses.

In addition, core courses have been established for the following specializations:

- Chemical Engineering specialization: Chemical Engineering 613, 623, 625, 631 and 633
- Petroleum Engineering specialization: Chemical Engineering 621, 629, 647, 657 and 677
- Biomedical Engineering Specialization: Chemical Engineering 613, 623, 625, 631 and 633

All Master of Science students in the Chemical Engineering and Petroleum Engineering specializations must complete at least one of the core courses of their specialization and all doctoral students must complete at least two of the core courses of their specialization. Requirements for other specializations are listed under the corresponding sections.

All Master of Science and doctoral students (Chemical, Petroleum, and Energy & Environment specializations) are required to register and participate in the Research Seminar course (Chemical Engineering 601) for each of the first two terms of their degree program. Each student (Chemical, Petroleum, and Energy & Environment specializations) must also present one research seminar in Chemical Engineering 601.

All Master of Science and doctoral students (Biomedical Engineering specialization) are required to register and participate in the Research Seminar course (Chemical Engineering 601) in one Fall Term and the Biomedical Engineering equivalent (Biomedical Engineering 607) in one Winter Term usually during the first year of their degree program. Each student (Biomedical Engineering specialization) must present one research seminar in Biomedical Engineering 607.

For more details, students must refer to the guidelines for the Research Seminar course. Requirements for other specializations are listed under the corresponding sections.

For Master of Engineering course-based students, at least 60 per cent of the courses must be from the declared area of specialization.

7. Credit for Undergraduate Courses

Not applicable.

8. Time Limit

See "Engineering Programs".

9. Supervisory Assignments

All students are required to have a supervisor before the second annual registration. For students in the Master of Science and Doctor of Philosophy degree programs, a supervisor is normally appointed at the time of admission.

10. Required Examinations

All final thesis oral examinations involve a public seminar/presentation before the oral examination.

PhD candidacy examination will not involve questions on the research proposal but will include questions on background knowledge needed to carry out the proposed research. See "Engineering Programs".

11. Research Proposal Requirements

Doctor of Philosophy

A research proposal must be submitted to and approved by the supervisory committee before the candidacy examination.

12. Special Registration Information

None.

13. Financial Assistance

See "Engineering Programs".

14. Other Information

See "Engineering Programs".

15. Faculty Members/Research Interests

The current research interests of the academic staff can be found at http://www.eng.ucalgary.ca/ench/node/73, or from the Department.

Engineering, Civil ENCI

Contact Information

Location: Schulich School of Engineering, Room F262

Program number: 403.220.5821

Fax: 403.282.7026

Email address: civgrad@ucalgary.ca

Web page URL:
http://www.schulich.ucalgary.ca/civil/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Master of Engineering (MEng) thesis-based and course-based

Specializations:

- Avalanche Mechanics
- Biomechanics
- Bituminous Materials
- Geotechnical Engineering
- Materials Engineering
- Project Management
- Structures & Solid Mechanics
- Transportation Engineering
- Water Resources
- Energy and Environment (Interdisciplinary)*
- Environmental Engineering (Interdisciplinary)*

**See the Calendar section under Interdisciplinary Specializations for further information.*

2. Admission Requirements

The Department of Civil Engineering requires higher English Language Proficiency in TOEFL and IELTS. We require at least a 570 for paper-based TOEFL, 93 for Internet-

based TOEFL and a Band of 7.0 for the IELTS exam.

Master's Programs

See "Engineering Programs".

Doctor of Philosophy

See "Engineering Programs".

Project Management Specialization

In addition to the "Engineering Program" degree requirements, a minimum of five years industrial experience, except in thesis-based degrees.

3. Application Deadline

Deadlines for submission of complete applications:

Canadian and Permanent Resident Applications

May 1 for September admission

September 1 for January admission

January 1 for May admission

International Admissions

April 1 for September admission

August 1 for January admission

December 1 for May admission

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission. Successful completion of "make-up" work does not guarantee admission. It is recommended that applicants discuss this option with the Departmental Graduate Student Advisor before taking any courses.

5. Program/Course Requirements

Note: If the student does not consult the supervisor before selecting courses, Department approval may be withheld.

In addition to Faculty of Graduate Studies and the Schulich School of Engineering requirements, the Department normally requires:

Master of Science

a) A minimum of four and a maximum of eight half courses.

b) Research and thesis work as major components of the program.

Master of Engineering (thesis-based)

a) Five to eight half courses.

b) A thesis related to original analysis and/or design.

Master of Engineering (course-based)

a) Ten to twelve half courses.

Doctor of Philosophy

a) A minimum of six half courses beyond the baccalaureate.

b) A minimum of two and a maximum of six half courses beyond the master's degree.

c) A detailed research proposal.

d) A candidacy exam which has both a written and oral component. The written component will be a four hour open book exam usually held a week prior to the oral exam.

6. Additional Requirements

All full-time Master of Science and doctoral students, except for those registered in Environmental Engineering 601 or Biomedical Engineering 605 or 607, are required to register and participate in the Research Seminar course Civil Engineering 601. Please note: these seminars are offered multiple times on different research topics and as such, Master of Science students are required to take Civil Engineering 601 two times and doctoral students three times while in program.

All graduate students who require access to Civil Engineering laboratories are required to complete a Workplace Hazardous Materials Information Systems (WHMIS) course and other required safety training courses before gaining access to the laboratories.

7. Credit for Undergraduate Courses

Not more than two of the half courses required in the thesis-based programs and not more than four of the half courses taken in the MEng program may be taken at the 500 level.

8. Time Limit

See "Engineering Programs".

9. Supervisory Assignments

See "Supervisors/Advisors" in the General Regulations section of this calendar.

10. Required Examinations

See "Engineering Programs".

11. Research Proposal Requirements

A detailed research proposal will be required for PhD students.

12. Special Registration Information

Not applicable.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar. Students applying for University of Calgary scholarships must submit their applications to the Department by February 1.

14. Faculty Members/Research Interests

Information about faculty members and their research interests may be found at http://www.schulich.ucalgary.ca/enci/faculty.

Engineering, Electrical and Computer ENEL

Contact Information

Location: ICT Building, Room 402

Program number: 403.220.5806

Fax: 403.282.6855

Email address: ecegapp@ucalgary.ca

Web page URL: http://www.enel.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Master of Engineering (MEng), thesis and course-based

All programs may be completed on a full-time or a part-time basis. For details, see the Calendar section on Schulich School of Engineering.

Specializations:

- Software Engineering*
- Energy and Environment (Interdisciplinary)**
- Environmental Engineering (Interdisciplinary)**
- Energy and Environmental Systems (Interdisciplinary)**

For a list of other supported research areas, please see section 15.

**The Master of Science and Doctor of Philosophy degrees with a specialization in Software Engineering are offered jointly through the Department of Electrical and Computer Engineering and the Department of Computer Science.*

***See the Calendar section on Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to Faculty of Graduate Studies and the Schulich School of Engineering requirements, the Department requires:

Master of Engineering and Master of Science

A bachelor's degree in electrical engineering or computer engineering.

Master of Science, Specialization in Software Engineering

a) At least one year of experience in software development.

b) Background knowledge in C or C++.

c) Knowledge of object-oriented design and human-computer interaction.

Note: Applicants with degrees in other disciplines may be considered, but additional undergraduate courses in electrical engineering may be required prior to admission.

Doctor of Philosophy

A master's degree in electrical engineering, computer engineering, or software engineering.

Note: Transfer to the doctoral program without completing the master's degree may be approved for exceptional students whose BSc degrees are in electrical engineering, computer engineering or software engineering.

3. Application Deadline

The preferred starting date for all graduate degrees is September.

Deadlines for submission of complete applications:

January 31 for September admission

April 30 for January admission

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process.

Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission or for grades below "B".

5. Program/Course Requirements

In addition to Faculty of Graduate Studies and the Schulich School of Engineering requirements, the Department requires:

Master of Engineering (course-based)

a) Ten to twelve half courses of which at least seven must be graduate courses in the Department of Electrical and Computer Engineering.

Students are encouraged to include Electrical Engineering 698 - Graduate Project in their programs. Normally Electrical Engineering 698 is taken as the last course, or concurrently with the last courses of the program. A copy of the Procedures and Guidelines is found on the departmental website.

Master of Engineering (thesis-based)

a) Normally, four to seven graduate half courses.

Master of Science

a) Normally, four to seven graduate half courses of which at least three must be in the area of specialization.

Master of Science, Specialization in Software Engineering

a) Two full-course equivalents selected from a specified list of courses.

b) An applied software engineering project written up as a Master of Science thesis and examined by an examination committee as specified in the Faculty regulations.

Doctor of Philosophy

a) Normally, six to nine graduate half courses beyond the bachelor's degree, or two to five graduate half courses beyond the master's degree with no fewer than half the courses in the Departmental program.

b) A written and an oral candidacy examination.

6. Additional Requirements

While studying full-time in the MSc or PhD program:

a) Students will be required to attend only two semesters of Electrical Engineering 605/607 at the beginning of their graduate studies program.

b) Students in the PhD program who completed the course in the MSc program will not be required to take the Electrical Engineering 605/607 for the second time.

c) Students who are required to take Electrical Engineering 605/607 must successfully present two seminars.

7. Credit for Undergraduate Courses

Where appropriate, and with approval of the supervisor and the Department, fourth year undergraduate courses (a maximum of two half courses for the Master of Science and one half course for Doctor of Philosophy) may be taken for credit toward a graduate degree.

8. Time Limit

Expected completion time is 20 months of full-time study for the Master of Science and four years for the Doctor of Philosophy. The maximum completion time is four years for the Master of Science and the Master of Engineering (thesis-based) and six years for the Master of Engineering (course-based) and the Doctor of Philosophy.

9. Supervisory Assignments

In all programs, a supervisor to provide guidance to the student is normally selected at the time of admission.

10. Required Examinations

See "Engineering Programs".

11. Research Proposal Requirements

Master of Science and Master of Engineering (thesis-based)

As required by the supervisor.

Doctor of Philosophy

The research proposal is approved during the candidacy examination.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance in the form of scholarships, teaching assistantships and research assistantships may be available through the Department. International students may be eligible for reimbursement of the tuition fee differential. Applications for scholarships must be submitted by January 15.

14. Other Information

Students enrolled in any of the engineering graduate programs may opt, in addition to their normal required course load, to undertake an international project outside Canada. The duration of the project should be between four and six months.

Details of research, courses, and financial assistance and other information are on the Departmental website.

15. Faculty Members/Research Interests

In addition to the official specializations listed in section 1, students enrolled in the Master of Science and Doctor of Philosophy degree programs in the Department may also conduct research in the following areas: Telecommunications, VLSI and Microelectronics, Image Processing, Computer Engineering, Power Electronics, Control Systems, Power Systems and Biomedical Engineering.

The active research interests of individual faculty members can be found at http://enel.ucalgary.ca/faculty.

Engineering, Geomatics ENGO

Contact Information

Location: Schulich School of Engineering, Room E228

Program number: 403.220.4979

Fax: 403.284.1980

Email address:
graduate@geomatics.ucalgary.ca

Web page URL:
http://www.geomatics.ucalgary.ca/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Master of Engineering (MEng), thesis and course-based

Specializations:

- Positioning, navigation and wireless location
- Earth observation
- Digital imaging systems (offered jointly with Biomedical Engineering)
- GIS and land tenure
- Energy and Environmental Systems (Interdisciplinary)*
- Environmental Engineering (Interdisciplinary)*

**See the Calendar section on Interdisciplinary Specializations for further information*

2. Admission Requirements

See "Engineering Programs".

All programs are available to both full-time and part-time students.

3. Application Deadline

Complete applications may be submitted any time up to and including January 1 for January admission, May 1 for May admission, July 1 for July admission and, September 1 for September admission, but applicants should allow up to four weeks for processing of their application. Shorter processing times may be possible if a potential supervisor has been identified.

In addition, international students should allow for the time required to apply for, and be granted, a Canadian student permit prior to their arrival. Please note that the time needed to obtain a Canadian study visa varies largely between country of origin and applicants are therefore encouraged to contact the Canadian Embassy in their respective countries to determine conservative processing times for this, including any necessary medical examinations that may be necessary. At the discretion of the supervisor, successful applicants who are unable to obtain a study visa in time may be allowed to defer their start date to a later time.

4. Advanced Credit

See "Engineering Programs".

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements and the Schulich School of Engineering, the Department requires:

Master of Engineering (course-based)

See “Engineering Programs”.

Master of Engineering (thesis-based)

a) A minimum of four graduate half courses.

b) After satisfactory progress in the student's own research work, enrolment in the Geomatics Engineering 605 Research Seminar course. This course must be completed during a semester that is prior to the final oral examination.

c) A thesis related to original engineering analysis or design.

Master of Science

a) A minimum of four graduate half courses.

b) After satisfactory progress in the student's own research work, enrolment in the Geomatics Engineering 605 Research Seminar course. This course must be completed during a semester that is prior to the final oral examination.

c) Attend six seminars (Geomatics Engineering 605, 607, and/or 609) in total. One page report should be submitted for each seminar.

d) A thesis related to original engineering research.

Doctor of Philosophy

a) A minimum of three graduate half courses beyond the Master of Science course requirements. For students who transfer from a Master of Science to a doctoral program, a minimum of two graduate half courses beyond the Master of Science course requirements.

b) After satisfactory progress in the student's own research work, enrolment in the Geomatics Engineering 607 and 609 Research Seminar courses. Geomatics Engineering 607 must be completed during a semester that is prior to the candidacy examination. Geomatics Engineering 609 must be completed during a semester that is prior to the final oral examination.

c) Attend six seminars (Geomatics Engineering 605, 607, and/or 609) in total. One page report should be submitted for each seminar.

d) A written and an oral candidacy examination based on the graduate course work.

e) A thesis related to advanced original engineering research.

Independent Study Courses

Course-based Master of Engineering students can have no more than three independent study courses count towards their degree requirements.

Thesis-based Master of Engineering students and Doctor of Philosophy students can have no more than one independent study course count towards their degree requirements. Students who transfer from the Master of Science to the Doctor of Philosophy program can have no more than two independent study courses count towards their degree requirements.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599, which are considered undergraduate courses.

8. Time Limit

See "Engineering Programs".

9. Supervisory Assignments

For thesis-based master's, or Doctor of Philosophy programs, see "Engineering Programs". For course-based master's programs, all students will be assigned an advisor at the time of registration.

10. Required Examinations

Master's Programs

See "Engineering Programs".

Doctoral Programs

Doctoral Candidacy Examination

The candidacy examination has a written and an oral component. The student's background knowledge in the field of Geomatics Engineering and in-depth knowledge in his/her chosen research specialization is examined.

The written examination is an open book examination of no longer than 6 cumulative hours. It consists of a comprehensive examination in the candidate's field of specialization and of a general examination in at least one of the other graduate streams in Geomatics Engineering, referred to as major and minor parts in the following. The major part will usually be of three hours duration and will count for 2/3 of the mark of the written component. The minor part will last one-and–a-half hours and will count for 1/3 of the mark of the written component. Passing marks in both the major and the minor parts are required to pass the written examination. A recommended reading list for the written examination will be made available to the student upon request.

The oral examination will further test the candidate's knowledge of his/her field of study in particular, and of geomatics in general, in addition to providing an opportunity to clarify, defend and extend answers in the written examination. Although the purpose of the candidacy exam is not to examine or approve the student's research proposal, questions on the research proposal may be included in the oral candidacy exam to assess the background knowledge and preparedness of the student to conduct doctoral research of high quality in his/her field of study.

Doctoral Final Oral Examination

See "Engineering Programs".

11. Research Proposal Requirements

Master of Engineering (thesis-based)

A thesis proposal accepted by the supervisor is required no later than 16 months after initial registration. Contents of the thesis, reflecting an applied approach to a problem, should contain new elements of engineering principles and applications.

The thesis proposal should include the following:

1. Statement of the problem.
2. Research objectives.
3. Literature review.
4. Methodology and procedures.
5. Outline of thesis contents.
6. Proposed time schedule.
7. Bibliography and references.

Master of Science

The Master of Science thesis proposal requirements, including the outline of the proposal's contents, are the same as those for the Master of Engineering (thesis-based). The thesis topic, however, should deal with original theoretical or practical research in Geomatics Engineering.

Doctor of Philosophy

The doctoral thesis proposal requirements, including the outline of the proposal's contents, are the same as those for the Master of Engineering (thesis-based). The thesis, however, must demonstrate the candidate's ability to pursue original research at a high level and represent a distinct advance in knowledge on the subject. The research should be of the recognized standard of technical journals requiring critical review. The supervisor and supervisory committee will normally require progress reports every six months during the doctoral program.

12. Special Registration Information

None.

13. Financial Assistance

Candidates are not admitted without financial support provided by an interested supervisor or official organizations. For information on awards, see the Awards and Financial Assistance section of this Calendar.

14. Other Information

See "Engineering Programs".

In addition, the Department offers a designated set of graduate half courses in each of the five specialization areas. Additional graduate courses are offered as Special Studies and Project courses. The Department also offers a Distinguished International Lecturer Series, which consists of approximately four to five courses offered annually by invited professors and researchers.

15. Faculty Members/Research Interests

Information about the Department's research areas may be found at http://www.geomatics.ucalgary.ca/research/.

Engineering, Mechanical and Manufacturing ENME

Contact Information

Location: Mechanical Engineering Building, Room 506

Program number: 403.220.4154/3541

Fax: 403.282.8406

Email address: gradenme@ucalgary.ca

Web page URL: http://www.schulich.ucalgary.ca/Mechanical/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc) thesis-based

Master of Engineering (MEng), thesis and course-based

The MEng program may be completed on a full-time or a part-time basis.

Specializations:

- Pipeline Engineering
- Engineering, Energy & Environment (Interdisciplinary Specialization)*
- Environmental Engineering (Interdisciplinary Specialization)*
- Energy & Environmental Systems (Interdisciplinary, thesis-based only)*

Further information on the Pipeline Engineering specialization may be found at www.schulich.ucalgary.ca/PEC. See section 15 for other supported areas of research.

**See the Calendar section under Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to the Faculty of Graduate Studies and the Schulich School of Engineering minimum requirements, the Department's requirements are as follows:

Master's Programs(MSc and MEng)

a) BSc degree or equivalent.

b) A minimum admission grade point average of 3.00 on a four-point scale or equivalent.

c) The admission requirements for both the MEng program and MSc program are the same

Doctor of Philosophy

See "Engineering Programs".

3. Application Deadline

Deadlines for submission of complete applications (applications received after the deadline will be considered for the following academic term):

March 01 for September admission

July 01 for January admission

November 01 for May admission

4. Advanced Credit

See "Engineering Programs".

5. Program/Course Requirements

In addition to Faculty of Graduate Studies and the Schulich School of Engineering minimum requirements, the Department requires:

Master of Engineering (course-based)

Ten half courses, no more than four of which can be senior undergraduate courses.

Master of Engineering (thesis-based)

a) Five to six half courses.

b) Presentation of one graduate seminar when registered in ENME/ENMF 613.

Master of Science

a) Five to six half courses of which two may be taken from outside the Department.

b) One course to be selected from Mechanical Engineering 631 - Numerical Methods for Engineers or Mechanical Engineering 633 - Mathematical Techniques for Engineers.

c) Presentation of one graduate seminar when registered in ENME/ENMF 613.

Doctor of Philosophy

a) Seven to ten half courses at the graduate level (up to two half courses may be taken from outside the Department): one to be selected from Mechanical Engineering 631 or Mechanical Engineering 633, or two to six half courses beyond the master's degree.

b) Presentation of one graduate seminar when registered in ENME/ENMF 713.

Note: Further details of Departmental requirements are listed in the Department's Graduate Studies Guidebook.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

See Section 5 for details.

8. Time Limit

See "Engineering Programs".

9. Supervisory Assignments

See "Engineering Programs".

10. Required Examinations

See "Engineering Programs".

11. Research Proposal Requirements

None beyond the Faculty of Graduate Studies requirements.

12. Special Registration Information

None.

13. Financial Assistance

See "Engineering Programs".

14. Other Information

See "Engineering Programs".

15. Faculty Members/Research Interests

Research is supported in the following areas: applied mechanics, automation, control, robotics and nano MEMS, biomechanics, design, manufacturing systems, materials and manufacturing processes, thermofluids, energy systems and environment.

Active research programs and research interests of current faculty can be found at http://www.schulich.ucalgary.ca/mechanical/research.

English ENGL

Contact Information

Location: Social Sciences Building, Room 1148

Program number: 403.220.5484

Fax: 403.289.1123

Email address: enggrad@ucalgary.ca

Web page URL:
http://www.english.ucalgary.ca/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), one year project-based or thesis-based

Under special circumstances, students may be considered for part-time status. Please consult the Department of English for more information.

Specialization:

- Literature in English

A Creative Writing option is also available.

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) A University of Calgary Honours degree or its equivalent in English (10 full-course equivalents in English).

b) A Statement of Intent.

c) A 5-10 page sample of critical writing; for creative writing applicants, an additional 10-page sample of creative writing.

d) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (written test), 100 (Internet-based test), a MELAB score of 84, an IELTS score of 7.5, or a PTE score of 7.0.

e) Two reference letters.

Doctor of Philosophy

a) A Master of Arts Degree in English or its equivalent.

b) A Statement of Intent.

c) A 5-10 page sample of critical writing; for creative writing applicants, an additional 10-page sample of creative writing.

d) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (written test), 100 (Internet-based test), a MELAB score of 84, an IELTS score of 7.5 or a PTE score of 7.0.

e) Two reference letters.

3. Application Deadline

Online applications must be complete and supporting documents (with the exception of letters of reference and official transcripts) received in the department by December 15th. Letters of reference and official transcripts will be received until January 10th. We recommend you allow at least 15 business days for mailing any supporting documents. Please note: The Department of English only has one application deadline and admits only for September.

4. Advanced Credit

Application for advanced credit must be made to the Department Head at the time of admission.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department normally requires:

Master of Arts (course-based)

a) Seven half-course equivalents in English at the 600 or 700 level beyond the Honours BA or equivalent.

b) English 710.

c) English 696 or its equivalent.

d) A demonstrated reading knowledge of a language other than English.

Master of Arts (thesis-based)

a) Three full-course equivalents in English at the 600 or 700 level beyond the Honours BA.

b) English 696 or its equivalent.

c) A demonstrated reading knowledge of a language other than English.

d) A scholarly and/or critical thesis approved by the Faculty of Graduate Studies.

Doctor of Philosophy

a) Six full-course equivalents in English at the 600, 700, or 800 level beyond the Honours BA or three full-course equivalents in English beyond the MA.

b) English 696 or its equivalent.

c) A demonstrated reading knowledge of a language other than English.

d) A General Comprehensive Examination.

e) A Field Candidacy Examination.

f) A doctoral dissertation on approved topic.

Copyediting

Ultimately, the thesis must be the student's own work. Editing should take place as part of a learning process, collaboration between the student and his/her supervisor and other academics in the University. Working with a student to teach him/her how to edit the thesis is part of a learning experience; having a thesis professionally edited is not acceptable.

6. Additional Requirements

All students must attend an orientation session.

Second Language Requirement

The Department of English requires, for both the MA and PhD, knowledge of one language other than English. Students are encouraged to establish competency in a language that contains a body of texts relevant to their program of study. This requirement can be met in the following ways:

a) A minimum grade of "B" in a full course or each of two half courses at a senior (300) level.

b) Passing the department reading exam. Computer-based courses in French (French 235 - French 237 and French 335 - French 337) and German (German 201 - German 213) are available and would be helpful in preparing for the department set exam.

c) Documentation establishing native proficiency in a language other than English.

It is the responsibility of the student to supply evidence of native proficiency or evidence that course work in a language at another university meets the requirement spelled out in this guide. Students who do not meet the requirement upon entry should consult with the Associate Head (Graduate Program) no later than the week before classes begin about the best approach to take.

7. Credit for Undergraduate Courses

With the approval of the Department, all graduate students may take for credit up to one full-course equivalent at the 500 level (excluding English 504).

8. Time Limit

Expected completion time is up to twelve months for the course-based Master of Arts, two years for the thesis-based Master of Arts and four years for the the Master of Arts (course-based) and Doctor of Philosophy degrees. Maximum completion time is two years for the course-based Master of Arts, four years for the thesis-based Master of and six years for the the Master of Arts (course-based) and Doctor of Philosophy degrees.

9. Supervisory Assignments

Master of Arts (thesis-based)

For the first seven months of the program, students are assigned an interim advisor to give them time to familiarize themselves with faculty members' research before securing a permanent supervisor.

By March 1 of the first year, each student must submit a proposed field of research and the name of a proposed supervisor to the Graduate Executive Committee for approval.

Doctor of Philosophy

For the first eight months of the program, students are assigned an interim advisor to give them time to familiarize themselves with faculty members' research before securing a permanent supervisor.

By April 1 of the first year, each student may submit the name of a proposed supervisor and the proposed area of field examinations to the Graduate Executive Committee for approval. By December 1 of the second year, the supervisor, following consultation with the student, will submit the names of the proposed supervisory committee to the Graduate Executive Committee for approval.

10. Required Examinations

Doctoral Candidacy Examinations

Before formally embarking on the writing of the PhD thesis, all students must pass the following:

1. A written General Comprehensive Examination, normally undertaken in September of the second year. Dates will be set by the department; this is a common exam, with a common sitting and common reading list. Consult the Department website for details.

2. The Faculty of Graduate Studies requires the successful competition of a candidacy oral examination. This candidacy exam is based on the field reading lists and written exams set by the department. Prepared by the supervisory committee, the examination consists of three parts, each requiring the student to answer one of two questions (for a total of three of six questions). This examination must be completed no less than ten working days before the candidacy oral examination.

The candidacy oral examination is a formal oral examination scheduled by the Faculty of Graduate Studies no later than 28 months after the student's initial registration in the program (for those who entered the program with an MA degree).

This oral examination should address issues arising from the written examination. Examiners are asked to record their assessment of the written component by commenting on the use of relevant literature and techniques, organization, literary competence, originality, argumentation leading to the conclusions, and anything else they consider important.

The candidacy oral examination will be conducted according to the Faculty of Graduate Studies procedures. Questions on the Research Proposal will not be included in the Oral Examination.

Consult the Department website for details.

The dissertation defence is open to the public.

11. Research Proposal Requirements

Master of Arts (thesis-based)

By May 1, no later than eight months after initial registration, each student must submit a thesis proposal with the form Registration of MA Thesis Topic to the Graduate Executive Committee. Further details are available from the department.

Doctor of Philosophy

By September 30 of the second year, each student must submit a thesis proposal on the form Initial PhD Thesis Research Proposal and Supervisory Committee to the Graduate Executive Committee.

The student must submit a Final PhD Thesis Proposal and Bibliography form along with a final thesis proposal and bibliography to the doctoral supervisory committee within three months of successful completion of the candidacy examinations. Further details are available from the department.

12. Special Registration Information

Students must register for courses by the end of June. Continuing students and new students who are able to do so should consult the course instructors before they register or as soon as they arrive on campus. Final approval to enter a course is given by the Head or Associate Head of the Department.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships are advised to have their applications to the Department by December 15.

14. Other Information

None.

15. Faculty Members/Research Interests

Detailed information about faculty members and their research interests may be found

at http://english.ucalgary.ca/contact-us/directory.

Environmental Design EVDS

Contact Information

Location: Professional Faculties 2182

Program number: 403.220.6601

Fax: 403.284.4399

Email address: evdsinfo@ucalgary.ca ; and evdsphd@ucalgary.ca

Web page URL: http://evds.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Environmental Design (MEDes), thesis-based

Master of Planning (MPlan), course-based

Master of Architecture (MArch), course-based

Specialization:

- Energy and Environmental Systems (Interdisciplinary, MEDes and PhD only)*

**See the Calendar section on Interdisciplinary Specializations for further information.*
***The Computational Media Design specialization is no longer available. See the Calendar entry for the Computational Media Design program.*

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, the Faculty of Environmental Design requires:

For applicants required to prove proficiency in English, a TOEFL score of 600 (written test); or 100 (Internet-based test); or an IELTS score of 7.5.

Doctor of Philosophy

a) An admission grade point average (GPA) above 3.50 on a four-point scale.

b) A research proposal that describes the nature of the thesis research the applicant expects to undertake. This will be used by an admissions committee as an indicator of the applicant's ability to conduct doctoral level research and to determine if adequate supervisory and research funding resources are available to support the proposed program. Only if such resources are available will the student be admitted. Please note that this research statement (maximum of 1500 words) must include the following sections: Background, research questions, literature review, research methodology, intellectual merit of the proposed research, and broader impacts of the proposed research. The research statement should also indicate if ethics approval is required to carry out the proposed research.

c) Three reference letters.

Master of Environmental Design (MEDes)

In addition to Faculty of Graduate Studies requirements, the Faculty of Environmental Design requires:

Applications are encouraged from a variety of academic backgrounds (including first professional degrees in architecture, landscape architecture, planning and design) or a combination of undergraduate degree and work-related experience.

Applicants for the Master of Environmental Design must provide:

a) Applicants must submit a clear, concise and substantive statement of interest (1,000 to 1,500 words), which informs the Admissions Committee of:

- The applicant's reasons for wanting to pursue the MEDes degree
- How the applicant's specific educational background and professional and personal experience relates to their proposed thesis project
- The applicant's thesis research interests and ideas to clarify the applicant's supervisory needs

b) Required: Applicants must submit at least one example of the applicant's previous academic or professional work such as a written essay, published research paper, major academic paper, thesis, design project, or consulting report.

in addition (optional):

A portfolio of the applicant's choosing that provides examples of or illustrates the applicant's design work, professional work, research, creative thinking, community action, planning products, or graphics and visual communication.

If any of the work submitted involved collaboration with others, the applicant should clearly identify their individual contributions. The examples of work and (if applicable) portfolio should be submitted in digital form (portable document PDF files), uploaded by the applicant to their Student Centre, upon submission of their online application.

c) Three reference letters.

Master of Planning (MPlan)

In addition to Faculty of Graduate Studies requirements, the Faculty of Environmental Design requires:

a) A clear, well-written, statement of intent which describes the applicant's preference for one of the planning streams and how the applicant's specific educational background and professional or personal experience relates to Planning as a field of study and the applicant's future vision for pursuing a graduate degree in Environmental Design (related to personal and professional goals and intentions).

b) A portfolio of the applicant's work, as selected by the applicant, to include at least one example of the applicant's previous academic or professional writing, such as a written essay, published research paper, major academic paper, design project or consulting report.

The portfolio may also include examples of the applicant's design work or design thinking, including creative work or ideas, community action, planning or design products, or graphics and visual communication.

The requirements for digital portfolio submissions are found in the Faculty of Environmental Design website at: http://evds.ucalgary.ca/content/master-planning-mplan-admissions.

The portfolio will be submitted in digital form (portable document PDF files), uploaded by the applicant to their Student Centre upon submission of their online application.

c) Three reference letters.

Master of Architecture (MArch)

In addition to Faculty of Graduate Studies requirements, the Faculty of Environmental Design requires:

a) Prospective applicants are advised to use opportunities within their four year recognized university undergraduate degree studies to develop knowledge in design, the humanities, social sciences, arts, engineering, biological and/or physical sciences – including, wherever possible, studio, laboratory and collaborative learning experiences.

b) Applicants must demonstrate successful completion of one or more years of undergraduate-level coursework in four areas: Design, Technology, Graphics, and History/Theory (equivalent to the courses taken in the minor in Architectural Studies, or in the MArch Foundation year). In order to complete these prerequisite requirements, applicants may be admitted to the MArch Foundation or qualifying year. An assessment of these prerequisite requirements will be made by an admissions committee and applicants will be informed in offers of admission which, if any, courses at the Foundation level will be required.

c) Candidates for MArch must provide evidence of original and/or creative work in any field or medium, and provide in writing a brief description of the work. The requirements for digital portfolio submissions are found in the Faculty of Environmental Design website at: http://evds.ucalgary.ca/content/master-architecture-march-admissions.

The portfolio will be submitted in digital form (portable document PDF files), uploaded by the applicant to their Student Centre upon submission of their online application.

d) Three reference letters.

3. Application Deadline

Doctor of Philosophy

The deadline for the submission of complete applications is February 1 for September admission.

Normally students begin their programs in September.

Master's Programs

Applications are accepted from September 1 through January 15 for September admission. There is no January admission. Please note that new admissions to any of the master's degree programs may be limited in number on an annual basis.

4. Advanced Credit

A student may apply for advanced credit for previous courses that have not been used to satisfy the requirements of any other

degree or diploma program. The applicant must make advanced credit requests as part of the admission process. Advanced credit will not be given for courses taken more than five years prior to admission application. Credit will not be given for courses taken to bring the grade point average to a required level for graduate studies admission. Advanced credit may not exceed two full-course equivalents or one third of the program whichever is less.

Course Exemptions: Students registered in a graduate degree program may receive an exemption from a specific course if they can demonstrate successful completion of an equivalent course. In order to be eligible for an exemption, the student must provide original transcripts, course outlines and samples of course assignments which will be assessed for academic equivalency. Courses for which exemptions are being sought must be from a recognized institution, and they must be graded courses with a minimum grade of "B-". Students granted an exemption from a course may be required to take another, equally weighted, course to satisfy credit hour requirements for their program.

Program Transfers: A student at the University of Calgary may request a transfer to another program of equivalent level. Any course taken in the initial program may be transferred to the new program, depending on its applicability to the receiving program.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements, students admitted to any of the Faculty's graduate programs (MArch, MPlan, MEDes, PhD) are expected to complete Environmental Design 501/601 Interdisciplinary Seminar as a core course. Additionally, the Faculty of Environmental Design requires:

Doctor of Philosophy

a) Students complete Environmental Design 601 Interdisciplinary Seminar, and two half course electives at the graduate level that are relevant to their area of research, chosen in consultation with their Interim Advisor or Supervisor. The PhD Co-ordinator must approve these courses.

b) Additional course work when recommended by the student's interim advisor or supervisor.

Fieldwork and research performed off-campus may be counted towards fulfillment of the full-time study and research requirement.

Master of Environmental Design (MEDes)

The Master of Environmental Design is an interdisciplinary degree concerned with designing, planning, managing, and studying human activities in the built and natural environments. The degree is thesis-based and driven by the student's Program of Study, developed in conjunction with their supervisor across the spectrum of faculty research expertise. For students with an appropriate professional background, the degree provides the opportunity to pursue research in a specific area of interest. Therefore, a clear statement of design or research interest in one of the areas of faculty research expertise is of particular importance in the admissions process. Students are admitted from a variety of backgrounds, but normally are in possession of professional design or planning degrees, post-professional design degrees, or significant work experience in a related field.

An individual student Program of Study (POS) will be submitted by all students for approval by the MEDes Graduate Co-ordinator prior to their second term registration. The POS must include the following academic requirements:

a) Required Courses:

Environmental Design 601 (HCE): Interdisciplinary Seminar

Environmental Design 753 (HCE): Research Skills and Critical Thinking

b) A minimum of two half course electives.

c) A thesis proposal approved by the Thesis Supervisor. The approved student thesis proposal must form part of the POS for approval.

d) Satisfactory Faculty of Graduate Studies student progress reports must be submitted annually.

Master of Planning (MPlan)

The Master of Planning program is designed to provide graduates with the core competencies required for certification by the Canadian Institute of Planners and its affiliate, the Alberta Professional Planners Institute. The Master of Planning Program has been granted accreditation by the Canadian Institute of Planners for the period of 2013/14 through 2017/18.

An individual Program of Study (POS) is required by all students for approval by the MPlan Graduate Director by May 31 of their first registration year. The POS must include the following academic requirements, totalling at least 17 HCEs:

a) Core required courses:

Environmental Design 601 (HCE)

Environmental Design Planning 621 (HCE)

Environmental Design Planning 623 (HCE)

Environmental Design Planning 625 (HCE)

Environmental Design Planning 627 (HCE)

Environmental Design Planning 631 (HCE)

Environmental Design Planning 633 (HCE)

Environmental Design Planning 635 (HCE)

Environmental Design Planning 637 (HCE)

Environmental Design Planning 644 (FCE)

b) One of the following Planning Technology courses (or approved equivalent):

Environmental Design 602 (HCE)

Environmental Design 611 (HCE)

c) All of the required courses for one of the following three streams:

i) Regional and Environmental Planning

Environmental Design 624 (HCE)

Environmental Design 626 (HCE)

and three half-course equivalents of approved, planning-related electives.

ii) City and Community Planning

Environmental Design 616 (HCE)

Environmental Design 622 (HCE)

Environmental Design 628 (HCE)

a minimum of two half-course equivalents of approved, planning-related electives.

iii) Urban Design and Development

Environmental Design 618 (HCE)

Environmental Design 622 (HCE)

Environmental Design 671 (HCE)

a minimum of two half-course equivalents of approved, planning-related electives.

Note: The course-based Master of Planning program is open to part-time students.

Master of Architecture (MArch)

The MArch is a first professional degree in Architecture accredited by the Canadian Architectural Certification Board (CACB). The MArch is a two year course-based degree with a Foundation year for those applicants without a design-related four year undergraduate degree. After its last review in 2011, the University of Calgary Master of Architecture professional program was accredited for another six years by the CACB. This is the maximum period for which programs can be accredited between reviews. Under NAFTA, this means that accredited Canadian degrees are fully recognized in the USA and vice versa. In Canada, all provincial associations recommend a degree from an accredited professional degree program as a prerequisite for licensure. The CACB, which is the sole agency authorized to accredit Canadian professional degree programs in architecture, recognizes two types of accredited degrees, the Bachelor of Architecture and the Master of Architecture. A program may be granted a six-year, three-year, or two-year term of accreditation, depending on the degree of conformance with established educational standards. Master's degrees may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree. A student Program of Study (POS) may be required by all students for approval by the MArch Graduate Co-ordinator. Successful completion of the MArch must include the following academic requirements:

a) Core required courses:

Foundation Year

Environmental Design 501 (HCE)

Environmental Design Architecture 511 (HCE)

Environmental Design Architecture 523 (HCE)

Environmental Design Architecture 523.01 (HCE)

Environmental Design Architecture 523.02 (HCE)

Environmental Design Architecture 541 (HCE)

Environmental Design Architecture 543 (HCE)

Environmental Design Architecture 580 (FCE)

Environmental Design Architecture 582 (FCE)

First (M1) and Second (M2) Year

Environmental Design Architecture 611 (HCE)

Environmental Design Architecture 613 (HCE)

Environmental Design Architecture 615 (QCE)

Environmental Design Architecture 617 (QCE)

Environmental Design Architecture 619 (HCE)

Environmental Design Architecture 621 (HCE)

Environmental Design Architecture 661 (HCE)

Environmental Design Architecture 663 (HCE)

Environmental Design Architecture 682.02 (FCE)

Environmental Design Architecture 682.04 (FCE)

Environmental Design Architecture 782 A (FCE)

Environmental Design Architecture 782 B (FCE)

b) One of the following block-week quarter courses, afterwards any of which may be taken or repeated for elective credit:

Environmental Design Block 697.77 make-Calgary Design Charrette

Environmental Design Block 697.65 Somerville Design Charrette

Environmental Design Block 697.47 Gillmor Theory Seminar

Environmental Design Block 697.66 Taylor Workshop

c) Five half-course equivalents of electives, of which, at least three half-course equivalents must be from a list approved by the Associate Dean, Academic-Architecture, circulated annually before commencement of the registration year.

6. Additional Requirements

A laptop computer is required for all students. Visit the website for further details: http://evds.ucalgary.ca/content/master-architecture-march-admissions.

7. Credit for Undergraduate Courses

Doctor of Philosophy

Not given.

Master of Environmental Design / Master of Planning

Only undergraduate courses numbered 500-599 may be considered for graduate-level credit and are subject to approval by the Program Director.

Master of Architecture

With the exception of Foundation year courses, only undergraduate courses numbered 500-599 may be considered for graduate-level credit and are subject to approval by the Program Director.

8. Time Limit

Students registered in the Master of Environmental Design (thesis-based) program must complete all degree requirements within four registration years.

Students registered in either the Master of Architecture or Master of Planning (course-based) programs must complete all degree requirements within six registration years. However, it is expected that these students will enrol on a full-time basis and complete the degree requirements within two registration years (excluding the Foundation year in the Master of Architecture program).

Students registered in the PhD program must complete all degree requirements within six registration years. However, it is expected that these students will enrol on a full-time basis and complete the degree requirements within four registration years.

9. Supervisory Assignments

Doctor of Philosophy

At the time of admission, each student will be assigned an interim advisor, who may or may not become the student's thesis supervisor. The interim advisor, in consultation with the PhD Co-ordinator, will recommend a program of courses that must be approved by the PhD Co-ordinator.

During the first year of studies, the student, with the advice of the interim advisor and the PhD Co-ordinator, will prepare a thesis proposal and propose a supervisor and the other members of a supervisory committee for approval by the PhD Co-ordinator.

Master of Environmental Design

Upon admission, each MEDes student will be assigned an Interim Supervisor appropriate to their admissions statement of intent and thesis research area who may assist with POS development and thesis proposal development. By registration in the second term of study a Thesis Supervisor must be approved specific to the student's approved thesis proposal.

Master of Planning

Upon admission, each MPlan student will be assigned an Academic Advisor to assist with POS development.

Master of Architecture

Upon admission each MArch student will be assigned a Program Advisor to assist with program requirements and planning.

10. Required Examinations

Doctor of Philosophy

Doctoral students are required to complete both a written and an oral candidacy examination. The written candidacy examination normally consists of a set of four questions set by the supervisory committee and taken in the second year of the program (or possibly the third year for students entering the program without a master's degree), after the completion of course work and after approval of the doctoral thesis proposal.

At least six months before the written examination, the supervisory committee will prepare a written outline of the material to be covered in the exam, a recommended reading list and a draft examination schedule. Normally, the student will be given two weeks to complete the written candidacy papers. The period during which the written examination and the oral examination are conducted must not exceed one month.

The written papers will form the basis of the oral candidacy examination although questions may extend beyond the written papers to areas outlined in the notice of candidacy examination.

Final thesis oral examinations are open.

Master of Environmental Design

Final thesis defence oral examination.

Master of Planning

Successful completion of course requirements.

Master of Architecture

Successful completion of course requirements.

11. Thesis Proposal Requirements

Doctor of Philosophy

Approval of the thesis proposal by the supervisory committee and the PhD Co-ordinator is required as noted in the "Supervisory Assignments" above. Thesis Proposals should clearly describe the project in terms of Title, Objectives, Background, Methodology and Expected Outcomes, and must include an explicit interventionist or problem-solving component.

Master of Environmental Design

Final thesis proposals will be individually approved by an approved Supervisor. Thesis Proposals should clearly describe the project in terms of Title, Objectives, Background, Methodology and Expected Outcomes, and must include an explicit interventionist or problem-solving component.

12. Convocation Information

In addition to Faculty of Graduate Studies submission requirements, all PhD and Master of Environmental Design (Thesis) students are required to submit one bound copy (bound in standard orange cloth-covered cases, bearing the author's name, title of work, year and the Environmental Design symbol (rainbow) lettered in white), and one personal data format (.PDF) copy on CD.

13. Financial Assistance

Financial assistance may be available to qualified students but cannot be guaranteed. For information on admission and academic awards, see the Awards and Financial Assistance section of this calendar, the EVDS website and the Awards Data Base on the Faculty of Graduate Studies website.

14. Other Information

Attendance at orientation for first year students is strongly encouraged.

15. Faculty Members/Research Interests

Current information about faculty members and research interests can be found at http://evds.ucalgary.ca/contact-us.

French, Italian and Spanish FISL

Contact Information

Location: Craigie Hall, Room D310

Program number: 403.220.4001

Fax: 403.284.3634

Email address: fisgrad@ucalgary.ca

Web page URL: http://fis.ucalgary.ca

1. Degrees and Specializations Offered

Master of Arts (MA), thesis and course-based routes, with specialization in either French or Spanish

The MA degree may be taken on a full-time or a part-time basis.

Please see section 15 for a list of supported research areas.

The Department also participates actively in interdisciplinary degree programs, such as Canadian Comparative Literature (with English) and Film.

Applicants interested in a doctoral degree on a special case basis should review the program's website to determine any additional requirements or restrictions, and then, if appropriate, contact the graduate program representative. Information on the Faculty of Graduate Studies Special Case Policy can be found at http://grad.ucalgary.ca/prospective/admissions/special-case.

A description of the PhD in Spanish or French Admission and Program Requirements as well as a sample Student Research Proposal can be found at http://fis.ucalgary.ca/graduate/prospective-students/doctoral-program-french-spanish.

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires students:

a) To demonstrate a sufficiently high level of oral and written competence in the French or Spanish language.

b) To have an adequate academic background in the discipline.

c) To submit an example of the applicant's written work: a term paper, research paper or other writing, which the applicant considers representative of his or her best work. The paper must be in either French or Spanish, depending on the language of study.

d) A 250-word (minimum) statement of research interest including research topic and the reasons for wishing to pursue graduate work in this Department.

e) Two reference letters.

3. Application Deadline

Deadline for the submission of complete applications: February 1.

Applications received later than the deadline will be considered for admission and for departmental funding, but chances of financial support are greatly reduced.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be granted for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

Note: Normally no more than one half course of Directed Reading may be taken for credit.

In addition to Faculty of Arts requirements, the Department normally requires:

Master of Arts (thesis-based)

Six half-course equivalents (including French 605 or Spanish 601, depending on the language of study).

Master of Arts (course-based)

Ten half-course equivalents (including French 605 or Spanish 601, depending on the language of study).

Applicants lacking the requisite background in language or literature may be admitted as qualifying students. In this case, extra course work is normally required. A qualifying oral examination based on set texts may be required before the students attain regular Master of Arts status. Courses taken as a qualifying student do not normally count as part of the student's course requirements.

Copyediting

The department prohibits copyediting in students' thesis for the MA or PhD degrees.

6. Additional Requirements

Master of Arts

All students must attend the departmental graduate orientation session in September. Attendance at the UofC Graduate Orientation is highly recommended.

a) Both options have a knowledge areas requirement that must be satisfied by the first month of the second year in program, or, as appropriate, one month after the completion of course work, whichever occurs first. Upon admission students will be advised of any specific course or other work needed to fulfill this requirement.

b) Before the end of their second year of study, MA Thesis students are required to make a departmental or external presentation relating to their research.

c) Students in the thesis-based and course-based programs are also expected to demonstrate their participation in university-wide research activities by attending at least five departmental or external scholarly presentations every year in their programs.

7. Credit for Undergraduate Courses

Only in exceptional circumstances and where appropriate to a student's program may graduate credit be received for courses numbered 500-599. No more than two half courses can be at the 500 level.

8. Time Limit

Expected completion time for full-time students is two years for a thesis program and three years for a course-based program. Maximum completion time is four years for a thesis program and six years for a course-based program.

9. Supervisory Assignments

Newly admitted students begin their programs under the supervision of the departmental Graduate Director. Students are expected to choose a permanent supervisor by the end of the second regular academic session after first registration (April 30 for September registrants and December 15 for January registrants). Selection of a supervisor should be by mutual agreement between the student and the staff member concerned, approved by the Graduate Director.

10. Required Examinations

Comprehensive examination (course-based)

The course-based program requires a comprehensive examination with a written and an oral component, taken after the completion of all course work and any other requirement such as the knowledge areas requirement. Students are required, as early as possible and, in any case, at least before registering for an eleventh semester to file the reading list on their chosen area of specialization with the Department's Graduate Committee. The list should be drafted after consultation with the student's supervisor and approved by that faculty member.

Final oral thesis examinations are open.

11. Research Proposal Requirements

Thesis students are required to submit a written thesis proposal thirteen months after initial registration (for September registrants: 1st draft to the supervisor is due by September 1 and the thesis proposal to the Graduate Committee is due by September 30; for January registrants: 1st draft to the supervisor is due by January 2 and the thesis proposal to the Graduate Committee is due by February 1).

This proposal should be approximately 1200 words in length and be accompanied by an abstract and an appropriately detailed preliminary bibliography. It should be drafted after consultation with the student's supervisor and have his/her preliminary approval. These documents will be circulated to the departmental Graduate Committee for approval. Abstracts of proposals may be reproduced for information purposes.

12. Special Registration Information

None.

13. Financial Assistance

Funding is available to qualified thesis-based students in the form of scholarships awards and/or teaching assistantships. Master of Arts students can expect to receive funding for a maximum of 20 months. Students applying for departmental funding for the following academic year must submit their applications to the Department by February 1. All students are strongly encouraged to seek external financial assistance throughout their program. For information on other funding opportunities, see the Awards and Financial Assistance section of this Calendar and the Faculty of Graduate Studies website: http://www.grad.ucalgary.ca/awards.

14. Other Information

Prospective students are encouraged to consult either the Head of the Department or the Graduate Director. Detailed information on our programs is also available at http://fis.ucalgary.ca.

15. Faculty Members/Research Interests

Support research areas: French Language Studies, French Literature from the Medieval to the Contemporary periods, French-Canadian Literature, Francophone Literatures and Film, Hispanic Language Studies and Literatures, Hispanic Cultures and Film, Spanish Language and Linguistics, Comparative Literature, Literary Theory, Second Language Learning and Teaching (including computer-assisted language learning).

Information about faculty members and their research interests may be found at http://fis.ucalgary.ca/.

Geography GEOG

Contact Information

Location: Earth Sciences Building, Room 356

Program number: 403.220.5584

Fax: 403.282.6561

Email address: geograd@ucalgary.ca

Web page URL: http://geog.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based

Master of Science (MSc), thesis-based

Master of Geographic Information Systems (MGIS), course-based with research component

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department of Geography requires all MA/MSc and PhD applicants to submit:

a) A proposal describing applicant's intended research area.

b) A current curriculum vitae or résumé.

c) Two reference letters.

For MGIS applicants the Department requires:

a) A statement of interest outlining the applicant's goals, motivation for applying to the program, and research area of interest.

b) A current curriculum vitae or résumé.

c) Two reference letters.

For the academic background requirements for the MGIS program, the Department will accept a four-year BA or BSc degree in Geography or in any related field that makes use of spatial data. Examples include, but are not limited to: Anthropology, Archaeology, Biological Sciences, Computer Science, Ecology, Environmental Science, Geology/Geophysics, Geomatics Engineering, History, Management, Mathematics, Political Science, Psychology, Tourism, Transportation Studies or Engineering, and Urban Studies.

3. Application Deadline

Deadlines for submission of complete applications:

For thesis programs

January 15 for September admission

August 31 for January admission

For MGIS applicants

April 30

Files are reviewed on an ongoing basis. Applications are accepted until the deadline, but late applications may be considered if there is capacity in the program.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires the following:

Master of Geographic Information Systems

Ten half courses must be completed while in the program. At least eight of these must be at the 600 level or higher; the remaining two may be at the 500 level. These will include:

a) Three core courses in Geographic Information Sciences in the areas of Remote Sensing, Spatial Analysis and Geographic Information Systems:

Geography 633 Research and Applications in Remote Sensing

Geography 639 Advanced Spatial Analysis and Modelling

Geography 647 Advanced Research and Applications in Geographic Information Systems

Each course assumes that the student has two undergraduate courses in the areas of Remote Sensing, analytical methods in Geography (or inferential statistics) and Geographic Information Systems, respectively.

b) Two research-based courses related to the area of Geographic Information Science:

Geography 681 GIS Project: Theoretical Issues

Geography 683 GIS Project: Application

These courses will be on a topic mutually agreed upon between the student and the supervisor. The first course will be concerned with gathering information and literature on the research topic and will provide a critical assessment of this literature. This will be written up as a course paper that will equate to the literature review chapter of a traditional thesis. The second research course will be concerned with carrying out a program of analysis in the chosen research area using the Geographic Information Science tools discussed in the core courses. The final paper produced for this course will equate to the analysis and discussion chapters of a traditional thesis.

c) Five additional half courses chosen by mutual agreement between the student and the supervisor. These courses will support the student's chosen research project and understanding of the Geographic Information Sciences.

The MGIS program may be completed on a full-time or a part-time basis.

Master of Arts, Master of Science

a) Four half-course equivalents in a two-year period, including History and Philosophy of Physical or Human Geography, and at least one graduate-level methods course in Geography.

b) Four semesters of Geography 601 (Graduate Research Seminars). Students may be exempted from a portion of this requirement by the Graduate Program Director.

c) An approved thesis proposal completed within the first year of the program.

For detailed information on courses and program requirements please refer to: http://www.geog.ucalgary.ca/.

Full-time status is expected. In some situations thesis programs may be completed on a part-time basis with approval from the Graduate Program Director.

Doctor of Philosophy

a) Two half-course equivalents during the first two years in program, including History and Philosophy of Physical or Human Geography.

b) Four semesters of Geography 601 (Graduate Research Seminars). Students may be exempted from a portion of this requirement by the Graduate Program Director.

c) An approved thesis proposal completed within the first 18 months of the program.

d) A candidacy exam completed within the first 24 months of the program.

For detailed information on courses and program requirements please refer to: http://www.geog.ucalgary.ca/.

Full-time status is expected. In some situations thesis programs may be completed on a part-time basis with approval from the Graduate Program Director.

6. Additional Requirements

For thesis programs: participation in the graduate research seminar series and the annual Department Conference.

For MGIS students: participation in the annual graduate student Department conference (oral presentation or development of an academic poster of their project work for presentation/display).

Departures from regular departmental program/course requirements may be recommended on an individual basis by the interim advisor or supervisor with approval from the Graduate Program Director.

7. Credit for Undergraduate Courses

No more than one half of a regular thesis graduate student's coursework can be at the undergraduate level. Programs requiring a larger ratio of undergraduate courses must receive approval of the Dean of Graduate Studies at the time of admission. MGIS students are allowed a maximum of one full course credit at the 500 level.

8. Time Limit

Expected completion time is two years in MA/MSc programs and four years in the PhD program. Maximum completion time is four years for MA/MSc programs and six years for the PhD program. For the MGIS Program, minimum completion time is one year and maximum completion time is six years.

9. Supervisory Assignments

Each graduate student has a supervisor appointed within the first term in program. For PhD students, a supervisory committee should be appointed within three months of the appointment of supervisor.

10. Required Examinations

MGIS oral comprehensive examinations will be based on project and course work. MGIS students will be examined on their comprehensive understanding of course material and their integrated professional knowledge/conception of geographic information science. The examination committee will consist of at least three examiners, including the graduate student advisor, but with no requirement for an external examiner.

PhD candidacy examinations have a written and an oral component. Questions on the research proposal will not be included in the oral candidacy examination. Final thesis oral examinations are open.

11. Research Proposal Requirements

See Program/Course Requirements.

12. Special Registration Information

None.

13. Financial Assistance

Department funding is available to highly ranked thesis students. Financial assistance may be available to qualified thesis students. For information on awards, see the Awards and Financial Assistance section of this Calendar or check the Graduate Awards Database: http://www.grad.ucalgary.ca//funding.

Unless otherwise stated, awards are made only to full-time students in thesis programs.

14. Other Information

None.

15. Faculty Members/Research Interests

Faculty members and their research interests can be found at http://geog.ucalgary.ca/contact-us#academics.

Geoscience GLGP

Contact Information

Location: Earth Sciences Building, Room 118

Program number: 403.220.3254

Fax: 403.284.0074

Email address: geosciencegrad@ucalgary.ca

Web page URL:
http://geoscience.ucalgary.ca/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based or course-based

The course-based Master of Science degree may be taken on a full-time or a part-time basis.

Specialization:

- Reservoir Characterization (Interdisciplinary)*

**See the Calendar section on Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to Faculties of Graduate Studies and Science requirements, the Department requires:

Master of Science

a) Normally, a four-year Bachelor of Science degree or equivalent. An Honours degree in geology or geophysics, or a field related to geophysics, such as physics or mathematics, is preferred.

b) A concise statement outlining the applicant's research interests and reasons for wishing to attend the University of Calgary.

c) For those students required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test), 92 (Internet-based test), a MELAB score of 82, an IELTS score of 7.5, or a PTE score of 64.

d) Two reference letters.

Doctor of Philosophy

a) Normally, a Master of Science degree or equivalent in geology or geophysics or a field related to geophysics, such as physics or mathematics.

b) A concise statement outlining the applicant's research interests and reasons for wishing to attend the University of Calgary.

c) For those students required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test), 92 (Internet-based test), a MELAB score of 82, an IELTS score of 7.5, or a PTE score of 64.

d) Two reference letters.

3. Application Deadline

Complete applications are due by:

February 1 for September admission

January admissions will not normally be considered.

4. Advanced Credit

Thesis-based programs: Application for credit should be made to the graduate program at the time of admission, so that the previous work can be taken into account when specifying a student's program.

Course-based programs: The student must request advanced credit in writing at the time of application for admission.

Master's programs: The total of advanced credit and transfer credit will generally not exceed either one-third of the program or two full-course equivalents, whichever is less.

Advanced credit is not guaranteed and will be determined by the Graduate Program Director or Department Head with consideration of the recommendation of the Interim Supervisor.

Courses for which advanced credit is being sought must be from a recognized institution and not have been used for any degree or diploma accreditation. They must be graded, graduate-level courses, and the graded level of performance must be equivalent to a "B" grade or higher standing at the University of Calgary. Advanced credit is not normally given for courses taken more than five years before admission to the current graduate degree program or for courses taken for the purposes of qualifying for admission.

5. Program/Course Requirements

In addition to the Faculties of Graduate Studies and Science requirements, the Department requires:

Master of Science (course-based)

a) Nine half courses, five of which must be at the 600 level or higher (includes Geology 701 or Geophysics 701 research project).

b) Completion of a Research Project (Geology 701 or Geophysics 701). The student is required to present and defend the project in a one-hour defence once the written research report is in near-final form. The supervisor and two other members of the department assess the project. If an industrial partner is involved, the industrial research supervisor may also assess the project.

c) Completion of at least six half courses in the first year of study by full-time students, and at least one half course in the first academic session by part-time students. Following is a list of required courses for the two concentration areas that are offered.

Geology Course-based Concentration

a) Geology 707.

b) At least seven additional geology or geophysics courses at the 500 or 600 level. At a minimum, three must be at 600 level. Up to four appropriate courses from another department may be substituted for a 500-level geology or geophysics course subject to program approval. Course-based students may receive credit for both Geology 703 and 701. Courses are selected in consultation with the supervisor and with the approval of the Graduate Program Director.

c) Geology 701. This course constitutes the research component of the degree and cannot be submitted and defended until after all other courses are completed.

d) Students with deficiencies may be required to take more than nine half courses upon the advice of their supervisor.

Geophysics Course-based Concentration

a) Four of the following: Geology 707, Geophysics 547, 551, 557, 657, 659.

b) At least four other Geophysics courses at the 500, 600 or 700 level. At least four of the eight required courses must be at the 600 or 700 level. One or two appropriate courses from another department may be substituted for a 500-level geology or geophysics course subject to program approval. Course-based students may receive credit for both Geophysics 703 and 701. Courses are selected in consultation with the supervisor and with the approval of the Graduate Program Director.

c) Geophysics 701. This course constitutes the research component of the degree and cannot be submitted and defended until after all other courses are completed.

d) Students with deficiencies may be required to take more than nine half courses upon advice of their supervisor.

Master of Science (thesis-based)

a) Completion of a minimum of four half courses in the first year of program.

b) Students with deficiencies may be required to take more than four half courses upon advice of their supervisor.

c) An oral public presentation of thesis results.

Doctor of Philosophy

a) Completion of four half courses in the first year of program.

b) Subject to supervisor and Graduate Program Director approval, some credit may be granted for courses taken during a master's program, to reduce the course requirement. Course requirements may be waived for a maximum of three half-course equivalents for students with Master of Science degree from the Department of Geoscience at the University of Calgary, and two half-course equivalents for students with Master of Science degrees from other programs or institutions.

c) Students with deficiencies may be required to take more than four half courses upon advice of their supervisor.

d) Students with a Bachelor of Science degree, but no master's degree, to complete a minimum of five half courses, with four in the first year of program.

e) Students in Geology to take Geology 707 during the first academic year in program.

f) That all students take either Geology or Geophysics 701 or 703.

g) An oral public presentation of thesis results.

6. Additional Requirements

Master of Science (course-based)

Full-time students are normally expected to provide their own financial support and pay tuition and fees as outlined in the graduate student calendar since the department does not normally offer financial support to course-based Master of Science students.

Normally, part-time students will be working in the field of Geology and/or Geophysics, and the industrial supervisor can agree to work with the supervisor in the Department to supervise the student's research project, and to evaluate the research project.

7. Credit for Undergraduate Courses

The Department does not give graduate credit for courses taken below the 500-level.

8. Time Limit

Expected completion time is two years for students in thesis-based master's degree programs, two years for full-time students in a course-based master's program, and three or four years for doctoral students. Maximum completion time is four years for students in a thesis-based master's program, and six years for students in a course-based master's program and doctoral students.

9. Supervisory Assignments

Upon admission, a student is assigned an interim supervisor by the Graduate Program Director, either based on prior communication between the student and a prospective supervisor, or chosen from the research field the student has specified. Usually the interim supervisor becomes the permanent supervisor, but the Graduate Program Director must approve the final selection before the thesis proposal is submitted. Supervisory committees for doctoral students are selected by consultation between the permanent supervisor and the student.

10. Required Examinations

Doctoral students have a two hour oral candidacy examination that must be completed by the twenty-eighth month of program.

Questions on the research proposal may be included in the oral candidacy examination. Students should contact their department for further details.

Master of Science thesis-based and doctoral students have final thesis oral examinations that are open to the public, with a public presentation on the same day.

11. Research Proposal Requirements

Master of Science thesis-based students must file a thesis proposal by March 15 of the second session of study for September registrants and July 15 for January registrants. The thesis proposal must not be more than five pages of text long and include an abstract and a list of references cited in the text. The supervisor will assess the proposal in detail.

PhD thesis students will submit a more substantial thesis proposal within 18 months of registration.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this calendar.

Students applying for scholarships must have complete applications submitted to the Department by February 1.

No financial support will be given to students enrolled in the course-based master's program.

14. Other Information

The department requires all graduate students to file a comprehensive Annual Report. The report is due by December 15 and covers activities for the current calendar year. Recent September registrants are required to report activities for their first term of study only.

No office space will be provided to students enrolled in the course-based master's program.

Detailed information about the graduate program can be found at departmental website.

15. Faculty Members/Research Interests

The current faculty research interests can be found at http://www.geoscience.ucalgary.ca/faculty_directory2.

German GSEA

The German Graduate Program is offered through the Department of Linguistics, Languages and Cultures.

Contact Information

Location: Craigie Hall, C Block, Room 205

Program number: 403.220.5293

Fax: 403.284.3810

Email address: llc@ucalgary.ca

Web page URL: http://llc.ucalgary.ca/

1. Degrees and Specializations Offered

Master of Arts degree (thesis-based)

The Department particularly solicits applications from students interested in pursuing a cross-disciplinary degree involving another department at the University of Calgary (e.g., English; History; Philosophy; French, Italian and Spanish).

Applicants interested in a doctoral degree in German Studies on a special case basis should review the program's website to determine any additional requirements or

restrictions, and then, if appropriate, contact the graduate program representative. Information on the Faculty of Graduate Studies Special Case Policy can be found at http://grad.ucalgary.ca/prospective/admissions/special-case.

The Department does not formally offer a part-time option – all students will be considered full-time.

2. Admission Requirements

In addition to the requirements of the Faculties of Graduate Studies and Arts, the Department of Germanic, Slavic and East Asian Studies requires:

a) A letter of intent outlining background, research interests, and goals for the program.

b) An academic writing sample (of approximately 8-15 pages) in English or German.

c) Two reference letters.

3. Application Deadline

Deadlines for the submission of complete applications:

February 1 for September admission

September 1 for January admission (discuss January admission with Department)

Late applications may be accepted but reduce the applicant's chances of receiving funding.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculty requirements, the Department requires:

a) Normally, three full-course equivalents for students who hold a baccalaureate degree.

b) For some students, depending upon background preparation, a course in bibliography and methodology.

c) Sufficient German language skills for the proposed program.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

No more than one-half of a regular graduate student's required program of course work can be at the undergraduate level. Undergraduate courses may be taken for credit only with departmental approval. Programs requiring a larger ratio of undergraduate courses must receive the approval of the Dean of Graduate Studies at the time of admission.

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

8. Time Limit

Expected completion time is two years for the Master of Arts and four years for the Doctor of Philosophy. Maximum completion time is four years for the Master of Arts and six years for the Doctor of Philosophy.

9. Supervisory Assignments

The Graduate Program Director is normally the interim supervisor for students entering the program, and will assist them in finding a supervisor within the first year. In the case of cross-disciplinary degrees, the choice of supervisor must be established upon application to the program.

10. Required Examinations

Final thesis oral examinations are open to the public.

Questions on the research proposal will not be included in the oral candidacy examination of special case doctoral degree students.

11. Research Proposal Requirements

The department requires all graduate students to submit a written thesis proposal by the sixteenth month of the program. The required form is available on the department website. The proposal should be drafted after consultation with the student's supervisor and have his/her preliminary approval.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to the Department by February 1.

14. Other Information

As part of the graduate program in German, students may participate in a one-semester exchange with Justus-Liebig-Universität Gießen.

15. Faculty Members/Research Interests

Research faculty and the specific areas within which Master of Arts thesis supervision is offered may be found at http://gsea.ucalgary.ca/graduate/faculty-members-german.

Please refer to the Course Listings in the Main Calendar: http://www.ucalgary.ca/pubs/calendar/current/german.html.

Greek and Roman Studies GRST

Contact Information

Location: Social Sciences Building, Room 558

Program number: 403.220.4831

Fax: 403.220.9581

Email address: rstgrad@ucalgary.ca

Web page URL: http://grst.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA) degree, thesis or course-based

The MA degree may be completed on a full-time or a part-time basis.

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

a) Normally at least eleven full-course equivalents of relevant undergraduate course work are expected for admission to the MA program, with some concentration in the proposed research area.

b) All research areas require proficiency in reading Latin and/or Greek.

c) Competence in reading French, German or Italian must be acquired either before or during the program.

d) For the PhD, an MA is required.

e) Two letters of reference.

3. Application Deadline

Deadlines for submission of complete application is December 1st for September admission.

4. Advanced Credit

Contact department for information.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts (thesis-based)

a) Greek and Roman Studies 603, first-year half course on research and professional training.

b) Four other seminar half courses, normally taken in the first year of the program; these may include up to two half courses outside the department if appropriate to the area of specialization.

c) Four quarter courses of directed studies in Greek and Latin texts (Greek or Latin 607), normally taken in Fall and Winter Terms of the first and second year. Greek or Latin 607 may be replaced with Greek or Latin 602 and/or 604.

d) An examination in translation, with dictionary, from French or German or Italian into English (normally to be attempted within the first twelve months of registration).

e) A thesis of approximately 20,000 words, with oral examination.

Master of Arts (course-based)

a) Greek and Roman Studies 603, first-year half course on research and professional training.

b) Eight other seminar half courses; these may include up to two half courses outside the department if relevant to the student's particular interests in the field.

c) Four quarter courses of directed studies in Greek and Latin texts (Greek or Latin 607), normally taken in Fall and Winter Terms of

the first and second year. Greek or Latin 607 may be replaced with Greek or Latin 602 and/or 604.

d) An examination in translation, with dictionary, from French or German or Italian into English (normally to be attempted within the first twelve months of registration).

Doctor of Philosophy

a) Greek and Roman Studies 603, first-year half course on research and professional training.

b) A minimum of four other graduate seminar half courses; these may include up to two half courses outside the department if appropriate to the area of specialization; students may be required to take up to four other seminar half courses depending upon their background training. Students are advised of any such requirements upon entry into the program.

c) Four quarter courses of directed studies in Greek and Latin texts (Greek or Latin 607); Greek or Latin 607 may be replaced with Greek or Latin 602 and/or 604.

d) A translation examination from two of the three following modern languages into English, French, German or Italian.

e) Examination of the Core Reading and Dissertation Reading List (contact the department for further information).

f) A twenty-page dissertation proposal.

g) A Candidacy Exam, which must be passed before 28 months of tenure.

h) A thesis of about 75,000 words, followed by an oral examination.

6. Additional Requirements

The department may require up to two additional half courses in order to ensure sufficient preparation in relevant areas for the MA, or four additional half courses in order to ensure sufficient preparation in relevant areas for the PhD. Students are advised of any such requirements upon entry into the program.

7. Credit for Undergraduate Courses

Not more than two of the half courses required in the thesis-based MA program, and not more than four half courses in the course-based program, may be taken at the 500 level.

8. Time Limit

Students studying on a full-time basis are expected to complete the program in two years. Students in thesis-based master's programs must complete their degrees within four years. Students in course-based master's programs must complete their degrees within six years. For the PhD program, students are expected to complete their degrees within six years.

9. Supervisory Assignments

The Graduate Program Director is normally the interim supervisor for a master's student entering the program, and will assist the student to find a supervisor within eight months of entering the program. Doctoral students are expected to have a supervisor upon entry. The appointment of a supervisor is subject to approval by the Department Head.

10. Required Examinations

Final oral examinations are open.

Questions on the research proposal will not be included in the oral candidacy examination.

11. Research Proposal Requirements

A formal proposal is not required for the MA thesis. The student's thesis topic is defined in consultation with the supervisor, normally within 12 months of entry into the program. It should be referred to the Program Graduate Program Director for approval. The PhD proposal is to be submitted in accordance with the Faculty of Graduate Studies requirements.

12. Special Registration Information

None.

13. Financial Assistance

The department offers full or partial support through teaching assistantships and Faculty of Graduate Studies Support to selected applicants. The Faculty of Graduate Studies offers numerous awards listed in the Graduate Calendar (e.g. Open Scholarships) in a university-wide competition.

Various awards are available from other agencies (federal and provincial governments, private foundations, etc.).

Applicants are encouraged to seek funding vigorously. The department can offer advice on identifying sources.

Note: Faculty of Graduate Studies Support and university scholarships are normally awarded only to students in the thesis-based program.

14. Other Information

Enquiries should be addressed to: grstgrad@ucalgary.ca.

15. Faculty Members/Research Interests

Details concerning the research areas of individual professors may be obtained from the department website at http://grst.ucalgary.ca/contact-us/directory.

Haskayne School of Business: Management MGMT

Contact Information

Location:

MBA Program: Scurfield Hall, Room 350

PhD Program: Scurfield Hall, Room 424

Phone:

MBA Program: 403.220.3808

PhD Program: 403.220.6073

Fax: 403.282.0095

Email address:

mbarequest@haskayne.ucalgary.ca

phdrequest@haskayne.ucalgary.ca

Web page URL:

http://www.haskayne.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Business Administration (MBA), course-based and thesis-based

Specializations:

- Entrepreneurship and Innovation
- Finance
- Marketing
- Project Management
- Global Energy Management and Sustainable Development
- Global Energy (Executive MBA only)
- Energy and Environmental Systems (Interdisciplinary, thesis-based only)*

**See the Calendar section on Interdisciplinary Specializations for further information.*

Joint programs, offered with other Faculties:

Juris Doctor/Master of Business Administration (JD/MBA)

Master of Public Policy/Master of Business Administration (MPP/MBA)

Master of Social Work/Master of Business Administration (MSW/MBA)

Master of Biomedical Technology/Master of Business Administration (MBT/MBA)

Doctor of Medicine/Master of Business Administration (MD/MBA) ("Leaders in Medicine" Program)

Combined programs, offered with professional societies:

MBA-CMA Program

This is a combined initiative between the Haskayne School of Business and the Certified Management Accountants of Alberta. For information check with the Haskayne MBA office.

MBA-CGA Program

This is a combined initiative between the Haskayne School of Business and the Certified General Accountants of Alberta. For information check with the Haskayne MBA office.

Master of Business Administration (course-based)

The course-based MBA program is designed for students who wish to pursue a career in management and is offered to students who possess a four-year degree or equivalent in any discipline. The program consists of required courses designed to create integrative business skills and elective courses where students have the opportunity to pursue areas of specialization. Students can complete the Haskayne MBA through full-time study that normally requires 16 to 20 months, or through evening study with completion in two to six years. Normally, combined programs (JD/MBA, MPP/MBA, MSW/MBA, MBT/MBA, MD/MBA) must be completed on a full-time basis. Students in the Haskayne MBA program

may choose a specialization in Finance, Entrepreneurship and Innovation, Marketing, Global Energy Management and Sustainable Development or Project Management. They may also elect not to have an area of specialization.

Executive MBA

The Executive MBA is offered jointly by the University of Calgary and the University of Alberta on alternate weekends and periodic intensive weeks. It is designed for those who wish to participate in an intensive MBA study program while still continuing actively in their careers.

Executive MBA – Specializing in Global Energy

The Global Energy focused delivery of the Executive MBA maintains the core content of the MBA program and the alternative scheduling of the EMBA that is more conducive to executives who remain active in their career. The MBA curriculum is enhanced by collaboration with IHS Cambridge Energy Research Associates (IHS CERA) allowing greater emphasis on energy-focused business from a global perspective. The material is delivered through five distinct learning modules, each conducted over a period of three to five months. These modules feature intensive two- to three-week residencies providing real-world experiences in international energy centres. All graduates of the Global Energy Executive MBA receive a specialization in Global Energy.

Master of Business Administration (thesis-based)

This program of studies is designed for students wishing to pursue a special research interest in the Haskayne School of Business. It is normally offered to students who possess a Bachelor of Commerce degree or its equivalent. The thesis program will admit only those students who can demonstrate a serious commitment to research, the ability to work independently in the production of a thesis, and a qualified supervisor who is interested in overseeing their research program.

Doctor of Philosophy

The Doctor of Philosophy program offers talented research-oriented students the opportunity to pursue an academic career in business-related subjects.

2. Admission Requirements

Master of Business Administration

In addition to the Faculty of Graduate Studies requirements, the MBA program requires:

a) A current résumé.

b) A 250-word response to each of "How, considering your career progress to date, does an MBA fit in with your future career goals?" and "When thinking of your own personal successes, were they a result of your own personal skills or your ability to work with others? Please describe".

c) For students required to prove proficiency in English, a minimum TOEFL score of 600 (written test), or 100 (Internet-based test), or an IELTS score of 7.0.

d) Completion of the Graduate Management Admission Test (GMAT*) with a recommended minimum score of 550 for the Haskayne MBA with high scores on both verbal and quantitative subcomponents. It is recommended that students should place above the 70th percentile on overall test scores. A minimum GMAT score of 600 or an equivalent GRE is required for the thesis program.

e) Two reference letters.

f) For the course-based MBA program only, the equivalent of at least 2 years of appropriate work experience.

g) For applicants to the thesis-based program, normally a Bachelor of Commerce with a minimum grade point average of 3.30 on a four-point scale.

h) For applicants to the Executive MBA (EMBA) delivery formats, the equivalent of at least seven years of work experience, a number of years of which must have carried management or professional responsibility.

i) Applicants to the EMBA specializing in Global Energy must be eligible to travel internationally.

j) Applicants may be interviewed by a member of the Admissions Committee as part of the application screening process.

k) An applicant to a combined MBA program (JD/MBA, MPP/MBA, MSW/MBA, MBT/MBA, MD/MBA) must be admitted to the MBA program, and make separate application for admission to the other program. The respective Combined Program Committee will review each application. Normally, only a full-time student in the Haskayne MBA Program may take a combined program.

Please note that receiving admission to both individual programs does not guarantee admission to the combined program.

Note: An applicant who has completed a bachelor's degree with an admission grade point average (GPA) from 2.50 to 2.99 may be admitted to an MBA course-based program as a regular student on the basis of the following equivalent achievement score: [(GPA x 200) + GMAT] >/= 1150.*

Doctor of Philosophy

In addition to the Faculty of Graduate Studies requirements, the Haskayne School of Business requires:

a) Normally, an MBA degree or equivalent from a recognized institution with a recommended minimum admission grade point average of 3.50 on a four-point scale. Students with an undergraduate or master's degree in an area other than business may be required to complete a qualifying period to gain a general business background before beginning the normal doctoral course requirements.

It is possible to enter the PhD program without an MBA or other master's degree. Consult the Director of the PhD Program for further information.

b) Completion of the Graduate Management Admission Test (GMAT*) with a recommended minimum score of 650, with high scores on both verbal and quantitative subcomponents. Many successful applicants in the recent past have earned scores of 700 and above; or equivalent results on the Graduate Record Exam (GRE). It is recommended that students should place above the 85th percentile on overall test scores on the Graduate Record Exam (GRE).

c) For those students required to prove proficiency in English, a minimum TOEFL score of 600 (written test), or 100 (Internet-based test), or an IELTS score of 7.0, or a MELAB score of 84, or a PTE score of 70.

d) Current CV.

e) Two reference letters.

f) A personal statement outlining objectives, intent and commitment to a research program.

g) Availability of a research-active supervisor and resources for the area in which the student wishes to study.

Work experience in business or public organizations will be considered.

See the PhD program website http://haskayne.ucalgary.ca/haskaynegrad/phd for more information. Approved changes to the program standards and requirements will be posted on the website.

**Consult the Haskayne School of Business about the Graduate Management Admission Test.*

3. Application Deadline

March 1 for international applicants (September admission)

Refer to website for other deadlines.

PhD and MBA (thesis-based) programs

January 15 for September admission - year-round admission assessment and decision possible for exceptional students with complete applications.

Combined programs

As separate application to applicable program is required, please see relevant program for deadlines.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process to the MBA program. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

Course requirements for doctoral students will be based on the student's background and program needs. Credit for previous courses will be provided as appropriate.

5. Program/Course Requirements

In addition to the requirements of the Faculty of Graduate Studies, the Haskayne School of Business requires:

MBA (course-based)

The MBA degree normally consists of twenty half courses (nineteen half courses and two quarter courses). Students may be granted exemption from foundation courses based upon prior academic preparation and with the approval of the Associate Dean (MBA Program). Students must complete

a minimum of fifteen half courses (or equivalent), of which a maximum of five half courses may be transfer credit from another recognized graduate program, for the MBA degree.

Foundation Courses

Accounting 601 Financial Accounting

Accounting 603 Management Accounting

Finance 601 Managerial Finance

Human Resources and Organizational Dynamics 601 Managing Human Resources

Management Information Systems 601 Management Information Systems

Management Studies 611 Managerial Economics

Management Studies 613 Managerial Decision Modelling

Marketing 601 Marketing Management

Operations Management 601 Operations Management

Strategy and Global Management 601 Strategic Management

Management Studies 601 Skills Development

Integrative Courses

Management Studies 715 Strategic Business Analysis

Business and Environment 777 Global Environment of Business

Management Studies 770 Topics in Leadership

Specializations

Students must complete seven elective half courses beyond the foundation and integrative courses. Students may select an area of specialization normally consisting of four half courses. Students wishing to specialize may choose from the following areas:

- Finance
- Entrepreneurship and Innovation
- Marketing
- Global Energy Management and Sustainable Development
- Project Management

Students who elect not to choose an area of specialization may choose instead from various graduate courses offered by the Haskayne School of Business. Subject to the approval of the Associate Dean (MBA Program) and the Faculty of Graduate Studies, graduate courses offered at the University of Calgary outside the Haskayne School of Business may also be taken.

Combined JD/MBA

A student admitted to the combined JD/MBA program spends the first year doing core studies in one program and the second year doing core studies in the other program. The remaining years in the program combine Law and Business courses in a way that will allow the achievement of both degrees in four rather than five years (please consult the MBA office).

Combined MPP/MBA

A student admitted to the MPP/MBA program spends the first year in the MBA program, completing a minimum of 12 half courses. The student will be required to hold an undergraduate degree and be admitted to both the MPP and MBA programs (please consult the MBA office).

Combined MSW/MBA

A student admitted to the combined MSW/MBA program will require an undergraduate degree in Social Work (BSW) or equivalent. The MSW/MBA degree can be completed in two years of study (24 months) including fall/winter and spring/summer sessions (please consult the MBA office).

Combined MBT/MBA

A student admitted to the combined MBT/MBA program will require an undergraduate degree in Biological Sciences or equivalent (please consult the MBA office).

Combined MD/MBA

A student admitted to the MD/MBA program spends the first year in the MBA program, completing a minimum of 12 half courses. The student will be required to hold an undergraduate degree and be admitted to both the MD and MBA programs. A program will be developed for each student under the guidelines of the Leaders in Medicine program (please consult the MBA office).

Combined MPP/MBA

Students must meet the admission requirements for the Faculty of Graduate Studies and those for the MBA and MPP programs. Please consult the MBA Admissions Officer or the MPP Program Manager for more information.

Executive MBA

The delivery format of the program is different from the Haskayne MBA program and requires more integrative types of sessions and activities. However, the program requires many of the same courses as are required in the Haskayne MBA program. In general, students in this program are expected to follow a general curriculum rather than electing an area-specific specialization other than the specialization in Global Energy Management. Only in rare cases will it be possible for students to do the latter. The Executive MBA has the same 13 core course credits with 7 additional courses for a total of 20 as the other MBA programs. A complete course overview can be found on the Haskayne website. It is expected that all participants entering the program in a given year will complete the program requirements at the same pace, completing all of them over the same 20-month time frame.

Executive MBA– Specializing in Global Energy

The delivery format of the program is different from the Haskayne MBA and Calgary-based Executive MBA programs. Course delivery will include more integrative types of sessions and activities, offered in modules in a variety of locations. The course content of the MBA required courses above, will be completed through the alternative delivery format with the added benefits of the networking and alternative scheduling for business career professionals and a real-world global experience with international travel. It is expected that all participants entering the program in a given year will complete the program requirements at the same pace, completing all of them over the same 19-month time frame. The Executive MBA Specializing in Global Energy has the same 13 core course credits with 7 additional courses for a total of 20 as the other MBA programs. A complete course overview can be found on the Haskayne website.

MBA (thesis-based)

a) A minimum of eight half-course equivalents selected by the student in consultation with his or her supervisor. Among these eight half courses, a course in research methods (Management Studies 773, Multivariate Analysis in Management), Business and Environment 777 and Strategy and Global Management 601, or 795 are required. MBA Thesis students are also invited and encouraged to take one or more doctoral-level courses as part of their programs.

b) Approval of each individual's program by the Director, MBA (thesis-based) Program.

Students who lack courses in one or more of the functional disciplines in management (i.e., accounting, finance, human resources and organizational dynamics, management information systems, operations management, marketing) may be required to take courses in those areas in partial fulfillment of their program either as part of, or in addition to, the normal eight half course requirement.

Doctor of Philosophy

Each student will have four areas of study. The first area (Management Studies – MGST) will be an overview of management education, theory, and research methods. The second will be designated as the major area; the third as the minor; and the remaining area is analytical methods.

a) Management Studies Area – A number of half courses, such as Management Studies 781, 783, 792, and 793. There is a requirement to complete courses at the Teaching and Learning Centre to develop necessary teaching skills. Students who have not completed a research-based master's degree should take Management Studies 792 during the Spring/Summer Sessions between their first and second years.

b) Major area: The major area must be chosen from those offered within the Haskayne School of Business:

- Accounting
- Entrepreneurship and Family Business Management
- Environmental Management/Sustainable Development
- Finance
- Human Resources and Organizational Dynamics
- Management Information Systems
- Marketing
- Operations Management
- Risk Management and Insurance
- Strategy and Global Management

- Tourism Management

Students will be required to take three or four half courses from the major area.

c) Minor Area – The minor area of study must complement the major area. It may be chosen from those areas offered within the Haskayne School of Business or from those offered from other faculties. Students will be required to take one or two half courses in their minor area.

d) Analytical Methods – Research and Statistics/Methods: at least three half courses offered within the Haskayne School of Business or by other Faculties.

The typical student will take six full-course equivalents over the first 20 months of the program. The number of courses may vary according to the student's particular program and background. Students work closely with their research-active supervisors who help guide them to the appropriate courses within and outside the School.

6. Additional Requirements

Attendance at an orientation session is mandatory for all incoming students in all MBA program options and for all incoming doctoral students.

7. Credit for Undergraduate Courses

Credit for undergraduate courses taken prior to admission may be granted based on the approval of the Associate Dean (MBA Program).

8. Time Limit

Thesis-based Master: five years

Course-based Master: six years

Doctor of Philosophy: six years

MSW/MBA: seven years

Note: It is expected that all participants entering the Executive MBA delivery format of the MBA program in a given year will complete the program requirements at the same pace, completing all of them over the same 20-month time frame.

9. Supervisory Assignments

Doctoral and MBA (thesis-based) students are required to select a permanent supervisor within the first twelve months of their program. For doctoral students, a supervisory committee reflective of the student's research interests is required within three months after the permanent supervisor has been approved.

10. Required Examinations

Doctoral students are required to complete written candidacy examinations developed by the supervisory committee within twenty-eight months of commencing the program. These often combine take-home examinations and an oral examination completed within a period of one month. Questions on the research proposal may be included in the candidacy exam. The written candidacy examination format may differ depending on the major area and the supervisory committee. Students are advised to consult with their supervisors at least six months in advance of the candidacy examination dates.

MBA thesis and doctoral students will complete an oral thesis examination at the end of their programs.

Oral thesis examinations are open.

11. Research Proposal Requirements

Students whose research involves human subjects must receive approval from the Haskayne School of Business and from the University of Calgary Conjoint Faculties Research Ethics Board before beginning data collection. Doctoral students are required to have an acceptable research proposal before the doctoral candidacy examination. MBA (Thesis) students must secure approval from the supervisor before beginning thesis research.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, please see the Awards and Financial Assistance section of this Calendar.

MBA Thesis and doctoral students applying for scholarships must submit their applications to the Program Director by January 15.

The Haskayne School of Business provides assistance for doctoral students in the form of Graduate Assistantships, Faculty of Graduate Studies Scholarships, the Robert Willson Scholarship, and the Marion Janet and Ian Stormont Forbes Graduate Scholarship. Students should also enquire about scholarships available from the Faculty of Graduate Studies. All admitted full-time MBA students will be automatically considered for Business scholarships.

14. Other Information

Successful applicants will be required to confirm their acceptance of an offer of admission into the MBA program with an online non-refundable $500 deposit to the Haskayne School of Business. The $500 will be credited toward fees upon registration.

15. Faculty Members/Research Interests

The active research interests of the faculty can be found at http://www.haskayne.ucalgary.ca/faculty/dir/faculty/.

History HIST

Contact Information

Location: Social Sciences Building, Room 656

Program number: 403.220.3839

Fax: 403.289.8566

Email address: histgrad@ucalgary.ca

Web page URL: http://hist.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), course-based and thesis-based

Specializations:

- History and Philosophy of Science (MA, thesis-based only)*
- Israel Studies (Interdisciplinary)**

**This specialization is offered in cooperation with the Departments of Philosophy.*

***See the Calendar section on Interdisciplinary Specializations for further information.*

Candidates should apply to the program of their choice, indicating the area of research (see section 5 below).

2. Admission Requirements

In addition to the requirements of the Faculties of Graduate Studies and Arts, the Department requires:

Master of Arts

a) Normally, a four-year undergraduate program with honours or a major in history. Usually this entails at least seven full-year History courses (or fourteen half courses). Credit may be given for up to two half courses in other disciplines, if appropriate for the proposed area of study.

b) A minimum admission grade point average of 3.40 on a four-point scale over the final 10 full-course equivalents of the undergraduate degree.

c) A copy of a historical research paper, preferably graded, normally at the senior undergraduate level.

d) A 250-word (minimum) statement of research interest including research topics in the major field and the reasons for pursuing a postgraduate degree in history.

e) Two reference letters.

Doctor of Philosophy

a) Normally, a completed four-year undergraduate program with honours or a major in history and a completed master's degree or the equivalent in history or in a related discipline.

b) A grade point average of 3.70 on a four-point scale in history at the graduate level.

c) A detailed statement of research interests, career goals, and ideas for the thesis topic.

d) A sample of written work, normally a master's thesis chapter or a major research paper completed at the master's level.

e) Two reference letters.

3. Application Deadline

Deadlines for the submission of complete applications:

January 15 for September admission and funding

April 15 for September admission only

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts (thesis-based)

a) A minimum of one year of full-time study at the University of Calgary.

b) Three full-course equivalents (including History 690) in two semesters of course work. master's students will complete their coursework through regularly offered History seminars.

Areas of faculty research interests include: Canada, Europe, Israel Studies, Latin America, United States, Britain, China, Atlantic History, History of Science, Intellectual History, Military-Diplomatic History, Political History, Popular Culture, Religious History, History of Gender and Sexuality, Social History, and Western Canada/Borderlands/Frontier.

In cooperation with the Department of Philosophy, the History Department offers a Master of Arts degree in the History and Philosophy of Science. Students who choose this specialization are required to take courses in the relevant departments. Candidates enrolled in the Department of History are expected to work with more than one instructor in History.

Students must take one half course seminar in a field unrelated to the student's research interests. In instances where there are no seminars being offered in the student's research field, students may, with permission of the chair of graduate studies, take one 500-level undergraduate seminar but on the understanding that extra course work will be required.

c) A thesis of 80 to 150 pages, including notes, charts, tables and appendices, but excluding bibliography. Students begin thesis preparation as they undertake their course work and may fulfill the requirements for their Master of Arts degree in twelve months.

d) A demonstration of reading knowledge of a second language related to the major field of study prior to the oral thesis defence.

Master of Arts (course-based)

There is no full-time requirement for this program.

a) A minimum of six full-course equivalents; two may be senior undergraduate courses at the 500 level (but on the understanding that extra course work will be required), two must be graduate seminars and at least two are to be graduate seminars in a secondary field.

b) Completion of History 690 in the first year and History 651 and 653 in the final year of program.

c) A 50–60 page research paper prepared in the final year and defended in an oral examination.

d) A demonstration of reading knowledge of a second language related to the major field of study before the oral examination.

e) Completion of at least one half course per semester.

Doctor of Philosophy

a) A minimum of two years of full-time study at the University of Calgary.

b) Three full-course equivalents at the graduate level, including courses in the primary, secondary and cognate areas. Doctoral students are required to complete 2.5 FCE in History coursework at the graduate level, of which at least 1 FCE must be completed in the primary area and one half course in the secondary area. Doctoral students must also complete one half course outside of History in a cognate area. The areas will be defined in detail by the supervisor and the student in consultation with the Supervisory Committee and must be approved by the Department Graduate Studies Committee. During the candidacy examination, the student will demonstrate a comprehensive understanding of the primary and secondary areas as well as his or her particular field of research. The secondary area will be selected from an area of history outside of the primary area. The cognate course will consist of a non-history discipline or thematic history subject. The length of the reading list will be 100-150 titles for the primary area (with the understanding that three articles or stand alone chapters in essay anthologies is the equivalent of one book), and 50-75 titles for the secondary area. The availability of secondary areas and cognate/thematic courses will depend on faculty members' expertise. Each of a student's areas must be taught by a different faculty member or as defined by the committee.

Primary Areas: Canada; History of Science, Latin America; Medieval and Early Modern Europe; Military/Diplomatic; Modern Europe and Britain; United States; World.

Secondary Areas (to be chosen from outside of Primary Area): Canada; History of Science; Latin America; Medieval and Early Modern Europe; Military/Diplomatic; Modern Europe and Britain; United States; World.

Cognate Course: Students will complete one half course of graduate-level coursework in an area outside of History. A student's cognate course will be determined in consultation with the supervisor.

c) A thesis normally of 400 pages, including notes, charts and tables, but excluding bibliography and appendices.

d) A demonstration of reading knowledge of a second language relevant to the student's research prior to the candidacy examination.

e) Written and oral candidacy examinations in primary and secondary areas. The Supervisory Committee consists of the primary and secondary area supervisors with the third member being a faculty member whose area of expertise is in the field of study for the student. The History Department urges candidates to take candidacy examinations within 16 months of first registration. Examinations must be completed within 20 months of first registration.

The doctoral program consists of two terms of coursework relevant to the primary and secondary areas, and cognate course. During the third and fourth terms, students read for the candidacy examinations. Four to five terms of thesis preparation will normally follow. Students who have not taken History 690 or its equivalent will be required to take it as part of their program in the first year and in addition to the requirements above.

Copyediting

The graduate program in the Department of History does not permit the use of third-party editors in the preparation of papers and theses.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Students enrolled in the part-time course-based Master of Arts program may take two of the required six full-course equivalents at the 500 level.

Students enrolled in the Master of Arts thesis program may apply for no more than one 500-level course for graduate credit, subject to the approval of the Department. Graduate students taking a 500-level course for graduate credit will be required to complete additional assignments.

8. Time Limit

Expected completion time is 12 to 20 months for the Master of Arts thesis program, and four years for the doctoral program. Maximum completion time is four years for the Master of Arts thesis program and six years for the course-based Master of Arts and doctoral programs.

9. Supervisory Assignments

Upon acceptance into the program, students are assigned an interim supervisor. Each student should select a permanent supervisor, subject to the consent of the faculty member, within three months of entering program. Admission to the master's and the doctoral programs is dependent upon the agreement of a faculty member to supervise in an interim capacity.

The supervisor establishes a doctoral supervisory committee in consultation with the student. The Supervisory Committee consists of the primary and secondary area supervisors with the third member being a faculty member whose area of expertise is in the field of study for the student. The supervisory committee must be selected within three months of the supervisor's appointment (no later than March of the first year of a program).

10. Required Examinations

Doctoral candidacy examinations have a written and an oral component and are taken upon completion of all course and language requirements. Students will write exams for their primary and secondary areas. There will be a closed-book exam in each field. (Primary area closed book format will require that the student write a three-hour exam on campus with no sources, answering two questions from a range of questions provided by the primary area supervisor.

Secondary area closed book format will require that the student write a two-hour exam on campus with no sources, answering two questions from a range of questions provided by the secondary area supervisor). Area supervisors will decide whether to emphasize historiography or teaching in setting exam questions. The supervisory committee, in consultation with the student, sets the subjects. A level of general knowledge consistent with teaching an introductory survey course is expected for each area. The oral candidacy examination is taken no later than twenty calendar days after the last written examination. The department strongly recommends that students take their candidacy examinations within 16 months of their first date of registration. Examinations must be taken within 20 months of first registration.

Final thesis oral examinations are open.

11. Research Proposal Requirements

Each doctoral student is required to submit a Dissertation Proposal to their graduate supervisory committee no more than four weeks after the oral examinations. The proposal will be approximately 2500 words in length, with three pages for the bibliography listing the most relevant primary and secondary work for the thesis. Within two weeks of receiving the dissertation proposal, the supervisory committee will have a meeting of up to one hour with the student to discuss it. The date for the proposal meeting will be set prior to the filing of the Notice of Candidacy. All of the members of the supervisory committee will sign off on the student's research proposal following the meeting, should they consider the proposal satisfactory. To be considered as making satisfactory progress in the PhD program, students must have their supervisory committee sign off on their dissertation proposal. Elements of a successful proposal include the problem or question that the research seeks to answer; the historiographic significance of that problem; a hypothesis as to how the problem might be addressed; a method for exploring that hypothesis; and an inventory of the most relevant evidence for the method.

12. Special Registration Information

Students should plan their courses in consultation with their supervisors, complete the Course Registration Form supplied by the department, obtain the supervisor's signature, and bring their course program to the Graduate Program Director for approval before registration.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their online applications to the Department by February 1.

14. Other Information

Since resources are limited, the Department may, in any year, admit fewer applicants than those who are qualified to undertake graduate studies.

15. Faculty Members/Research Interests

The research interests of current faculty can be found at: http://hist.ucalgary.ca/graduate/areas-specialization.

Interdisciplinary Graduate Program IGP

Contact Information

Location: Professional Faculties Building, Room 3174

Program number: 403.220.7209

Email address: igpgrad@ucalgary.ca

Web page URL: http://www.ucalgary.ca/igp

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based

Master of Science (MSc), thesis-based

Please note that specializations are determined by the Supervisory Committee in consultation with the Director of the Interdisciplinary Graduate Program. Students are encouraged to select specializations as early as possible, preferably before beginning their programs of study.

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, the Interdisciplinary Graduate Program requires:

a) A statement identifying at least two academic disciplines or interdisciplinary degrees that will be integrated in the MA, MSc or PhD degree.

b) For MA and MSc admission an undergraduate degree in one of the academic disciplines or interdisciplinary degrees that will be integrated in the master's degree. For PhD admission the master's degree must be thesis (research)-based (or equivalent) and in one of the academic disciplines or interdisciplinary degrees that will be integrated in the PhD degree. Please note that applicants who hold non-thesis-based master's degrees must present clear evidence of research experience (e.g., peer-reviewed papers in the research literature) that is equivalent to a thesis (research)-based degree.

c) A grade point average of 3.50 or higher (on the University of Calgary four-point system). For MA and MSc admission this is based on the last two years of the undergraduate degree (minimum of 10 full-course equivalents). For PhD admission the overall GPA from the master's degree will be considered.

d) Applicants required to prove proficiency in English must fulfill this requirement in one of the following three ways:

- A TOEFL score of 600 (paper-based test) including at least 5.0 on the Test of Written English (TWE), and a score of at least 50 on the Test of Spoken English (TSE)
- A TOEFL score of 100 on the Internet-based test
- An IELTS score of 7.5.

e) Three reference letters on the Interdisciplinary Graduate Program's reference letter forms.

f) An up-to-date curriculum vitae. Please separate refereed and non-refereed research contributions.

g) A concise statement of reasons for applying to the Interdisciplinary Graduate Program, including its fit with career objectives.

h) A research statement (maximum of 1500 words (5 pages)). Please note that this research statement must include the following sections: Background, research questions, literature review, research methodology, intellectual merit of the proposed research, and broader impacts of the proposed research. The research statement should also indicate if ethics approval is required to carry out the proposed research.

i) A statement of interdisciplinarity that:

- Sets out what makes the proposed program of study interdisciplinary
- Specifies how each academic discipline or interdisciplinary degree will inform the research and why each is essential to answering the proposed research questions
- Provides clear evidence that the proposed program of study cannot be undertaken in any other disciplinary or interdisciplinary degree at the University of Calgary

Please note that insufficient academic preparedness for another disciplinary or interdisciplinary degree and absence of an MA, MSc, or PhD program at the University of Calgary in an established disciplinary or interdisciplinary degree are not adequate reasons for pursuing a degree in IGP.

j) Proposed coursework as set out below in Program/Course Requirements.

k) A proposed Supervisory Committee. For MA and MSc admission the Supervisory Committee must consist of at least two people (Supervisor plus one person), one from each identified academic discipline or interdisciplinary degree (maximum of three members). For PhD admission the Supervisory Committee must consist of at least three people (Supervisor plus two people), at least one from each identified academic discipline or interdisciplinary degree (maximum of four members).

l) The proposed Supervisor must provide a letter that:

- Confirms his/her willingness to supervise the applicant through to completion of the degree
- Supports the proposed research and statement of interdisciplinarity
- Confirms that the proposed research cannot be carried out in his/her program
- Sets out how the proposed courses and research project will ensure sufficient disciplinary rigor within the program of study
- Explains how the selection of other members of the Supervisory Committee

will ensure a balance of interdisciplinary and disciplinarity
- Confirms department/program approval for his/her role on the Supervisory Committee for this student
- Includes a curriculum vitae that provides evidence of his/her expertise and experience relevant to the proposed research

m) Each proposed Supervisory Committee Member must provide a letter that:
- Confirms his/her willingness to serve on the Supervisory Committee through to completion of the degree
- Supports the proposed research and statement of interdisciplinarity
- Confirms that the proposed research cannot be carried out in his/her program
- Sets out how the proposed courses and research project will ensure sufficient disciplinary rigor within the program of study
- Includes a curriculum vitae that provides evidence of his/her expertise and experience relevant to the proposed research

n) A proposed completion schedule. The Interdisciplinary Graduate Program does not offer a part-time registration status option. Expected completion time is two years for the MA degree and the MSc degree and four years for the PhD degree. Maximum completion time is four years for the MA degree and the MSc degree and six years for the PhD degree.

o) A funding plan that provides evidence of sufficient financial resources to carry out the program of study. For MA and MSc admission a two-year funding plan is required. For PhD admission a four-year funding plan is required. Applicants must be eligible to hold awards administered by the Faculty of Graduate Studies and the Interdisciplinary Graduate Program. Please note that statements signalling an intention to apply for funding are not sufficient.

p) A statement of availability of, and access to, all resources that are required to carry out the proposed research (e.g., equipment, data, access to respondents, funding for fieldwork).

3. Application Deadline

The Interdisciplinary Graduate Program admits students for a September start through a four-step admissions process. Each step requires specific documentation by a specified date. The decision not to recommend admission can be made at each step in the process. Successful applicants at each step will move to the next step. Unsuccessful applicants at each step will receive a letter informing them that they will not be recommended for admission to the Interdisciplinary Graduate Program.

Step 1 Assessment of eligibility.

Deadline for submission of required documentation: 4:00 pm (MST) January 15

Required documentation:
- Online application
- Application fee
- Academic transcripts for all previous programs of study
- TOEFL or IELTS score (where required)
- Up-to-date curriculum vitae
- Specification of two academic disciplines or interdisciplinary degrees that will be integrated in the Interdisciplinary Graduate Program
- A statement confirming that at time of first registration you are eligible to hold graduate awards administered by the Faculty of Graduate Studies and the Interdisciplinary Graduate Program

Step 2 Assessment of proposed program of study, supervision and funding plan.

Deadline for submission of required documentation 4:00 pm (MST) March 1

Required documentation:
- Statement of career goals and fit with proposed program of study
- Research statement
- Statement of interdisciplinarity
- Proposed coursework
- Proposed completion schedule
- Funding plan
- Statement of availability of, and access to, resources necessary to carry out proposed research
- Three reference letters
- Supervisory Committee package (letters of support from the supervisor and members of Supervisory Committee; curriculum vitae of supervisor and each member of the Supervisory Committee)

Step 3 Admissions Seminar held within three weeks of assessment of proposed program of study, supervision and funding plan.

Step 4 Recommendation to the Faculty of Graduate Studies.

4. Advanced Credit

Requests for advanced credit must be made as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission. Advanced credit requests may not exceed one-third of the course load identified at the Admission Seminar. PhD applicants may not receive credit for undergraduate courses.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements, the Program requires:

For the MA degree and the MSc degree:
- A minimum of four graded half courses, two per academic discipline or interdisciplinary degree integrated in the program of study
- Additional courses in methodology and statistics as needed
- A maximum of one directed reading course
- At least 75 per cent of the coursework must be at the graduate level

For the PhD degree:
- A minimum of four graded graduate-level half courses, two per academic discipline or interdisciplinary degree integrated in the program of study
- Additional courses in methodology and statistics as needed
- A maximum of one directed reading course

Copyediting of students' theses is not allowed.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

None.

8. Time Limit

Maximum completion time is four years for a master's program and six years for a doctoral program.

9. Supervisory Assignments

All students must have an approved supervisory committee at the time of admission.

10. Required Examinations

The doctoral candidacy examination has a written component and an oral component. The written component consists of three questions set by the Supervisory Committee. The student has three weeks to complete the written component. The oral component of the candidacy examination will take place one week after the submission of the answers.

Questions on the thesis research proposal will not be included in the oral candidacy examination.

Final thesis examinations are open.

11. Research Proposal Requirements

All students must have a thesis research proposal approved by their Supervisory Committees. For PhD students the thesis research proposal must be approved before the candidacy examination.

12. Special Registration Information

Course registration must be completed manually by completing the Faculty of Graduate Studies Change of Registration form.

13. Financial Assistance

Applicants will not be admitted to the MA degree or the MSc degree without an approved two-year funding plan. Applicants will not be admitted to the PhD degree without an approved four-year funding plan.

Students are required to apply for external and internal awards for which they are eligible. For information on awards and application deadlines, see the Faculty of Graduate Studies website. Students should also check with the Interdisciplinary Graduate Program for internal deadlines.

Applicants: Please note that award deadlines may fall before the application deadline for admission.

Financial assistance may be available from the Interdisciplinary Graduate Program.

Priority will be given to students in the first two years of a master's degree or the first four years of a PhD degree. This funding may include an Interdisciplinary Graduate Program Scholarship, a Graduate Teaching Assistantship and/or a Graduate Teaching Fellowship.

Eligibility:

- May not hold or accept full-time employment
- May not hold or accept paid employment that entails 600 or more hours per year

Application:

MA students and MSc students

- Apply directly to the Interdisciplinary Graduate Program on its Awards Competition form
- Deadline: 4:00 pm (MST) January 15

PhD students

- Apply to the Faculty of Graduate Studies – Graduate Award Competition
- Deadline: 4:00 pm (MST) January 15

14. Other Information

None.

Kinesiology KNES

Contact Information

Location: Kinesiology B, Room 146

Program number: 403.220.5183

Email address: knesgrad@ucalgary.ca

Web page URL:
http://www.ucalgary.ca/knes/grad

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Specializations (offered only to PhD, MSc students):

- Biomechanics
- Exercise & Health Physiology
- Health & Exercise Psychology
- Multi-Media Applications in Learning
- Neuro-Motor Psychology & Motor Learning
- Nutrition, Metabolism & Genetics
- Physical Medicine and Rehabilitation
- Sport History
- Sport and Exercise Psychology
- Sport Medicine

Master of Kinesiology:

Specialization:

- Applied Exercise Physiology

The Master of Kinesiology (MKin) is a full-time course-based program specializing in Applied Exercise Physiology.

Students are normally registered as full-time students however in very exceptional circumstances, registration as part-time students may be recommended by the Faculty of Kinesiology, Associate Dean (Graduate) for subsequent approval by the Dean, Faculty of Graduate Studies or designate.

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, the Faculty of Kinesiology requires the following:

Doctor of Philosophy

a) Consent for supervision from an approved Faculty Member in Kinesiology.

b) An appropriate academic background for the area of specialization.

c) A minimum grade point average (GPA) of 3.20 or higher on a four-point scale over the last 10 full-course equivalents and/or last two years of study.

d) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written), or 92 (Internet-based), or an IELTs score of 7.5, or a MELAB score of 82.

e) Two reference letters.

f) Written confirmation of external funding in accordance with policies of the Faculty of Kinesiology Graduate Program.

g) A student may request a transfer from the Master of Science degree program to the doctoral degree program, upon the recommendation of the supervisory committee and subsequent approval of the Associate Dean (Graduate) and Dean, Faculty of Graduate Studies.

Master of Science

a) Consent for supervision from an approved Faculty Member in Kinesiology.

b) An appropriate academic background for the area of specialization.

c) A minimum GPA of 3.20 or higher on a four-point scale over the last 10 full-course equivalents and/or last two years of study.

d) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written) or 92 (Internet-based), or an IELTs score of 7.5, or a MELAB score of 82.

e) Two reference letters.

Master of Kinesiology

The following are the minimum requirements for applying to the program. Please note, normally applicants with higher GPAs are selected for admission to the program.

a) A minimum grade of "B" or 3.00 in each of the following undergraduate prerequisite courses or equivalents: Anatomy, Exercise Physiology, Biomechanics, Sport Psychology and Statistics.

b) A minimum admission GPA of 3.00 or higher on a four-point scale over the last 10 full-course equivalents and/or two years of study in Kinesiology or an appropriate academic background for the area of specialization.

c) A demonstrated ability to be self-motivated and capable of independent study as shown in undergraduate studies, volunteer work and/or work experience in exercise science areas will be considered.

d) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written) or 92 (Internet-based), or an IELTs score of 7.5, or a MELAB score of 82.

e) Two reference letters.

3. Application Deadline

Doctor of Philosophy

Master of Science

The deadline for the submission of complete applications to thesis-based programs is March 31 for September 1 admission.

Master of Kinesiology

The deadline for the submission of complete applications to the course-based program is March 1 for September 1 admission.

4. Advanced Credit

Advanced credit will be limited to two full-course equivalents with a grade of "B" or higher for students admitted to the Master of Kinesiology program. The student must request advanced credit in writing at the time of application for admission to the Faculty of Kinesiology.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements, the Faculty of Kinesiology requires:

Doctor of Philosophy

A minimum of three graduate-level half courses selected according to the student's background research focus and will be approved by the graduate supervisor and supervisory committee.

Master of Science

a) One graduate-level half course in statistics.

b) One graduate-level half course in research design.

Master of Kinesiology

a) A total of 5.5 graduate-level full-course equivalents.

Core Courses (Required of all students): Kinesiology 605, 606, 615, 617, 673, 690, 697, 715, 773, 775 and 785.

b) A final oral presentation is considered the capstone event. This will be undertaken in conjunction with Kinesiology 715.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Graduate credit may be granted for courses offered at the 500 level at the discretion of the Associate Dean (Graduate).

8. Time Limit

Doctor of Philosophy

Expected completion time is four years.

Maximum completion time is six years.

Master of Science

Expected completion time is two years.

Maximum completion time is four years.

Master of Kinesiology

Expected completion time is 20 months commencing in September.

Maximum completion time is six years.

9. Supervisory Assignments

Doctor of Philosophy

Master of Science

Supervisor(s) must be identified at the time of admission for thesis-based programs. Within three months of admission, the student and supervisor(s) must select a supervisory committee according to the Faculty of Graduate Studies' procedures. The composition of the supervisory committee must be approved by the Associate Dean (Graduate).

Master of Kinesiology

Not applicable.

10. Required Examinations

Doctor of Philosophy

a) Doctoral Candidacy Examination will occur after a student's research proposal is approved by the Supervisory Committee and Associate Dean (Graduate). The Candidacy Examination has both written and oral components. The student and supervisor select one of the two formats for the written portion of the examination:

i) A closed book, six-hour examination administered on one-day in two three-hour blocks will be invigilated by the supervisor. The supervisor will provide the student with five questions determined by the Candidacy Examination Committee. The student will answer four out of five questions. The written answers are circulated to the Candidacy Examination Committee immediately after the written examination concludes.

ii) The Candidacy Examination Committee will determine five questions to be distributed to the student four weeks before the Oral Candidacy Examination. The student will prepare a written paper for four of the questions and submit a copy of each paper to each examiner one week before the Oral Candidacy Examination. Each paper should be a maximum of twenty double-spaced pages.

Oral Candidacy Examination: The basis of the Oral Candidacy Examination will be the written examination, general knowledge and the thesis topic. The Oral Candidacy Examination will occur seven (7) days after the written component concludes. Both the written and the oral components of the Candidacy Examination must be found acceptable in order to receive a Pass.

b) Doctoral Thesis Oral Examinations are administered according to the Faculty of Graduate Studies' procedures and are open examinations.

Master of Science

Master's Thesis Oral Examinations are administered according to the Faculty of Graduate Studies' procedures and are open examinations.

Master of Kinesiology

Not applicable.

11. Research Proposal Requirements

Doctor of Philosophy

Master of Science

Each thesis-based student drafts and presents a research proposal to his/her supervisory committee prior to commencing data collection.

The proposal consists of:

a) Background information from the scientific literature, including a critical evaluation of previous work.

b) A clear statement of the objectives of the proposed research program.

c) An analysis of the methodology to be used in the implementation of the proposal.

d) An indication of the contributions to scientific knowledge that should result from the candidate's research.

The supervisory committee may limit the length of the proposal, and must officially approve it before it is submitted to the Faculty of Kinesiology, Associate Dean (Graduate).

Students whose research involves human subjects must receive approval from the University of Calgary Conjoint Health Research Ethics Board before beginning data collection. Research with animals must receive approval from a University Animal Care Committee.

Master of Kinesiology

Not applicable.

12. Special Registration Information

None.

13. Financial Assistance

Doctor of Philosophy

Evidence of external financial support in accordance with the Faculty of Kinesiology Graduate Program requirements must be provided before admission. This external funding must be in the form of a Supervisor's Grant, external award(s), government funding, etc.

Master of Science

Students are encouraged to apply for external awards, government funding, etc.

Financial assistance may be available to qualified thesis-based students in the form of Graduate Assistantships (Teaching).

For information on other awards, please contact the Faculty of Kinesiology Graduate Program.

Master of Kinesiology

MKin students may apply for Graduate Assistantship (Teaching) positions.

14. Other Information

Initial enquiries should be directed to Faculty of Kinesiology Graduate Program.

15. Faculty Members/Research Interests

Current faculty and their areas of research interest can be found at http://www.ucalgary.ca/knes/researchinterests.

Law LAW

Contact Information

Location: Murray Fraser Hall

Program number: 403.210.8718

Fax: 403.210.9662

Email address: law@ucalgary.ca

Web page URL: http://www.law.ucalgary.ca

1. Degrees and Specializations Offered

Master of Laws (LLM), thesis-based and course-based

Specializations:

- Natural Resources, Energy and Environmental Law
- Energy and Environmental Systems (Interdisciplinary, thesis-based only)*

**See the calendar section on Interdisciplinary Specializations for further information.*

The Faculty also offers a Post-baccalaureate Certificate in Natural Resources, Energy and Environmental Law.

Applicants interested in a doctoral degree in Law on a special case basis should review the program's website to determine any additional requirements or restrictions, and then, if appropriate, contact the graduate program representative. Information on the Faculty of Graduate Studies Special Case Policy can be found at http://grad.ucalgary.ca/prospective/admissions/special-case.

2. Admission Requirements

In addition to the requirements of the Faculty of Graduate Studies, the Faculty of Law requires, for both the thesis-based and course-based LLM degree programs and the Post-baccalaureate Certificate program:

a) An academic degree in law.

b) For applicants required to provide proof of proficiency in English, a minimum TOEFL Internet-based score of 100, of which the reading, listening and writing component must total 75; or a minimum TOEFL Paper-based score of 600 and a TWE score of 5.5; or the minimum IELTS overall band score of 7.0, with a reading and writing band minimum of 7.0; or a MELAB score of 85; or a PTE score of 70.

c) Applicants to the LLM program must submit a brief statement of their proposed thesis or major paper and indicate their proposed supervisor. Forms and details are available from the Faculty.

d) Two reference letters.

3. Application Deadline

a) Thesis-based LLM applications are accepted for September admission only. The deadline for submission of completed applications is December 15.

b) Course-based LLM applications are accepted for September admission only. The deadline for submission of completed applications is December 15.

c) Post-Baccalaureate Certificate applications are accepted for September or January admission. The deadline for completed

applications for September admission is December 15 and the deadline for completed applications for January admission is July 15.

d) Deadlines are firm for international students, but may be flexible for Canadian students.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for courses taken as part of another completed degree/diploma/certificate or for courses taken to bring the grade point average to a required level for admission. Credit may be given for courses taken towards the Faculty of Law's thesis-based or course-based LLM degree program or as part of the Faculty's Post-baccalaureate Certificate program when transferring between programs.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements, the Faculty of Law requires:

LLM (thesis-based)

a) Law 703: Graduate Seminar in Legal Research and Methodology. Students must receive a passing grade in this course to advance in the program.

b) Law 705: Graduate Seminar in Legal Theory.

c) At least two additional 600-level half courses in the areas of natural resources, energy or environmental law or in a related area or from a related discipline with the approval of the Graduate Director.

d) A substantial research thesis in the area of natural resources, energy or environmental law, approximately 100 to 125 pages (30,000-38,000 words) in length, exclusive of the bibliography, prepared under the supervision of a faculty member or other suitable person appointed by the Graduate Director.

e) Two terms in residence, normally consecutive and normally from September to April. Students usually require at least 15 to 18 months from initial registration for thesis completion and defence.

LLM (course-based)

a) Law 703: Graduate Seminar in Legal Research and Methodology. Students must receive a passing grade in this course to advance in the program.

b) An additional five half courses in the areas of natural resources, energy or environmental law or in a related area or from a related discipline with the approval of the Graduate Director. At least two of the five additional courses must be at the 600 level and at least two of the five additional courses must include a research paper evaluation worth at least 50 per cent of the course grade. One of the additional courses may be Law 705, the Graduate Seminar in Legal Theory.

c) Law 706: A major research paper, approximately 50 to 60 pages (15,000–18,000 words) in length, prepared under the supervision of a Faculty member or other suitable person appointed by the Graduate Director and evaluated on a Pass/Fail basis.

Post-baccalaureate Certificate Program

The completion of four courses in the area of natural resources, energy or environmental law or a related area, including at least one with a research paper evaluation worth at least 50 per cent of the course grade and including at least two at the 600 level. All courses require the approval of the Graduate Director.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Not applicable.

8. Time Limit

a) All requirements for the thesis-based LLM degree must be completed within three calendar years of initial registration.

b) All requirements for the course-based LLM degree must be completed within five years of initial registration. It is expected that full-time students will complete the program in one calendar year.

c) All requirements for the Post-Baccalaureate Certificate program must be completed within three calendar years of initial registration.

d) All requirements for the Special Case PhD must be completed within six calendar years.

9. Supervisory Assignments

Contact the Faculty of Law Graduate Director for information.

10. Required Examinations

Thesis oral examinations are open.

11. Research Proposal Requirements

The proposal submitted at the time of application must be in the area of natural resources, energy or environmental law.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students, although funding for course-based LLM and Post-Baccalaureate Certificate students will very rarely be provided. For information on awards, see the Awards and Financial Assistance section of this calendar or the Faculty of Law Calendar or website.

Students applying for scholarships must submit their scholarship applications to the Faculty of Law by the deadlines for completed admission applications.

14. Other Information

Attaining an LLM degree without a Canadian LLB degree will not qualify graduates to practice law in Canada. Inquiries on this issue must be addressed to the appropriate provincial governing body for the legal profession. In Alberta, contact the Law Society of Alberta.

15. Faculty Members/Research Interests

The active research interests of members of the Faculty of Law and the affiliated Canadian Institute of Resources Law (CIRL) can be found on the Faculty of Law website at http://www.law.ucalgary.ca.

Linguistics LING

The Linguistics Graduate Program is offered through the Department of Linguistics, Languages and Cultures.

Contact Information

Location: Social Sciences Building, Room 820

Program number: 403.220.5469

Fax: 403.282.3880

Email address: linggrad@ucalgary.ca

Web page URL: http://llc.ucalgary.ca/graduate/graduate-program-linguistics

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA)

The norm is full-time study, but part-time study may also be arranged. Full-time study is defined as in the Graduate Calendar ("Student Status") and is not compatible with full-time employment. Status of students with part-time employment will be determined on a case-by-case basis.

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) Significant undergraduate training in linguistics, normally including at least one course in syntax and one course in phonology.

b) A statement of purpose specifying the applicant's research interests and reasons for wishing to pursue a Master of Arts degree at the University of Calgary.

c) A sample of previous work in linguistics or a related field (e.g., an Honours undergraduate thesis, or a course paper).

d) For applicants required to provide proof of proficiency in English, a minimum IELTS score of 7.0; OR a minimum TOEFL score of 560 (written test), 83 (Internet-based test); OR a minimum score of 550 (written test), 80 (Internet-based test) AND a minimum score of 5.0 on the Test of Written English (TWE); OR a MELAB score of 81; OR a PTE score of 59.

e) Three reference letters.

Doctor of Philosophy

a) A master's degree in linguistics, or a master's degree in a related field with significant training in linguistics at the graduate level, normally including at least one graduate course in syntax and one graduate course in phonology, with a minimum grade point average of 3.40 on a four-point scale.

b) A statement of purpose specifying the applicant's research interests and reasons for wishing to pursue a doctoral degree at the University of Calgary.

c) A sample of previous work in linguistics or a related field (e.g., a seminar paper or Master of Arts thesis).

d) For applicants required to provide proof of proficiency in English, a minimum IELTS score of 7.0; OR a minimum TOEFL score of 560 (written test), 83 (Internet-based test); OR a minimum score of 550 (written test), 80 (Internet-based test) AND a minimum score of 5.0 on the Test of Written English (TWE); OR a MELAB score of 81; OR a PTE score of 59.

e) Three reference letters.

3. Application Deadline

Students applying for admission and university scholarships must submit their applications to the department by January 15. All applications submitted by this deadline will also receive full consideration for department scholarships and assistantships. Applications received by January 15 will normally be considered for September admission. Financial support may be limited for applications received after January 15. We strongly encourage individuals to apply as soon as possible.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) A departmental presentation relating to the student's thesis research. Continuation in program is dependent upon this presentation being judged acceptable by the faculty members of the Linguistics Department.

b) A minimum of six half-course equivalents, including Linguistics 611, 613, and 697.

c) Linguistics 600.

d) Knowledge of a language other than English demonstrated to the satisfaction of the Graduate Studies Committee. The following groups will be judged on acceptance to the program to have met the MA language requirement:

- Students whose mother tongue is not English and who were required to satisfy the English language proficiency requirements for admission to program.
- Students whose mother tongue is English and who provide evidence of past schooling in another language (e.g., schooling in an immersion program in French, German or a First Nations language).
- Students whose mother tongue is English and who provide evidence of having completed a foreign language secondary school credit such as Spanish Language Arts 30, or French Language Arts 31.
- Students whose mother tongue is English and who provide evidence of at least A1 ("Basic User") level of proficiency in another language in the Common European Frame of Reference from a certified testing agency or a recognised academic institution (e.g., university or college) or a recognised language teaching organization.

Students whose mother tongue is English and who cannot provide evidence of prior exposure to another language on admission can meet the MA language requirement during their MA program in the following ways:

- By providing evidence of having received credit for one half-course equivalent for a University of Calgary language course, e.g., Chinese 205, French 209, German 202, Japanese 205, Russian 201.
- By providing evidence of having received credit for one of the following courses: Indigenous Languages 205, Linguistics 551, or 605.

It is the responsibility of the student to provide relevant documentation that the MA language requirement has been met. It is strongly recommended that this program requirement be met within the first 16 months of program. It is the responsibility of the supervisor to ensure that the student meets the deadline for completing this requirement.

Doctor of Philosophy

a) Completion of six half-course equivalents in Linguistics beyond the MA, including Linguistics 611 and 613. Course requirements are normally completed during the first two years.

Note: No more than two half courses can be taken with the same instructor.

b) Linguistics 600.

c) Knowledge of a language other than English demonstrated to the satisfaction of the Graduate Studies Committee. The following groups will be judged on acceptance to the program to have met the PhD language requirement:

- Students whose mother tongue is not English and who were required to satisfy the English language proficiency requirements for admission to program.
- Students whose mother tongue is English and who provide evidence of past schooling in another language (e.g., schooling in an immersion program in French, German or a First Nations language).
- Students whose mother tongue is English and who provide evidence of having completed a foreign language secondary school credit such as Spanish Language Arts 30, or French Language Arts 31.
- Students whose mother tongue is English and who provide evidence of at least A1 ("Basic User") level of proficiency in another language in the Common European Frame of Reference from a certified testing agency or a recognised academic institution (e.g., university or college) or a recognised language teaching organization.

Students whose mother tongue is English and who cannot provide evidence of prior exposure to another language on admission can meet the doctoral language requirement during their PhD program in the following ways:

- By providing evidence of having received credit for one half-course equivalent for a University of Calgary language course, e.g. Chinese 205, French 209, German 202, or Japanese 205, or Russian 201.
- By providing evidence of having received credit for one of the following courses: Indigenous Languages 205, Linguistics 551, or 605.

It is the responsibility of the student to provide relevant documentation that the doctoral language requirement has been met. This program requirement must be met by the time the thesis proposal is submitted. It is the responsibility of the supervisor to ensure that the student meets the deadline for completing this requirement.

Copyediting

Copy editing of the examination version of the thesis is not permitted. Students may make use of a copy editor or copy editing service for the final version only of the thesis. The name of the copy editor or copy editing service must appear on the Acknowledgements page.

Acknowledgement is required whether the copy editing was done by a paid professional or by an acquaintance, friend or family member. Fees for copy editing must be assumed by the student.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

At both the master's and the doctoral level, with the approval of the Graduate Program Director and the Department Head, a student may take for credit a maximum of two undergraduate half-course equivalents. Normally, only 500-level courses are approved as acceptable, and students must provide evidence that such courses represent a necessary contribution to their program.

8. Time Limit

Expected completion time is two years for a master's degree and four years for a doctoral degree. Maximum completion time is four years for a master's degree and six years for a doctoral degree.

9. Supervisory Assignments

Master of Arts

A student is assigned a supervisor on admission to the program based on the stated research interests of the student, the disciplinary expertise of faculty members and Departmental capacity. This faculty member commits to supervising the student's thesis and to advising and mentoring the student.

Since research interests can change while in program, students are free to select a different supervisor after admission to program but must finalize supervisory arrangements by the end of the second term of study (usually April). When a student wishes to change supervisor, that choice must be made by mutual agreement between the student and the faculty member concerned, in consultation with the Graduate Program Director.

Doctor of Philosophy

A student is assigned a supervisor on admission to the program based on the stated research interests of the student, the disciplinary expertise of faculty members and Departmental capacity. This faculty member commits to supervising the student's thesis and to advising and mentoring the student. Since research interests can change while in program, students are free to select a different supervisor after admission to program but will normally finalize supervisory arrangements by the end of the second term of study (usually April) and must finalize supervisory arrangements by the end of the second annual registration. When a student wishes to change supervisor, that choice must be made by mutual agreement between the student and the faculty member concerned, in consultation with the Graduate Program Director.

Once the student has finalized the choice of a thesis supervisor, a supervisory committee is struck. It will normally consist of the supervisor and two other faculty members from the Department. One of the two members of this committee may be external to the department. It is desirable to have at least one committee member with supervisory experience at the doctoral level. The supervisory committee must be recommended by the Graduate Program Director and be approved by the Dean of the Faculty of Graduate Studies no later than three months after supervisory arrangements are finalized. This will normally be during the summer of the first year of study, but no later than the third month following the second annual registration. The responsibility for organizing the supervisory committee lies with the supervisor but it should be constituted in consultation with the student.

10. Required Examinations

Doctor of Philosophy

A doctoral student is required to take the Candidacy Examination after completion of all course work, normally within 20 months of first registration. Doctoral candidacy examinations have a written and an oral component. The written candidacy examination consists of an original research paper in the student's research area, and a portfolio. The student's portfolio will normally consist of final papers from 3 of the 6 required courses, their current CV, and presentations and publications (if any). Course papers for inclusion in the portfolio are chosen by the student in consultation with the supervisor. Examination questions for the Faculty of Graduate Studies oral examination will be based on the original research paper and the student's portfolio papers.

11. Research Proposal Requirements

Master of Arts

Students in the master's program must complete Linguistics 697.

Doctor of Philosophy

Students in the doctoral program must submit a written thesis proposal to their supervisory committee within twenty-four months of the first registration, but not before the student has passed his/her oral candidacy examination. The body of the proposal (excluding bibliographic references) must not exceed ten pages in length.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance is normally available to qualified students. Funding is provided to full-time students only. Students are required to inform the department of any part-time employment. Failure to do so will result in revocation of departmental funding.

For information on awards, see the Awards and Financial Assistance section of this calendar. Students applying for scholarships must submit their applications to the Department by January 15.

Students whose applications are complete by January 15 will automatically be considered by the Department for Graduate Research Scholarships and Graduate Assistantship support. In addition, faculty members of this Department may have special project funds for research assistantships.

Information on Departmental assistantships is available on the Department's Graduate Programs web page: http://ling.ucalgary.ca/graduate.

14. Other Information

Students should consult the Departmental Graduate Handbook for further information and regulations governing the graduate program. Copies are available from the Graduate Program Administrator, SS 816; or may be downloaded from the Department's graduate program web page: http://ling.ucalgary.ca/graduate.

15. Faculty Members/Research Interests

Current faculty research interests can be found at http://llc.ucalgary.ca/graduate/graduate-program-linguistics.

Mathematics and Statistics MTST

Contact Information

Location: Math Sciences Building, Room 462

Program number: 403.220.6299

Fax: 403.282.5150

Email address: gradapps@math.ucalgary.ca

Web page URL:
http://math.ucalgary.ca/gradstudies

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), course-based and thesis-based

Master of Science (course-based) degree may be completed on a part-time basis. The normal course load for a full-time course-based Master of Science student is three half courses per term.

Specializations:

- Applied Mathematics
- Pure Mathematics
- Statistics

2. Admission Requirements

In addition to Faculties of Graduate Studies and Science requirements, the Department requires:

Master of Science

a) Normally, bachelor's degree, or its equivalent, in the subject of the specialization to which the application is made, or a closely related area.

b) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test); or 93 (Internet-based test); or minimum IELTS score of 7; or minimum MELAB score of 84; or a minimum PTE score of 70.

c) Three Reference Forms with reference letters.

Doctor of Philosophy

a) A master's degree or equivalent in the subject of the specialization to which the application is made.

b) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test); or 93 (Internet-based test); or minimum IELTS score of 7; or minimum MELAB score of 84; or a minimum PTE score of 70.

c) Three Reference Forms with reference letters.

d) Excellent students, admitted to the master's program, may be transferred to the PhD program after having demonstrated exceptional performance at the graduate level, subject to endorsement by the supervisor and approval by the Graduate Committee. Such transfer requests are to be initiated by the supervisor and are to include information about research ability.

3. Application Deadline

The deadline for submission of complete applications is January 15 for September admission. After this date, complete applications may be considered if space is available.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as a requirement of another completed degree/diploma. The determination for advanced credit will be made prior to entry into the program.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Science requirements, the Department normally requires that:

Master of Science (thesis-based)

All students in Applied Mathematics, Pure Mathematics and Statistics take course work to the equivalent of an honours bachelor's degree plus at least five half-course equivalents, or four half-course equivalents if completing program in one year (not counting the seminar course 621) at the graduate level. In addition:

a) Applied Mathematics students must include two of Applied Mathematics 605, 617, Pure Mathematics 607, 611 in their program.

b) Pure Mathematics students must include two of Applied Mathematics 605, 617, Pure Mathematics 607, 611 in their program.

c) Statistics students must include any three of Statistics 701, 703, 721, 723 in their program.

Master of Science (course-based)

a) Applied Mathematics students take eight half-course equivalents which must include two of Applied Mathematics 605, 617, Pure Mathematics 607, 611.

b) Pure Mathematics students take eight half-course equivalents which must include two of Applied Mathematics 605, 617, Pure Mathematics 607, 611.

c) Statistics students take eight half-course equivalents which must include any three of Statistics 701, 703, 721, 723.

All students complete a project resulting in a written report.

Doctor of Philosophy

Course requirements for the Doctor of Philosophy beyond those for a master's degree are determined on an individual basis, but the following rules apply:

a) Applied Mathematics students must include eight half-course equivalents in their total graduate program (MSc and PhD); including the equivalent of two of Applied Mathematics 605, 617, Pure Mathematics 607, 611.

b) Pure Mathematics students must include eight half-course equivalents in their total graduate program (MSc and PhD); including the equivalent of two of Applied Mathematics 605, 617, Pure Mathematics 607, 611.

c) Statistics students must include eight half-course equivalents in their total graduate program (MSc and PhD); including the equivalent of any three of Statistics 701, 703, 721, and 723.

6. Additional Requirements

All MSc graduate students are required to register in one of the seminar courses Applied Mathematics 621, Pure Mathematics 621, or Statistics 621 in the first year of their program.

All PhD students are required to register in one of the seminar courses Applied Mathematics 621, Pure Mathematics 621, or Statistics 621 in the first or second year of their program.

The Seminar courses are not counted in the calculation of the number of required half courses in each program.

7. Credit for Undergraduate Courses

Credit may be given for courses taken below the 600-level. At least one half of a graduate student's course work must be at the 600 level or higher and only where appropriate to a student's program may credit be given for courses numbered 500–599.

8. Time Limit

Expected completion time for full-time master's students is two years. The maximum completion time allowed for a thesis-based master's program is four years, and for a course-based master's program is six years. The expected completion time for a doctoral student is four years, and the maximum completion time is six years.

9. Supervisory Assignments

The Graduate Program Director, Department of Mathematics and Statistics, assigns supervisors based upon the graduate student's proposed program admission.

10. Required Examinations

Doctoral students must pass written Preliminary Examinations during first year but no later than sixteen months from the beginning of their doctoral programs and before the oral candidacy examination.

Final thesis oral examinations are open.

Further details about the written and oral examinations may be obtained from the Department website: http://math.ucalgary.ca/gradstudies/programs.

11. Research Proposal Requirements

At least three months before a PhD Oral Candidacy Examination, a research proposal, prepared by the student and approved by the supervisor, will be submitted to the student's Supervisory Committee. The Committee will inform the student of the material (topics, books, articles, etc.) to be mastered for the Oral Candidacy Examination. The material will be based upon the proposal, and will be agreed upon with the student.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar. Successful applicants may be offered departmental teaching assistantships and/or research stipends in their offer letter.

14. Other Information

None.

15. Faculty Members/Research Interests

Information about current faculty and their research interests is available from the Department website http://math.ucalgary.ca/gradstudies/research and from individual faculty members' web pages.

Medicine Programs

Contact Information

Graduate Medical Education Office

Location: Health Sciences Centre, Room G329

Fax: 403.210.8109

Web page URL:
http://medicine.ucalgary.ca/grad

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD), thesis-based

Master of Science (MSc), thesis-based

Master of Biomedical Technology (MBT), course-based

Master of Community Medicine (MCM), course-based

Master of Disability and Community Studies (MDCS), course-based

Joint programs, offered with other Faculties:

The Faculty of Medicine and the Haskayne School of Business offer a combined Master of Biomedical Technology/Master of Business Administration (MBT/MBA) program. Contact either program for further information.

Students in the Faculty of Medicine and the Departments of Anthropology and Archaeology may choose an interdisciplinary specialization in Biological Anthropology. For further information on the Biological Anthropology (Interdisciplinary) specialization, see the separate listing in this calendar.

The University of Calgary and Alberta offer a joint Biomedical Engineering Program. Further information can be obtained from the separate listing in this Calendar.

In addition, the University of Calgary offers the joint Leaders in Medicine Program leading to MD/Master's or MD/Doctoral degrees. Students applying to the MD/MSc or MD/PhD program must apply individually to each program and complete a supplementary application for the Leaders in Medicine Program.

Further information regarding the Leaders in Medicine Program is provided under the Degree Information section in this Calendar.

2. Admission Requirements

In addition to the Faculty of Graduate Studies regulations, the Faculty of Medicine graduate programs require:

Master of Science

- BSc degree or equivalent
- A minimum admission grade point average of 3.30 (on the University of Calgary four-point system; equivalent to a "B+") based on the last two years of the undergraduate degree consisting of a minimum of 10 full-course equivalents.

Doctor of Philosophy

- MSc degree, or relevant master's degree, recognized by the Faculty of Graduate Studies, or transfer from MSc program, or, in exceptional cases, BSc degree or equivalent.

- A minimum admission grade point average of 3.30 (on the University of Calgary four-point system; equivalent to a "B+") based on the last two years of the undergraduate degree consisting of a minimum of 10 full-course equivalents and any master's course work if applicable.

Refer to the individual program entries for additional program admission requirements.

3. Application Deadline

Refer to individual program information.

4. Advanced Credit

Applicants must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission Refer to individual programs for additional advanced credit information.

5. Program/Course Requirements

Refer to individual program information.

6. Additional Requirements

Refer to individual program information.

7. Credit for Undergraduate Courses

Refer to individual program information.

8. Time Limit

Maximum completion times follow the Faculty of Graduate Studies regulations:

- Maximum completion time for a course-based master's program is six years
- Maximum completion time for a thesis-based master's program is four years
- Maximum completion time for a doctoral program is six years
- Maximum completion time for the MD/master's program is six years
- Maximum completion time for the MD/PhD program is eight years

For specific program expected time to completion, please refer to individual program information.

9. Supervisory Assignments

Supervisors and supervisory committees are assigned according to the Faculty of Graduate Studies Handbook of Supervision and Examination and are approved by the Graduate Program Director of each program. Master of Science students in the Leaders in Medicine Program must have supervisory committees constituted according to the regulations of the graduate home program. Both master's and doctoral students will also be evaluated and advised by a Joint Liaison Committee composed of the Associate Dean (Graduate Sciences Education) and the Associate Dean (Undergraduate Medical Education.

For specific program supervisory assignment information, please refer to the individual program entry.

10. Required Examinations

All thesis-based programs, MSc and PhD require successfully passing the Final Thesis Oral Examination. For more specific program examination information, please refer to the program section.

Doctoral Candidacy Examinations

In addition to Faculty of Graduate Studies regulations, the Faculty of Medicine candidacy examinations consist of both a written and an oral component. For the MDCH doctoral candidacy examination procedure see the MDCH Graduate Calendar section. For all other programs:

The student's approved research proposal will serve as the examination's written component. The written component shall consist of a 13-17 page (single spaced) document, excluding references and figures, that includes a literature review of the students topic area and a description of the proposed research. The oral examination will take place one month after the submission of the written document to the examination committee. The supervisor is a non-voting observer at the doctoral candidacy exam. The oral examination must be completed within 24 months after initial registration for direct-entry doctoral students and within 30 months after initial registration for doctoral students who transferred from an MSc program.

The final thesis defence for MSc and PhD degrees will consist of a public seminar followed by an open oral examination.

Refer to individual program sections for specific candidacy examination information.

11. Research Proposal Requirements

All MSc and PhD students must defend a written research proposal to their supervisory committee. For MSc students, this document must be submitted within 12 months after initial registration in the program. For PhD students, the research proposal forms the written component of the candidacy exam, and an approved version of the proposal must be submitted at least two weeks before the candidacy exam, with all exam requirements being fulfilled by 24 months after initial registration in the program.

For additional information, refer to the individual program sections.

12. Special Registration Information

None.

13. Financial Assistance

Refer to the individual program sections.

14. Other Information

Research Integrity Day is a Research Ethics session offered in January and April of each year. All graduate students in the Faculty of Medicine are required to attend Research Integrity Day once during their program as part of their course requirements.

- PhD students must meet this requirement prior to their candidacy exam.
- MSc students must meet this requirement prior to defending their thesis.
- MBT, MCM and MDCS students must contact the program administrator or review the program web page for further information on when they must meet this requirement.

15. Faculty Members/Research Interests

Refer to the individual program sections.

Medicine, Biochemistry and Molecular Biology MDBC

Contact Information

Location: Health Sciences Centre, Room G329

Program number: 403.220.8306

Fax: 403.210.8109

Email address: bmbgrad@ucalgary.ca

Web page URL: http://www.ucalgary.ca/bmb

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

2. Admission Requirements

All master's thesis and doctoral students are considered full-time. In exceptional circumstances part-time status may be considered and must be approved by the Graduate Program Director.

In addition to Faculties of Graduate Studies and Medicine requirements, the Department requires:

a) A minimum admission grade point average over the last two years (minimum 20 half-course equivalents) of 3.30 (B+) on a four-point scale or equivalent.

b) Normally, a four year Bachelor of Science degree, or its equivalent.

c) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (paper-based test), or 100 (Internet-based test), or a minimum IELTS score of 7.50, or a MELAB score of 84, or a minimum PTE score of 70.

d) Master's applicants are required to submit two reference letters and two corresponding reference forms, PhD applicants are required to submit three reference letters and three corresponding reference forms which follow the reference guidelines posted on the program's prospective student website.

e) A current Curriculum Vitae.

3. Application Deadline

Deadlines for submission of required documents for international applicants:

April 15 for September admission

August 15 for January admission

December 15 for May admission

February 15 for July admission

Deadlines for submission of required documents for domestic applicants:

June 15 for September admission

October 15 for January admission

February 15 for May admission

April 15 for July admission

Students applying to the MD/Master's or MD/PhD program must also apply to the

Leaders in Medicine program by completing a supplementary application.

4. Advanced Credit

Any credit to be given for courses completed will be included in the letter of offer for admission to the Faculty of Graduate Studies.

5. Program/Course Requirements

In general, MSc students will be required to take at least two graduate-level half-course equivalents and PhD students will be required to take at least three graduate-level half-course equivalents.

6. Additional Requirements

Each student is required to participate regularly in journal club and work-in-progress seminar programs administered by the Institute or Research Group to which the student and his/her supervisor belong, and the student will present at least one journal club seminar and one work-in-progress presentation per year.

Attendance at a Research Integrity Day workshop is required for all graduate students.

7. Credit for Undergraduate Courses

Courses at the 500 level are not usually considered graduate courses. Students should register in 500-level courses only upon the recommendation of their supervisory committee. Credit will be given for 500-level courses appropriate to a student's program as long as an equal or greater number of courses at the 600 level or above is included in the program.

8. Time Limit

See "Medicine Programs".

9. Supervisory Assignments

The Biochemistry and Molecular Biology Graduate Program has an optional rotation program that may last up to six months. This allows the graduate student and the potential supervisor to learn more about each other's research interests and available research projects. The student will spend two months in each laboratory of up to three faculty members. After the rotation program, the student will select a permanent supervisor. Alternatively, a student may begin the program with a permanent supervisor, if such arrangements have been made prior to arrival.

Supervisory committees are required for both master's and doctoral students in the BMB Graduate Program. A permanent supervisory committee must be in place no later than 3 months after the appointment of the supervisor.

Students in the Leaders in Medicine program must have a supervisory committee constituted according to the regulations of the graduate program. In addition, these students are monitored by a Joint Liaison Committee of the Leaders in Medicine program.

10. Required Examinations

See the "Medicine Programs" entry in this Calendar.

11. Research Proposal Requirements

See the "Medicine Programs" entry in this Calendar.

12. Special Registration Information

None.

13. Financial Assistance

All students who are accepted into the Biochemistry and Molecular Biology Graduate Program will receive a minimum stipend ($21,000 for MSc students and $23,000 for PhD students). Students are encouraged to apply to external agencies for financial assistance from scholarships or studentships. Some of these awards provide stipends in excess of the program minimum. Information on awards can be obtained from the office of the Biochemistry and Molecular Biology Graduate Program.

14. Course Information

All Biochemistry and Molecular Biology graduate students are required to take either the Biochemistry and Molecular Biology core course Medical Science 721; or Advanced Genetics course Medical Science 641.01 as part of their course work requirement.

Descriptions of courses with biochemistry and molecular biology content at the University of Calgary are included under Biochemistry (BCEM), Cellular, Molecular and Microbial Biology (CMMB) and Medical Science (MDSC) listings elsewhere in the Calendar. Relevant courses for the Biochemistry and Molecular Biology graduate program include:

500-level Courses – Courses at the 500 level are not usually considered graduate courses. Students should register in 500-level courses only upon the recommendation of their supervisory committee.

Graduate-level Courses

Biochemistry 731 Protein and Metabolic Engineering

Medical Science 604 Integrative Human Physiology

Medical Science 605 Information Storage and Processing in Biological Systems (Computer Science 605)

Medical Science 609.02 Genes and Development

Medical Science 613.05 Regulation of Gene Expression in Bacteria

Medical Science 619.01 Cellular and Molecular Neuroscience

Medical Science 619.03 Developmental Neuroscience

Medical Science 621.01 Basic Principles of Pharmacology

Medical Science 631 Muscle Physiology

Medical Science 639.01 Principles of Immunology

Medical Science 639.02 Cellular and Molecular Immunology

Medical Science 641.01 Advanced Genetics I

Medical Science 641.04 Genomics

Medical Science 671 Techniques in Medical Science

Medical Science 675 Bioinformatics Resources for the Biologist

Medical Science 683.01 Cancer Pathology, Epidemiology and Therapy

Medical Science 683.02 Molecular Mechanisms of Cancer

Medical Science 683.04 Cell Biology of Cancer

Medical Science 721 Biochemistry and Molecular Biology

Medical Science 751.02 Cellular and Molecular Pathogenic Mechanisms of Diabetes

Medical Science 751.09 Ion Channel Diseases

15. Other Information

For further information on graduate program application and admission, consult the department website at http://www.ucalgary.ca/bmb/.

16. Faculty Members/Research Interests

Faculty members in the Department are affiliated with one or more of the Faculty of Medicine's Institutes and Centres. In addition, faculty research is grouped according to research streams: Molecular and Developmental Genetics, Molecular Biology of Disease, Genomics, Proteomics and Bioinformatics and Cell Signalling and Structure.

Research interests of the Groups can be found on the department website at http://www.ucalgary.ca/bmb/FacultyResearch.

Medicine, Biomedical Technology MDBT

Contact Information

Location: Health Sciences Centre, Room G329

Program number: 403.220.8306

Fax: 403.210.8109

Email address: mbtgrad@ucalgary.ca

Web page URL:
http://www.biotech.ucalgary.ca/

1. Degrees and Specializations Offered

Master of Biomedical Technology (MBT), course-based

This interdisciplinary program combines courses in basic biomedical sciences (covering genetics, biochemistry, cell biology, physiology, immunology, microbiology, and pharmacology) with training in business aspects such as scientific, market, patent & financial analysis.

The Master of Biomedical Technology Graduate Program and the Haskayne School of Business offer a combined MBT/MBA program. Contact the Graduate Science Education Office for further information.

2. Admission Requirements

All students are considered full-time. Part-time status may be considered and must be approved by the Graduate Program Director.

In addition to the Faculties of Graduate Studies and Medicine requirements, the program requires:

a) A minimum admission grade point average over the last two years (minimum 20 half-course equivalents) of 3.30 (B+) on a four-point scale or equivalent.

b) Normally, a four year Bachelor of Science degree in biological sciences, or its equivalent.

c) For students required to provide proof of proficiency in English, a TOEFL score of 600 (paper-based test), or 250 (computer based), or 100 (Internet-based), or a minimum IELTS score of 7.5, or a MELAB test score of 84, or a minimum PTE score of 70.

d) Two reference letters, which follow the reference guidelines posted on the program's prospective student website, and two corresponding reference forms.

e) A current Curriculum Vitae.

f) A Vision Statement (no more than one page in length) outlining career goals, and how the MBT program will help achieve them.

3. Application Deadline

Deadline for the submission of completed applications for September admission:

June 1 for Canadian citizens and permanent residents, and

May 1 for applicants attending on a study visa

4. Advanced Credit

See "Medicine Programs". In consultation with the Graduate Program Director, advanced credit may be requested in accordance with Faculty of Graduate Studies regulations.

5. Program/Course Requirements

In addition to the Faculties of Graduate Studies and Medicine requirements, the program requires all MBT students to successfully complete eleven half-course equivalents:

1. Medical Science 672: Biotechnology Business Aspects (3 credits - runs over Fall and Winter)

2. Medical Science 673: Biomedical Technology Careers (3 credits - runs over Fall and Winter)

3-4. Medical Science 674.01: Physiological and Pharmacological Aspects of Therapeutics Development (6 credits - runs over Fall and Winter)

5-6. Medical Science 674.02: Molecular, Cellular and Immunological Biotechnology (6 credits - runs over Fall and Winter)

7. Medical Science 669: Clinical Trials and Bio-Manufacturing (3 credits - runs over Fall and Winter)

8. Medical Science 678: Project in Biomedical Technology (3 credits - runs over Fall and Winter)

9. Medical Science 668: Biotechnology Commercialization (3 credits - runs over Winter)

10-11. Medical Science 670: Practicum in Biomedical Technology (6 credits - runs over Spring and Summer)

It is required that MDBT students will successfully complete all Fall and Winter courses prior to beginning their practicum.

6. Additional Requirements

Suggested prerequisites: Genetics (Biology 311 or equivalent), Cellular and Molecular Biology (Biology 331 or equivalent, Biochemistry or macro molecules (Biochemistry 393 or equivalent), and senior-level course work in at least two of the following subject areas: microbiology, immunology, pharmacology and/or physiology.

Attendance at a Research Integrity Day workshop is required for all graduate students.

7. Credit for Undergraduate Courses

None.

8. Time Limit

This program may be completed in one year on a full-time basis. It may also be completed on a part-time basis. Maximum completion time is six years.

9. Supervisory Assignments

The Graduate Program Director will serve as interim supervisor for all newly admitted students. In the MBT program, there is no official requirement for students to have a supervisor. We do recommend, however, that students have a faculty supervisor and/or a mentor from the business community.

See “Medicine Programs” for more information.

10. Required Examinations

None.

11. Research Proposal Requirements

None.

12. Special Registration Information

None.

13. Financial Assistance

None.

14. Other Information

None.

15. Faculty Members/Research Interests

None.

Medicine, Cardiovascular and Respiratory Sciences MDCV

Contact Information

Location: Health Sciences Centre, Room G329

Program number: 403.220.8306

Fax: 403.210.8109

Email address: cvrgrad@ucalgary.ca

Web page URL:
http://www.ucalgary.ca/crs_gse/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Faculty members within the MDCV program hold academic appointments in Biochemistry and Molecular Biology, Biological Sciences, Medicine, or Physiology & Pharmacology. Faculty members are typically affiliated with the Libin Cardiovascular Institute, but may also be members of other research institutes within the Faculty of Medicine.

2. Admission Requirements

All MSc and PhD students are considered full-time. In exceptional circumstances part-time status may be considered, and must be approved by the Graduate Program Director.

In addition to Faculties of Graduate Studies and Medicine requirements, applicants to the MDCV program will be expected to meet the following criteria:

a) A minimum admission grade point average over the last two years (minimum 20 half-course equivalents) of 3.30 (B+) on a four-point scale or equivalent.

b) Applicants will have completed a four year Bachelor of Science degree, or its equivalent.

c) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (paper-based test), or 100 (Internet-based test), a minimum IELTS score of 7.0, or a minimum MELAB score of 84, or a minimum PTE score of 70.

d) Applicants to the master's program are required to submit two reference letters, and two corresponding reference forms. Applicants to the doctoral program are required to submit three reference letters, and three corresponding reference forms. References must follow the reference guidelines posted on the program's prospective student website.

3. Application Deadline

Deadlines for submission of required documents for international applicants:

April 1 for September admission

August 1 for January admission

December 1 for May admission

February 1 for July admission

Deadlines for submission of required documents for domestic applicants:

June 1 for September admission

October 1 for January admission

March 1 for May admission

May 1 for July admission

4. Advanced Credit

Advanced credit for previous course work is usually not given. For additional information, please see “Medicine Programs”.

5. Program/Course Requirements

In addition to the stated Faculty of Graduate Studies and Medicine requirements, the MDCV program requires:

a) The minimum course requirement is normally two half courses for an MSc and an additional one half course for a PhD program. At least one course for an MSc program and two courses for a PhD program should be from the list of recommended MDCV graduate courses.

b) Students holding a completed BSc degree entering the PhD program are required to successfully complete a minimum of three half courses.

c) Students holding a completed MSc degree in the same area of study entering the PhD program are required to complete a minimum of one half course provided that a minimum of two half courses were completed in their MSc program.

d) Students transferring from the MSc program to the PhD program are required to complete a minimum of one additional half course.

e) Students holding a completed MSc degree in an unrelated field of studies entering the PhD program are required to complete a minimum of three half courses unless otherwise agreed by the student's supervisory committee.

f) Attendance at the seminar and journal club series organized by the student's affiliated research Institute (e.g. Libin Cardiovascular Institute, Hotchkiss Brain Institute, etc.) and the presentation of at least one research-in-progress seminar annually. Students are also required to participate in the monthly MDCV student seminar program, which will include an annual presentation.

The amount of course work to be undertaken is determined by the student's supervisory committee; however, it also must meet the departmental minimum requirements of the program.

6. Additional Requirements

Attendance at a Research Integrity Day workshop is required for all graduate students. MSc students must attend prior to defending their thesis and PhD students must attend prior to their candidacy oral examination.

7. Credit for Undergraduate Courses

Credit may be given for courses taken below the 600 level. At least one half of a graduate student's course work must be at the 600 level or higher. Only under unusual circumstances and upon the recommendation of the supervisory committee and approval by the Graduate Director may credit be received for courses numbered 500–599.

8. Time Limit

For additional information, please see "Medicine Programs".

9. Supervisory Assignments

The selection of the supervisor must be by mutual agreement between the student and the faculty member concerned and approved by the MDCV Graduate Director. The supervisor will be a member one of the recognized research institutes within the Faculty of Medicine (e.g. Libin Cardiovascular Institute, Hotchkiss Brain Institute, Snyder Chronic Disease Institute, etc.). Every graduate student must have a supervisory committee named within eight months after initial registration. The final composition of the supervisory committee must be approved by the MDCV Graduate Director.

10. Required Examinations

See the "Medicine Programs" entry in this Calendar.

11. Research Proposal Requirements

See the "Medicine Programs" entry in this Calendar.

12. Special Registration Information

None.

13. Financial Assistance

All students who are accepted into the Cardiovascular and Respiratory Science Graduate Program will receive a minimal stipend as reflected by current national Tri-Council graduate studentship awards. Students are encouraged to apply to external agencies for financial support and studentship awards. Students in the MDCV program are also eligible to apply for University of Calgary Scholarships (see Awards and Financial Assistance section of this Calendar). Possible sources of financial support are listed on the Faculty of Graduate Studies website: http://grad.ucalgary.ca/awards.

Students in the program are eligible to receive a Tuition Reimbursement to assist them with tuition costs while paying full program fees. The amount of the scholarship varies from year to year, and is dependent on available funds.

14. Other Information

For information on individual course requirements, please visit the graduate program's web page at http://www.ucalgary.ca/crs_gse/.

Detailed course descriptions are available at http://www.ucalgary.ca/pubs/calendar/ and timetabling information for individual courses can be found through the MyUofC portal.

15. Faculty Members/Research Interests

Faculty members and their research interests may be found at http://www.ucalgary.ca/crs_gse/Supervision.

Medicine, Community Health Sciences MDCH

Contact Information

Location: Health Sciences Centre, Room 345

Program number: 403.220.4288/210.6689

Fax: 403.210.8109

Email address: chsgrad@ucalgary.ca

Web page URL: http://www.ucalgary.ca/communityhealthsciences

The Department of Community Health Sciences offers a number of degrees and specializations. Details on the course-based master's degrees are presented first, followed by the thesis-based degrees.

Further information on degree offerings can be obtained from the Department's website.

Course-Based Degrees

1. Degrees and Specializations Offered

a) Master of Community Medicine (MCM) a course-based degree available only to physicians registered in the Public Health and Preventive Medicine Residency Training Program.

b) Master of Disability and Community Studies (MDCS), a course-based degree examines the intersection between community, disability, chronic illness, and marginalizing conditions within a social justice framework. The goal is to generate research, leadership, capacity, innovation, and partnerships. The graduate program attracts professionals across disciplines and sectors. The MDCS is offered in an alternate delivery format (combined face-to-face and online) and has a differential tuition fee.

2. Admission Requirements

a) MCM

- Currently enrolled in the Royal College Residency Training Program in Public Health and Preventive Medicine at University of Calgary
- Hold an MD or equivalent degree
- Meet the admission requirements of the Department of Community Health Sciences
- Two letters of reference

b) MDCS

- Minimum admission grade point average of 3.30 on a four-point scale over the last two full years or equivalent
- Three years of experience in a field of practice in community rehabilitation
- A written statement and professional profile of past education and work experience
- Two letters of reference

3. Application Deadline

a) MCM - January 31 for September admission

b) MDCS - January 31 for September admission

4. Advanced Credit

a) MCM - Applicable graduate courses may be considered.

b) Completed at a satisfactory level (minimum "B+") and within three years of admission to the graduate program, may be credited toward a student's degree requirements.

See "Medicine Programs".

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Medicine requirements, the Department requires:

a) MCM - A minimum of twelve half-course equivalents, in combination with the Public Health and Preventive Medicine Residency Program.

b) MDCS - A minimum of twelve half-course equivalents.

Course descriptions and detailed outlines of courses offered by the Department of Community Health Sciences are found on the departmental website at http://www.ucalgary.ca/communityhealthsciences/.

They are also listed in the Courses of Instruction section of this Calendar.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

The Department does not normally give credit for undergraduate courses.

8. Time Limit

a) MCM - Expected completion time is within 6 years (maximum six years).

b) MDCS - Expected completion time is 3 years (maximum six years).

9. Supervisory Assignments

a) MCM - A Supervisor must be named as part of the admission process. The Supervisory Committee must be named prior to planning the Community Health Sciences 602: Practicum in Public Health and Preventive Medicine, usually in the second term of the second year of the student's program.

b) MDCS - A faculty member is assigned as a supervisor prior to the final project; supervisory committee is not required.

10. Required Examinations

a) MCM - A final comprehensive written and oral examination with respect to the course content, plus a practicum evaluation.

b) MDCS - A capstone project with a public presentation and paper will be required for completion of the degree. For further details, please see the department website.

11. Research Proposal Requirements

a) MCM – A formal research proposal is not necessary, however a practicum proposal is required.

b) MDCS – Not applicable.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, please see the Awards and Financial Assistance section of this Calendar.

14. Other Information

MDCS - Students are encouraged to produce an article for publication.

15. Faculty Members/Research Interests

Current faculty and their areas of research can be found at: http://www.ucalgary.ca/communityhealthsciences/.

Thesis-Based Degrees

1. Degrees and Specializations Offered

a) Doctor of Philosophy (PhD)

b) Master of Science (MSc)

Specializations:

- Biostatistics
- Community Rehabilitation and Disability Studies
- Epidemiology
- Healthcare Epidemiology
- Clinical Epidemiology
- Health Economics
- Health Services Research
- Medical Education
- Population/Public Health

Within the thesis-based programs, the student must select a specialization from the list above.

Descriptions of each specialization and its requirements are found on the Departmental website at: http://www.ucalgary.ca/communityhealthsciences/.

2. Admission Requirements

In addition to Faculty requirements, the Department requires:

a) Minimum admission grade point average of 3.30 on a four-point scale over the last two full years or equivalent.

b) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (written test), or 100 (Internet-based test), an IELTS score of 7.0, a MELAB score of 84, or PTE score of 70.

c) A statement outlining the applicant's interest and reasons for choosing the program.

d) A letter from a faculty member of our Department indicating interest in supervising the applicant.

e) Work and/or research experience in the health system, community rehabilitation and/or disability studies is highly recommended.

f) Two letters of reference.

3. Application Deadline

The deadline for the submission of complete applications is January 31 for September admission.

Students applying to the MD/MSc or MD/PhD program must apply individually to each program and complete a supplementary application for the Leaders in Medicine Program.

4. Advanced Credit

Open Studies Students may take courses before applying for admission to a graduate program. However, these students are not eligible to enrol in two Block Week courses: Introduction to Community Health Sciences (Community Health Sciences 600) and Determinants of Health (Community Health Sciences 601), and three core courses, Essentials of Biostatistics (Community Health Sciences 610), Fundamentals of Epidemiology (Community Health Sciences 640) and Health Research Methods (Community Health Sciences 681). A maximum of two half courses, completed at a satisfactory level (minimum "B+") and within three years of admission to the graduate program, may be credited toward a student's degree requirements. Completing courses does not guarantee admission into the program.

5. Program/Course Requirements

All students must complete the Block Week course: Community Health Sciences 600: Introduction to Community Health Sciences. All students, with the exception of the Community Rehabilitation and Disability Studies and the Medical Education Specialization, must also complete the Block Week course: Community Health Sciences 601: "Determinants of Health". The additional program requirements are as follows:

Master of Science

A minimum of six half-course equivalents for all specializations (with the exception of five half-course equivalents in Medical Education). See departmental website for specific course requirements for each MSc specialization.

Doctor of Philosophy

A minimum of four half-course equivalents for all specializations (with the exception of three half-course equivalents in Medical Education), in addition to specific MSc courses if not completed previously. See departmental website for specific course requirements for each PhD specialization.

Brief course descriptions, schedules, and outlines are provided on the departmental website at: http://www.ucalgary.ca/communityhealthsciences/current. Some courses are only offered in block weeks.

6. Additional Requirements

Students are required to comply with Tri-Council Research Ethics training. Attendance at Research Integrity Day is required once during a student's program.

All students attend the departmental seminars offered during the academic year.

7. Credit for Undergraduate Courses

The Department does not normally give credit for undergraduate courses.

8. Time Limit

Expected completion time for the MSc program is two to three years (maximum four years) and for the PhD program is four to five years (maximum six years).

Time limits for MSc/PhD students in the Leaders in Medicine program are slightly different. Expected completion time for the MD/MSc program is four to five years (maximum six years) and for the MD/PhD program is six to seven years (maximum eight years).

9. Supervisory Assignments

Applicants must secure a supervisor prior to applying for admission. The Supervisor, in consultation with the student and the Graduate Program Director, recommends the Supervisory Committee within 3-6 months of registration. The student and Supervisor sign and submit an Appointment of Supervisor and/or Supervisory Committee form.

Students in the Leaders in Medicine Program must also have a Supervisory Committee as in above regulations. Both MD/MSc and MD/PhD students will also be evaluated and advised by a Joint Liaison Committee composed of the Associate Dean (Graduate Sciences Education), Associate Dean (Undergraduate Medical Education), and the Associate Dean (Research) of the Faculty of Medicine.

10. Required Examinations

For the PhD candidacy exam the student and his/her Supervisory Committee establish a concept map outlining the student's study area and an accompanying reading list. The Supervisory Committee develops three exam questions that meet the competency requirements as outlined by the department. These questions are derived from the concept map and reading list developed for each student. Questions on the research proposal are not included. The student has three weeks to prepare written solutions to the three questions. The oral examination follows seven days later.

In both MSc and PhD programs final thesis oral examinations are open.

11. Research Proposal Requirements

The proposal is usually 12 to 15 single-spaced, typed pages. Appendices are permitted and should include the research instrument and, if the research involves agencies or institutions outside of the Department, their written permission to conduct the research. Doctoral students should include a complete literature review as an appendix. See departmental website at http://www.ucalgary.ca/communityhealthsciences/current/.

After approval by the student's Supervisory Committee and before commencement of data collection, all proposals are submitted to the Conjoint Health Research Ethics Board for ethical review, and some are submitted to the appropriate committee for impact review.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, please see the Awards and Financial Assistance section of this calendar.

The Department's deadline for applications to the Graduate Award Competition is January 15. Funding opportunities can be found at http://grad.ucalgary.ca/awards and http://www.ucalgary.ca/communityhealthsciences/current/fin.

14. Other Information

None.

15. Faculty Members/Research Interests

Current faculty and their areas of research are on the departmental website at: http://www.ucalgary.ca/communityhealthsciences/prospective/admission/advisor.

Medicine, Gastrointestinal Sciences MDGI

Contact Information

Location: Health Sciences Centre, Room G341B

Program number: 403.210.9572

Fax: 403.210.8109

Email address: gigrad@ucalgary.ca

Web page URL:
http://www.ucalgary.ca/gisgp/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

All master's thesis and doctoral students are considered full-time. In exceptional circumstances part-time status may be considered and must be approved by the Graduate Program Director.

Specializations:

- Physiology
- Biochemistry
- Molecular Biology
- Pharmacology
- Immunology
- Immunopharmacology
- Microbiology
- Nutrition
- Parasitology
- Pathology
- Epidemiology
- Host-Pathogen Interactions

2. Admission Requirements

In addition to the Faculty of Graduate Studies regulations, the Faculty of Medicine graduate programs require a minimum admission grade point average of 3.30 (on the University of Calgary four-point system; equivalent to a "B+") based on the last two years of the undergraduate degree consisting of a minimum of 10 full-course equivalents.

- BSc degree or equivalent

Doctor of Philosophy

- MSc degree, or relevant master's degree, recognized by the Faculty of Graduate Studies, or transfer from MSc program, or, in exceptional cases, BSc degree or equivalent (3.70 GPA recommended).

a) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (written test), or 100 (Internet-based test), or an IELTS score of 7.5, or a MELAB score of 84 or a PTE score of 70.

b) Two references from individuals who can attest to the applicant's academic background. Each referee to provide a reference form and accompanying letter on institutional letterhead.

c) Student must procure a supervisor within the Gastrointestinal Sciences program, prior to admission.

d) Endorsement by the Chairperson, Gastrointestinal Sciences Education Committee (GSEC) that the applicant is acceptable and that adequate supervision of the proposed program is available.

e) Meeting the minimum admission criteria does not guarantee acceptance into the program. Applications are ranked according to academic excellence, prior research experience and commitment to the study of gastrointestinal sciences.

3. Application Deadline

Students may be admitted for September, January, May or July. International applications require at least 12 weeks to process prior to admission. See graduate program information for general application guidelines.

Students who wish to apply to the Leaders in Medicine joint degree program (i.e. MD/MSc or MD/PhD) must apply individually to the graduate and to the medical program. If accepted into each program he or she must complete a supplementary application for the LIM Program.

4. Advanced Credit

See "Medicine Programs".

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Medicine requirements, the Department requires:

a) The completion of a minimum of two half-course equivalents for the Master of Science. For the degree of Doctor of Philosophy, the completion of a minimum of one half-course equivalent for those entering with a master's degree in a related subject. For those entering with a Bachelor of Science or equivalent, a minimum of three half-course equivalents are required. Normally, one of these courses is Medical Science 637.01. Exceptions, however, can be approved by the Program Director on the recommendation of the supervisor or the graduate education committee.

b) A supervisory committee set up within three months of initial registration.

c) A written research proposal presented to the supervisory committee within twelve months of initial registration.

d) A seminar presentation once a year. Exceptions require recommendation by the supervisory committee and approval of the Graduate Program Director.

e) Doctoral students must pass an oral candidacy examination within 24 months in the program. If transferring from MSc to PhD within 30 months of initial registration in the program. The exam requires submission of an approved version of the doctoral research

proposal and specific topics of study to the examining committee no less than 2 weeks prior to the exam. Specific details of the exam format can be found at http://grad.ucalgary.ca/current/managing-my-program/examinations.

f) Regular, mandatory attendance at the G.I. Sciences weekly seminar program.

**To qualify for an approved specialization, the supervisor and/or at least one member of the supervisory committee should have expertise in that specialization and the research in the thesis should be largely based in that discipline. In addition, the student should complete graduate course work deemed relevant/required by the supervisor and the supervisory committee for the student to be competent in the specialization.*

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

No credit given.

8. Time Limit

Expected completion time is two and a half years for the master's program and five years for the doctoral program. See "Medicine Programs" for maximum completion times.

9. Supervisory Assignments

See "Medicine Programs".

The various laboratories in the group assess students, and the laboratory that has a need/interest in the student will offer the student a placement. Student is responsible for finding a supervisor prior to admission.

10. Required Examinations

See the "Medicine Programs" entry in this Calendar.

11. Research Proposal Requirements

See the "Medicine Programs" entry in this Calendar.

12. Special Registration Information

Exceptional students registered for the MSc degree may request to change their registration status to that of a PhD candidate within 24 months of admission to the program. Within 18 months of initial registration, the student will discuss with the supervisor his/her intent to transfer from the MSc to the PhD program. Students are only eligible for transfer if at least two graduate courses have been completed. A revised draft research proposal should be presented to the supervisory committee before the transfer has occurred. Transfers will require unanimous approval from each member of the supervisory committee and recommendation to the program director. The student's academic record and approval from the supervisory committee will be considered in making a decision to recommend a transfer into a PhD program.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see http://grad.ucalgary.ca/awards.

14. Other Information

Contributions to journals, relevant journal clubs and/or seminars are an expectation. Please visit the Department of Gastrointestinal Sciences Website at http://www.ucalgary.ca/girg/ for additional information.

15. Faculty Members/Research Interests

Current faculty research interests and additional information of the MDGI graduate program can be found at http://www.ucalgary.ca/gisgp/grad_studies.

Medicine, Immunology MDIM

Contact Information

Location: Health Sciences Centre, Room G329

Program number: 403.210.9572

Fax: 403.210.8109

Email address: imgrad@ucalgary.ca

Web page URL: http://www.ucalgary.ca/irg/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Faculty members are affiliated with the Faculties of Medicine, Science, and Veterinary Medicine.

The Immunology Graduate Program is offered in collaboration with the above faculties, and the curriculum has been designed for students with undergraduate or MSc degrees in those faculties. Background experience, qualifications, and areas of interest of applicants will be taken into account at the time of admission.

Students in the MSc and PhD degree programs are normally considered full-time.

2. Admission Requirements

In addition to the Faculty of Graduate Studies regulations, the Faculty of Medicine graduate programs require a minimum admission grade point average of 3.30 (on the University of Calgary four-point system; equivalent to a "B+") based on the last two years of the undergraduate degree consisting of a minimum of 10 full-course equivalents and master's course work if applicable.

Master of Science

- BSc degree or equivalent

Doctor of Philosophy

- MSc degree, or relevant master's degree, recognized by the Faculty of Graduate Studies, or transfer from MSc program, or, in exceptional cases, BSc degree or equivalent.

a) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (written), or 100 (Internet-based), or a minimum IELTS score of 7.0, or a minimum MELAB score of 84, or a minimum PTE score of 70.

b) Two references from individuals that can attest to the applicant's academic background. Each referee to provide a reference form and accompanying letter on institutional letterhead.

c) Endorsement by the Chairperson, Immunology Graduate Education Committee (IGEC) that the applicant is acceptable and that adequate supervision of the proposed program is available.

d) An undergraduate course in immunology (Cellular, Molecular Microbial Biology 527 or equivalent). It will be possible for a student to take Medical Science 755.01 during the first year of their program if he/she does not have an appropriate prerequisite course.

e) Meeting the minimum admission criteria above does not guarantee acceptance into the program. Applications will be ranked according to academic excellence, prior research experience and commitment to the study of immunology. Students must also have confirmed faculty member willing to supervise his or her studies.

3. Application Deadline

Deadlines for submission of complete applications for students with international transcripts:

April 1 for September admission

August 1 for January admission

December 1 for May admission

Deadlines for submission of complete applications for students with Canadian and U.S. transcripts:

June 1 for September admission

October 1 for January admission

February 1 for May admission

4. Advanced Credit

Applicants may request to receive credit for previously completed courses at the time of application. Where credit is to be given, it will be noted in the letter to the Faculty of Graduate Studies recommending the student's admission.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Medicine requirements, the Immunology Graduate Program requires:

a) Completion of a minimum of two half courses for an MSc and three half courses for a PhD. Medical Science 639.02 or 639.04 is compulsory for all MSc students. Both courses are compulsory for PhD students. Optional courses for either degree can be drawn from any 600 level courses offered by the Faculty of Medicine in areas that are relevant to the student's research proposal, and approved by the supervisor and supervisory committee. Courses taken while a student is an Open Study student cannot be used as credits in either the MSc or PhD program.

b) Participation in the seminar program of the Immunology Research Group (IRG). This will entail the annual presentation of a 30-50 minute Research in Progress seminar, attendance at the weekly seminars and journal club.

c) Presentation on the thesis project to the IRG around the time of the defence.

6. Additional Requirements

Attendance at a Research Integrity Day workshop is required for all graduate students. MSc students must attend prior

to defending their thesis and PhD students must attend prior to their candidacy oral examination.

Contributions to journals, relevant journal clubs and/or seminars are desirable.

7. Credit for Undergraduate Courses

Credit will not be given for courses taken below the 600-level.

8. Time Limit

Expected completion time is 2.5 years for an MSc and 5 years for a PhD. See "Medicine Programs" for maximum completion times.

9. Supervisory Assignments

Individuals intending to apply for admission to the Immunology Graduate Program are encouraged to contact faculty members directly regarding the possibility of acting as a supervisor. If a potential supervisor has not been identified at the time of application, applications that meet or exceed the minimum criteria will be circulated to potential supervisors based on the indicated areas of interest (declared by candidates in the application). A supervisor and a source of funding (minimum of $19,000 per annum) must be identified for a student to be admitted to the Immunology Graduate Program.

The supervisor, in consultation with the student, selects a Supervisory Committee. For MSc students, the Supervisory Committee consists of the supervisor plus 2 faculty members, at least one of whom must have completed the supervision of an MSc student. For PhD students, the Supervisory Committee consists of the supervisor plus a minimum of 2 faculty members. At least two members should be from the IRG, and at least two members must have completed the supervision of a doctoral graduate.

10. Required Examinations

See the "Medicine Programs" entry in this Calendar.

11. Research Proposal Requirements

See the "Medicine Programs" entry in this Calendar.

12. Special Registration Information

Exceptional students registered for the MSc degree may request to change their registration status to that of a PhD candidate within 24 months of admission to the program. Within 18 months of first registration, the student will discuss with the supervisor his/her intent to transfer from the MSc to the PhD program. Students are only eligible for transfer if at least 2 graduate courses have been completed. A revised draft research proposal should be presented to the supervisory committee before the transfer has occurred. Transfers will require unanimous approval from each member of the supervisory committee and recommendation to the Chairperson, IGEC. The student's academic record and approval from the supervisory committee will be considered in making a decision to recommend a transfer into a PhD program. If the transfer is approved, the Chairperson, IGEC will send a written recommendation to the Dean of the Faculty of Graduate Studies.

The student will be required to submit a revised research proposal and complete the course requirements of the doctoral program. Student must meet the 30-month deadline for the candidacy oral examination.

13. Financial Assistance

Applicants must identify a source of funding to be admitted into the Immunology Program. Graduate students are generally funded by their supervisor's operating grants, internal awards, and/or external awards. Self-funding is not an option. Possible sources of financial support are listed on the Faculty of Graduate Studies awards database: http://grad.ucalgary.ca/awards.

These include Faculty of Graduate Studies Scholarships, Dean's Excellence Awards, Dean's Entrance Awards, and the Faculty of Graduate Studies Open Scholarship Competition.

Students in the program are eligible to receive a Graduate Student Support scholarship to assist them with tuition while paying full program fees, upon completion of annual program requirements.

Students are also eligible to receive the Immunology Program Specific award for travel to a national or international scientific meeting to make a presentation.

In addition, the Immunology Program Award for Research Excellence is awarded to students whose final thesis is unanimously deemed worthy of nomination for a national or international award by the examiners of their final thesis. In addition to a certificate, the student receives a monetary award.

14. Other Information

The Immunology Graduate Program offers the following four courses:

Medical Science 639.01: Principles of Immunology

Medical Science 639.02: Cellular and Molecular Immunology

Medical Science 639.04: Inflammation

Information regarding the courses can be obtained at http://www.ucalgary.ca/irg/Education.

Detailed course descriptions are available at http://www.ucalgary.ca/pubs/calendar/ and timetabling information can be found through the MyUofC portal.

15. Faculty Members/Research Interests

The research interests of current IRG faculty members can be found at http://www.ucalgary.ca/irg/faculty.

Medicine, Microbiology and Infectious Diseases MDMI

Contact Information

Location: Health Sciences Centre, Room G329

Program number: 403.220.2558

Fax: 403.210.8109

Email address: midgrad@ucalgary.ca

Web page URL:
http://www.ucalgary.ca/microinfect/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc) thesis-based

2. Admission Requirements

In addition to Faculties of Graduate Studies and Medicine requirements, the Department requires:

a) A minimum admission grade point average over the last two years (20 half courses) of 3.30 ("B+") on a four-point scale or equivalent.

b) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test), or 92 (Internet-based test), or an IELTS score of 7.0, or a MELAB score of 82 or a PTE score of 64.

c) Two reference letters.

Applicants who do not meet the above requirements will be considered only in exceptional circumstances.

3. Application Deadline

Deadlines for the submission of complete applications:

May 15 for September admission

September 15 for January admission

January 15 for May admission

Students applying to the MD/Master's or MD/PhD program must apply individually to each program and complete a supplementary application to the Leaders in Medicine Program.

Students with international transcripts should contact the department for application deadlines.

4. Advanced Credit

See "Medicine Programs".

5. Program/Course Requirements

In addition to Faculty requirements, the Department requires:

Master of Science

a) The completion of a minimum of one full-course equivalent.

b) The presentation of an annual seminar in the applicable research group.

Doctor of Philosophy

a) The completion of a minimum of one and one-half full-course equivalents.

b) The presentation of an annual seminar in the applicable research group.

c) The presentation of a seminar on the results of his/her thesis research.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

No more than half a student's program may be done at the 500 level.

8. Time Limit

Expected completion time is two years for students in the Master of Science program and four years for doctoral students. Maximum completion time is four years for the Master of Science program and six years for the doctoral program.

Leaders in Medicine - Expected completion time for the MD/Master's program is four to five years, and for the MD/PhD program, six to seven years. The maximum completion time is six years for the MD/Master's, and eight years for the MD/PhD program.

See "Medicine Programs" for maximum completion times.

9. Supervisory Assignments

Students may interview several potential supervisors. The decision to establish a relationship is based upon mutual agreement between the student and the supervisor. Supervisory committees are established based upon the needs of the student and the expertise of the committee members, following discussions between the student and the supervisor.

10. Required Examinations

See the "Medicine Programs" entry in this Calendar.

11. Research Proposal Requirements

See the "Medicine Programs" entry in this Calendar.

12. Special Registration Information

None.

13. Financial Assistance

The general policy of the Microbiology and Infectious Diseases Graduate Program is that all students shall be full-time and that all students will receive financial support for the entire period of their program.

14. Other Information

Courses in Microbiology and Infectious Diseases are offered under the auspices of the Department of Medical Science and are listed in this Calendar under that heading.

15. Faculty Members/Research Interests

The research interests of the faculty can be found at http://www.ucalgary.ca/microinfect/Our_Grad_Program.

Medicine, Neuroscience MDNS

Contact Information

Location: Health Sciences Centre, Room G329

Program number: 403.220.2558

Fax: 403.210.8109

Email address: neurosci@ucalgary.ca

Web page URL:

http://www.ucalgary.ca/neuroscience

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

2. Admission Requirements

In addition to Faculties of Graduate Studies and Medicine requirements, the Department requires:

a) A minimum admission grade point average over the last two years (20 half courses) of 3.30 ("B+") on a four point scale or equivalent.

b) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test), or 92 (Internet-based test), or an IELTS score of 7.0, or MELAB score of 82, or a PTE score of 64.

c) Two reference letters.

3. Application Deadline

Deadlines for submission of complete applications for students with Canadian and U.S. transcripts:

May 15 for September admission

September 15 for January admission

February 15 for May admission

April 15 for July admission

Students with international transcripts should contact department for application deadlines.

4. Advanced Credit

Not given.

5. Program/Course Requirements

In addition to the Faculties of Graduate Studies and Medicine requirements, the Department requires:

Master of Science

a) Satisfactory completion of Cellular, Molecular and Developmental Neuroscience (Medical Science 619.01), and Systems Neuroscience and Neuropathology (Medical Science 619.02) in the first year.

b) Participation in a seminar program and journal club, and presentation of research seminar.

Doctor of Philosophy

a) Satisfactory completion of Cellular, Molecular and Developmental Neuroscience (Medical Science 619.01) and Systems Neuroscience and Neuropathology (Medical Science 619.02) in the first year.

b) Satisfactory completion of another graduate-level course in an area that is pertinent to the student's thesis project.

c) Participation in a seminar program and journal club, and presentation of research seminars.

6. Additional Requirements

As determined by agreement with Supervisor and Supervisory Committee.

7. Credit for Undergraduate Courses

Not given.

8. Time Limit

Expected completion time for students in a master's program is two years, four years for a doctoral program. See "Medicine Programs" for maximum completion times.

9. Supervisory Assignments

Supervisors must be identified and committed to support the student for the first two years, before admission is recommended. The decision should be by mutual agreement between the prospective student and the faculty member, and approved by the Graduate Co-ordinator. For relevant criteria and responsibilities of supervisors, see the Policies and Procedures of the Department of Neuroscience and the Handbook of Supervision and Examinations in this calendar. A Supervisory Committee must be struck within three months of initial registration. The method of striking, composition and functions of the Supervisory Committee are detailed in the Policies and Procedures.

10. Required Examinations

See the "Medicine Programs" entry in this Calendar.

11. Research Proposal Requirements

See the "Medicine Programs" entry in this Calendar.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance is available to qualified students through supervisor operating grants or competitive awards (a minimum stipend of $20,000 is required). For information on awards, see the Awards and Financial Assistance section of this Calendar, the Department of Neuroscience, the Faculty of Medicine Research Office and the education section of the Hotchkiss Brain Institute at http://www.hbi.ucalgary.ca/education.

14. Other Information

Rather than study in "classical" disciplines such as anatomy or physiology, students are placed with a supervisor who is a member of a multidisciplinary research group. This multidisciplinary scheme greatly facilitates the development of individual research programs, especially with respect to collaborations involving different techniques and model systems. Students are encouraged to take advantage of such collaborations to enhance the scope and quality of their thesis research.

The purpose of the graduate program is to educate independent, reliable, and competent research neuroscientists. Although many holders of Master of Science and Doctor of Philosophy degrees find employment that does not directly involve research, having such degrees implies that an individual is able to pursue a research problem to a meaningful conclusion. The main role of the program is to provide a favourable environment both for creative research and for the acquisition of a basic body of knowledge in the neurosciences. The Master of Science and doctoral degrees are distinguished both in the degree of originality expected in the candidate's research, and in the normal course load undertaken. Members of the Department of Neuroscience, other than the supervisor, have an important role to play in each student's training.

Further information on applications and admission, and brochures describing the research interests of individual Department members may be obtained from the Graduate Program Administrator, Neuroscience Graduate Program, Graduate Science Education, Faculty of Medicine, University of Calgary, Room G329, Health Sciences Centre, 3330 Hospital Drive NW, Calgary, Alberta T2N 4N1. Faculty research interests can also be accessed on the Department of Neuroscience website at http://www.ucalgary.ca/neuroscience or the Hotchkiss Brain Institute website at http://www.hbi.ucalgary.ca/index.php.

Courses in Neuroscience are offered under the auspices of the Department of Medical Science and are listed in this Calendar in the Courses of Instruction section.

15. Faculty Members/Research Interests

The research interests of the department can be found at either the Department of Neuroscience website at http://www.ucalgary.ca/neuroscience or the HBI website at http://www.hbi.ucalgary.ca/member.

Medicine, Medical Science MDSC

Contact Information

Location: Health Sciences Centre, Room G347A

Program number: 403.220.6852

Fax: 403.210.8109

Email address: medgrad@ucalgary.ca

Web page URL:
http://www.ucalgary.ca/mdsc

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Students in the MSc and PhD degree programs are normally considered full-time.

Specializations:

- Cancer Biology*
- Critical Care Medicine*
- Mountain Medicine and High Altitude Physiology*
- Joint Injury and Arthritis*
- Biomechanics
- Biomedical Ethics
- Molecular & Medical Genetics
- Pathologists' Assistant
- Physiology
- Surgery (In co-operation with the Department of Surgery)
- Medical Imaging (Interdisciplinary)**

**A part-time option may be available within these specializations.*

***See the Calendar section on Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to Faculties of Graduate Studies and Medicine requirements, the Medical Science Graduate Program requires the following:

a) a minimum admission grade point average of 3.30 (on the University of Calgary four-point system; equivalent to a "B+") based on the last two years of the undergraduate degree consisting of a minimum of 10 full-course equivalents.

b) For applicants required to provide proof of proficiency in the English language, a minimum TOEFL score of 600 (paper-based test), 100 (Internet-based test), or a minimum IELTS score of 7.0, or a minimum MELAB score of 84, specializations may have additional requirements.

c) Two reference letters and reference forms.

d) For admission to the Master of Science program with a specialization in surgery, prior admission to the surgery residency program is required. Students will normally apply to the Master of Science program in the third year of the surgery residency program. For admission to the Surgeon Scientist Program prior admission to the Medical Science Graduate Program is required.

3. Application Deadline

Students may be admitted for September, January, May, or July. Contact the Medical Science Graduate Program office for general application deadlines.

4. Advanced Credit

Advanced credit is not normally given in a thesis-based program. See "Medicine Programs".

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Medicine requirements, the Department requires:

Master of Science

a) A BSc degree or equivalent.

b) A minimum of two half courses.

c) Regular attendance and presentation at a journal club and a final seminar which precedes the thesis defence, although specific training programs may have additional requirements.

Doctor of Philosophy

a) A MSc degree, or relevant master's degree, recognized by the Faculty of Graduate Studies, or transfer from MSc program, or, in exceptional cases, BSc degree or equivalent.

b) A minimum of three half courses.

c) Regular attendance and presentation at a journal club and a final seminar which precedes the thesis defence, although specific training programs may have additional requirements.

6. Additional Requirements

Attendance at a half-day Research Integrity Day seminar during their program. Students must attend this seminar before they are approved to defend their thesis. The seminar is held only twice per year, once in January and again in April. Contact the Graduate Program Administrator for more information.

7. Credit for Undergraduate Courses

Graduate credit may be given for 500-level courses. No more than one half course of credit will be allowed in a two half course program (e.g., if a 500-level full-course is taken, only one half course credit is allowed toward the completion of program course requirements).

8. Time Limit

Average completion time for students in the MSc program is two and a half years, four and a half years in the PhD program.

Leaders in Medicine - Expected completion time is four to five years in the MD/MSc program, six to seven years in the MD/PhD program.

See "Medicine Programs" for maximum completion times.

9. Supervisory Assignments

Students in thesis-based programs have identified a supervisor at the time of admission. In consultation with their supervisors, students must select a supervisory committee consisting of their supervisor plus two other faculty members (MSc) or three other faculty members (PhD) within three months of the appointment of the Supervisor. The Graduate Program Director must approve the composition of the supervisory committee. Specializations may have additional requirements.

10. Required Examinations

See the "Medicine Programs" entry in this Calendar.

11. Research Proposal Requirements

See the "Medicine Programs" entry in this Calendar.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance must be provided by the supervisor. For information on awards, see the Awards and Financial Assistance section of this calendar.

Information and deadlines for Medical Science Faculty of Graduate Studies' award competitions will be provided throughout the year.

14. Other Information

None.

15. Faculty Members/Research Interests

Information about institutes in the Faculty of Medicine can be found at http://medicine.ucalgary.ca/research/institutes.

Military and Strategic Studies CMSS

Contact Information

Location: 8th floor, Social Sciences Building

Program number: 403.220.4038

Fax: 403.282.0594

Email address: cmss@ucalgary.ca

Web page URL:
http://www.cmss.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Strategic Studies (MSS), course-based (including the co-operative education option) or thesis-based

Specialization:

- Israel Studies (Interdisciplinary)*

**See the Calendar section on Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to the requirements of the Faculties of Graduate Studies and Arts, CMSS requires:

Master of Strategic Studies (MSS), course-based and thesis-based

a) A bachelor's degree with a grade point average of at least 3.40 on a four-point scale.

b) A writing sample.

c) An agreement to supervise by a potential supervisor from applicants to the thesis-based program.

d) A research proposal from applicants to the thesis-based program.

Doctor of Philosophy

Applicants will be admitted only if the CMSS Graduate Committee is satisfied that adequate supervision is likely to be available for the duration of their studies. Successful applicants should be aware that admission to the program does not imply a Centre commitment to provide supervision for all research interests they may have. Students are also advised to consult the Faculty of Graduate Studies Handbook of Supervision and Examination.

Prerequisites for admission to the PhD program are:

a) A completed master's degree.

b) A GPA of 3.70 on a four-point scale over all completed graduate courses in the master's program; 3.40 in the undergraduate program over the last 20 half courses or two years of study.

c) A completed application to the Centre, along with supporting documentation.

d) A detailed statement of the proposed thesis research.

e) A representative piece of written work, normally a master's thesis chapter or major research paper.

f) The Centre requires a tentative agreement from a faculty member to supervise, so students need to contact potential supervisors at the beginning of the application process.

g) All students whose native language is one other than English are required to pass the TOEFL test with a minimum score of 600 (written), or 92 (Internet-based), or 7+ on the IELTS test, or 84 on the MELAB test, or 70 on the PTE test. The test must have been taken within the last two years.

h) Two letters of reference.

i) All post-secondary transcripts.

3. Application Deadline

Deadlines for the submission of complete applications:

January 15 for September admission and funding

4. Advanced Credit

In the course-based master's program, advanced credit may be given for a maximum of two half courses at the senior undergraduate (500) level. The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to the required level for admission.

5. Program/Course Requirements

Master of Strategic Studies

In addition to Faculties of Graduate Studies and Arts requirements, the Centre for Military and Strategic Studies requires:

a) Core Courses: All master's students take, in any sequence, the following three core area half courses:

Strategic Studies/History 655 Classics of Strategy

Political Science 681 Advanced Analysis of International Relations

Political Science 685 Strategic Studies

All master's students will also take the following course in the Fall Block Week preceding their first term:

Strategic Studies 603 Military and Strategic Studies: Questions and Methods

MSS students in the thesis stream are required to present their supervisor with a formal thesis proposal normally no later than the end of their second term (usually, the end of the Winter Term of their first year for students entering the program in the thesis stream; for students transferring from the course-based stream, where at all possible the same general timeline should apply).

b) Areas of Concentration: In any sequence, thesis-based students must complete three half-course equivalents; course-based students must complete nine half-course equivalents; and course-based Co-operative Education students must complete six half-course equivalents from the following:

(1) Arctic Security

Strategic Studies 662 Advanced Studies in Canadian Arctic Security

(2) Canadian Military Studies

Strategic Studies 609 Canadian Military and the Second World War

Strategic Studies 611 Canadian Military Studies

Strategic Studies 613 Canada and the First World War

(3) U.S. Security Policy

Political Science 633 U.S. Security Policy

(4) Domestic Security/Hemispheric Security

(5) Ethics and Morality in Conflict

Political Science 619 War and Interpretation

Political Science 684 Human Rights and Humanitarianism

(6) Intelligence and Security

Strategic Studies 657 Intelligence, Information Operations and Command, Control, Communications and Computers

(7) Israeli Security Studies

Israel Studies 601 Modern Israel

(8) Military Anthropology

Anthropology 641 Graduate Seminar in Civil Military Relations

(9) Sea Power

Strategic Studies 659 Sea Power

(10) Unconventional Warfare

Political Science 689 Unconventional Warfare

Political Science 675 Special Topics in Comparative Politics

(11) Causes of War

Strategic Studies 663 War – Causes and Aftermath

(12) Military History

History 637 Topics in Military History

(13) Special Topics in Military and Strategic Studies

Strategic Studies 649 Special Topics in Military and Strategic Studies

(14) With the approval of the Graduate Director, thesis-based students may take one half course from the following and either course-based students or course-based students with Co-operative Education may take one or more half courses from the following:

Strategic Studies 651 Reading Seminar I

Strategic Studies 653 Research Seminar I

(15) With the approval of the Graduate director any other graduate course pertinent to the student's studies may be taken. Consult the Program website for a list of other recommended graduate courses.

c) Co-operative Education: The Co-operative Education option is only available as part of the course-based MSS program. Students will complete an 8-month work placement during their second year, which will replace three other non-core half courses. Thesis-based MSS students will be permitted to transfer to the course-based co-operative education option during their first year of study. For further information interested students should contact the CMSS faculty co-operative education advisor or the Centre website.

Doctor of Philosophy

a) Course Work:

Each student must normally take six half-course equivalents including three core courses:

- Political Science 681: Advanced Analysis of International Relations
- Political Science 685: Strategic Studies
- Strategic Studies 655: Classics of Strategy.

All PhD students will also take the following course in the Block Week preceding their first term:

Strategic Studies 603 Military and Strategic Studies: Questions and Methods

For candidacy examinations, students will have two major fields of study. One of these will be strategic studies and the other the dissertation area. Students will be required to take at least one half course in each field, namely Political Science 685 and an appropriate elective.

b) Written and oral candidacy examination.

c) Doctoral thesis proposal.

d) Written doctoral thesis.

e) Oral thesis defence.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

With the approval of the Graduate Director, students enrolled in the thesis-based MSS program may apply to take one 500-level half courses for graduate credit, but will be required to complete additional requirements for the course. Students in the course-based program may apply to take one 500-level half courses for graduate credit, but will be required to complete additional requirements for each course.

8. Time Limit

Expected completion time for the thesis-based and course-based Master of Strategic Studies is two years. Maximum completion time is four years for the thesis-based Master of Strategic Studies and six years for the course-based Master of Strategic Studies.

Expected completion time for the PhD in Military and Strategic Studies is four years. Maximum completion time for the PhD in Military and Strategic Studies is six years.

9. Supervisory Assignments

Students must contact a possible supervisor before admission. Agreement from a supervisor must be included in the application package.

10. Required Examinations

For the PhD program, all course work must be completed before the candidacy examination can be taken.

There will be two three-hour written examinations, one in each field, as well as the single oral examination covering the content and questions on both of the written exams. There will normally be two fields – a major field and a second field. The major field will always be strategic studies, while the second field will be in an area closely related to the student's dissertation research. Military and Strategic Studies is an interdisciplinary program, and our doctoral students will draw upon a wide variety of disciplines for their second field.

A candidacy examination consists of both written and oral components. CMSS requires that the written component be taken after the completion of course work and no later than 28 months of initial registration into the program, although completion within 16-20 months is encouraged by the Centre. For CMSS purposes, this component will consist of written examinations in the two major fields of study. The oral examination will be held no later than one month after the written examination.

Final thesis oral examinations are open.

11. Research Proposal Requirements

The dissertation proposal is submitted to the members of the student's Supervisory Committee, normally no later than eight weeks after the successful completion of the oral candidacy exam. After the proposal is successfully defended in a meeting of the Supervisory Committee, the student can go on to the dissertation research phase.

12. Special Registration Information

None.

13. Financial Assistance

Not applicable.

14. Other Information

None.

15. Faculty Members/Research Interests

Faculty members and their areas of interest may be found at http://www.cmss.ucalgary.ca.

Music MUSI

Contact Information

Location: Craigie Hall D 100

Program number: 403.220.5313

Fax: 403.282.6825

Email address: musicgs@ucalgary.ca

Web page URL: http://scpa.ucalgary.ca/studentsalumni/music-students/graduate

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Specializations:

- Composition
- Music Education
- Musicology
- Sonic Arts

Master of Arts (MA)

Specialization:

- Musicology

Master of Music (MMus) thesis-based

Specializations:

- Composition
- Conducting
- Music Education
- Performance
- Sonic Arts

**The Computational Media Design specialization is no longer available. See the Calendar entry for the Computational Media Design program.*

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, Music requires that all applicants submit:

a) One-page letter detailing their specific reasons for pursuing graduate study.

b) Two reference letters.

Other requirements are outlined below and based on the degree being pursued.

Master of Music (Performance)

A live audition or video/audio recording. Repertoire for the audition must contain representative works from a variety of historical periods and must demonstrate an advanced level of technical accomplishment. Recordings should be approximately 20-30 minutes in length. Live auditions are scheduled for early February.

Master of Music (Conducting)

a) A completed Bachelor of Music degree, including study in conducting.

b) Demonstrated ability in an audition, which can be met in two ways:

- A video of approximately fifteen minutes.
- A rehearsal of a University ensemble (during Fall and early Winter).

c) Demonstrated competence on a major instrument or voice.

Master of Music (Composition)

a) A completed Bachelor of Music degree (or equivalent), including study in composition.

b) A portfolio of at least three recent compositions, together with recordings (where available). Applicants wishing to specialize in electroacoustic composition must submit recordings.

Master of Music (Sonic Arts)

a) A completed Bachelor of Music degree (or equivalent) with a major, minor or concentration in Electroacoustic Music, Sonic Arts, Digital Audio Arts or similar field.

b) A portfolio of recent sonic arts creative and/or research projects, and a research paper.

Master of Music (Music Education)

Music is not currently accepting applications to the Master of Music (Music Education) for the 2014-2015 academic year.

a) Normally, two years of successful teaching experience or equivalent professional involvement in music education.

b) An essay on a topic in Music Education prepared during or subsequent to the applicant's undergraduate work.

Master of Arts (Musicology)

A research essay or paper of approximately 10-15 pages on a topic in music history or theory prepared during or subsequent to the applicant's undergraduate course work.

Doctor of Philosophy

a) A recognized master's degree or equivalent.

b) Composition - a portfolio of works, together with recordings, if available, and an extended research paper.

c) Musicology - one or two extended research essays of approximately 25 pages in length.

d) Music Education - one or two extended research essays.

e) Sonic Arts - a portfolio of sonic arts creative and/or research projects, and an extended research paper.

3. Application Deadline

The deadline for the submission of complete applications for both master's and doctoral program is January 15 for September admission.

For students wishing to pursue a Master of Music in Performance, an audition of approximately thirty minutes will be arranged on an individual basis from December 1 to April 15. Specific dates and times can be arranged by contacting the Graduate Administrator at 403.220.5422.

For consideration for university scholarships, complete applications (including the audition and the required TOEFL score, if applicable) must be concluded by January 15. Departmentally-administered funding (such as graduate teaching assistantships and research scholarships) will be decided after April 15.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, Music, excluding qualifying courses, requires:

Master's Degrees

Master of Arts (Musicology): Music 637, 631 and six half approved graduate-level courses.

Master of Music (Composition): Music 613, Music 631, Music 641.01, 641.02 or 653 and three half approved graduate-level courses.

Master of Music (Conducting): Music 637, 631, Music Performance 632 or 634 and four half approved graduate-level courses.

Master of Music (Performance): Music 621, 623, 637, 631, one half graduate-level course in Music Theory and Composition or Music History and Literature and three other approved half course options.

Master of Music (Music Education): Music 631, 637 and six half approved graduate-level courses.

Master of Music (Sonic Arts): Music 631, 651, 653 and three half approved graduate-level courses. Music 613 may be recommended.

Master of Science (CMD): satisfy the program/course requirements in the Computational Media Design section of the Graduate Calendar, wherein the requirement for "one half graduate-level course in Design or Art" will be met by Music 631. In addition, the "two half other graduate-level courses" will include one of Music 651 or 653.

Restrictions

No more than two half courses for the Master of Music and Master of Arts degrees may be taken in an area other than Music, except in the specialization of CMD.

Students in the PhD program with a specialization in CMD will satisfy the course requirements found in the Computational Media Design (Interdisciplinary) section of the Graduate Calendar, which shall include one of either Music 751 or 753.

Doctor of Philosophy

Students entering the PhD program will normally be required to complete at least six half courses. Music 631 is required unless this course or its equivalent has been completed as part of a master's degree.

PhD (Composition), (Musicology), (Music Education): An interdisciplinary half course designed by the student and supervisor, and five additional approved graduate-level half courses.

PhD (Sonic Arts): Music 751, 753 and four additional approved graduate half courses. Music 613 may be recommended.

6. Additional Requirements

Diagnostic tests in music history and theory will be given to all entering master's students in order to determine if qualifying work in these areas is required.

Language

Master's Programs

Master of Arts (Musicology)

Applicants are required to demonstrate a reading knowledge of a language other than English—normally German. In practice, this requirement and any other linguistic competence that may be deemed necessary for the student's proposed research area must be met before the thesis topic will be approved.

Other Master's Programs

While there are no formal second-language requirements for the various programs of the Master of Music degree, students may be required to attain proficiency in a language other than English where this is deemed appropriate for the proposed thesis/project.

Doctor of Philosophy

Doctor of Philosophy (Musicology)

Candidates are required to demonstrate a reading knowledge of two languages other than English. German is recommended as one of the required languages.

Doctor of Philosophy (Composition), (Music Education) Candidates are required to demonstrate a reading knowledge of one language other than English.

Performance

Graduate students in the MMus Performance program are required to participate in one of the large ensembles for the duration of their degree. Pianists are required to accompany two hours per week in a vocal or instrumental studio if they do not participate in an ensemble. Another option for pianists is to accompany a Junior or a Senior recital. The head of the performance area will make all ensemble or accompanying assignments. Students in graduate programs other than performance are not required to participate in an ensemble, although such participation is encouraged.

Thesis/Recital/Project

Master's Programs

All master's degree programs require a thesis or recital or project equivalent (see below), prepared under the guidance of a supervisor and approved by the Music Graduate Studies Committee.

Master of Music (Performance)

The thesis is interpreted to be two public recitals featuring solo performances and chamber music. At least one Canadian work should be included in one of the recitals. The examining committee will evaluate the candidate's performance in both of the recitals. Recital proposals are to be submitted to the Graduate Administrator for approval by the Graduate Committee at least two months before each performance.

Master of Music (Conducting)

The thesis is interpreted to be two public performances, on or off campus, with University or community ensembles.

Master of Music (Composition)

The thesis is interpreted to be either a substantial creative project and an accompanying descriptive essay related to the project, or a portfolio of creative work, the majority of which must have been created in the second year of residency, and an accompanying descriptive essay related to the portfolio. Normally, the project or portfolio will have been presented in a public recital prior to the thesis defence.

Master of Music (Sonic Arts)

The thesis is interpreted to be either a substantial sonic arts creative project with an accompanying research document or a portfolio of sonic arts creative work realized in the second year of study and an accompanying descriptive essay related to the portfolio. The project or portfolio of works will be performed or presented in public prior to the thesis defence.

Master of Arts or Master of Music (CMD)

The thesis will satisfy the requirements described in the Computational Media Design (Interdisciplinary) section of the Graduate Calendar.

Doctor of Philosophy

Doctor of Philosophy (Composition)

The thesis is interpreted to be a substantial creative project and an accompanying analytical/research paper approved by the supervisory committee.

Doctor of Philosophy (Sonic Arts)

The thesis is interpreted to be a cohesive sonic arts creative project with an accompanying research document approved by the supervisory committee. The project will be performed or presented in public prior to the thesis defence.

7. Credit for Undergraduate Courses

Not applicable.

8. Time Limit

Maximum completion time is five years for the Master of Music programs and four years for the Master of Arts (Musicology). Maximum completion time is six years for the doctoral program.

9. Supervisory Assignments

The Graduate Director will function as the interim supervisor for all newly admitted students during their first term. This arrangement will allow students to use their first term as an opportunity to meet with faculty and to secure a permanent supervisor.

10. Required Examinations

Master's Degrees

Master of Arts (Musicology), Master of Music (Composition), Master of Music (Music Education) and Master of Music (Sonic Arts)

A comprehensive oral examination encompassing all areas of the chosen field is required. This examination will take place following the completion of coursework and must be satisfactorily completed before the submission of the thesis/project. In (Sonic Arts) the exam questions will be based on a compiled bibliography (readings and works) relevant to the student's area of research.

Master of Music (Performance) and (Conducting)

A comprehensive oral examination based upon the literature of the instrument and more extensively upon the repertoire of the approved recital programs is required. This examination must be satisfactorily completed at least four weeks before the date of the second public performance required for the degree.

Doctor of Philosophy

This degree requires a candidacy examination with a written and an oral component upon completion of course work, but no later than 28 months after initial registration.

Questions on the research proposal will be included in the oral candidacy examination.

Final thesis oral examinations of written theses are open.

11. Research Proposal Requirements

Research proposals must be submitted to and approved by the Graduate Studies Committee at least two months before the student intends to defend or perform.

The proposal should include:

- A detailed description of the area of investigation.
- A clear statement of the approach to be taken and the research method to be utilized.
- An account of how the work will be presented.
- An indication of how the project will make an original contribution to the student's field of study.

12. Special Registration Information

Students should consult the Graduate Director before registering.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

For scholarship applications, see Application Deadlines.

14. Other Information

International applications will not be considered unless the applicant has completed and passed the TOEFL examination (or equivalent) **before** the application or scholarship deadline. Students must apply for the Graduate Awards Competition by January 15.

15. Faculty Members/Research Interests

Current faculty members and their areas of interest can be found at http://scpa.ucalgary.ca.

Nursing NURS

Contact Information

Location: Professional Faculties Building, Room 2260

Program number: 403.220.6241

Fax: 403.284.4803

Email address: nursgrad@ucalgary.ca

Web page URL: http://nursing.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Nursing (MN), course-based or thesis-based

Integrated Master of Nursing/Nurse Practitioner (MN/NP)

Post-Master's Nurse Practitioner Diploma (PMNP)

The Doctor of Philosophy program is designed to educate professionals for excellence in nursing scholarship through original research related to specialized practice with identified client populations.

Master of Nursing programs prepare nurses for advanced practice in focused areas that may include direct clinical practice, education, or health policy/leadership. The thesis-based program offers a focused supervised research experience.

A Post-Master's Nurse Practitioner (PMNP) diploma program, with an adult health acute care focus, is offered. The PMNP can be achieved as a Post-Master's program or through an integrated Master of Nursing/Nurse Practitioner (MN/NP) program. The Nurse Practitioner program or any of its courses will only be offered contingent on the availability of resources and a sufficient cohort of students. Further information on the integrated MN/NP program can be found at http://nursing.ucalgary.ca.

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements, the Faculty of Nursing requires that an applicant must:

Master of Nursing

a) Be a Registered Nurse holding a baccalaureate degree, normally in nursing;

b) Be eligible for active nursing registration in Alberta (registrants in the program must provide proof of active CARNA registration or equivalent each year);

c) Hold CPR Certification at the Basic Rescuer or Basic Cardiac Life Support or "C" level;

d) Have successfully completed one undergraduate half course in research methodology;

e) Have successfully completed one undergraduate half course in statistics;

f) Applicants to the MN/NP and PMNP programs must have three years' (full-time or equivalent) clinical experience and must provide documentation from their employer confirming they have met the three years' experience (4,500 hours);

g) Submit two references, one from someone capable of assessing the applicant's academic and research ability, normally an academic, and one from someone who can attest to the applicant's nursing practice and expertise;

h) Submit a security/police clearance letter (Alberta Health Services require security clearance checks for nursing graduate students who will be doing a practicum or research in the region);

i) For applicants required to provide proof of proficiency in English submit a minimum TOEFL score of 600 (written test) or 100 (Internet-based test); IELTS score of 7.0; MELAB score of 83; PTE score of 70; or Level 3 on the EAP program, and;

j) Have an interview(s) with a faculty member, if requested by the Faculty.

The practicum providers and public health authorities have determined that in order to participate in practicum it is mandatory for students to be immunized against/tested for a variety of communicable diseases. They also must be fit tested for a N95 mask. Further information is available on the Faculty of Nursing website. This is also applicable to those in the MN/NP and the PMNP programs;

A minimum of three years' (full-time or equivalent) Registered Nurse practice experience in the proposed area of study is required for applicants to the MN/NP or the PMNP. These applicants must also provide commitment from the Health Region for practicum placement availability for the final practicum of the NP program (Nursing 650).

Any graduate student requesting transfer to the integrated MN/NP program must consult with his/her current supervisor prior to application.

Applicants to the MN/NP can be admitted on a part-time basis up to the commencement of the first NP practicum (Nursing 642)

at which time a transfer to full-time studies must occur.

Doctor of Philosophy

a) Normally be a Registered Nurse.

b) Normally hold CPR Certification at the Basic Rescuer or Basic Cardiac Life Support or "C" level.

c) Submit a study plan outlining the areas of proposed concentration, goals in undertaking doctoral work, initial intentions regarding course work, and a statement of the preliminary plans for thesis research.

d) Provide examples of the applicant's written scholarly work such as publications, research reports, course assignments, etc.

e) Provide a curriculum vitae.

f) Provide a letter of commitment from the identified supervisor indicating willingness to provide supervision throughout the program of studies and supporting the applicant's study plan.

g) For applicants required to provide proof of proficiency in English submit a TOEFL score of 600 (written test) or 100 (Internet-based test); IELTS score of 7.0; MELAB score of 83; PTE score of 70; or Level 3 on the EAP program.

h) Have successfully completed one graduate-level half course in quantitative methods, one graduate-level half course in qualitative methods, plus one graduate-level half course in statistics. Exceptions may be considered, but the onus will be on the applicant to provide sufficient evidence to warrant exception. Deficiencies must be successfully eliminated prior to or in the first year of the Doctoral Program.

i) Submit three references, one of which must be from the applicant's supervisor of his/her master's program.

j) Submit a security/police clearance letter (Alberta Health Services require security clearance checks for nursing graduate students who will be doing a practicum or research in the region).

The practicum providers and public health authorities have determined that in order to participate in practicum it is mandatory for students to be immunized against/tested for a variety of communicable diseases. They also must be fit tested for a N95 mask. Further information is available on the Faculty of Nursing website.

Academic Accommodation Policy for Students with Disabilities

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, but they do not relieve students of their responsibilities to develop the essential skills and abilities expected of all other students.

3. Application Deadline

There are three application deadlines for submission of complete applications:

- December 1 (early bird for the following September)
- February 1 (for the following September)
- September 15 (for the following January)

There are three application deadlines for the PMNP diploma program:

- December 1 and February 1 for admission in September if the prerequisite courses are completed
- If the prerequisite courses are not completed, applications must be submitted by September 15 for admission to the Winter, Spring, or Summer Terms as appropriate.

Applicants are highly encouraged to begin their application process early.

4. Advanced Credit

Applicants must include requests for advanced credit, accompanied by a rationale, when they apply for admission. For courses taken outside the University of Calgary, applicants must provide official transcripts and a copy of the course outline detailing the course description, objectives, assignments, readings, etc.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies' requirements, the Faculty of Nursing requires the following:

Master of Nursing Programs

The Master of Nursing Program is presently revising its curriculum to align with Faculty of Nursing strategic plan, and comply with changes required by the Nursing Education Program Approval Board (NEPAB). The Nurse Practitioner program, in particular, will be revising and shifting content and delivery of the program to meet the NEPAB standards. These standards will be in accordance with established University processes, but the implementation of the revised courses may be done outside the usual annual cycle.

Courses in the integrated Master of Nursing/Nurse Practitioner program and the Post-Master's Nurse Practitioner Diploma program (Nursing 642, 644, 646, 650, 661, 663, 665) are often scheduled outside the standard semester timelines, as permitted.

Master of Nursing (course-based)

a) Successful completion of the following core courses: Nursing 605, 611, 621, 627, 629, 633, 634, 683.

b) One graduate-level half course in statistics (Nursing 609).

c) Two graduate-level half course electives related to the student's focus of study.

Master of Nursing/Nurse Practitioner

d) Successful completion of the following core courses: Nursing 605, 611, 621, 627, 629, 633, 661, 663, 665, 683.

e) One graduate-level half course in statistics (Nursing 609).

f) Successful completion of the following core NP courses: Nursing 642, 644, 646, 650.

Post-Master's Nurse Practitioner Diploma

g) Successful completion of prerequisite courses: Nursing 661, 663, 665.

h) Successful completion of the following core NP courses: Nursing 642, 644, 646, 650.

For the Nurse Practitioner practicum component of the integrated MN/NP and for the PMNP, there are additional requirements:

- Mandatory participation of NP students in all activities related to practicum courses. NP students' practicum experiences may be scheduled at various hours, including evenings, nights and weekends. Practicum experiences may also extend outside the normal academic term. Normally, a student will not be permitted to withdraw from a NP practicum course in order to avoid a failing grade in that course.
- Students in either the MN/NP or the PMNP will not be permitted to take Nursing 642 if their cumulative grade point average prior to commencing Nursing 642 is less than 3.00.

Master of Nursing (thesis-based)

a) At minimum successful completion of the following core courses: Nursing 605, 611, 621, 627, 629, 633, 683.

b) One graduate-level half course in statistics (Nursing 609).

Evaluation of nursing practicum will be weighted at 40 per cent of the final grade across all of the practica in the MN course-based and MN thesis-based programs, with a weight of 60 per cent for the seminar component.

Doctor of Philosophy

a) For students prepared at the master's level in nursing a minimum of six half courses is required: Nursing 705, 769, two courses in advanced research methods at the 700 level, and two doctoral thesis seminars (Nursing 711 and 733).

b) Students in the doctoral program normally are required to take advanced research methods courses at the 700 level in both qualitative and quantitative research approaches, one of which must be Nursing 721 or 783.

c) After completion of the student's course work and approval of the thesis research proposal, a candidacy examination with a written and an oral component is required. Baccalaureate and non-nursing master's prepared applicants must complete additional coursework beyond the six core half courses listed in (a). Applicants are individually assessed. The number and types of additional courses required will vary according to the applicant's academic, research and practice background as well as the proposed research plan.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Under special circumstances, with the consent of the Faculty, students may take undergraduate courses, normally at the senior or 500-level, for the Master of Nursing degree.

8. Time Limit

Expected completion time for full-time students in the Master of Nursing program is two years. Maximum completion time is four years for the thesis-based program and six years for the course-based program including the MN/NP. The PMNP is one year, full-time study. Expected completion time for doctoral students is four years; maximum completion time is six years.

9. Supervisory Assignments

a) Students in any of the course-based routes of the Graduate Programs will be assigned a permanent supervisor throughout their program of study.

b) If co-supervision is sought for a Master of Nursing/Nurse Practitioner (MN/NP) student, the supervision for the MN component will consist of the faculty member as the supervisor, and the NP faculty member as the co-supervisor. When the student commences the first practicum in the NP component, the supervision will reverse in that the supervisor will now be the NP faculty member and the co-supervisor will be responsible for the MN comprehensive examination.

c) In addition to normal regulations for assignment of supervisors in the MN program, a supervisory committee must be struck for all MN thesis students no later than three months after the appointment of supervisor.

d) Normally the Faculty of Nursing supervisor for an MN/NP or PMNP student is a member of the Nurse Practitioner Committee.

e) Doctoral students require a Faculty of Nursing member to commit to their supervision as a condition of admission.

10. Required Examinations

Master of Nursing (course-based)

A final comprehensive examination consists of a take-home written exam, designed according to the student's specialization, and an oral component. The written component must be completed within one week and constitutes the basis for a final oral examination two weeks later.

For the Nurse Practitioner component of the integrated MN/NP, all courses, with the exception of Nursing 650, must be completed prior to the MN comprehensive examination. Students may not proceed to Nursing 650 if they have not successfully completed their MN comprehensive examination.

The final exam in the MN/NP and the PMNP includes an experiential practice component and an oral examination.

Master of Nursing (thesis-based)

The final oral thesis examination is open.

Doctor of Philosophy

The doctoral candidacy examination has a written and an oral component. The written component focuses on three areas:

a) the theory that defines existing knowledge in the student's chosen area of nursing research.

b) the literature that defines existing knowledge in the student's chosen area of nursing research.

c) the proposed research method and data analysis/management strategy chosen for the thesis. The student has three weeks to complete the written component. The candidacy committee has approximately two weeks to review the written submission before the oral examination.

The student is expected to defend and extend his/her knowledge in these three areas. Questions about the student's proposed research may be asked.

The final doctoral oral thesis examination is open.

11. Research Proposal Requirements

Doctoral students must have their research proposals approved in principle by their supervisory committee prior to candidacy. Students must receive formal approval of their research proposals from the supervisory committee before proceeding to ethical review and implementation of the project. The approved proposal will be housed in the Research Office, Faculty of Nursing.

Students whose research involves human subjects must receive ethics approval from the University of Calgary Conjoint Health Research Ethics Board.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar. Scholarship application packages will be available on the Faculty of Nursing Website prior to each competition deadline. The application deadline for internal scholarships is February 1. Students admitted to the doctoral program are highly encouraged to seek external funding to support their studies and research. Please note that the deadlines for external funding applications may not coincide with the February 1 deadline.

14. Other Information

None.

15. Faculty Members/Research Interests

Current faculty and their research interests can be found at http://nursing.ucalgary.ca/contact-us.

Philosophy PHIL

Contact Information

Location: Social Sciences Building, Room 1248

Program number: 403.220.5533

Fax: 403.289.5698

Email address: philgrad@ucalgary.ca

Web page URL: http://www.phil.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based and course-based

The course-based Master of Arts degree may be completed on a full-time or a part-time basis.

Specializations*:

- History and Philosophy of Science (MA only)
- Philosophy of Religion (MA only)

**These two specializations are offered in cooperation with the Departments of History and Religious Studies respectively.*

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires three letters of reference, and a sample of written work, such as a recent essay, written in English. Applications will not be considered without a sample of written work.

For applicants required to prove proficiency in English, a minimum TOEFL score of 600 (written test), 100 (Internet-based test), a MELAB score of 84 or an IELTS score of 7.0 must be submitted.

3. Application Deadline

The deadline for submitting complete applications is January 15 for September admission.

Candidates applying for financial assistance should ensure that all documents relevant to their scholarship application reach the Department by January 15. The Department makes its first round of decisions for financial support by the end of March. Although most applications are for September admission, January admission is also possible.

4. Advanced Credit

The Department does not normally give advanced credit for courses taken previously. However, in special circumstances, a request for advanced credit may be considered if it is made as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to raise the grade point average to a level required for admission. Normally, advanced credit may be given for a maximum of three half-course equivalents.

5. Program/Course Requirements

Note: Normally, in both master's and moctoral programs, no more than one half

course of Directed Reading can be taken to satisfy the minimum course requirement.

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts (thesis-based)

a) A minimum of six half-course equivalents.

b) In the specializations History and Philosophy of Science or Philosophy of Religion, courses taken in History or Religious Studies, may, with departmental approval, count as fulfilling course requirements for the degree.

Master of Arts (thesis-based) with Specialization in the History and Philosophy of Science

a) Two half-course equivalents (two terms) in the philosophy of science.

b) Two half-course equivalents (two terms) in the history of science.

c) Two half-course equivalents (two terms) in the history and philosophy of science.

d) Proficiency in a second language or logic, depending on the department of enrolment.

Master of Arts (course-based)

a) A minimum of ten half courses, including at least two half courses in the History of Philosophy and two half courses in 20th Century or Contemporary Philosophy.

b) Students to remedy background deficiencies, if any, in a certain area or areas of philosophy by taking course work below the 500-level.

c) Students must complete at least one half course in each annual registration period.

Doctor of Philosophy

a) Normally, a minimum of six half courses for students with a Master of Arts degree.

b) Normally, a minimum of twelve half courses for students entering directly from an honours undergraduate program.

c) Students to show competence in logic, which may be done by achieving a grade of "B" or better in Philosophy 379.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Normally, no undergraduate courses will be credited towards completion of course requirements in a graduate program.

8. Time Limit

Expected completion time for full-time students is two years in a master's thesis program, three years in a master's course-based program, and four years in a doctoral program. Maximum completion time is four years for a master's thesis program, and six years for a master's course-based or doctoral program.

9. Supervisory Assignments

Students are assigned an interim advisor until they have an opportunity to become acquainted with other members of the faculty. Each student must have a supervisor by the end of the second regular academic session after first registration (April for September registrants and December for January registrants) and well in advance of the student's determination of areas for the final examination. The choice of supervisor must be by mutual arrangement between the student and staff member concerned, and approved by the Department.

A supervisory committee at the master's level is not normally appointed. When such a committee is deemed necessary, the Dean's approval must be obtained.

A doctoral student shall be under the general supervision of a supervisory committee. After consultation with the student, the supervisor will submit a list of possible members of the supervisory committee to the Graduate Studies Committee for approval. The supervisory committee should be established as soon as possible and no later than three months after the supervisor's appointment.

10. Required Examinations

Doctor of Philosophy

Departmental Preliminary Examinations

Students will be required to show competence in three of the following four areas:

Area I – metaphysics and epistemology

Area II – history of philosophy

Area III – philosophy of language and logic

Area IV – moral and political philosophy

The student chooses three areas. Competence in an area is shown by submitting a satisfactory essay or passing an examination. At least one area must be passed by either a sit-down or take-home examination. Exams are administered, and essays accepted, four times yearly. All three areas must be passed within 20 months of registration and, the student is not allowed to take an exam in a particular major area more than three times. Students who have not passed three areas within 20 months of registration will not normally receive further Departmental support.

Oral Candidacy Examination

After completion of required course work and preliminary examinations, the doctoral student must pass an oral candidacy examination prior to beginning the doctoral thesis. Before the examination, the student must submit a thesis proposal (approximately 20 pages) that will serve as the basis of discussion at the examination. The purpose of the examination is to ascertain whether the student's academic preparation and ability is adequate to pursue profitable research on the issues proposed. Questions on the research proposal will be included in the oral candidacy examination.

Master of Arts (course-based)

The course-based Master of Arts has a research constituent. This constituent is to be satisfied by passing all components, written and oral, of the Final Master's Examination.

A Final Master's Examination of overall competency is required after completion of all course work, consisting of written and oral components. Effective July 1, 2009, the Department of Philosophy will be monitoring and overseeing this examination.

The following regulations apply:

i. Each student in the program will be examined by a Final Master's Examination Committee appointed by the Department Head in consultation with the Graduate Director not later than three months prior to the Final Master's Examination. The committee shall consist of four members including a neutral chair. The normal composition shall be the student's supervisor and three other members of the academic staff.

ii. The written component will examine the competency of the student in two fields or areas of philosophy, one of which must be in the History of Philosophy or 20th Century/ Contemporary Philosophy, while the second may be elected by the student. A guideline for suitable areas of philosophy on which a student may choose to be examined is given by the generic titles of graduate course offerings in philosophy. There should not be any significant overlap in the two chosen areas. Competency in an area will be tested by examining the student's mastery of selected central problems, authors and/or positions in that area.

iii. Students should determine their examination areas in consultation with their supervisor and must declare their chosen examination areas not later than six months before the time of examination by reporting these to the Graduate Director. The following regulations apply:

(a) Not later than two weeks after the examination areas have been determined, the supervisor will draw up a bibliography for each of these areas. The bibliographies will be discussed with the student. A copy of the bibliographies, with the signatures of the supervisor and student, shall be submitted to the Graduate Director not later than five months prior to the written exam.

(b) Examination questions for the written and oral components of the Final Master's Examination will be drawn from the bibliographies for each of the examination areas.

iv. Details of the written component:

(a) The supervisor shall distribute examination questions for the written component to all members of the examination committee for their approval, and the Graduate Director, at least a week in advance of the written exam.

(b) The written component will consist of two three-hour written examinations. The written examinations are to be completed within one week.

(c) Each examiner is required to submit a written assessment of the student's written examination performance, to be submitted to the neutral chair of the examination committee prior to the examination.

(d) The written component of the examination must be judged to be either acceptable ('Pass') or unacceptable ('Fail').

(e) The committee will inform the student and Graduate Director within three weeks of the exam submission whether the student

has passed. If the student has not passed the exam, the committee will provide the student and the Graduate Director with written comments of its decision. (The student may request a written assessment even in the case of a Pass.) If the committee does not make a decision within three weeks of the exam's submission, then it is the responsibility of the Graduate Director to ensure that the exam is assessed in a timely manner.

(f) This is a closed exam.

v. The student shall not be permitted to proceed to the oral component if the student does not secure a 'Pass' on the written component.

vi. The oral examination will be held a minimum of two weeks and not later than three weeks following a decision on the written component. Questions for the oral examination will be based on the bibliographies for the areas selected for examination.

vii. Details of the oral component:

(a) The oral examination is a formal examination, not an informal discussion with the student.

(b) All examiners must be given an opportunity to question the student early in the examination, e.g. by rounds of questioning.

(c) The oral examination shall not exceed two hours. This does not include deliberation time of the committee.

(d) The oral component of the examination must be judged to be either acceptable ('Pass') or unacceptable ('Fail').

(e) This is a closed exam.

viii. The result of the Final Master's Examination shall be either 'Pass' or 'Fail'. To secure a 'Pass', the student must obtain a 'Pass' on both the written component and the oral component of the exam. In the event of a failure, the examining committee may recommend that the student be given an opportunity to take the failed component of the examination again between two and six months from the date of the first attempt. No more than two attempts will be permitted.

ix. Students may appeal the grade that they obtain on either the written component or the oral component of the Final Master's Examination. In the event of an appeal, the student shall first address a letter of appeal to the Graduate Director. In the letter, the student must clearly and fully state the decision being appealed, the ground for appeal and the remedies being sought, along with any special circumstances that warrant an appeal of the reappraisal. The Graduate Director will then report his or her decision to the student. If the student is not satisfied with this decision, the student may file an appeal in accordance with the terms and conditions specified by the Teaching Faculty Appeals Committee.

Thesis Programs

The candidacy exam has a written component, the student's research proposal. This proposal must be submitted to all members of the candidacy examining committee at least two weeks before the examination. The candidacy oral can include questions on the research proposal.

Thesis oral examinations are open.

11. Research Proposal Requirements

The research proposal is to be submitted in accordance with Faculty of Graduate Studies requirements.

12. Special Registration Information

Incoming students meet with the Department of Philosophy Graduate Director to discuss their programs and to decide which courses to take.

13. Financial Assistance

Most thesis students admitted to the program receive some level of financial support from the Department. Suitably qualified Master's students may be given a guarantee of financial support from September of their first year to the end of April of their second year. All doctoral students receive a guarantee of financial support for the four years of their program.

For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to the Department by January 15.

Satisfactory academic progress in the student's program is required for funding.

Satisfactory Academic Progress:

Thesis-based and Full-time Course-based MA students

a) Must complete at least five half courses in their first two terms, and maintain a GPA of at least 3.60 in all courses taken, this GPA being computed at the end of the first week of June each year, and in any case no more than one grade of "B-" or lower during the course of their program.

b) Are expected to complete their degree by May of their second year in the program. (Equivalent requirements apply to students who register at times other than September.)

Doctoral Students

a) Must complete at least five half courses in their first two terms, and maintain a GPA of at least 3.60 in all courses taken, this GPA being computed at the end of the first week of June each year, and in any case no more than one grade of "B-" or lower during the course of their program.

b) Must pass all Departmental PhD Preliminary Examinations within 20 months of first registration (for those without an MA, the period will be determined by the Graduate Studies Committee).

c) Must take the Candidacy Examination within eight months of the completion of the Preliminary Examinations and pass this examination no later than twenty-eight months after the date of the student's first registration in the program (for those without an MA, thirty-six months after first registration in graduate studies in philosophy).

14. Other Information

None.

15. Faculty Members/Research Interests

The faculty's main interests and specialties can be found at: http://www.phil.ucalgary.ca/people/.

Physics and Astronomy PHAS

Contact Information

Location: Science B, Room 605

Program number: 403.220.3617

Fax: 403.289.3331

Email address: gradinfo@phas.ucalgary.ca

Web page URL:
http://www.phas.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), course-based and thesis-based

The PhD and MSc degree may be completed on a full-time or a part-time basis.

Specializations:

- Astrophysics
- Medical Physics
- Physics
- Radiation Oncology Physics*
- Space Physics
- Medical Imaging (interdisciplinary)**

**Radiation Oncology Physics and Medical Imaging are not offered to the course-based MSc degree.*

***See the calendar section on Interdisciplinary Specializations for further information.*

Diplomas and Certificates:

- Post-PhD Diploma in Radiation Oncology Physics
- Postdoctoral Certificate in Radiation Oncology Physics

2. Admission Requirements

In addition to Faculty of Graduate Studies and Faculty of Science requirements, the Department requires:

a) A University of Calgary Honours background in Physics, Engineering Physics, Astronomy/Astrophysics, or equivalent.

b) For some applicants, a satisfactory score on the General and Advanced Physics Graduate Record Examination.

c) All applicants for whom English is not their first language must also submit a Test of English as a Foreign Language (TOEFL) score. The minimum acceptable TOEFL score is 550 on the paper-based exam, or 80 on the Internet-based exam. For the IELTS examination (general module), the minimum acceptable score is 7.0.

d) Two reference letters.

Master of Science

Applicants to the Master of Science program, whose background does not include the equivalent of an undergraduate honours degree in the proposed area of study, may require additional make-up courses. Such

applicants should consult with the department regarding their admission status.

Post-PhD Diploma in Radiation Oncology Physics

For the Post-PhD Diploma program, applicants must possess a PhD from a CAMPEP accredited graduate program or equivalent and an appointment as an Associate Medical Physicist by the Alberta Cancer Board.

Postdoctoral Certificate in Radiation Oncology Physics

In addition to Faculty requirements, the Department requires a PhD in Physics, Medical Physics, Biophysics, Biomedical Engineering. Applicants with PhDs in sciences other than those listed above may consult with the department regarding possible admission. A minimum GPA of 3.50 over an applicant's last 10 full-course equivalents of course work is required before an applicant may be considered for admission; however, exceptional students with extenuating circumstances may be considered.

3. Application Deadline

Deadlines for the submission of complete applications:

January 15 for September admission

July 1 for January admission

Late applications will be considered if any openings remain in the graduate program.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

Postdoctoral Certificate in Radiation Oncology Physics: Credit for a maximum of one half-course equivalents may be given for a course taken as part of previous graduate and/or undergraduate (minimum 600-level courses) degree. Coursework content will be reviewed on a case-by-case basis. This course must be deemed equivalent to those offered by the program and have been taken within the past 5 years. Oral examination may be required.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies and Faculty of Science requirements, the Department requires:

That all students, with the exception of registrants in the Post-PhD Diploma program, in Radiation Oncology Physics and the Postdoctoral Certificate in Radiation Oncology Physics, register in the Graduate Seminar, Physics 691, during Fall and Winter Terms of the first two years in program.

Master of Science (thesis-based)

a) For students specializing in Astrophysics, Physics, or Space Physics, four half-course equivalents, including at least two of Physics 609, 611, 613, and 615, plus two elective courses at the 500 or 600 level, as approved by the Graduate Chair.

b) For students specializing in Medical Physics, five half-course equivalents, including Medical Physics 623, 625, at least two of Physics 609, 611, 613, and 615, plus one elective courses at the 500 or 600 level, as approved by the Graduate Chair.

c) For students specializing in Radiation Oncology Physics, eight half-course equivalents, including Medical Physics 623, 625, 633, 637, 639, Medical Science 689.01, and two of Physics 609, 611, 613, and 615.

Master of Science (course-based)

This program may be taken part-time or full-time.

a) That the student choose one of the three broad areas of specialization: astrophysics, physics, or space physics. Medical physics and Radiation Oncology Physics are not available as a course-based degree.

b) Ten half-course equivalents, including Physics 603, 605, 609, 611, 613, 615.

c) Four half-course equivalents, depending upon the area of specialization:

Astrophysics – Astrophysics 699 plus three half-course equivalents labelled ASPH (two of these may be at the 500 level). Physics 629 and Space Physics 679 may be taken instead of Astrophysics courses.

Physics – Physics 699 plus two half-course equivalents labelled ASPH, PHYS, or SPPH (these may be at the 500 level) plus one half-course equivalent labelled PHYS, at the 600 level or above.

Space Physics – Space Physics 699 plus three half-course equivalents labelled SPPH, at the 600 level or above. Physics 509 may replace a SPPH course.

d) A comprehensive examination with a written and oral component.

Doctor of Philosophy

a) A minimum of two half-course equivalents at the 600 level or higher for students who hold a master's degree.

b) A minimum of six half-course equivalents at the 600 level or higher for those entering the doctoral program without a master's degree.

c) For students specializing in Radiation Oncology Physics who do not hold an accredited MSc degree in Radiation Oncology Physics, Medical Physics 623, 625, 633, 637, 639, and Medical Science 689.01, and two courses from Physics 609, 611, 613, or 615.

Post-PhD Diploma in Radiation Oncology Physics

Eight half-course equivalents including Medical Physics 711, 712, 721, 722, 731, 741 and two of Human Resources and Organizational Dynamics 793, 741 or Strategy and Global Management 797.01.

Postdoctoral Certificate in Radiation Oncology Physics

The Department of Physics and Astronomy offers a postdoctoral certificate in Radiation Oncology Physics. This certificate program is a two-term program for students with PhDs in Physics wishing to transition to a career in clinical radiation oncology physics. Students will acquire a broad background in theoretical medical physics including radiation physics, radiobiology, radiation safety, medical imaging and the modern practice of radiation oncology, through intensive coursework and hands-on experience. The program is designed to meet all the recommendations in Report 197S of the American Association of Physicists in Medicine. At the completion of this program students will be well-prepared to begin a residency in medical physics. Potential candidates for this program must hold a PhD in Physics or a related discipline.

The program requirements consists of 6 x 3 credit hour required courses. The semester schedule below is for full-time students:

Fall

Medical Physics 623 Radiological Physics and Radiation Dosimetry

Medical Physics 639 Radiobiology and Radiation Safety for Medical Physicists

Medical Science 689.01 Medical Imaging Techniques

Winter

Medical Physics 625 Radiation Oncology Physics

Medical Physics 633 Radiation Oncology Physics Laboratory

Medical Physics 637 Anatomy and Statistics for Medical Physicists

Ethics and Errors – offered not for credit

No substitutions accepted.

Six half-course equivalents which are Medical Physics 623, 625, 633, 637, 639, Medical Science 689.01.

Graduation requires successful completion of all required courses with a minimum grade of "B".

6. Additional Requirements

Postdoctoral Certificate in Radiation Oncology Physics: Regular attendance at Radiation Oncology Rounds, Grand Rounds and non-credit training sessions such as the Ethics and Errors course (winter term) – offered not for credit.

7. Credit for Undergraduate Courses

Credit for a maximum of two half-course equivalents may be given for courses taken at the 500 level.

Postdoctoral Certificate in Radiation Oncology Physics: No credit will be given for undergraduate-level courses.

8. Time Limit

Expected completion time is two years for full-time students in a thesis master's program, three years in a course-based program, four years in a doctoral program, and two years in the Post-PhD Diploma program. Maximum completion time is four years for a thesis master's program, and six years for a course-based master's or a doctoral program. Expected completion time is 8 months (two terms) for a student in the Postdoctoral Certificate in Radiation Oncology Physics program.

9. Supervisory Assignments

Newly admitted students will normally be supervised by the Graduate Director or an interim supervisor in their field of interest during the first 8 months in program. During this time students will normally complete all of the course work and have an opportunity to become acquainted with the research of potential supervisors within the department. Students are responsible for securing a permanent supervisor from among the researchers in the department within the first four months in program. Registrants in the Post-PhD Diploma program are supervised by the Director of Medical Physics or designate, Tom Baker Cancer Centre.

The MSc program has a supervisory committee requirement which follows the same requirements and rules as the PhD.

Postdoctoral Certificate in Radiation Oncology Physics: All students will be supervised by the post-PhD certificate co-ordinator or delegate co-ordinator for the duration of their program.

10. Required Examinations

Master of Science (course-based)

Two weeks before the comprehensive oral examination, students must write a three-hour, closed-book comprehensive examination, prepared by the Departmental Graduate Affairs Committee in collaboration with the supervisor.

Master of Science (thesis-based)

Final thesis defence is required. The oral thesis defence is open.

Doctor of Philosophy

There is a mandatory pre-candidacy meeting, which has to be held within the first 18 months of the PhD for students admitted directly to the PhD program, and within the first 26 months for students transferring from the MSc to the PhD program. The pre-candidacy meeting involves the supervisory committee and two additional faculty members, who intend to serve as examiners in the candidacy exam later on. Based on the proposed research project and on an assessment of the student's background knowledge, the meeting serves to define a list of topics that will form the basis for the background questions in the candidacy exam. This list is official once it has been approved by the Graduate Program Director.

Students are required to complete the oral candidacy exam. This exam will include questions on the thesis proposal and on relevant background knowledge as defined in the pre-candidacy meeting.

Final thesis defence is required. The oral thesis defence is open.

Postdoctoral Certificate in Radiation Oncology Physics

Students are evaluated through assignments and course-based examinations.

11. Research Proposal Requirements

Students entering a doctoral program with a completed master's degree must submit a written thesis proposal within 24 months of initial registration. Students entering a doctoral program with a bachelor's degree, or who have transferred into the doctoral program from a master's program, must submit a written thesis proposal within 28 months.

12. Special Registration Information

Registration in the Post-PhD Diploma program is contingent upon employment by the Alberta Cancer Board as an Associate Medical Physicist.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, please see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to the Department by January 15.

Registrants in the Post-PhD Diploma program must hold an Associate Medical Physicist position, which is a paid appointment.

14. Other Information

See the Department website.

15. Faculty Members/Research Interests

The active research interests of the staff can be found at http://www.ucalgary.ca/phas/research/

Astronomy and Astrophysics:

http://phas.ucalgary.ca/graduate

Environmental Physics:

http://newton.phas.ucalgary.ca/~annlisen/

Complexity Science:

http://www.ucalgary.ca/complexity/

General Relativity:

Isotope Science:

http://www.ucalgary.ca/uofcisl/

Medical Physics:

http://www.ucalgary.ca/rop/

Quantum Optics:

http://iqis.org/ ; and

http://qis.ucalgary.ca/QO/

Space and Plasma Physics:

http://www.phys.ucalgary.ca/

Political Science POLI

Contact Information

Location: Social Sciences Building, Room 756

Program number: 403.220.5921

Fax: 403.282.4773

Email address: poligrad@ucalgary.ca

Web page URL: http://poli.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based

The MA and PhD programs in Political Science are offered as full-time programs only.

2. Admission Requirements

In addition to the Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) A minimum grade point average of 3.40 on a four-point scale over the last ten full-course equivalents taken in the applicant's undergraduate program.

b) Normally a four-year BA in Political Science or a strong background in Political Science of at least 5 full-course equivalents in Political Science. Special consideration may be given to those who have not achieved this background.

c) All students whose native language is other than English are required to pass a language proficiency test: TOEFL with a minimum score of 620 (paper-based), or 105 (Internet-based); IELTS with a minimum score of 7+; MELAB with a minimum score of 87; or PTE with a minimum score of 75.

d) Two reference letters.

e) A statement of research interests.

f) Sample of written work, preferably a paper submitted for a Political Science course.

g) Email confirmation from a potential supervisor who is interested in supervising your work.

Doctor of Philosophy

a) A minimum grade point average of 3.70 on a four-point scale over completed graduate courses.

b) Normally a Master of Arts in Political Science or a strong background in Political Science. Special consideration may be given to those who have not achieved this background.

c) All students whose native language is other than English are required to pass a language proficiency test: TOEFL with a minimum score of 620 (paper-based), or 105 (Internet-based); IELTS with a minimum score of 7+; MELAB with a minimum score of 87; or PTE with a minimum score of 75.

d) Two reference letters.

e) A statement of research interests.

f) Sample of written work, preferably a paper submitted for a Political Science course.

g) Email confirmation from a potential supervisor who is interested in supervising your work.

3. Application Deadline

Deadline for the submission of completed applications is January 15 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not normally be given for course work taken as part of another completed degree/diploma. If graduate-level courses are taken as post-BA courses, the Graduate Program Director may allow the student to claim up to two half courses at our graduate level.

5. Program/Course Requirements

In addition to the Faculties of Graduate Studies and Arts requirements, the Department normally requires the following:

Master of Arts

a) Master of Arts students must complete a minimum of five half courses:

- At least two half courses must be taken in the Political Science Department at the University of Calgary.
- Two or three half courses will be in the student's major field (i.e. Canadian Politics, Comparative Politics, International Relations, and Political Thought).
- A maximum of one half course can be a reading course.
- Students must demonstrate a basic knowledge of research methods equivalent to Political Science 691. If students are required to take Political Science 691, it will be included in these five half courses. Students who have an equivalent of Political Science 691 will still be required to take five half courses.

b) A written thesis.

c) Thesis Oral Examination.

Doctor of Philosophy

a) Doctoral students must complete a minimum of six half courses:

- At least four half courses must be taken in the Political Science Department at the University of Calgary.
- One full-course equivalent in each of the student's two major fields (i.e., Canadian Politics, Comparative Politics, International Relations, or Political Thought).
- A maximum of two half courses may be reading courses.
- Language courses will not be considered part of the six half course requirement.
- PhD Students must demonstrate a basic knowledge of research methods equivalent to Political Science 691. If students are required to take Political Science 691 it will not be considered part of the six half course requirement.

b) A candidacy examination with a written and oral component, normally completed within twenty months of first registration.

c) A thesis proposal, normally defended within four months of the oral candidacy exam.

d) A demonstration of reading proficiency in a language other than English, as determined by the supervisory committee. Normally students without prior reading proficiency will be required to achieve a grade of at least "B" in one full-course equivalent in a second language.

e) A written dissertation.

f) Dissertation Oral Examination.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

The department does not give graduate credit for courses taken below the 600-level, except in special cases.

8. Time Limit

Maximum completion time is four years for a master's program and six years for a Doctoral program.

The Department of Political Science encourages completion of the master's within two years and the Doctorate within four.

9. Supervisory Assignments

Master of Arts

Wherever possible, an incoming student should have a specific supervisor in mind when applying for the program and should initiate supervisory arrangements with this faculty member. A supervisor is determined as a result of consultations involving the student and the Graduate Program Director, normally within the first term of the student's program, but the supervisor must be appointed within 12 months of initial registration.

Doctor of Philosophy

Wherever possible, an incoming student should have a specific supervisor in mind when applying for the program and should initiate supervisory arrangements with this faculty member. Supervisory arrangements are normally completed within the first six months of the doctoral program, but the supervisor must be appointed within 12 months of initial registration. Where the matter of supervision is still under consideration, the Graduate Program Director usually serves as interim supervisor until a final decision is made.

Supervisory committees for doctoral students are struck as the result of consultations amongst the student, supervisor, and Graduate Program Director and must be established as soon as possible and no later than three months after the supervisor's appointment.

10. Required Examinations

Doctoral Candidacy Exams

The doctoral candidacy examination has a written and an oral component. The Department requires two written candidacy examinations, one in the student's field of thesis research and the other in the student's second chosen field of study. The examinations test the student's general knowledge of the fields as well as specific topics within these fields.

Thesis Oral Exams

A thesis/dissertation oral in the MA and PhD programs.

11. Research Proposal Requirements

Doctoral students must submit and defend a written thesis proposal (no more than 20 pages in length) for approval by the supervisory committee.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to the Department by January 15.

For Department funding information, refer to: http://poli.ucalgary.ca/graduate/graduate-funding.

14. Other Information

None.

15. Faculty Members/Research Interests

General departmental research interests are listed at: http://poli.ucalgary.ca/graduate.

Individual faculty members' areas of research can be found at: http://poli.ucalgary.ca/research.

Psychology PSYC

Contact Information

Location: Administration Building, Room 255

Program number: 403.220.5659

Fax: 403.282.8249

Email address: psycgrad@ucalgary.ca

Web page URL:
http://psychology.ucalgary.ca/

The Department of Psychology offers graduate work leading to the Master of Science and Doctor of Philosophy degrees in psychology and in clinical psychology. These degree programs are described separately in the links below.

Psychology (PSYC) Program

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

The Department accepts applicants who plan to remain full-time to the completion of their degree. The program does not offer a part-time option.

Specializations:

- Industrial/Organizational Psychology
- Medical Imaging (Interdisciplinary)*

**See the Calendar section on Interdisciplinary Specialization for further information.*

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

a) A four-year undergraduate degree in Psychology or related discipline.

b) A minimum admission grade point average of 3.40 on a four-point scale over the last 20 half courses.

c) An undergraduate course in statistics/experimental design.

d) An acceptable score on the Graduate Record Examination (Verbal, Quantitative, and Analytical) for students with an undergraduate degree in Psychology. Students not having an undergraduate degree in Psychology must also write the Psychology Subject Test.

e) For applicants required to provide proof of proficiency in English, a TOEFL score of 600 (written test), or 100 (Internet-based test), an IELTS score of 7.5, a MELAB score of 84, or a PTE score of 70.

f) Two reference letters.

3. Application Deadline

Deadlines for the submission of completed applications:

January 1 for May or September admission

October 1 for January admission

The Industrial Organizational Program accepts applications for a September start date only.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Science

Master's students must take no fewer than six half courses, two of which must come from Psychology 607, 611, 613, 615, 617, or 619; and two of which must come from Psychology 601, 620, 630, 639, 700, 702, 703, 709, 710, 712, 713, 720, 730, or 739 (these courses may be repeated for credit), over their 24-month program.

Doctor of Philosophy

Doctoral students shall take no fewer than six half courses while in the program. The Supervisor and the Director of Graduate Studies, Department of Psychology, must approve all courses. Incoming doctoral students must demonstrate that they have an adequate background in statistics and methodology (including computer applications). Those needing remedial work may be required by the Department of Psychology to take particular courses.

Industrial Organizational Specialization

I/O students in the MSc program are required to take eight half courses with two half courses in research methods and statistics, four half courses in I/O Psychology (639, 739), and two half courses outside the I/O area.

I/O students in the PhD program are required to take four half courses in I/O Psychology (739), and two half courses outside of I/O Psychology that were not completed during the MSc program.

Medical Imaging Specialization

The specialization is open to students interested in pursuing research in cognitive and clinical neuroscience. This specialization requires completion of a course sequence in Medical Imaging (see the MEDI section for further details). MSc students must take a minimum of two courses (the core and a foundational course). PhD students would take three courses (including the core, a foundational and an elective course). PhD students previously completing the MSc Specialization in Medical Imaging will be required to complete one elective course in medical imaging.

These requirements are in addition to the core requirements of the Psychology graduate program. The Medical Imaging courses would count towards Psychology graduate program elective courses.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Credit may be given for 500-level undergraduate courses.

8. Time Limit

Expected completion time is two years for the Master of Science program and three years for the doctoral program. (Particular circumstances can be taken in to account).

9. Supervisory Assignments

An interim supervisor is assigned to each student at the time of admission. In no case will a student be admitted if an appropriate supervisor is not expected to be available. The shift from interim to permanent supervisor formally takes place at the end of the first year. The Director of Graduate Studies, Department of Psychology, must approve the permanent supervisor.

Master's level students must have a supervisory committee consisting of the supervisor plus two other faculty members.

10. Required Examinations

A doctoral student will normally be required to take the candidacy examination within the first 17 - 20 months of the program. The candidacy examination has a written and an oral component. The written examination consists of one, two or three questions, determined by the supervisory committee that must be answered in no more 30 double-spaced pages in total (word-processed, 12 pt font, reference list extra). Students must consult with their supervisors. The oral examination questions will be based on the answers to the written questions and the candidacy reading list.

Final thesis oral examinations are open.

11. Research Proposal Requirements

Students whose research involves human subjects must receive approval from the appropriate departmental or University Ethics Review Committee before beginning data collection.

All Master of Science students must formally present a thesis proposal not more than 14 months after admission to the program. The proposal must be typed and 10 to 30 double-spaced pages (12 pt font, reference list extra). Students must consult with their supervisors. The supervisory committee must approve the thesis proposal.

All Doctor of Philosophy students must formally present a thesis proposal not more than 16 months after admission to the program. The proposal must be typed and 10 to 30 double-spaced pages (12 pt font, reference list extra). Students must consult with their supervisors. The supervisory committee must approve the thesis proposal.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships are advised to submit their applications to the Department by January 15.

14. Other Information

Initial inquiries may be made to the Director of Graduate Studies, Department of Psychology.

15. Faculty Members/Research Interests

The active research interests of the faculty can be found at http://www.psychology.ucalgary.ca.

Clinical Psychology (CPSY) Program

Contact Information

Location: Administration, Room 255

Program number: 403.220.5659

Fax: 403.282.8249

Email address: psycgrad@ucalgary.ca

Web page URL:
http://www.psychology.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

The purpose of the graduate program in Clinical Psychology is to prepare students for careers as doctoral-level clinical psychologists in research, academic, and applied settings. In the course of doctoral training students also are required to complete the Master of Science (MSc) degree. However, consistent with its goal of doctoral training, the program only admits students who wish to pursue the doctoral degree.

Students registered in master's thesis-based and doctoral programs will be considered full-time. The program does not offer a part-time option.

2. Admission Requirements

In addition to the Faculties of Graduate Studies and Arts requirements, the program requires:

a) An honour's degree in psychology (or equivalent) with a minimum grade point average of 3.60 on a four-point scale in the last 10 full courses to be considered for entry, although competition for the program is such that higher grade point averages are typical of students who are admitted.

b) Scores on the Aptitude (Verbal/Quantitative) dimensions of the Graduate Record Examinations (GRE). Please note that students with scores less than the 50th percentile on the Verbal and Quantitative subtests will not normally be admitted.

c) A statement of research and professional interests, including the specification of prospective research supervisors from among current Program faculty.

d) For applicants required to provide proof of proficiency in English, a TOEFL score of 600 (written test), or 100 (Internet-based) test, or an IELTS score of 7.5, or a MELAB score of 84, or a PTE score of 70.

e) Two reference letters.

3. Application Deadline

The deadline for complete applications is January 1 for September admission.

4. Advanced Credit

Advanced credit may be given for up to two full-course equivalents of graduate work, if this work is consistent with the program's requirements.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

The Program outline is as follows:

Year 1

Psychology 650, 651, 659, 660, 671, 673, 615, thesis work

Year 2

Psychology 601, 650, 681, 683, plus a graduate-level Psychology Statistics course or Methodology course (Psychology 617 or equivalent), completion of the thesis

Year 3

Psychology 750, 760, a graduate-level breadth course, the Candidacy Examination, thesis work

Year 4

Psychology 750, 762, thesis work

Year 5

Pre-Doctoral Clinical Internship Psychology 798, and completion of thesis oral and written requirements

Breadth course requirements may be satisfied through Psychology 750, courses offered by the Department of Psychology, or by obtaining advanced credit for undergraduate courses. Please see program handbook for details.

The prerequisite for all Clinical Program courses (unless otherwise noted) is consent of the Program.

Successful completion of years one and two, plus the Master of Science thesis, constitute the requirements of the Master of Science degree. Program students must formally apply and be approved by the program and the Faculty of Graduate Studies for admission to the doctoral program upon completion of Master of Science requirements.

6. Additional Requirements

Clinical suitability and professional conduct.

7. Credit for Undergraduate Courses

Credit for breadth courses may be given if the applicant has two senior undergraduate courses in that area. Credit for Psychology 601 may be given if the applicant has a senior undergraduate course in History and Systems of Psychology.

8. Time Limit

It is expected that students will complete the MSc thesis within two years. Students in the MSc program must complete all requirements within four registration years. Students who have taken three years to complete all requirements for the master's degree will normally not be admitted into the doctoral program. It is expected that students will complete the Doctoral Program within 5 years. Maximum time to completion for the MSc is 4 years and for the Doctoral program is 6 years.

9. Supervisory Assignments

Program students must have a research supervisor at all times. Supervisors are arranged by mutual consent of student and faculty member, and are consistent with the focus of the student's research work. Master's level students must have a supervisory committee consisting of at least three members, with at least one who is a member of the core clinical faculty. Doctoral candidates must have a supervisory committee of at least three members.

10. Required Examinations

In addition to course-specific written requirements, students must sit a written and oral doctoral candidacy examination in the third year of their program (i.e., the first year of doctoral studies).

The oral candidacy exam will focus on questions on general clinical psychology and research knowledge. Questions on the research proposal will not be included in the oral candidacy examination.

Final thesis oral examinations are open.

A thesis final defence is also required.

11. Research Proposal Requirements

Students in the program must complete both a master's thesis and doctoral thesis, according to the criteria set by the Faculty of Graduate Studies. These research projects typically involve the design of a research question and research project, the collection, analysis and interpretation of original data, and the preparation of a written document consistent with good scholarship. Students whose research involves human subjects must receive approval from the appropriate departmental or University Ethics Review Committee before beginning data collection.

12. Special Registration Information

Admission to this Program is normally only available in September of each year.

13. Financial Assistance

Financial assistance may be available to qualified students. Applicants and program students are strongly encouraged to apply for internal and external awards. For information on Awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to the Department by January 15.

14. Other Information

The program subscribes to the scientist-practitioner model of clinical training as described in the Canadian Psychological Association's requirements for program accreditation, and emphasizes the integration of course work, research, and clinical training. The program has been fully accredited by CPA for six years (2011-2017).

15. Faculty Members/Research Interests

https://psychology.ucalgary.ca/graduate/program-clinical-psychology.

Public Policy PPOL

Contact Information

Location: School of Public Policy

Downtown Campus

906 8th Avenue SW

5th Floor

Calgary, Alberta

T2P 1H9

Program number: 403.210.3802

Fax: 403.210.6939

Email address: mpp@ucalgary.ca

Web page URL: www.policyschool.ca

1. Degrees and Specializations Offered

Master of Public Policy (MPP), course-based

Master of Public Policy/Master of Business Administration (MPP/MBA), combined degree, course-based

Master of Public Policy/Juris Doctor (MPP/JD), combined degree, course-based

MPP

The MPP is a 12-month professional degree program offered for full-time study with limited seats for part-time study (Director approval required).

Combined MPP/MBA

The MPP/MBA program is normally restricted to full-time study. It allows students to obtain both degrees in a significantly shorter time frame than if they are taken separately.

Combined MPP/JD

The MPP/JD program is normally restricted to full-time study. It allows students to

obtain both degrees in a significantly shorter time frame than if they are taken separately.

2. Admission Requirements

Master of Public Policy

In addition to the Faculty of Graduate Studies requirements, the School requires:

a) A minimum 3.30 grade point average (on the four-point scale) in the last two years of program or over the last ten full-course equivalents.

b) A current resume.

c) A personal statement outlining the applicant's career goals and how the applied-for program would help achieve those goals.

d) For students required to prove proficiency in English, a minimum TOEFL score of 600 (written test), 250 (computer-based test) or 100 (Internet-based test) or a score of 7.0 on the IELTS.

Combined MPP/MBA

Students must meet the admission requirements for the Faculty of Graduate Studies and those for the MBA and MPP programs. Please consult the MBA Admissions Officer or the MPP Program Manager for more information.

A separate application for the MPP and for the MBA is required for the combined MPP/MBA program. See deadlines for each program.

Combined MPP/JD

Students must meet the admission requirements for the Faculty of Graduate Studies and those for the JD and MPP programs. Please consult the JD Student Services Coordinator or the MPP Program Manager for more information.

A separate application for the MPP and for the JD is required for the combined MPP/JD program. See deadlines for each program.

3. Application Deadline

Deadline for the submission of completed applications for the MPP program is March 1 for Canadians and Permanent Residents of Canada and February 1 for International Students.

A separate application for the MPP and for the MBA is required for the combined MPP/MBA program and a separate application for the MPP and for the JD is required for the combined MPP/JD program. See deadlines for each program.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not normally be given for course work taken as part of another completed degree/diploma. If graduate-level courses are taken as post-BA courses and not used as credit towards another degree, the School may allow the student to claim up to two half courses at our graduate level towards the MPP requirements should the student be admitted into the MPP program.

5. Program/Course Requirements

In addition to the Faculty requirements, the School requires that all students complete the following:

Master of Public Policy

Please note: All Public Policy courses are restricted to Master of Public Policy students. Students outside of the Master of Public Policy program must obtain permission to register in courses through the School of Public Policy. Core courses are held evenings throughout the academic year. Some exceptions may apply.

a) Two preparatory/foundation courses (Public Policy 601 and 603) during the last two weeks of August and during Fall Block Week prior to the start of the Fall Term. Satisfactory performance in these courses is required for continuation in the MPP program. Exemptions will normally be given for these two preparatory/foundation courses to those who have completed courses with a grade of "B" or better in economics, mathematics, and statistics offered by a recognized undergraduate program within the past five years.

b) An effective writing and research course (Public Policy 613) during the January Block Week.

c) The following eight core courses:

Public Policy 605: Markets and Public Policy

Public Policy 607: Politics and Collective Choice

Public Policy 609: Decision Analysis

Public Policy 615: Public Finances

Public Policy 617: Regulation and the Law

Public Policy 619: Governance, Institutions and Public Policy

Public Policy 621: Communicating Policy

Public Policy 623: Capstone Project (Note: Credit/Fail – The capstone project is not included in final grade point calculation)

d) Two elective courses:

The elective courses must be selected from graduate-level courses offered at the University of Calgary. In selecting electives students need to be aware that they must satisfy the prerequisites for those courses. The two elective courses should be related in such a way that they form a concentration in an area of public policy. See "Approved Graduate Elective Courses" below for suggested electives. The choice of elective courses must in all cases be approved by the Academic Director.

Public Policy 611. Independent Study. Various sections of this independent study course covering different topic areas are typically offered. These are reserved for Master of Public Policy students. School of Public Policy permission required for all other students. Please refer to the online course listings for details on topics covered each term.

Combined MPP/MBA

Students admitted to the MPP/MBA will normally focus mostly on courses for the MBA during the first year and mostly on MPP courses in year two. Typically, the remaining courses required will be completed in the first term of year three. Please consult the MBA Admissions Officer or the MPP Program Manager for more information.

Combined MPP/JD

In the first year of the combined program students would complete all of the first year compulsory courses in Law. During the Summer term of year 1, students in the joint program would complete the two MPP Foundation courses in economics and empirical methods (these may be waived for students with adequate academic backgrounds in these areas). In the second year of the Joint Program, students would focus on completing the compulsory core Law courses and five Public Policy core courses. The latter will vary depending on the student's area of specialization but would typically include: Public Policy 605, 607, 609, 615 and 619. Up to two elective (non-core) Public Policy courses may be substituted with approval of the JD/MPP program committee, consisting minimally of the program directors of the two programs. In the Spring/Summer period between years 2 and 3 students would complete Public Policy 621 and 623. In year 3, students would complete the upper level JD compulsory course(s) and required International and Writing requirements, along with enough approved Law or Public Policy electives. It is expected that most students will complete in less than three and one-half calendar years by attending courses every session. Please consult the MPP Program Manager or the JD Student Services Co-ordinator for more information.

Copyediting

The School of Public Policy does not allow copyediting on students' work.

6. Additional Requirements

The School hosts a variety of Community Outreach events year-round that attract global policy experts and practitioners. As a feature of the MPP program, The School also puts on a Friday Speaker Series specifically for students in the program. These talks feature prominent policy figures in an interactive environment.

The School's event series represents a tremendous opportunity for students to network with policy experts from business and government. For this reason, students are expected to attend as many events as possible throughout the academic year.

7. Credit for Undergraduate Courses

The School does not give graduate credit for courses taken below the 600-level, except in special cases.

8. Time Limit

Maximum completion time for the MPP is four years.

9. Supervisory Assignments

All MPP students in the program will be guided by faculty holding appointments to the School.

10. Required Examinations

No additional examinations outside of the courses are required.

11. Research Proposal Requirements

No additional research requirements outside of the courses are required.

12. Special Registration Information

None.

13. Financial Assistance

Students admitted to the MPP program will automatically be considered for financial awards from the School of up to $10,000 per student. Other financial assistance may be available to qualified students. For information on awards, see the website for the School and the Awards and Financial Assistance section of this Calendar.

14. Other Information

None.

15. Faculty Members/Research Interests

Current research interests in the School can be found at: http://www.policyschool.ca.

Samples of Graduate Elective Courses for the MPP

Note: Not all elective courses may be available in all years and availability may depend on student's undergraduate program. Other elective courses not listed here may be considered. In all cases the choice of elective courses must be approved by the Academic Director.

Courses offered by the Department of Communication and Culture

Communications Studies 605: Organizational Communication

Communications Studies 619: Communication and Cultural Industries

Communications Studies 623: Social Contexts of Technology

Communications Studies 627: Media and Politics

Communications Studies 641: Intercultural and International Communication

Courses offered by the Department of Economics

Economics 619: Economics of International Commercial Policy

Economics 621: International Trade

Economics 627: Energy in the Production Sector of the Economy

Economics 635: Regulatory Economics

Economics 653: Public Revenue Analysis

Economics 655: Cost/Benefit Analysis

Economics 667: Seminar in Industrial Organization

Economics 675: Advanced Topics in Natural Resource Economics

Economics 677: Seminar in Economics of the Environment

Economics 679: Health Economics I

Economics 681: Health Economics II

Courses offered by the Department of Political Science

Political Science 617: Advanced Political Theory

Political Science 619: War and Interpretation

Political Science 631: Parties Elections and Representation

Political Science 641: Selected Topics in Public Law

Political Science 651: Policy Studies

Political Science 653: Gender and Public Policy

Political Science 683: Advanced Studies in Foreign Policy

Political Science 685: Strategic Studies

Political Science 689: Unconventional Warfare

Courses offered by the Department of Sociology

Sociology 603: Seminar in Sociology of Health and Illness

Sociology 653: Seminar on Urban Sociology

Sociology 667: Seminar on Ethnic Relations

Sociology 671: Seminar on the Sociology of Families

Sociology 677: Seminar in Sociology of Gender Relations

Courses offered by the Faculty of Social Work

Social Work 632: Social Policy and Social Justice

Social Work 665: Influencing Policy Development

Social Work 679: Special Topics Seminar I (Interested students should contact the Faculty of Social Work for a list of topics to be examined)

Courses offered by the Faculty of Law

Law 577: Tax Policy

Law 624: Environmental Law and Ethics

Law 630: International Petroleum Transactions

Law 648: Securities Law

Courses offered by Haskayne School of Business

Human Resources and Organizational Dynamics 601: Managing Human Resources

Human Resources and Organizational Dynamics 691: Project Team Building and Interpersonal Skills

Human Resources and Organizational Dynamics 721: Advanced Leadership and Technical Skills

Human Resources and Organizational Dynamics 745: Cross Cultural Leadership and Human Resources Management

Strategy and Global Management 601: Strategic Management I

Courses offered by Faculty of Medicine, Department of Community Health Sciences

Community Health Sciences 661: Health Economics I

Religious Studies RELS

Contact Information

Location: Social Sciences Building, Room 1301

Program number: 403.220.6988

Fax: 403.210.0801

Email address: rels@ucalgary.ca

Web page URL: http://www.ucalgary.ca/rels/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based

Specializations:

- Eastern Religions
- Nature of Religion
- Western Religions
- Israel Studies (Interdisciplinary)*

Feasibility of areas within these specializations depends on available research resources and faculty expertise; refer to section 15 of this entry for more information.

**See the Calendar section on Interdisciplinary Specializations for further information.*

2. Admission Requirements

In addition to the Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) An admission grade point average of 3.30 or higher on a four-point scale and a minimum of six full-course equivalents in Religious Studies (or their equivalents), usually including at least one full-course equivalent from each of the three streams (Eastern, Western, Nature), as determined by the graduate committee.

b) A reading knowledge of a modern language other than English or of a classical language appropriate to the thesis research. The language requirement normally should be met before admission to the master's program.

c) Two reference letters.

d) Applicants must include in their application package a sample of written work (e.g. a recent research essay).

Doctor of Philosophy

a) A degree comparable to the University of Calgary Religious Studies Master of Arts with a minimum grade point average of 3.50 on a four-point scale.

b) Two reference letters.

c) Applicants must include in their application package a sample of written work (e.g. a recent research essay).

Students with an Honours Bachelor of Arts degree in Religious Studies, a grade point

average of 3.70 or higher, and evidence of competence in the required languages may be admitted directly into the doctoral program or may be considered for transfer to the doctoral program after the first year of the master's program. Such applicants must include in their application package a detailed statement (10 pages) of the purpose, field, and course of study to be pursued in the program.

3. Application Deadline

Deadline for the submission of complete applications is January 7 for September admission.

4. Advanced Credit

Any requests for advanced credit must be made when applying for admission. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission. Graduate course work completed before admission and not counted toward satisfying undergraduate degree requirements will be assessed by the Departmental Graduate Committee to determine course requirements.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department normally requires:

Master of Arts (thesis-based)

a) Five half-course equivalents (in addition to individualized requirements that may be set by the Departmental Graduate Committee at the time of admission).

- Religious Studies 601 – Studies in Western Religions
- Religious Studies 603 – Studies in Eastern Religions
- Religious Studies 605 – Studies in the Nature of Religion
- Religious Studies 607 – Supervised Master's Thesis Inquiry
- Religious Studies 609 – Critical Discourses in the Study of Religion

b) A thesis proposal to be presented to the Graduate Studies Committee for evaluation and approval before the second annual registration.

Doctor of Philosophy

a) For students with a Master of Arts in Religious Studies, five half courses are required) in addition to individualized requirements that may be set by the Departmental Graduate Committee at the time of admission):

- Religious Studies 701 – Studies in Western Religions
- Religious Studies 703 – Studies in Eastern Religions
- Religious Studies 705 – Studies in the Nature of Religion
- Religious Studies 707 – PhD Departmental Colloquium
- Religious Studies 709 – Advanced Critical Discourses in the Study of Religion

b) For students with a BA Honours or for students transferring from the master's program, eight half courses are required (in addition to individualized requirements that may be set by the Departmental Graduate Committee at the time of admission):

- Religious Studies 601 – Studies in Western Religions
- Religious Studies 603 – Studies in Eastern Religions
- Religious Studies 605 – Studies in the Nature of Religion
- Religious Studies 701 – Studies in Western Religions
- Religious Studies 703 – Studies in Eastern Religions
- Religious Studies 705 – Studies in the Nature of Religion
- Religious Studies 707 – PhD Departmental Colloquim
- Religious Studies 709 – Advanced Critical Discourses in the Study of Religion

6. Additional Requirements

PhD Language Requirements

Before the written candidacy examination, doctoral students must demonstrate a reading knowledge of at least two languages other than English. At the discretion of the Department and upon recommendation of the Graduate Director, competency in additional languages may be required. The foreign language requirement may be satisfied in two ways:

a) Successful completion (final grade of "B" or higher) at some stage of the student's university program of at least two full-course equivalents in a first language other than English, and one full-course equivalent in a second language; or

b) Successful completion (grade of "B" or higher) of a language examination administered by the Department of Religious Studies or by another department on behalf of the Department of Religious Studies. When the test is administered by another department, it will consist of a passage or passages selected by the supervisor and/or any requirements that the other department may deem necessary; the test will be graded by the examiner(s) of the other department. When members of the Department of Religious Studies administer the test, the examination questions will be determined, administered, and graded by two members of the Department (one of whom normally will be the supervisor) who have expertise in the language under consideration. In the event that a second person with expertise in the required language is not available, the Department Head may seek an expert from outside the department.

7. Credit for Undergraduate Courses

Credit for undergraduate courses will be given only upon approval of the Departmental Graduate Committee.

8. Time Limit

Expected completion time for full-time students is two years in the master's program and four years in the PhD program. Maximum completion time is four years in the master's program and six years in the doctoral program.

9. Supervisory Assignments

The Departmental Graduate Committee assigns an advisor (interim supervisor) when an applicant is recommended for admission to the Faculty of Graduate Studies. A regular supervisor must be assigned by the beginning of the second registration year.

10. Required Examinations

The doctoral candidacy examination includes two written components and one oral component. Each written candidacy examination focuses on one aspect of the student's doctoral research in Religious Studies:

Examination A – theory and method in the study of religion

Examination B – religious beliefs and practices in context

The written examinations are based on a bibliography established by the candidate in consultation with the supervisory committee and must be taken no later than 26 months after admission to the program. The oral examination is based on the bibliography, the written examinations and the thesis proposal.

Final thesis oral examinations are open.

11. Research Proposal Requirements

The thesis proposal must be approved by each member of the student's supervisory committee, acknowledged by individual signature and date on the front cover, and by the Departmental Graduate Committee, no later than 24 months after admission to the program with a completed master's degree. The proposal should be no more than 20 pages in length and must obtain all required approvals before the student is allowed to take the candidacy examination.

An approved thesis proposal is the basis of consensus on a candidate's research program. When, as sometimes happens in the course of a research project, the research focus or methodology shifts markedly:

a) The candidate will forward a letter to the supervisory committee to document the shift and the reason for the shift. The student also shall compose an addendum, to be appended to the initial proposal, detailing the new direction and supplying any necessary additions to the bibliography.

b) The supervisor, on behalf of the supervisory committee, will reply to the revised proposal indicating acceptability and/or required revisions.

Students should be aware that such shifts may entail revision of the supervisory committee structure.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on

awards, see the Awards and Financial Assistance section of this Calendar or inquire of the Department.

Students applying for scholarships must submit their applications to the Department by February 1.

14. Other Information

None.

15. Faculty Members/Research Interests

Research is supported in the following areas:

Eastern Religions – Buddhist Studies; Chinese Philosophy; Hinduism; Indian philosophy; South Asian Religions.

Nature of Religion – Comparative religion; comparative philosophy and religion; religious pluralism; science and religion; women and religion; religion and film; religion and place studies; African religions; new religious movements; hermeneutics; theory and method in the study of religion.

Western Religions – Ancient Israel; Biblical mythology; Rabbinic Judaism; Jewish philosophy; Christian origins and early Christianity; women in early Christianity; early modern Protestantism (Anabaptism, German Pietism, Protestantism and Enlightenment); Christian spiritual autobiography.

Current faculty research areas can be found at http://rels.ucalgary.ca/research/interests.

Social Work SOWK

Contact Information

Locations

Calgary:

Professional Faculties Building, Room 3256

Program number: 403.220.6945

Fax: 403.282.7269

Email address: fswgrad@ucalgary.ca

Edmonton:

#444, 11044-82 Avenue

Edmonton, AB

T6G 0T2

Program number: 780.492.3888

Fax: 780.492.5774

Email address: fswcnar@ucalgary.ca

Lethbridge:

4401 University Drive

Lethbridge, AB

T1K 3M4

Program number: 403.329.2794

Fax: 403.329.2787

Email address: mswinfo@uleth.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Post-Master's Diploma in Advanced Studies in Social Work (PMDip)

Master of Social Work (MSW), course-based and thesis-based

MBA/MSW, course-based

The course-based MSW degree may be completed on a full-time or a part-time basis.

Specializations:

- Clinical Social Work Practice
- Leadership in the Human Services
- International and Community Development

PhD

The PhD is a research-based degree and is intended to produce highly qualified social work researchers and teachers. The aim of developing such advanced scholarly and research skills is to equip doctoral students for future roles as leaders of the social work profession. Students complete nine courses, a candidacy exam, and a thesis. The PhD is Calgary-based.

PMDiploma

The Faculty of Social Work also offers a Post-Master's Diploma (PMDip) in Advanced Studies in Social Work. Students complete eight courses. The PMDip is Calgary-based.

MSW

The MSW programs are available for both BSW graduates and graduates from other disciplines. 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. The course-based route is appropriate for students who intend to provide direct service in the field. The thesis route is appropriate for students who intend to proceed to doctoral studies and/or anticipate a career requiring advanced program evaluation or research skills.

In Calgary, MSW students are admitted annually and choose one of three Specializations: Clinical Social Work Practice, Leadership in the Human Services, or International and Community Development. Students without an undergraduate degree in social work are admitted to a two-year program, while BSW graduates are admitted directly into a one-year Specialization program.

In Edmonton, the Faculty of Social Work offers the Clinical Social Work Practice Specialization. Program delivery blends on-site and web-based formats. On-site courses are offered on Friday evenings and Saturdays, four times per term, and occasional week-long intensives. Students may continue working while registered in the program. Students with a BSW complete the Clinical Specialization program in two years. Students with undergraduate degrees in other disciplines complete a Foundation program followed by the Clinical Specialization program, requiring a total of four years of study. Admission occurs in odd-numbered years (i.e., 2011, 2013, etc.).

In Lethbridge, the Faculty of Social Work offers the Clinical Social Work Practice Specialization to students with a BSW. Program delivery blends web-based and on-site formats, allowing students from Lethbridge and southern Alberta to continue working while pursuing graduate education. Students complete the program in two years. Admission occurs in odd-numbered years (i.e., 2011, 2013, etc.).

The MSW course-based Specialization in Leadership in the Human Services is administered through Calgary as a distance program and is accessible to students regardless of home location. One course is offered on campus for one week in July in both the first and second years of the program. Other courses are offered via distance delivery. The program is designed to be completed in two years of full-time study.

MSW/MBA

The Faculty of Social Work and the Haskayne School of Business offer a combined program leading to the Master of Social Work/Master of Business Administration (MSW/MBA) degree. Offered from the Calgary location, the Master of Social Work/Master of Business Administration (MSW/MBA) program is designed to prepare students for business-related social work careers. This program is available only to full-time MSW Specialization students.

A Post-baccalaureate Certificate and Diploma in Mental Health and Addictions is offered in Calgary.

2. Admission Requirements

Students are responsible for meeting the admission requirements as established by the Faculty of Graduate Studies. In addition to Faculty of Graduate Studies requirements, the Faculty of Social Work requires the following:

For PhD and PMDip:

a) A Master of Social Work or equivalent graduate degree with a minimum grade point average of 3.50 on a four-point scale.

b) A study plan outlining the applicant's educational goals, career expectations, research proposal and research experience.

c) Substantial professional experience.

d) A sample of written work including, for example, published and/or unpublished scholarly papers and/or professional reports.

e) For applicants required to provide proof of proficiency in English submit a minimum TOEFL score of 580 (written test), or 92 (Internet-based test); or IELTS score of 7.0; or MELAB score of 90; or Level 3 on the EAP program.

f) Three reference letters.

For MSW course-based

In Calgary and Edmonton:

a) A Bachelor of Social Work degree, or a four-year bachelor's degree from another discipline.

b) The equivalent of two years of full-time paid or volunteer work in the human services field.

c) A study plan outlining the applicant's educational goals and career expectations. (If applying to the Calgary program, the study plan must indicate the applicant's in-

tended area of Specialization: Clinical Social Work Practice, Leadership in the Human Services, or International and Community Development).

d) For applicants required to provide proof of proficiency in English submit a minimum TOEFL score of 580 (written test), or 92 (Internet-based test); or IELTS score of 7.0; or MELAB score of 90; or Level 3 on the EAP program.

e) Two reference letters.

In Lethbridge:

a) A Bachelor of Social Work degree.

b) A study plan outlining the applicant's educational goals and career expectations.

c) For applicants required to provide proof of proficiency in English submit a minimum TOEFL score of 580 (written test), or 92 (Internet-based test); or IELTS score of 7.0; or MELAB score of 90; or Level 3 on the EAP program.

d) Two reference letters.

For MSW thesis-based

In Calgary and Edmonton:

a) A Bachelor of Social Work degree, or a four-year bachelor's degree from another discipline.

b) The equivalent of two years of full-time paid or volunteer work in the human services field.

c) A study plan outlining the applicant's educational goals and career expectations. (If applying to the Calgary program, the study plan must indicate the applicant's intended area of Specialization: Clinical Social Work Practice, Leadership in the Human Services, or International and Community Development).

d) An additional statement providing a rationale for selecting the thesis route and a preliminary research proposal. Students considering applying to the thesis route are strongly encouraged to discuss this option with the Thesis Program Co-ordinator prior to completing the application process.

e) For applicants required to provide proof of proficiency in English submit a minimum TOEFL score of 580 (written test), or 92 (Internet-based test); or IELTS score of 7.0; or MELAB score of 90; or Level 3 on the EAP program.

f) Two reference letters.

In Lethbridge:

a) A Bachelor of Social Work degree.

b) A study plan outlining the applicant's educational goals and career expectations.

c) An additional statement providing a rationale for selecting the thesis route and describing the applicant's area of research interest. Students considering applying to the thesis route are strongly encouraged to discuss this option with a Faculty member prior to completing the application process.

d) For applicants required to provide proof of proficiency in English submit a minimum TOEFL score of 580 (written test), or 92 (Internet-based test); or IELTS score of 7.0; or MELAB score of 90; or Level 3 on the EAP program.

e) Two reference letters.

For MSW/MBA (in Calgary only):

a) A Bachelor of Social Work degree or completion of the MSW Foundation courses (described in Section 5 below). Applicants demonstrating academic excellence and prior human services experience may be considered for admission to the Foundation year.

b) A study plan outlining the applicant's educational goals and career expectations.

c) Admission into the Haskayne School of Business.

d) For applicants required to provide proof of proficiency in English submit a minimum TOEFL score of 580 (written test), or 92 (Internet-based test); or IELTS score of 7.0; or MELAB score of 90; or Level 3 on the EAP program.

e) Two reference letters.

3. Application Deadline

Final submission deadlines are as follows:

PhD & PMDip Programs: January 31 for September admission.

Calgary MSW Programs: December 1 for September admission to the Clinical Social Work Practice and International and Community Development Specializations, July admission to the Leadership in Human Services Specialization (distance delivery), and/or July or September admission to MSW/MBA (depending upon Specialization).

The Calgary MSW Program uses a rolling admission policy; that is, qualified applicants may be offered a space in a program prior to final application submission deadlines.

Edmonton and Lethbridge MSW Programs:

January 31 for September admission in odd-numbered years (2011, 2013, etc.).

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for coursework taken as part of another completed degree/diploma or for courses taken to raise the grade point average for admission purposes. For all Faculty of Social Work graduate programs, advanced credit may be granted for not more than the equivalent of three half courses.

Approval of advanced credit will be based on an evaluation of the applicant's particular circumstances and the fit between the prior coursework and the applicant's program of study in the MSW or PhD. Students exploring the possibility of Advanced Credit should contact the Student Advisor in the program location to which they are applying (Calgary, Edmonton, or Lethbridge).

5. Program/Course Requirements

Please note that not all programs/courses are offered every semester. Students should consult the timetables and program curriculum plans located on the web for sequences and availability of courses.

In addition to Faculty of Graduate Studies requirements, the Faculty of Social Work requires:

PhD

A minimum of nine half-course equivalents;

Required core courses include:

- Social Work 741: Research Foundations: Epistemology and Professional Knowledge-Building
- Social Work 743: Theory, History, and Philosophy: Values, Ethics and Professional Beliefs
- Social Work 745: Research Methods I: Quantitative
- Social Work 747: Research Methods II: Qualitative
- Social Work 721: Integrative Research Colloquia

Note: Social Work 721 can only be taken once all other required courses have been completed**.**

Four half course options relevant to the student's area of specialization. Option courses may be taken outside of the Faculty of Social Work, depending on the student's needs and course availability. All courses taken external to the Faculty of Social Work must have prior approval from the Faculty of Social Work.

A thesis research proposal.

PMDip

A minimum of eight half-course equivalents;

Required core courses include:

- Social Work 741: Research Foundations: Epistemology and Professional Knowledge-Building
- Social Work 743: Theory, History, and Philosophy: Values, Ethics and Professional Beliefs
- Social Work 745: Research Methods I: Quantitative
- Social Work 747: Research Methods II: Qualitative

Four half course options relevant to the student's area of specialization. Option courses may be taken outside of the Faculty of Social Work, depending on the student's needs and course availability. All courses taken external to the Faculty of Social Work must have prior approval from the Faculty of Social Work.

MSW for students with a BSW:

Course-based students complete ten specialization half-course equivalents as follows:

a) Five core courses (see specific courses listed by specialization, below).

b) Three option courses (option course requirements and offerings vary by year, program and location).

c) Social Work 696: Advanced Practicum (525 hours; one full course).

Thesis-based students complete nine specialization half-course equivalents as follows:

a) Five core courses (see specific courses listed by specialization, below).

b) Social Work 655 Thesis Research.

c) One option course (option course requirements and offerings vary by year, program and location).

d) Social Work 696 Advanced Practicum (525 hours; one full course).

MSW for students with a Bachelor's degree in a discipline other than social work:

Nine foundation half-course equivalents, as follows: (note that foundation courses must be completed before students progress to specialization courses)

- Social Work 621: History and Foundation of the Profession
- Social Work 625: Practice with Individuals, Families and Groups
- Social Work 627: Practice with Organizations and Communities
- Social Work 629: Professional Communication and Interviewing
- Social Work 632: Social Policy and Social Justice
- Social Work 637: Human Behaviour in the Environment
- Social Work 641: Models of Practice
- Social Work 645: Issues in Social Work Research
- Social Work 633: Foundational Field Practicum (426 hours)

and

Ten specialization half-course equivalents for course-based students as follows:

a) Five core courses (see specific courses listed by specialization, below).

b) Three option courses (option course requirements and offerings vary by year, program and location).

c) Social Work 696: Advanced Practicum (525 hours; one full course).

or

Nine specialization half-course equivalents for thesis-based students as follows:

a) Five core courses (see specific courses listed by Specialization, below).

b) Social Work 655 Thesis Research.

c) One option course (option course requirements and offerings vary by year, program and location).

d) Social Work 696 Advanced Practicum (525 hours; one full course).

Clinical Social Work Practice Specialization (offered in Calgary, Edmonton and Lethbridge)

Required core courses:

- Social Work 651: Policy as Context for Clinical Work
- Social Work 653: Comparative Approaches to Change
- Social Work 657: Clinical Social Work Applications
- Social Work 659: Evidence and Clinical Practice
- Social Work 697: Diversity, Oppression and Social Justice
- Social Work 696: Advanced Practicum (525 hours; one full course)

Leadership in the Human Services (LHS) Specialization (distance delivery; offered in Calgary only)

Required core courses:

- Social Work 665: Influencing Social Policy
- Social Work 667: Leadership Theories In Action
- Social Work 669: Leading Organizations and Communities
- Social Work 693: Research as a Foundation for Leadership
- Social Work 697: Diversity, Oppression and Social Justice
- Social Work 696: Practicum (525 hours; one full course)

In the LHS Specialization, option courses are predetermined, as follows:

- Social Work 695: Becoming an Evidence-Based Leader
- Social Work 679.10: Maximizing Staff Performance through Supervision
- Social Work 679.18: Practice Skills for Leading and Supervising in Human Services Organizations

International & Community Development (offered in Calgary only)

Required core courses:

- Social Work 671: Social Policy
- Social Work 673: International Social Development or Social Work 699.21: Advanced Community Development Theory and Practice I
- Social Work 675: Advanced International Social Work Modules or Social Work 699.22: Advanced Community Development Theory and Practice II
- Social Work 677: Social Work Research for International and Community Methods
- Social Work 697: Diversity, Oppression and Social Justice
- Social Work 699.21: Advanced Community Development Theory and Practice I
- Social Work 699.22: Advanced Community Development Theory and Practice II
- Social Work 696: Advanced Practicum (525 hours, usually completed outside of Canada in the Spring/Summer semester following completion of core courses; one full-course).

In the International & Community Development Specialization there is one option course.

MSW/MBA

A minimum of eight half-course equivalents in the MSW Specialization year required (five core specialization courses, one option, and Social Work 696 for 525 hours - one full course), and a minimum of sixteen half-course equivalents in the MBA program.

Required MBA include:

- Accounting 601: Introductory Financial Accounting
- Accounting 603: Management Accounting
- Finance 601: Managerial Finance
- Human Resources and Organizational Dynamics 601: Managing Human Resources
- Marketing 601: Marketing Management
- Management Information Systems 601: Management Information Systems
- Management Studies 611: Managerial Economics
- Management Studies 613: Managerial Decision Modelling
- Management Studies 715: Strategic Business Analysis
- Operations Management 601: Operations Management
- Strategic and Global Management 601: Strategic Management
- Business and Environment 777: Global Environment of Business
- Management Studies 601: MBA Skills
- Management Studies 770: Leadership Capstone
- And three elective courses in the student's area of interest.

6. Additional Requirements

Participation in Orientation Sessions held prior to the start of the Fall semester is strongly recommended for incoming students.

7. Credit for Undergraduate Courses

Credit for undergraduate courses will not be awarded.

8. Time Limit

As established by the Faculty of Graduate Studies, maximum completion time is four years for a thesis-based master's program, six years for a doctoral program or a course-based master's, and seven years for the MSW/MBA Program.

Expected completion times in the Calgary programs are:

- One 12-month year for full-time course-based MSW students with a BSW
- Two 12-month years for full-time course-based MSW students without a BSW
- 26 months for the MSW/MBA (minimum)
- Two 12-month years for a thesis-based MSW student with a BSW
- Three 12-month years for a thesis-based MSW student without a BSW
- Six 12-month years for a PhD
- Two 12-month years for a part-time MSW with a BSW
- Four 12-month years for a part-time MSW without a BSW

In the Edmonton and Lethbridge MSW programs, students are admitted as cohorts and are therefore required to complete courses as they are scheduled. For the purposes of government grants and loans, students are classified as full-time.

In Edmonton, course-based students admitted without a BSW complete the Foundation program component in the initial two years and the Clinical Specialization component in the subsequent two years.

In Edmonton and Lethbridge, course-based students admitted with a BSW complete the MSW Clinical Specialization in two years. Typically, thesis students require one additional 12-month year to complete their programs. Courses are scheduled on weekends, in week-long intensives and/or in online format for accessibility by rural and employed students.

Maximum completion time for the MHA Certificate and Diploma is four (4) years.

9. Supervisory Assignments

Course-based MSW and MSW/MBA students are assigned a faculty advisor upon entry into the program. A change of advisor, initiated by the student or the faculty member, can occur at any time during the student's enrolment in the program.

PhD, PMDip and thesis-based MSW students are initially assigned an interim faculty advisor. Before the end of the first year, each student must designate a faculty member as permanent supervisor. In the doctoral program, the supervisor and student must then select a supervisory committee within three months of the appointment of the permanent supervisor. Doctoral supervisory committees typically consist of the supervisor and two other members, one of whom may be external to the Faculty of Social Work.

10. Required Examinations

PhD

The doctoral candidacy examinations must be completed within 28 months of the student's admission to the program after all required course work has been completed and the thesis proposal has been approved by the student's supervisory committee. The examinations include a written and an oral component, both of which the student must complete to the satisfaction of his or her examining committee. Students should consult the FSW candidacy examination guidelines for further detail. Students must also defend their thesis to the satisfaction of the examining committee.

MSW (thesis)

The final examination for the thesis-based MSW involves an oral defence of the thesis. The thesis examination is conducted by the student's examining committee, which must be designated at least one month before the oral examination. The MSW examining committee includes the thesis supervisor, a faculty member from the Faculty of Social Work, an approved faculty member from a faculty outside of Social Work, and a neutral chair.

MSW (course-based)

Course-based students are required to complete a capstone experience at the end of their coursework and practicum. Each student will meet this requirement according to the structure within his/her location (Calgary, Edmonton, Lethbridge).

11. Research Proposal Requirements

PhD

PhD students must have their thesis proposal approved by their supervisory committee prior to doing their candidacy exams and applying for ethics certification. Those students whose research involves human subjects must complete the Tri-Council Policy Statement 2 Course on Research Ethics (CORE) and receive approval from the University of Calgary Conjoint Faculties/ Health Research Ethics Board before beginning data collection. A copy of the proposal becomes part of the student's record within the Faculty of Social Work.

Thesis—Edmonton and Lethbridge

Normally, thesis-based MSW students in Edmonton and Lethbridge complete the Tri-Council Policy Statement 2 Course on Research Ethics (CORE) and apply for research ethics certification in the summer following their admission to the Clinical Specialization, after their thesis proposal has been approved by their supervisor.

Thesis—Calgary

Students should complete all coursework prior to having their proposal approved by their supervisor. Once coursework has been completed and the proposal approved, students can proceed with completing the Tri-Council Policy Statement 2 Course on Research Ethics (CORE) and applying for ethics certification.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Faculty of Graduate Studies awards database section of the calendar (http://fsw.ucalgary.ca/Gradstudentfunding), and consult with the Student Services Office in the Faculty of Social Work.

14. Other Information

The Faculty of Social Work also offers a Post-baccalaureate Certificate and Diploma in Mental Health and Addictions. The Certificate is comprised of four courses and the diploma requires eight courses. Inquiries about this program should be directed to fswgrad@ucalgary.ca.

All students in the Faculty of Social Work are expected to be proficient in and have access to email, Internet searching, and word processing computer programs. Students may be expected to use technology in courses; video-conferencing, web-based tools, discussion boards, and chat rooms may be used in addition to or in lieu of class time.

The Master of Social Work program is accredited by the Canadian Association of Social Work Education. Information on the Faculty of Social Work and its programs is available online at http://www.fsw.ucalgary.ca.

Requests for information should be directed as follows:

Calgary: 1.877.220.6945

Edmonton: 1.888.492.3888

Lethbridge: 1.866.329.2794

15. Faculty Members/Research Interests

Current faculty members and their research interests can be found at http://fsw.ucalgary.ca/Contact.

Sociology SOCI

Contact Information

Location: Social Sciences Building, Room 956

Program number: 403.220.6501

Fax: 403.282.9298

Email address: socigrad@ucalgary.ca

Web page URL: http://soci.ucalgary.ca/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Arts (MA), thesis-based

2. Admission Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) A grade point average of 3.30 on a four-point scale over the last two years of coursework or 10 full-course equivalents.

b) Demonstrated competence, normally through course work, in classical and contemporary sociological theory, social research methods, and social statistics.

c) A written statement of intent.

d) A sample of written work.

e) Two reference letters.

Doctor of Philosophy

a) A grade point average of 3.30 on a four-point scale over a master's program.

c) Demonstrated competence in sociological theory, social methodology, and social statistics, in addition to a substantive interest.

d) A written statement of intent.

e) A sample of written work.

f) Two reference letters.

3. Application Deadline

January 15 for September admission.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/ diploma or for courses taken to bring the grade point average to a required level for admission.

Master of Arts – Credit may be allowed for up to two 600-level Sociology half courses.

Doctor of Philosophy – Credit may be allowed for up to three 600- or 700-level half courses.

5. Program/Course Requirements

In addition to Faculties of Graduate Studies and Arts requirements, the Department requires:

Master of Arts

a) Competence in sociological statistics, methods of sociological research, and sociological theory demonstrated by completing Sociology 611; 613 or 615; and 631.

b) Completion of two half-course equivalent electives at the 600 or 700 level; at least one half-course equivalent elective must be a Sociology Department offering in a substantive area.

c) Completion of Sociology 602 - Training in Professional Sociology and successful preparation and completion of a thesis prospectus.

d) Completion of the MA Thesis requirement.

Doctor of Philosophy

a) Sociology 611; 702; 731; two half-course equivalent methodology courses at the 700 level, selected from decimalized sections of Sociology 705Q, 711Q, or 715Q; two half-course equivalent electives at the 600 or 700 level selected from Sociology Department offerings on substantive topics. Students who have taken one of the required courses in a previous degree may substitute any other 600- or 700-level course.

b) Successful completion of a thesis prospectus, normally within twenty months of initial registration in the doctoral program. Successful completion of the prospectus means that the Supervisory Committee has approved the thesis project, and a written copy of the prospectus is filed with the Sociology Department Student Administrator.

c) A candidacy examination with a written and an oral component.

d) Completion of the PhD Thesis requirement.

Copyediting Policy

Students may hire an editor to copyedit their theses. The student, supervisor and editor must abide by the following regulations:

1. Prior to hiring a copy editor, permission from the supervisor(s) must be obtained. An agreement outlining the permitted scope of editing must be signed by the student and the supervisor(s).

2. A disclosure statement is required in the thesis (e.g., a sentence in the preface or acknowledgment stating that the thesis has been professionally edited).

3. Under no circumstances should the copyediting alter the content, structure or contribution of the thesis.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

None.

8. Time Limit

Expected completion time is 20 months for the Master of Arts and four years for the Doctor of Philosophy degree. Maximum completion time is four years for the Master of Arts and six years for the doctoral program.

9. Supervisory Assignments

An interim advisor is assigned to incoming students who have not already selected a supervisor. In the case of MA students, after one term in the program, a student will make supervisory arrangements with a faculty member in the chosen area of research. In the case of PhD students after two terms in the program, a student will make supervisory arrangements with a faculty member in the chosen area of research. In the case of PhD students, the supervisor and student will select two other faculty members to serve on the student's supervisory committee.

10. Required Examinations

Doctoral Candidacy Examinations

The candidacy examination has a written and an oral component. A final reading list is prepared by the student's supervisory committee and given to the student at least three months before the written examination. The written candidacy examination in the student's substantive area is written within one month of the oral candidacy examination. The written candidacy is normally a seven day take-home or seven hour closed-book examination. Both the written and oral candidacy examinations are graded together.

Questions on the research proposal will not be included in the oral candidacy examination.

The Candidacy Oral Defence is a Closed Examination.

Thesis Oral Examinations

Final thesis oral examinations are open.

11. Research Proposal Requirements

Students whose research involves human subjects must receive approval from University of Calgary Conjoint Faculties Research Ethics Board or the Conjoint Health Research Ethics Board (if applicable) before beginning data collection.

Master of Arts students are required to prepare a thesis prospectus within nine months of the date of entry into the program.

Doctoral students are required to prepare a thesis prospectus for approval by their supervisory committee within twenty months of the date of entry into the program.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. Information on departmental funding is available in the online **Graduate Student Handbook** at http://soci.ucalgary.ca/graduate. For further information on awards, please see the Awards and Financial Assistance section of this Calendar.

Students applying for Graduate Award Competitions through the Faculty of Graduate Studies must submit their applications to the Department by January 15.

14. Other Information

Students should refer to the Department's online information and the Sociology Graduate Student Handbook at http://soci.ucalgary.ca/graduate for further clarification and explanation of these regulations.

15. Faculty Members/Research Interests

The active research interests of the faculty can be found at http://soci.ucalgary.ca/people/faculty.

Sustainable Energy Development SEDV

Contact Information

Location: Haskayne School of Business, Scurfield Hall, Room 453

Program number: 403.220.2013

Fax: 403.282.0095

Email address:

CALGARY: sedv@ucalgary.ca

QUITO: sed@usfq.edu.ec

Web page URL:
http://www.ucalgary.ca/sustainableenergy/ and http://www.usfq.edu.ec/

1. Degrees and Specializations Offered

Master of Science (MSc), course-based

The MSc program may be completed on a full-time or a part-time basis.

The Master of Science in Sustainable Energy Development Program is an interdisciplinary program for professional individuals seeking a broad-based education in energy and sustainable development.

Instruction is offered by members of the Faculties of Environmental Design, Law, the Schulich School of Engineering and the Haskayne School of Business of the University of Calgary and from the Universidad San Francisco de Quito (for the courses offered in Quito, Ecuador).

The Program is for high potential professionals who have demonstrated the ability to produce results, communicate effectively, and who have an interest in sustainable development. They will have an undergraduate degree from an internationally recognized university in any discipline (engineering, management, law, science, architecture, etc.) and preferably three years of work experience. Students enter with a broad range of educational and experience backgrounds, many from energy and environment organizations, including government agencies.

The objective of the Program is to provide students with a background in energy and environmental management such that they will be able to ensure sustainable energy development and minimize the impact of development on the environment. Opportunities exist to engage in activities, such as field trips to the oil sands and other energy-related industrial operations, visits to water and wastewater treatment plants, semi-

nars by industry experts, etc. In addition, students can also benefit by undertaking individual or group projects on topics that are supported by industry.

CALGARY, Alberta, Canada: The program is offered at the University of Calgary campus over a period of 16 months beginning in May of each year.

QUITO, Ecuador, South America: In partnership with the Universidad San Francisco de Quito (USFQ) and the Latin American Energy Organization (OLADE), the program is offered at USFQ campus over a period of 16 months beginning in August of each year.

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, the Program requires:

a) Letter of intent outlining background, research interest and goal for the Program.

b) In exceptional circumstances, students who do not meet the Faculty of Graduate Studies minimum GPA requirement of 3.00 may be considered for admission after upgrading requirements have been met. These include a minimum of three half courses with a minimum grade of "B" in each course, which must be senior undergraduate and/or graduate courses at the University of Calgary.

c) Curriculum vitae.

d) Work experience (to be assessed by the Graduate Program Director).

e) Certificate of proficiency in the English language or TOEFL, IELTS, MELAB or PTE (refer to the Admissions section of this calendar for minimum English language proficiency score requirements).

f) Two reference letters.

3. Application Deadline

Calgary:

Canadian residents: March 31 for May admission

International applicants: December 31 for May admission

Quito:

Residents not requiring a study permit: June 30 for August admission Canadian/ International students: April 30 for August admission

4. Advanced Credit

The Program does not grant advanced credit for courses completed prior to the admission.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies requirements, the Program requires:

Calgary and Quito:

a) Successful completion of 14 graduate-level courses, including Sustainable Energy Development 625.

b) Attendance and participation in seminars, upgrade courses and/or field trips.

Quito only:

Completion of English upgrading course (2-3 week duration) for non-native English students subject to the discretion of the Graduate Program Directors.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

The Program does not accept undergraduate courses for credit toward the graduate degree.

8. Time Limit

Expected completion time is 16 months. Maximum completion time is six years.

9. Supervisory Assignments

Not applicable.

10. Required Examinations

None.

11. Research Proposal Requirements

Please refer to the course requirements for Sustainable Energy Development 625.

12. Special Registration Information

Admission to the Program delivered in Calgary is only available in May of each year.

Admission to the Program delivered in Quito, Ecuador, is only available in August of each year.

13. Financial Assistance

Financial assistance may be available to qualified students enrolled in the Program after completing eight (8) courses. For information on awards, see the Awards and Financial Assistance section of this Calendar.

14. Other Information

Calgary and Quito:

All courses are instructed in English.

Quito only:

Students are not required to speak Spanish for admission to the Program at USFQ. However it is strongly recommended that non-native Spanish speakers take the preliminary Spanish upgrade course that is part of the USFQ Program offering.

15. Faculty Members/Research Interests

See the website of the home department and home institution of the Faculty member.

Veterinary Medical Sciences VMS

Contact Information

Location: Teaching Research and Wellness (TRW) Building, Room 2D09

Program number: 403.210.8764

Fax: 403.210.8121

Email address: vmgrad@ucalgary.ca

Web page URL:
http://vet.ucalgary.ca/graduate

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Note: All students are registered full-time.

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements, the Veterinary Medical Sciences program requires:

a) A baccalaureate degree* or its equivalent from a recognized institution with a minimum admission grade point average of 3.00 on a four-point scale or equivalent, and a minimum of 3.00 during the last two years (60 credit hours) of undergraduate study.

b) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test), or 92 (Internet-based test), a minimum IELTS score of 7.0, or a minimum MELAB score of 82.

c) Two reference letters.

**Note that a Doctor of Veterinary Medicine (DVM) degree is not a requirement for entry into the MSc or PhD programs. Applicants who do not meet the above requirements will be considered only under exceptional circumstances.*

3. Application Deadline

Applications will be considered for the September, January, and May terms and will only be reviewed upon submission of the online application and receipt of ALL required supporting documents by the following deadlines:

Admission Term	Canadian and US Admission Deadline	International Admission Deadline
September	June 1	March 1
January	November 1	June 1
May	March 1	November 1

4. Advanced Credit

Advanced credit may be given for course work completed prior to entry into the program. The applicant must make requests for advanced credit as part of his or her application for admission.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements, all MSc and PhD students must complete:

a) Veterinary Medicine 601 - Professional Skills in Health Science Research;

b) Veterinary Medicine 605 - Introduction to Research Methods**;

***A suitable entry-level biostatistics course may be taken as an alternative to Veterinary Medicine 605 with permission from the Graduate Program Director.*

c) MSc students must take at least one additional half course, and PhD students must take at least two additional graduate-level half courses that are appropriate to their field of study and have been approved by their Supervisory Committee; and

d) MSc students is the presentation of one seminar prior to scheduling the thesis defense; the program requirement for PhD students is one seminar scheduled prior to oral candidacy, and the presentation of a second seminar prior to scheduling the thesis defense.

e) A public presentation of a final seminar that immediately precedes the thesis defence.

6. Additional Requirements

In accordance with Canadian Council on Animal Care guidelines, all students who work with animals must take either Veterinary Medicine 603, or a suitable certification course on animal care and use. All students working with humans or animals must take appropriate certification. In accordance with Tri-Council guidelines, all students who perform research involving humans must take the CORE tutorial certificate prior to applying for ethics certification (www.ucalgary.ca/research/ethics/CORETutorial) and must receive ethics certification prior to working with human subjects.

7. Credit for Undergraduate Courses

The student's Supervisory Committee may recommend credit for undergraduate courses provided they are relevant to the area of study. Final approval is required by the Graduate Program Director.

8. Time Limit

In accordance with FGS policy, students in full-time study, are expected to complete an MSc in two years, with a maximum time of four years; students in PhD programs are expected to complete their degree in four years with a maximum time of six years.

9. Supervisory Assignments

Students will normally have identified a permanent supervisor at the time of admission.

In consultation with the student's supervisor(s), a Supervisory Committee will be selected that includes a minimum of two additional faculty members for MSc degrees, or three additional faculty members for PhD degrees. In PhD committees, one member will be named from outside the VMS graduate program. The appointment of a supervisory committee shall be completed within three months after starting the program. The Graduate Program Director will approve the composition of the committee.

10. Required Examinations

The candidacy exam for VMS PhD students will consist of a written and oral component. The student's research proposal serves as the written component of the candidacy exam. In the VMS Graduate Program, the oral exam is based both on the written proposal and all relevant related topics assigned by the exam committee. Therefore, it is required that the oral candidacy is completed early in the student's doctoral program, ordinarily by 18 months, but not later than 24 months after initial registration. The written component shall consist of maximum 20 page (double-spaced) document, excluding references and figures, and will include a relevant literature summary of the student's field of study and description of proposed research. References, figures and appendices ordinarily should not exceed 15 pages. The oral exam should be scheduled one week after submission of the written proposal to the exam committee. The supervisor/co-supervisor will attend the exam and may question the candidate, however they serve as non-voting members.

The final thesis defence for MSc and PhD degrees will consist of a public seminar immediately followed by an open oral examination. In the thesis defence, the supervisor(s) are full voting members of the examination committee.

11. Research Proposal Requirements

The VMS Graduate Program requires all master's and doctoral students to defend a Research Proposal to their supervisory committee. A copy of the final version of the proposal will be kept in the student's file. For VMS master's students, it is recommended that the research proposal be defended by six months after starting the program, but no later than twelve months after initial registration in the program. For VMS doctoral students the defence of the research proposal is the oral candidacy exam. All master's students who transfer to a doctoral degree must present and defend a revised proposal to their Supervisory Committee within six months of program transfer as a component of their doctoral candidacy exam.

12. Special Registration Information

None.

13. Financial Assistance

Full-time graduate students in the VMS Graduate Program will be offered a stipend of at least $20,000 per year (normally two years for MSc and four to five years for PhD students). Funding, secured by the student and supervisor, may come from a variety of sources, including grants, external salary awards, and UCVM scholarships. Admission to the Program is conditional on demonstration of internal or external studentship support. Further information on funding opportunities can be found at http://vet.ucalgary.ca/awards_and_scholarships.

14. Other Information

Outstanding students enrolled in the MSc program may request a change of registration status and transfer to the PhD program. The request must be done within the first 18 months of the program and supported in writing by the supervisor and formally recommended by the Supervisory Committee to the Graduate Program Director. The student will be required to defend their thesis proposal, appropriate for a PhD project, within six months of transferring to complete the requirements of the PhD candidacy exam.

15. Faculty Members/Research Interests

Faculty members and their research interests may be found on the Faculty website (http://www.vet.calgary.ca/research).

Additional information can be obtained by calling the contact number listed for the VMS program or from the Administrative Office of the Faculty of Graduate Studies.

Interdisciplinary Specializations

Biological Anthropology BANT

Contact Information

Location: Earth Sciences 852

Program number: 403.220.2665

Fax: 403.282.9562

Email address: wwilson@ucalgary.ca

Web page URL: https://bioanth.ucalgary.ca/

1. Degrees and Specializations Offered

The University offers an interdisciplinary specialization in Biological Anthropology to students registered in an existing graduate program. The student will receive the degree offered by the home program:

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Master of Arts (MA), thesis-based

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, all applicants must meet the minimum standards of the home program. Admission to the specialization requires:

a) A Bachelor of Arts or Bachelor of Science degree (and Master of Arts degree for admission to the PhD program) in Anthropology, Archaeology, Biology, Zoology, Ecology, or Health Sciences with a GPA of at least 3.30 on a four-point scale in the last two years of program or over the last ten full-course equivalents.

b) An example of the applicant's written work: a term paper, research paper, Master of Arts, or honours thesis that the applicant considers representative of his or her best work. Published work authored by the applicant is also acceptable provided the applicant is the sole or senior author.

c) A concise statement setting forth the applicant's academic interests and reasons for wishing to pursue graduate work in the specialization. The area of thesis research should also be specified.

d) An up-to-date curriculum vitae.

3. Application Deadline

The deadlines for the submission of complete application is January 15 for September admission and funding.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies and the home program requirements, the Specialization requires:

Master of Arts / Master of Science

1. Five half-course equivalents, which shall include:

a) Archaeology 617 (Theory and its Application in Biological Anthropology).

b) Anthropology 603 (Thesis Development).

c) Any two of the following: Medical Science 755 (Human Gross Anatomy), Archaeology 613 (Analysis of Human Skeletal Remains), Anthropology 635 (Primatological Theory), or Anthropology 605 (Professional Skills for Anthropologists), Anthropology 613 (Current Issues in Methodology in Primatology).

d) One optional course relevant to the proposed research topic.

e) All students are expected to have proficiency in statistics. The supervisor and two other faculty members of the specialization, in concert with the applicant, will determine if additional course work is needed in statistics, depending upon the applicant's background and proposed research area.

2. A season of fieldwork offering appropriate experience for the proposed research (for example, primate field study, archaeological excavation, or field research in human biology), to be approved by the supervisor. However, students specializing in laboratory-based topics (for example, morphological studies or bone chemistry) may substitute an approved program of laboratory work for the fieldwork requirement.

Doctor of Philosophy

1. Course Requirements:

If students entering the PhD specialization have completed the master's specialization in Biological Anthropology, or if they have completed equivalent courses in another master's program, they will not be required to repeat those courses. Rather, additional courses will be determined at the discretion of the student's supervisory committee.

Normally, six half-course equivalents, which shall include (unless completed previously):

a) Archaeology 617 (Theory and its Application in Biological Anthropology).

b) Anthropology 701 (Independent Studies).

c) Any two of the following: Medical Science 755 (Human Gross Anatomy), Archaeology 613 (Analysis of Human Skeletal Remains), Anthropology 635 (Primatological Theory) or Anthropology 605 (Professional Skills for Anthropologists), Anthropology 613 (Current Issues in Methodology in Primatology).

d) Two courses relevant to the proposed research topic.

The number of courses required of each student may vary according to his or her particular needs as determined by the Supervisory Committee. Statistics will be required in the event the student's committee deems it necessary. The courses will be selected based on the student's previous statistics training and the type of data analyses to be conducted in the research.

2. Two seasons of fieldwork offering appropriate experience for the proposed research topic (for example, primate field study, archaeological excavation, or field research in human biology), to be approved by the supervisor. Fieldwork may have been undertaken before entry into the specialization and may be counted toward the fieldwork requirement. Students specializing in laboratory-based topics (for example, morphological studies or bone chemistry) may substitute an approved specialization of laboratory work for the fieldwork requirement.

3. Submission to the supervisory committee of a paper that demonstrates an ability to research and write a paper at a professional level.

4. Proficiency in a second language.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Students may apply for no more than one 500-level course for graduate credit, subject to the approval of the Program Director. Graduate students taking a 500-level course for graduate credit will be required to complete additional assignments.

8. Time Limit

Expected completion time for the MA and MSc is two years and maximum completion time is four years.

Expected completion time for the PhD is four years and maximum completion time is six years.

9. Supervisory Assignments

Students will be assigned a supervisor upon admission.

10. Required Examinations

Final thesis oral examinations are open.

Oral Candidacy Examinations

Following the completion of all course work, the research paper and the language requirement, doctoral students sit the Candidacy Examination. In the Biological Anthropology Graduate Specialization, the Candidacy Examination consists of two parts in sequence, as follows: (1) a written component and (2) an oral component.

The oral candidacy examination is required by University regulations and must be held no later than twenty-eight months following initial registration as a full-time graduate student in a PhD program. Students entering the doctoral program with a bachelor's degree, or transferring into a doctoral program from a master's program before the master's program is completed, must attempt the candidacy examinations no later than 36 months after initial registration in the Faculty of Graduate Studies.

The Candidacy Examination in the Biological Anthropology Graduate Specialization consists of a written plus an oral examination administered by the Candidacy Examination Committee, composed of the Supervisory Committee plus two additional members, one of whom must be external to the Specialization if the External is not already a member of the Supervisory Committee.

The Candidacy Examination is an examination of the student's knowledge and abilities to reason, utilize the relevant literature, and to solve problems within the three fields or areas which have been set out.

In consultation with the student, the Supervisory Committee will determine three areas of knowledge for which the student will be responsible in his or her Candidacy Examination. These topics will be communicated (in writing) to the student, with copies to other members of the Supervisory Committee.

These topics will also be communicated to the two other members of the Candidacy Examination Committee, who must be selected no later than eight weeks prior to the oral examination.

Members of the Candidacy Examination Committee will each submit one or two questions, so that there are at least two questions within each of the three areas. The supervisor will select six questions from those submitted, and provide them to the student at least five weeks prior to the Oral Candidacy Examination. The student will select one question from each of the three areas for a total of three questions. The student will have two weeks in which to prepare answers to these questions as a take-home, open-book exam. Each answer should be approximately 6000 words. Copies of the completed examination will be distributed to all members of the Examination Committee. The Committee will assess the written exam on a Pass/Fail basis. The oral examination is conducted in accordance with Faculty of Graduate Studies regulations.

In the oral component of the Candidacy Examination, the written examinations will serve as the basis from which the examination shall proceed, but examiners are not limited to the written component in framing the questions asked, and questioning may range into cognate areas, at the discretion of the Neutral Chair.

Students must pass both the written and oral exams in order to pass the candidacy exam.

11. Research Proposal Requirements

Within twenty months of entering the program, the student, with the supervisor's advice, develops a thesis research proposal. This is then transmitted to the student's supervisory committee for agreement and to the Graduate Program Director of the student's home program for approval and placed on file.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to the home program by January 2.

14. Other Information

Given the limited resources, the specialization may, in any year, admit fewer applicants than those who are qualified to undertake graduate studies.

15. Faculty Members/Research Interests

See the website of the home department of the faculty member.

Clinical Research CRES

Applications for this interdisciplinary specialization are not currently being accepted.

Energy & Environmental Systems EESS

Contact Information

Location: Energy, Environmental, Experiential Learning Building, Room 467

Program number: 403.210.6965

Fax: 403.220.2400

Email address: eespinfo@ucalgary.ca

Web page URL:
http://science.ucalgary.ca/iseee/student

1. Degrees and Specializations Offered

The University offers an interdisciplinary specialization in Energy and Environmental Systems to students registered in an existing graduate program currently offered through one of the following Faculties that are affiliated with the Institute for Sustainable Energy, Environment and Economy (ISEEE):

- Faculty of Arts
- Faculty of Environmental Design
- Haskayne School of Business
- Faculty of Law
- Faculty of Science
- Schulich School of Engineering

In cases where the student's proposed research area cannot be supported through a single academic program, and which would necessitate the combination of at least two academic areas, they may seek admission and earn the EES specialization through the Interdisciplinary Graduate Program (IGP) of the Faculty of Graduate Studies.

2. Admission Requirements

In addition to the Faculty of Graduate Studies' requirements, all applicants must meet the minimum admission requirements of the home graduate program and ISEEE. To apply for the specialization, students must complete an online EES specialization application form: http://science.ucalgary.ca/iseee/student/apply-now.

When applying to the EES specialization, students must have already applied to a home graduate program, faculty, or department and must already have a supervisor. Successful candidates must be approved for admission by both the home graduate program as well as by EES. Admission to a degree program does not guarantee entrance to the EES specialization. Likewise, admission to the EES specialization does not guarantee entrance to a degree program.

3. Application Deadline

There are no deadlines for applying for admission into the EES Specialization; however; students will only be admitted into the EES Specialization on January 1, May 1 and September 1. Students who are already enrolled in a graduate program at the University of Calgary are able to apply to the EES Specialization.

4. Advanced Credit

Requests for advanced credit must be made at the time of application. Credit will not be granted for course work taken as part of another completed degree/diploma or for courses taken to bring the admission GPA to the required level.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies and the home graduate program's requirements, students undertaking the EES specialization must successfully complete the following:

EES Specialization at the Master's Level

Students in the EES specialization are required to complete four courses, which include:

- Energy and Environmental Systems 601: Introduction to Energy and Environmental Systems
- Energy and Environmental Systems 607: Tools for System Analysis
- The remaining two courses must be electives approved by the EES Graduate Studies Committee. These courses are intended to bolster a student's back-

ground in energy and environmental systems and/or interdisciplinary research methods, and may be taken in other faculties, schools, or departments at the University of Calgary.

Master's students must also comply with the requirements of their home graduate program. In addition to these course requirements, students must conduct research that takes an interdisciplinary approach to a real-world problem in the area of energy and environmental systems. Students must also actively partake in EES seminars and activities, and contribute meaningfully to the interdisciplinary culture of the specialization.

EES Specialization at the Doctoral Level

Students who have previously earned a master's degree with the EES specialization cannot enrol into the EES specialization as a PhD student. Doctoral students are required to take the same EESS core courses that are required at the master's level and two electives in the area of energy and environment. Doctoral students must also comply with requirements of their home graduate program.

EES Specialization with MGIS Degree (course-based)

Students enrolled in the Master of Geographic Information Systems degree program who wish to earn the EES specialization will need to take three of the EES courses (Energy and Environmental Systems 601, 603, and one other). Students are not required to take Geography 683, but must take the other core courses in the MGIS program (Geography 647, 633, 639, and 681). Finally, students will still be required to fulfill the 10 half course requirement of the MGIS program, and can select the remaining three courses from Geography optional courses or EES related courses. It is not recommended that students required to complete the MGIS upgrade courses undertake the EES specialization.

EES Specialization with the Interdisciplinary Graduate Program (IGP)

The course curriculum for IGP students will be determined at the IGP admission seminar. Course requirements will typically include the EES core courses, but may also include other courses to ensure adequate coverage of the relevant disciplines involved. Changes to the student's curriculum after the admission seminar will require the approval of the Supervisory Committee, IGP Director, and the Faculty of Graduate Studies.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Students are allowed to take only one 500-level course for graduate credit, subject to the approval of the EES Graduate Studies Committee. Graduate students taking a 500-level course for graduate credit will be required to complete additional assignments.

8. Time Limit

Expected completion time for a master's degree is two years and the maximum completion time is four years.

Expected completion time for the PhD degree is four years and the maximum completion time is six years.

9. Supervisory Assignments

Students must meet supervisory requirements of home department.

10. Required Examinations

Final thesis orals follow the requirements of the Faculty of Graduate Studies and the home graduate program. Students in doctoral programs must fulfill the written candidacy examination requirement of the home graduate program. All doctoral students must complete the candidacy oral examination in accordance with Faculty of Graduate Studies' regulations.

11. Research Proposal Requirements

If a research proposal is required by the home department, then a copy of the proposal must be submitted to the EES Graduate Studies Committee and will be placed on file.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available on a competitive basis to all qualified full-time graduate students enrolled in the EES specialization. Students are also encouraged to seek funding opportunities through the Faculty of Graduate Studies' Open Scholarship Competition (contact the home program for application deadlines), as well as external funding agencies.

14. Other Information

Given limited resources, the specialization may, in any year, admit fewer applicants than those who are qualified to undertake graduate studies.

Engineering, Energy & Environment ENEE

Contact Information

Location: Engineering Building, Room ENA206B

Program number: 403.220.2881

Fax: 403.210.9892

Email address: ceere@ucalgary.ca

Web page URL:
http://www.schulich.ucalgary.ca/CEERE/

The Centre for Environmental Engineering Research and Education (CEERE) in the Schulich School of Engineering (SSE) has the overall responsibility for the co-ordination and delivery of a comprehensive postgraduate program specialization in the multidisciplinary field of energy & environment. All five engineering departments participate in delivering this SSE-wide specialization.

Applications for admission to the Faculty of Graduate Studies should be submitted to the engineering department that best matches the applicant's undergraduate and/or postgraduate academic training.

1. Degrees and Specializations Offered

Degrees with an interdisciplinary specialization in Energy & Environment:

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Master of Engineering (MEng), thesis-based and course-based

Only the Master of Engineering degree is available for part-time enrolment.

2. Admission Requirements

In addition to the Faculty of Graduate Studies, SSE, and home department requirements, the Energy & Environment specialization requires:

Master of Engineering and Master of Science

A bachelor's degree in engineering.

Note: Applicants with applied science degrees may be considered, but additional undergraduate engineering courses may be required.

Doctor of Philosophy

A master's degree in engineering.

Note: Transfer to the doctoral program without completing the master's degree may be approved for exceptional students.

3. Application Deadline

See departmental and program sections in this Calendar for deadlines regarding submission of complete applications for students with international transcripts or with Canadian and U.S. transcripts.

4. Advanced Credit

See "Engineering Programs".

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements and to the course requirements described below, students should consult their "home" department in the Schulich School of Engineering for any additional program or course requirement(s).

Master of Engineering (Course-based Route)

Ten half courses of which a minimum of six must be graduate half courses. Environmental Engineering 671 is required, together with at least three courses selected from a list of courses related to Energy & Environment available from CEERE.

Note: Students with applied science undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

Master of Engineering (Thesis-based Route)

A minimum of four graduate half courses. Environmental Engineering 671 is required, together with at least one course selected

from a list of courses related to Energy & Environment available from CEERE.

Note: Students with applied science undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

Master of Science

A minimum of four graduate half courses plus Environmental Engineering 601. Environmental Engineering 671 is required, together with at least one course selected from a list of courses related to Energy & Environment available from CEERE. Students must successfully complete Environmental Engineering 601 twice before their thesis defence.

Note: Students with applied science undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

Doctor of Philosophy

For applicants with Bachelor of Science and Master of Science degrees in Engineering:

A minimum of two graduate half courses plus Environmental Engineering 601. Environmental Engineering 671 is required. In case Environmental Engineering 671, or its equivalent, has already been completed, at least one course must be selected from a list of courses related to Energy & Environment available from CEERE. Students must successfully complete Environmental Engineering 601 twice before their thesis defence.

For applicants with a bachelor's degree in Engineering, but without a completed master's degree:

A minimum of six graduate half courses plus Environmental Engineering 601. Environmental Engineering 671 is required, together with at least two courses selected from a list of courses related to Energy & Environment available from CEERE. Students must successfully complete Environmental Engineering 601 twice before their thesis defence.

Note: Students with applied science undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

6. Additional Requirements

All full-time Master of Science and Doctor of Philosophy students are required to register and participate in the Research Seminar course, Environmental Engineering 601. It must be successfully completed twice before the thesis defence.

7. Credit for Undergraduate Courses

Not applicable.

8. Time Limit

Expected completion time is two years for the Master of Science degree, and three years for the Doctor of Philosophy. Maximum completion time is four years for the Master of Science and Master of Engineering (Thesis) degrees and six years for the Master of Engineering (Courses Only) and Doctor of Philosophy degrees.

9. Supervisory Assignments

All students are required to have a thesis supervisor before the second annual registration. For students in the Master of Science and Doctor of Philosophy degree programs, a supervisor is normally appointed at the time of admission.

10. Required Examinations

Final thesis oral examinations follow the requirements of the Faculty of Graduate Studies and the home graduate program.

11. Research Proposal Requirements

None.

12. Special Registration Information

None.

13. Financial Assistance

See "Engineering Programs".

14. Other Information

See "Engineering Programs".

15. Faculty Members/Research Interests

The current research interests of the faculty members can be found at http://www.schulich.ucalgary.ca/CEERE/ or from the various engineering departments.

Environmental Engineering ENEN

Contact Information

Location: Engineering Building, Room ENA206B

Program number: 403.220.2881

Fax: 403.210.9892

Email address: ceere@ucalgary.ca

Web page URL:
http://www.schulich.ucalgary.ca/CEERE/

The Centre for Environmental Engineering Research and Education (CEERE) in the Schulich School of Engineering (SSE) has the overall responsibility for the coordination and delivery of a comprehensive postgraduate program specialization in the interdisciplinary field of environmental engineering. All five engineering departments participate in delivering this SSE-wide environmental engineering specialization.

Applications for admission to the Faculty of Graduate Studies should be submitted to the engineering department that best matches the applicant's undergraduate and/or postgraduate academic training.

1. Degrees and Specializations Offered

Degrees with an interdisciplinary specialization in Environmental Engineering:

Doctor of Philosophy (PhD)

Master of Science (MSc), thesis-based

Master of Engineering (MEng), thesis-based and course-based

Only the Master of Engineering degree is available for part-time enrolment

2. Admission Requirements

In addition to the Faculty of Graduate Studies, SSE, and home department requirements, the Environmental Engineering specialization requires:

Master of Engineering and Master of Science

A bachelor's degree in engineering.

Note: Applicants with applied science undergraduate degrees may be considered, but additional undergraduate engineering courses may be required.

Doctor of Philosophy

A master's degree in engineering, preferably in environmental engineering or equivalent.

Note: Transfer to the doctoral program without completing the master's degree may be approved for exceptional students.

3. Application Deadline

See departmental and program sections in this Calendar for deadlines regarding submission of complete applications for students with international transcripts or with Canadian and U.S. transcripts.

4. Advanced Credit

See "Engineering Programs" in this Calendar.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements and the course requirements described below, students should consult their "home" department in the Schulich School of Engineering for any additional program or course requirement(s).

Master of Engineering (Course-based Route)

Ten half courses. Environmental Engineering 603 and 605 are normally required, together with at least one of Environmental Engineering 621, 623, 625 627 or 635, and at least one other Environmental Engineering course.

Students with non-engineering undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

Master of Engineering (Thesis-based Route)

A minimum of four half courses. Environmental Engineering 603 or 605 is normally required, together with at least one of Environmental Engineering 621, 623, 625, 627 or 635, and at least one other Environmental Engineering course.

Students with non-engineering undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

Master of Science

A minimum of four half courses plus Environmental Engineering 601. Environmental Engineering 603 or 605 is normally required, together with at least one of Environmental Engineering 621, 623, 625, 627 or 635, and at least one other Environmental Engineering course. Students must successfully com-

plete Environmental Engineering 601 twice before their thesis defence.

Students with non-engineering undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

Doctor of Philosophy

For applicants with Bachelor of Science and/or Master of Science degrees in Environmental Engineering:

A minimum of two half courses plus Environmental Engineering 601. One of Environmental Engineering 621, 623, 625, 627 or 635 is normally required. Students must successfully complete Environmental Engineering 601 twice before their thesis defence.

For applicants with Bachelor of Science and Master of Science degrees in Engineering, but not in Environmental Engineering:

A minimum of three half courses and Environmental Engineering 601. Environmental Engineering 603 or 605 is normally required, together with at least one of Environmental Engineering 621, 623, 625, 627 or 635. Students must successfully complete Environmental Engineering 601 twice before their thesis defence.

For applicants with a bachelor's degree in Engineering, but without a completed master's degree:

A minimum of six half courses plus Environmental Engineering 601. Environmental Engineering 603 and 605 are normally required, together with at least one of Environmental Engineering 621, 623, 625, 627 or 635, and at least one other Environmental Engineering course. Students must successfully complete Environmental Engineering 601 twice before their thesis defence.

Students with non-engineering undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

6. Additional Requirements

All full-time Master of Science and Doctor of Philosophy students are required to register and participate in the Research Seminar course, Environmental Engineering 601. It must be successfully completed twice before the thesis defence.

7. Credit for Undergraduate Courses

Not applicable.

8. Time Limit

Expected completion time is two years for the Master of Science degree, and three years for the Doctor of Philosophy. Maximum completion time is four years for the Master of Science and Master of Engineering (thesis-based) degrees and six years for the Master of Engineering (course-based) and Doctor of Philosophy degrees.

9. Supervisory Assignments

All students are required to have a thesis supervisor before the second annual registration. For students in the Master of Science and Doctor of Philosophy degree programs, a supervisor is normally appointed at the time of admission.

10. Required Examinations

Final thesis oral examinations follow the requirements of the Faculty of Graduate Studies and the home graduate program.

11. Research Proposal Requirements

None.

12. Special Registration Information

None.

13. Financial Assistance

See "Engineering Programs".

14. Other Information

See "Engineering Programs".

15. Faculty Members/Research Interests

The current research interests of the faculty members can be found at http://www.schulich.ucalgary.ca/CEERE/ or from engineering departments.

Israel Studies ISST

Contact Information

Dr. David Tal

Kahanoff Chair in Israel Studies

Location: SS 646

Program number: 403.220.6405

Fax: 403.282.8606

Email address: dtal@ucalgary.ca

Web page URL: http://ss.ucalgary.ca/isst/

1. Degrees and Specializations Offered

The University offers an interdisciplinary specialization in Israel Studies to students registered in an existing graduate program. The student will receive the degree offered by the home program.

Master of Arts (MA)

Specialization: Israel Studies (Interdisciplinary)

2. Admission Requirements

In selecting students for the program, a broad range of disciplinary backgrounds will be considered as well as relevant experience. Upon application to an existing program students must contact the Israel Studies Program Director.

All applicants must meet the requirements of the Faculty of Graduate Studies and the home program. In addition applicant must send the Israel Studies Program:

a) A copy of a graded writing sample.

b) A 250-word (minimum) statement of research interest including research topics in the field and reasons for pursuing a graduate degree with a specialization in Israel Studies.

3. Application Deadline

The deadlines for the submission of complete applications correspond to the home program through which applicants have applied.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies and the home program requirements, the Program requires:

Master of Arts

a) A minimum of one year of full-time study at the University of Calgary.

b) Three full-course equivalents:

- Israel Studies 601 (half course)
- One full-course equivalent in the student's disciplinary focus
- One appropriate methods course in the focus discipline - for example, History 690 or Political Science 691 (half course)
- One full-course equivalent in Israel Studies options, to be chosen from:
  - English 607.14
  - English 607.17
  - History 515
  - History 691
  - Political Science 596.74
  - Political Science 675.01
  - Political Science 681
  - Religious Studies 601
  - Religious Studies 681
  - Strategic Studies 651 (topic focused on Israel)
  - Strategic Studies 653 (topic focused on Israel)

Course selection will be made in consultation with the Israel Studies Program Director and in relation to the student's field of thesis research.

c) A demonstration of reading knowledge of Hebrew or a second language related to the major field of study before the oral thesis defence. Students may satisfy this requirement by successfully completing a language examination administered by the Israel Studies Program Director, by successfully competing Religious Studies 207 and 209, or by successfully completing equivalent language courses (e.g., in Arabic or Russian) should this be required by a student's area of concentration.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Students may apply for no more than one 500-level course for graduate credit, subject to the approval of the Program Director. Graduate students taking a 500-level course for graduate credit will be required to complete additional assignments.

8. Time Limit

Expected completion time is two years. Maximum completion time is four years.

9. Supervisory Assignments

Students will be assigned a supervisor upon admission.

10. Required Examinations

Final thesis oral examinations are open.

11. Research Proposal Requirements

Within twenty months of entering the program, the student, with the supervisor's advice, develops a thesis research proposal to be submitted to the Program Director for approval and placed on file.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance may be available to qualified students. For information on awards, see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships must submit their applications to the Program in accordance with the home department deadline.

14. Other Information

Given the limited resources, the Program may, in any year, admit fewer applicants than those who are qualified to undertake graduate studies.

Medical Imaging MEDI

Contact Information

Location: FMC ST 1105

Program number: 403.944.4336

Email address: i3t@ucalgary.ca

Web page URL: www.ucalgary.ca/i3t

1. Degrees and Specializations Offered

A Graduate Specialization in Medical Imaging is offered in conjunction with the following graduate programs: Biomedical Engineering, Electrical and Computer Engineering, Medical Sciences, Neurosciences, Physics and Astronomy and Psychology. The specialization is offered at the MSc and PhD level.

2. Admission Requirements

Admission into a graduate program that offers the Graduate Specialization in Medical Imaging and submission and approval of a written request to join the Specialization. Specialization admission forms are available at www.ucalgary.ca/i3t. Program is open to both Canadian and international students.

3. Application Deadline

Not applicable. Students must first apply to a graduate program offering the specialization. See www.ucalgary.ca/i3t for a current listing of graduate programs offering the Graduate Specialization in Medical Imaging.

4. Advanced Credit

Credit may be granted for appropriate courses to count towards the specialization with approval of the Graduate Specialization in Medical Imaging.

Students Currently Enrolled in Participating Graduate Programs

Have completed (or are completing) at least one graduate-level course in medical imaging and plan to complete at least one more graduate course. Typically, these courses would consist of the core and one of the foundational courses. Upon request, an approved Medical Imaging elective course may be accepted to meet the foundational course requirement.

- Be attending the Advanced Imaging Seminar Series, and as part of their request for admission into the Graduate Specialization have given (or are scheduled to give) an appropriate presentation in this series.
- Undertake a Medical Imaging-related research thesis under the supervision of a Specialization-participating graduate supervisor, and
- Enrolment in the specialization would also need to be approved by their Graduate Program.

5. Program/Course Requirements

The Specialization requirements will consist of completion of:

1. at least two graduate-level courses in medical imaging for MSc and three medical imaging courses for PhD (as described below),
2. the Professional Skills Workshop Program,
3. a Medical Imaging-related research thesis, and
4. attendance and annual presentation in the Advanced Imaging Seminar Series (fulfilled by repeated enrolment in Medical Science 689.98).

In addition, participation in an International or Industrial Exchange of approximately two to four months in duration, by PhD trainees will be strongly encouraged.

The Specialization requires completion of a course sequence in Medical Imaging, in addition to requirements of the specific graduate program. MSc students must take a minimum of two graduate courses (the core and a foundational course). PhD students take at least three graduate courses (including the core, a foundational and an elective course). PhD students previously completing the MSc Specialization in Medical Imaging will be required to complete one elective course in Medical Imaging. PhD students may elect to take the second foundational course as an elective course. These requirements are in addition to the core requirements of a specific participating graduate program. In most programs, the medical imaging graduate courses would count towards graduate program elective courses. In some graduate programs, participation in the Specialization may require students to take an additional graduate course or courses.

Students in the Medical Imaging Specialization should choose between the Technology and Application Streams. The Technology Stream would typically include students enrolled in engineering or physics graduate programs. Application Stream would typically include students in the biological, psychological or medical sciences.

Core required course (MSc and PhD students):

- Medical Science 689.01 - Medical Imaging Techniques

Select one of the following two foundational graduate courses (MSc and PhD students):

- Medical Science 689.10 - Medical Imaging Theory (for students in the Technology Stream)
- Medical Science 689.11 - Medical Imaging Applications and Analysis (for students in the Application Stream)

In consultation with your supervisor and supervisory committee (if appropriate), please select at least one elective course from the following list (PhD students):

- Electrical Engineering 697 - Digital Image Processing
- Mechanical Engineering 619.36 - Computer Measurement for BME
- Medical Science 689.02 - Advanced Magnetic Resonance Imaging
- Medical Science 689.03 - Advanced Image Processing
- Medical Science 689.04 - Advanced Molecular Imaging (offered alternate years)
- Medical Science 689.05 - Advanced Neuro-imaging (offered alternate years)
- Medical Science 689.10 - Medical Imaging Theory
- Medical Science 689.11 - Medical Imaging Applications and Analysis
- Medical Science 689.99 - Special Projects in Medical Imaging (with consent of Specialization)
- Neuroscience 5850 - Neuro-imaging Techniques- offered at The University of Lethbridge
- Other Medical Imaging-related graduate courses with prior approval of specialization and graduate program

In addition a new services course is offered (on a pass/fail basis):

- Medical Science 698 – Advance Imaging Seminar

6. Additional Requirements

Satisfactory completion of all graduate program and specialization requirements is required for awarding of the "Specialization in Medical Imaging" designation.

7. Credit for Undergraduate Courses

Credit (in the Specialization) will not be given for 500-level courses.

8. Time Limit

As per graduate program requirements.

9. Supervisory Assignments

As per graduate program requirements.

10. Required Examinations

As per graduate program requirements.

11. Research Proposal Requirements

Research proposal must be on a Medical Imaging topic and fit into a research area broadly defined by the Specialization (see www.ucalgary.ca/i3t):

1. Image Acquisition and Reconstruction - Development of algorithms suitable for accurate imaging using existing technologies (e.g., MR, CT) and emerging methods (e.g., microwaves).
2. Signal Processing for Information Synthesis - Development of robust strategies for the assessment of brain and other organ function via advanced signal processing.
3. Quantitative Imaging and Analysis - Development of software engineering approaches, validation and testing for the creation of resilient methods for quantitative imaging.

A copy of the proposal must be provided to the Specialization office. Other requirements are as per the graduate program requirements. Typically this proposal is to be provided within 12 months of starting the program.

In programs that do not require submission of a research proposal, a suitable proposal should be developed by the student within 12 months of starting the specialization, approved by the supervisor and supervisory committee (where appropriate), and submitted to the Specialization office.

12. Special Registration Information

None.

13. Financial Assistance

As per graduate program requirements. Additional funding may be available through the Specialization or other University sources for well-qualified students.

14. Other Information

None.

15. Faculty Members/Research Interests

Please refer to www.ucalgary.ca/i3t for a listing of participating faculty members and their research interests.

Reservoir Characterization RSCH

Contact Information

Geoscientists should contact the Department of Geoscience and engineers should contact the Department of Chemical and Petroleum Engineering for further information.

Department of Chemical and Petroleum Engineering

Location: Schulich School of Engineering, Room B202

Program number: 403.220.4802

Fax: 403.284.4852

Email Address: chemandpetenggrad@ucalgary.ca

Web page URL: http://www.eng.ucalgary.ca/Chemical

Department of Geoscience

Location: Earth Sciences 118

Program number: 403.220.3254

Fax: 403.284.0074

Email Address: geosciencegrad@ucalgary.ca

Web page URL: http://www.geo.ucalgary.ca

1. Degrees and Specializations Offered

The University offers an interdisciplinary specialization in Reservoir Characterization to students registered in an existing course-based master's program in the Departments of Chemical and Petroleum Engineering or Geoscience. The program integrates reservoir engineering, geology, geophysics, and reservoir characterization. The student will receive the degree offered by the home program:

Master of Engineering in Chemical and Petroleum Engineering (MEng)

Master of Science in Geology or Geophysics (MSc)

All students will normally be considered to have full-time status. In exceptional circumstances part-time status may be considered and must be approved by the Graduate Director.

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, all applicants must meet the minimum standards of the home program.

Acceptance into the Master of Engineering program would normally require the completion of the equivalent of the Bachelor of Science in Oil and Gas Engineering degree offered by the University of Calgary. However, individuals with more diverse background and industry experience may be considered for admission.

Acceptance into the Master of Science program requires the completion of a Bachelor of Science in Geoscience plus a course in Well Logging and Formation Evaluation, Petroleum Engineering 507 at the University of Calgary, or equivalent.

Applicants with an undergraduate degree in geology must demonstrate acceptable proficiency in mathematics. It is an asset for geologists to have taken additional mathematics courses as technical electives during their undergraduate degree.

3. Application Deadline

See departmental listings for the deadlines for the submission of completed applications.

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree/diploma or for courses taken to bring the grade point average to a required level for admission.

5. Program/Course Requirements

To address the broad background of students entering the Reservoir Characterization Interdisciplinary Specialization, there are three streams for completion: Geology, Geophysics and Engineering.

All students must take at least six courses at the 600 and/or 700 level.

Students in the engineering stream are required to take:

Geophysics 559 – Geophysical Interpretation

Chemical Engineering 621 – Reservoir Simulation

Chemical Engineering 661 – Geostatistics for Reservoir Characterization OR Geology 697 – Advanced Geostatistics

Chemical Engineering 698/Geology 698*** – Reservoir Characterization for Field Development (RCFD)

Human Resources and Organizational Dynamics 789 – Seminar in the Management of Human Resources

and select four from the following list, two of which MUST be geoscience:

Petroleum Engineering 543 – Geological Characterization of Oil and Gas Reservoirs

Chemical Engineering 687 – Petroleum Economics

Chemical Engineering 649 – Naturally-Fractured Reservoirs

Geology 694.03 – Reservoir Evaluation and Hydrocarbon Play Assessment

Geology/Geophysics 649 – Advanced Petrophysical Techniques

Geology 655 – Unconventional Gas Reservoir Characterization and Evaluation

Geophysics 671 – Inverse Theory and Applications I

Geology 593.02 or 693.02 – Stratigraphy and Sedimentation of clastic rocks (Q)*

Geology 593.03 or 693.03 – Stratigraphy and Sedimentation of carbonate rocks (Q)*

Students in the geology stream are required to take:

Petroleum Engineering 523 – Introduction to Reservoir Engineering

Chemical Engineering 621 – Reservoir Simulation

Chemical Engineering 661 – Geostatistics for Reservoir Characterization OR Geology 697 – Advanced Geostatistics

Chemical Engineering 698/Geology 698*** – Reservoir Characterization for Field Development (RCFD)

Human Resources and Organizational Dynamics 789 – Seminar in the Management of Human Resources

and select four from the following list, two of which MUST be engineering:

Engineering 407 – Numerical Methods in Engineering

Petroleum Engineering 513** – Flow in Porous Media

Petroleum Engineering 525 – Waterflooding and Enhanced Oil Recovery

Petroleum Engineering 533 – Petroleum Production Engineering

Petroleum Engineering 543 – Geological Characterization of Oil and Gas Reservoirs

Chemical Engineering 687 – Petroleum Economics

Chemical Engineering 649 – Naturally-Fractured Reservoirs

Geophysics 559 – Geophysical Interpretation

Geology 613** – Flow in Porous Media

Geology 694.03– Reservoir Evaluation and Hydrocarbon Play Assessment

Geology/Geophysics 649 – Advanced Petrophysical Techniques

Geology 655 – Unconventional Gas Reservoir Characterization and Evaluation

Students in the geophysics stream are required to take:

Petroleum Engineering 523 – Introduction to Reservoir Engineering

Chemical Engineering 621 – Reservoir Simulation

Chemical Engineering 661 – Geostatistics for Reservoir Characterization OR Geology 697 – Advanced Geostatistics

Chemical Engineering 698/Geology 698*** – Reservoir Characterization for Field Development (RCFD)

Human Resources and Organizational Dynamics 789 – Seminar in the Management of Human Resources

and select four from the following list, two of which MUST be engineering:

Engineering 407 – Numerical Methods in Engineering

Petroleum Engineering 513** – Flow in Porous Media

Petroleum Engineering 525 – Waterflooding and Enhanced Oil Recovery

Petroleum Engineering 533 – Petroleum Production Engineering

Petroleum Engineering 543 – Geological Characterization of Oil and Gas Reservoirs

Chemical Engineering 687 – Petroleum Economics

Chemical Engineering 649 – Naturally-Fractured Reservoirs

Geology 613** – Flow in Porous Media

Geology 694.03 – Reservoir Evaluation and Hydrocarbon Play Assessment

Geology/Geophysics 649 – Advanced Petrophysical Techniques

Geology 655 – Unconventional Gas Reservoir Characterization and Evaluation

Geology 593.02 or 693.02 – Stratigraphy and Sedimentation of clastic rocks (Q)*

Geology 593.03 or 693.03 – Stratigraphy and Sedimentation of carbonate rocks (Q)*

where * (Q) = quarter course taught in ½ semester; Geology 593.02 and .03 must both be taken for program credit.

***Choose only one (1) of Petroleum Engineering 513 or Geology 613.*
****To be taken in the final semester of study.*

The RCFD course is a team-based experience with each team required to analyse and integrate various data (e.g., seismic, logs, and production) from a real field. Each member of the team is expected to have proficiency on the software packages for geophysical interpretation, geological mapping, geostatistical modelling and reservoir flow modelling. The reservoir characterization will require the development and assessment of a geostatistical model of the field that will be used for a history match and to propose future development. The project will conclude with a formal presentation to experts from both academia and industry.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

The applicant must make advanced credit requests as part of the admission process. Credit will not be given for course work taken as part of another completed degree or diploma program, or for courses taken to bring the grade point average to the required level for admission.

8. Time Limit

Expected completion time is two years and maximum completion time is six years.

9. Supervisory Assignments

Supervisors will be approved by the specialization Graduate Program Director.

10. Required Examinations

After the conclusion of the Capstone Project, there will be a comprehensive oral examination of each student before an examining committee that includes a faculty member from each of the three disciplines. Each student will be expected to express in-depth knowledge in his/her area of expertise (engineering, geology, geophysics), and to have a comprehensive knowledge of the significance of the other two areas in successful reservoir characterization.

11. Research Proposal Requirements

None.

12. Special Registration Information

None.

13. Financial Assistance

For information on awards, see the Awards and Financial Assistance section of this Calendar.

14. Other Information

None.

15. Faculty Members/Research Interests

See the website of the home department of the faculty members.

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.

Note: 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.

Sample Course Description

See numbered footnotes for explanations of the information commonly provided in a course description.

Medical Science 6091 H(3-2T)[2]
(Biochemistry 609)[3]

Gene Expression

The flow of genetic information from DNA to final protein product. The subject will be covered in two courses offered in alternating years: gene structure and regulation of transcription, including gene structure and organization, chromatin structure, regulation of transcription and post-translational processing; and the activity of genes during development including stored messenger ribonucleoprotein particles and translational control in gametes, the switch from maternal to zygote genome control of development in early embryos and the molecular basis of morphogenesis and differentiation.

609.01. Gene Structure and Regulation of Transcription

609.02. Genes and Development

Prerequisite:[4] Medical Science 537 (Biochemistry 537) or equivalent.

Corequisite:[5] Biology 515

Note:[6] Credit for both Medical Science 609.02 and 751.14 will not be allowed.

MAY BE REPEATED FOR CREDIT[7]

NOT INCLUDED IN GPA[8]

[1]**Course Numbers: e.g. Medical Science 609**

The number of the course indicates the level of the course:

- Junior level: 200's
- Senior level: 300's and 400's
- Upper level undergraduate: 500's
- Graduate level: 600's and 700's

[2]**Hours of Instruction: e.g. H(3-2T)**

The hours of instruction per week are indicated with this code:

- M More than a full course; refer to individual course description for hours.
- F(3-3) Full course; equivalent of 3 hours of lectures and 3 hours of lab each week for 2 terms.
- F(3-1S-3) Full course; equivalent of 3 hours of lectures, 1 seminar hour, and 3 hours of lab each week for 2 terms.
- Q(3-0) Quarter-course; equivalent of 3 hours of lectures each week for 1 half term.
- H(3-3/2) Half-course; equivalent of 3 hours of lectures every week and 3 hours of lab every other week for 1 term.
- E(0-3) Eighth-course; equivalent of 3 hours of lab each week for one quarter term.

The figures "S" or "T" attached to a number signify seminar or tutorial hours.

[3]**Cross-Listed Courses: e.g. Medical Science 609 (Biochemistry 609)**

Courses which are listed under two Departments and which can be taken for credit from either Department, but not both. The credit is determined by the student's registration.

[4]**Prerequisite:** Must be completed before registering in this class.

[5]**Corequisite:** Must be completed at the same time as this class.

[6]**Notes/Antirequisites:** Notes provide additional information pertaining to the course, e.g. restrictions, recommendations. Certain courses carry the notation "Not open to students with credit in course number XXX" or "Credit for both 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.

[7]**May Be Repeated for Credit**

Some courses are decimalized in order to accommodate different topics of study e.g. 609.01, 609.02. If this notation is present, students are allowed to take multiple decimalized topics belonging to one course number.

[8]**Not 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.

Contents

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Courses of Instruction by Faculty

Faculty of Arts
Anthropology ANTH
Archaeology ARKY
Art ART
Art History ARHI
Communication and Culture CMCL
Communications Studies COMS
Dance DNCE
Drama DRAM
Economics ECON
English ENGL
Fine Arts FINA
French FREN
Geography GEOG
German GERM
Greek GREK
Greek and Roman Studies GRST
History HTST
Israel Studies ISST
Latin LATI
Linguistics LING
Music MUSI
Music Education MUED
Music Performance MUPF
Philosophy PHIL
Political Science POLI
Psychology PSYC
Religious Studies RELS
Sociology SOCI
Spanish SPAN
Strategic Studies STST

Faculty of Environmental Design
Environmental Design EVDS
Environmental Design Architecture EVDA
Environmental Design Planning EVDP

Haskayne School of Business
Accounting ACCT
Business and Environment BSEN
Entrepreneurship and Innovation ENTI
Finance FNCE
Human Resources and Organizational Dynamics HROD
Management Information Systems MGIS
Management Studies MGST
Marketing MKTG
Operations Management OPMA
Risk Management and Insurance RMIN
Strategy and Global Management SGMA
Tourism Management TOUR

Faculty of Kinesiology
Kinesiology KNES

Faculty of Law
Law LAW

Faculty of Medicine
Community Health Sciences MDCH
Medical Science MDSC

Faculty of Nursing
Nursing NURS

Schulich School of Engineering
Biomedical Engineering BMEN
Chemical Engineering ENCH
Civil Engineering ENCI
Electrical Engineering ENEL
Environmental Engineering ENEN
Geomatics Engineering ENGO
Manufacturing Engineering ENMF
Mechanical Engineering ENME
Software Engineering for Engineers ENSF

Faculty of Science
Applied Mathematics AMAT
Astrophysics ASPH
Biochemistry BCEM
Biology BIOL
Cellular, Molecular and Microbial Biology CMMB
Chemistry CHEM
Computer Science CPSC
Ecology ECOL
Geology GLGY
Geophysics GOPH
Marine Science MRSC
Mathematics MATH
Medical Physics MDPH
Physics PHYS
Plant Biology PLBI
Pure Mathematics PMAT
Space Physics SPPH
Statistics STAT

Faculty of Social Work
Social Work SOWK

Faculty of Veterinary Medicine
Veterinary Medicine VETM

Werklund School of Education
Educational Psychology EDPS
Educational Research EDER

Collaborating Faculties
Community Rehabilitation (MD, SW) CORE
Interprofessional Health Education (KN, NU, SW) IPHE
Language (AR, ED) LANG
Software Engineering (EN, SC) SENG
Sustainable Energy Development (EN, EV, LA, HA) SEDV

Other
Energy and Environmental Systems EESS
Public Policy PPOL
University UNIV

Course Descriptions

Accounting ACCT

Instruction offered by members of the Haskayne School of Business.

Accounting Chairperson — H. Warsame

Graduate Courses

Accounting 601 **H(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 **H(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 **H(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 **H(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 H(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 721 H(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 H(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 H(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 H(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 H(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 H(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 H(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 H(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 H(3S-0)

Advanced Seminar in Accounting
Advanced accounting research topics.

Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

PhD Course

Accounting 799 H(3S-0)

Doctoral Seminars in Accounting
799.01. Seminar in Financial Accounting

799.02. Seminar in Managerial Accounting

799.04. Seminar in Taxation

Anthropology ANTH

Instruction offered by members of the Department of Anthropology in the Faculty of Arts.

Department Head – M. Pavelka

Anthropology 501 H(3-0)

Conference Course in Anthropology
Arranged for various topics of anthropology on the basis of special interest and need.

Prerequisite(s): Anthropology 203, one additional senior Anthropology course and consent of the Department.

MAY BE REPEATED FOR CREDIT

Anthropology 505 H(3-0)

Conference Course in Primatology
Arranged for various topics of primatology on the basis of special interests and need.

Prerequisite(s): Anthropology 311 and one additional senior primatology course and consent of the Department.

MAY BE REPEATED FOR CREDIT

Anthropology 523 H(3-0)
(Archaeology 523) (Geography 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): Not open to students with credit in Anthropology 609, Archaeology 609, and Geography 609.

Anthropology 535 H(3-0)

History and Theory in Primatology and Physical Anthropology
Historical and theoretical survey of ideas about the biological bases of human and non-human primate social behaviour. Impacts of the theoretical models of the modern synthesis, ethology, behavioural ecology, socio-ecology, and sociobiology or the study of human and non-human primates.

Prerequisite(s): Anthropology 413.

Anthropology 541 H(3-0)

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.

Anthropology 552 F(3-3)

Field Studies in Primatology
Intensive training and practice in field methods of observational primate behaviour or behavioural ecology.

Prerequisite(s): Anthropology 413 and consent of the Department.

Corequisite(s): Anthropology 553.

Note: Normally offered during Spring Term.

MAY BE REPEATED FOR CREDIT

Anthropology 553 H(3-3)

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): Anthropology 413 and consent of the Department.

Corequisite(s): Anthropology 552.

Note: Normally offered during Spring Term.

MAY BE REPEATED FOR CREDIT

Anthropology 571 H(3-0)

Advanced Seminar in Primatology
Current theoretical and methodological issues will be explored in a discussion-based seminar format.

Prerequisite(s): Anthropology 413.

Anthropology 573 H(3-0)

Advanced 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.

Anthropology 589 H(3-0)
(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): Anthropology 201 or Archaeology 203 or Archaeology 305, 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.

Anthropology 601 **H(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 **H(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 **H(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): Not open to students with credit in Anthropology 601.90 or the equivalent.

NOT INCLUDED IN GPA

Anthropology 611 **H(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 **H(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 **H(3-0)**

Anthropological Theory
Prerequisite(s): Consent of the Department.

Anthropology 635 **H(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 **H(3-0)**

Seminar in Civil-Military Relations
Comparative analysis of relations between civil society and military institutions. A critical approach to analysing 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 **H(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 **H(3-0)**

Independent Studies
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Applied Mathematics AMAT

Instruction offered by members of the Department of Mathematics and Statistics in the Faculty of Science.

Department Head - M. Lamoureux

Note: For listings of related courses, see Actuarial Science, Mathematics, Pure Mathematics and Statistics.

Applied Mathematics 501 **H(3-0)**

Seminar in Applied Mathematics
Topics will be chosen according to the interests of instructors and students and could include analysis of optimization algorithms, approximation theory, control theory, differential equations, mathematical physics.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Applied Mathematics 503 **H(3-0)**

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): Applied Mathematics 491 or Computer Science 491.

Applied Mathematics 505 **H(3-0)**

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): Pure Mathematics 445 or 545; and one of Applied Mathematics 311 or 307; or consent of the Department.

Applied Mathematics 507 **H(3-0)**

Introduction to Relativity Theory
Mathematical theories of space and time. Special Relativity. Electro-dynamics. General Relativity.

Prerequisite(s): Applied Mathematics 505 or consent of the Department.

Applied Mathematics 509 **H(3-0)**

Analytical Dynamics
Symplectic geometry, Hamilton's equation, Hamilton-Jacobi theory, constraints and reduction.

Prerequisite(s): Applied Mathematics 505 or consent of the Department.

Applied Mathematics 581 **H(3-0)**

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): Applied Mathematics 481.

Antirequisite(s): Credit for both Applied Mathematics 581 and 681 will not be allowed.

Applied Mathematics 583 **H(3-0)**

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): Applied Mathematics 481 and 491.

Antirequisite(s): Credit for both Applied Mathematics 583 and 683 will not be allowed.

Graduate Courses

In addition to the prerequisites listed below, consent of the Applied Mathematics Department is a prerequisite for all graduate courses in Applied Mathematics.

Applied Mathematics 601 **H(3-0)**

Topics in Applied Mathematics
Topics will be chosen according to the interests of instructors and students.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Applied Mathematics 605 **H(3-0)**

Differential Equations III
Linear systems, classification. Non-linear systems: Existence and uniqueness. Flow and one parameter groups of transformations. Stability theory. Hyperbolicity, Unstable/Stable/Center manifold theorems. Poincare-Bendixson.

Prerequisite(s): Applied Mathematics 411 and Pure Mathematics 445 or 545 or equivalents.

Applied Mathematics 613 **H(3-0)**

Partial Differential Equations II
Fundamental solutions, integral equations, eigenvalue problems, non-linear problems.

Prerequisite(s): Consent of the Department.

Applied Mathematics 617 **H(3-0)**

Analysis IV
Analysis in abstract spaces. Function spaces.

Prerequisite(s): Pure Mathematics 545.

Antirequisite(s): Credit for Applied Mathematics 617 and Pure Mathematics 617 will not be allowed.

Applied Mathematics 621 **Q(2S-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 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.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Applied Mathematics 643 **H(3-0)**

Perturbation Theory
Perturbation problems for ordinary differential equations, matrices and more general operators.

Applications. Methods will be motivated by discussion of physical problems.

Prerequisite(s): Familiarity with complex variables, linear algebra and differential equations.

Applied Mathematics 651 H(3-0)

Monte Carlo Methods for Quantitative Finance
Fundamental concepts of Monte Carlo methods; review of quantitative finance; random number generation; simulating stochastic differential equations; variance reduction; quasi-Monte Carlo methods; computing sensitivities; early exercise options; Levy processes and other price models; applications to risk management.

Prerequisite(s): Consent of the Department.

Applied Mathematics 653 H(3-0)

Introduction to Levy Processes with Applications
Infinite divisibility, Levy processes (LP), the Levy-Khintchine formula; examples of LP; Poisson integration, the Levy-Ito decomposition, subordinators; Markov processes, semi-groups and generators of LP; Ito-formula for LP, quadratic variation; LP as time-changed Brownian motion, change of measure (Girsanov theorem); stochastic differential equations driven by LP; Feynman-Kac formula and martingale problem for LP; applications of LP; simulation of LPs.

Prerequisite(s): Consent of the Department.

Applied Mathematics 671 H(3-0)

Numerical Linear Algebra
Iterative and elimination methods for linear systems of equations, determination of eigenvalues, linear and convex programming.

Prerequisite(s): Applied Mathematics 441 and Applied Mathematics 491.

Applied Mathematics 673 H(3-0)

Approximation Theory
Existence, uniqueness of minimal solutions, Haar systems, characterization by alternation, Remez algorithm, monotone operators, spline approximation.

Prerequisite(s): Applied Mathematics 491; and Mathematics 335 or 355 or Pure Mathematics 435 or 455.

Applied Mathematics 677 H(3-0)

Numerical Solution of Partial Differential Equations
Explicit and implicit methods for PDE, difference equations.

Prerequisite(s): Applied Mathematics 311 and 491.

Applied Mathematics 681 H(3-0)

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): Applied Mathematics 481.

Antirequisite(s): Credit for both Applied Mathematics 681 and 581 will not be allowed.

Applied Mathematics 683 H(3-0)

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): Applied Mathematics 481 and 491.

Antirequisite(s): Credit for both Applied Mathematics 683 and 583 will not be allowed.

In addition to the numbered and titled courses shown above, the department offers a selection of advanced level graduate courses specifically designed to meet the needs of individuals or small groups of students at the advanced doctoral level. These courses are numbered in the series 800.01 to 899.99. Such offerings are, of course, conditional upon the availability of staff resources.

Archaeology ARKY

Instruction offered by members of the Department of Archaeology in the Faculty of Arts.

Department Head - G. Oetelaar

Archaeology 501 H(3-0)

Practical Problems in Archaeological Interpretation
Exercises in the analysis and interpretation of a variety of archaeological data sets.

Prerequisite(s): Archaeology 201 or 205 or consent of the Department.

Archaeology 503 H(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 or consent of the Department.

Archaeology 505 H(3-0)

Topics of Debate
Topics of debate in archaeology and human biology from a perspective that emphasizes philosophical, theoretical and methodological issues. Designed to hone students' critical, analytical, and debating skills, and as preparation for graduate studies.

Prerequisite(s): Archaeology 451.

Note: Archaeology 505 should be taken in the final year of the program.

Archaeology 506 F(0-7)

Advanced Archaeological Field Techniques
As a continuation of Archaeology 306, students are offered training in the more advanced aspects of fieldwork.

Prerequisite(s): Archaeology 201 and 306.

Note: Normally offered during the Spring and/or Summer Terms.

Archaeology 515 H(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): Archaeology 201 and consent of the Department.

Antirequisite(s): Not open to students with credit in Archaeology 533.26.

Archaeology 521 H(3-0)

Reconstructing Plains Culture
Archaeological plains cultures and the methodological and theoretical issues involved in the use of archaeological reconstructions of the past. Normally, focus will be on the Canadian Plains.

Prerequisite(s): Archaeology 321 or consent of the Department.

Antirequisite(s): Not open to students with credit in Archaeology 623.

Archaeology 523 H(3-0)
(Anthropology 523) (Geography 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): Not open to students with credit in Archaeology 609, Anthropology 609 and Geography 609.

Archaeology 531 H(3-0)

Special Topics in Archaeology
This course is offered periodically to meet special needs of students or visiting faculty members.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Archaeology 533 H(3-0)

Special Topics in Analytical Archaeology
This course is offered periodically to meet special needs of students or visiting faculty members.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Archaeology 537 H(3-0)

Topics in Mesoamerican Archaeology
Focus will be on particular time periods or themes in Mesoamerican archaeology and ethnohistory.

Prerequisite(s): Any two of Archaeology 341, 343, 345 or 347.

Archaeology 553 H(3-0)

Caribbean Prehistory
The prehistory and history of the indigenous peoples of the Caribbean from the first peopling of the islands to the early contact period.

Antirequisite(s): Not open to students with credit in Archaeology 531.61.

Archaeology 555 H(3-2)

Human Osteology
Introduction to identification and interpretation of human skeletal and dental remains. Emphasis

is on functional anatomy and reconstruction of prehistoric lifeways.

Prerequisite(s): Archaeology 203 or consent of the Department.

Antirequisite(s): Not open to students with credit in Archaeology 613.

Note: Preference in enrolment is given to students who have declared a Major in Archaeology or Anthropology.

Archaeology 589 H(3-0)
(Anthropology 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): Mathematics 30-1, 30-2, Pure Mathematics 30 or equivalent; Anthropology 201 or Archaeology 203 or Archaeology 305, and consent of the Department.

Archaeology 591 H(3-0)

Landscape Archaeology
Human perceptions and uses of the ecophysical and cultural environment. How societies humanize their environment by naming places, identifying resources, establishing paths, modifying and replicating the natural landscape thereby creating a tradition of land use that can be accessed archaeologically.

Prerequisite(s): Archaeology 451.

Archaeology 593 H(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 H(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): Mathematics 30-1, 30-2, Pure Mathematics 30 or equivalent; Archaeology 203 or consent of the Department. Archaeology 555 is recommended.

Note: Preference in enrolment is given to students who have declared a Major in Archaeology or Anthropology.

Archaeology 596 F(3S-0)

Honours Thesis (BSc)
Thesis normally required of Honours BSc students and also open for credit to other undergraduate Majors. Students are expected to carry out an analytical research project on a subject acceptable to the Department and to produce a final report written in a professional manner. Normally the project will be directed by one staff member who will consult with another staff member in arriving at an evaluation of the report.

Prerequisite(s): Consent of the Department.

Archaeology 597 H(3S-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 F(3S-0)

Honours Thesis (BA)
Thesis normally required of Honours BA students and also open for credit to other undergraduate Majors. Students are expected to carry out a research project in a subject acceptable to the Department and to produce a final report written in a professional manner. Normally, the project will be directed by one staff member who will consult with another staff member in arriving at an evaluation of the report.

Prerequisite(s): Consent of the Department.

Archaeology 599 H(3-0)

Independent Readings in Archaeology
An independent reading course for archaeology majors. Emphasis will be on the methodological, technical and scientific literature relating to archaeological interpretation. Each student is required to choose reading in consultation with an advisor.

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.

Archaeology 601 H(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 H(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 605 H(3-2)

Advanced Zooarchaeology
Specialized techniques of zooarchaeological analysis employed in research areas including site seasonality, aging and sexing, paleo-environmental reconstruction and identification techniques for non-mammalian species.

Prerequisite(s): Archaeology 417 or equivalent.

Archaeology 607 H(3-3)

Interpretation in Lithic Analysis
Lithic analysis methodology, including issues such as reduction stage analysis, usewear and residue analysis, material sourcing, replication, and spatial patterning. The use of lithic remains in interpretation of the social behaviour of archaeological cultures.

Prerequisite(s): Consent of the Department.

Archaeology 611 H(3-2)

Advanced Geoarchaeology
Critical evaluation of case studies and field examples to explore analytical methods and interdisciplinary theoretical approaches used in geoarchaeology. Field projects will be accompanied by seminar discussions of methodological and analytical approaches to geoarchaeology.

Prerequisite(s): Archaeology 453, or Geography 307, or Geology 373, or consent of the Department.

Archaeology 613 H(3-1T-2)

Analysis of Human Skeletal Remains
Methods of analysing 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): Not open to students with credit in Archaeology 555 or 603.07.

Archaeology 615 H(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 H(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 biocultural approach will be emphasized.

Prerequisite(s): Consent of the Department.

Archaeology 619 H(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 or consent of the Department.

Archaeology 621 H(3S-0)

Problems in Ethnoarchaeology
Seminar on selected topics relating to ethnoarchaeology.

Prerequisite(s): Consent of the Department.

Archaeology 625 H(3S-0)

Hunter-Gatherer Adaptations
Intensive study of contemporary and prehistoric hunter-gatherer social and economic adaptations.

Archaeology 627 H(3S-0)

Origins of Agriculture
Intensive study of the origins of agriculture throughout the world.

Archaeology 629 H(3-1)

Advanced Ceramic Analysis
Studies in ceramic analysis, including typology, manufacturing techniques, use-wear, form/function and style.

Archaeology 631 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(3S-0)**

Advanced Seminar in Selected Topics
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Art ART

Instruction offered by members of the Department of Art in the Faculty of Arts.

Department Head – B. Rusted

Graduate Courses

Art 601 **H(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): Restricted to MFA or PhD students enrolled in the Art Department, or consent of the Department.

Art 603 **H(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 or consent of the Department.

Art 605 **H(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): Restricted to MFA or PhD students enrolled in the Art Department, or consent of the Department.

MAY BE REPEATED FOR CREDIT

Art 661 **F(3/2S-10)**

Advanced Studio Practice
Individual weekly study in studio, with seminar-based discussions in research area. The seminar meets every two weeks throughout the entire academic year.

661.01. Advanced Studio Practice

661.02. Thesis Studio Practice

Prerequisite(s): For Art 661.01: Restricted to MFA or PhD students enrolled in the Art Department, or consent of the Department; for Art 661.02, the prerequisite is Art 661.01.

Art 691 **H(3-0)**

Pedagogy and Professional Practice
Issues in professional practice and post-secondary teaching in visual art. Optional course.

Prerequisite(s): Restricted to MFA or PhD students enrolled in the Art Department, or consent of the Department.

MAY BE REPEATED FOR CREDIT

Art 699 **H(3-0)**

Topics in Art Theory and Criticism
Studies in contemporary art theory and criticism.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Art 761 **H(2T-10)**

Advanced Independent Studio research
Theoretical and applied concepts in studio.

Prerequisite(s): Restricted to MFA or PhD students enrolled in the Art Department, or consent of the Department.

MAY BE REPEATED FOR CREDIT

Art History ARHI

Instruction offered by members of the Department of Art in the Faculty of Arts.

Department Head – B. Rusted

Graduate Courses

Art History 613 **H(3-0)**

Independent Study in Art History
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Art History 615 **H(3-0)**

Conference Course in Art History
Specialized study in an area of art history selected on the basis of particular interest and need.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Art History 617 **H(3-0)**

Thesis Development
A reading and conference course in the student's research area.

Prerequisite(s): Consent of the Department.

Astrophysics ASPH

Instruction offered by members of the Department of Physics and Astronomy in the Faculty of Science.

Department Head - R.I. Thompson

Note: For listings of related courses, see Astronomy, Physics, Medical Physics, and Space Physics.

Astrophysics 503 **H(3-0)**

The Interstellar Medium
Multiwavelength observations of gas and dust in our Galaxy; distribution and physics of neutral atomic hydrogen and molecules; interstellar chemistry; physics of dust grains; HII regions; interstellar shocks; gas dynamics; star formation.

Prerequisite(s): Astrophysics 213, Physics 325, 381, and one of Mathematics 349 or 375 or Applied Mathematics 307.

Note: Taught in the Fall of odd years.

Astrophysics 509 **H(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 213, Physics 325, 381, and one of Mathematics 349 or 375 or Applied Mathematics 307.

Note: Taught in the Winter of even years.

Graduate Courses

Astrophysics 607 **H(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 **H(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 **H(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

Instruction offered by members of the Department of Biological Sciences in the Faculty of Science.

Department Head - R.M.R. Barclay

Biochemistry 543 **H(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, and Chemistry 353 or 355.

Biochemistry 547 **H(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 **H(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 **H(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.

Note: Prior completion of Biochemistry 555 is strongly recommended.

Biochemistry 555 **H(3-1T-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 393 or 443.

Note: Prior or concurrent completion of Biochemistry 431 and 471 is strongly recommended.

Biochemistry 561 **H(3-0)**

Applied Biochemistry and Biotechnology
An introduction to the language, materials, methods, concepts and commercial applications of biotechnology with emphasis on methodology, biocatalysts, and key concepts of genome sequencing, proteomics, and transcriptomics. Also, drug and antibiotic development, mechanisms of some drugs, and drug resistance will be introduced.

Prerequisite(s): Biochemistry 393.

Antirequisite(s): Credit for both Biochemistry 561 and Biotechnology 561 will not be allowed.

Note: Prior completion of Cellular, Molecular and Microbial Biology 411 or Biochemistry 401 is strongly recommended.

Biochemistry 575 **H(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 or 443.

Biochemistry 577 **H(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 **H(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 **H(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 molecular level. Structural analysis, drug design and molecular dynamics methods will be described, as well as current practices for commercialization. Various modern 'omics' research approaches and current leading drug targets of the pharmaceutical industry will also be discussed.

Biology BIOL

Instruction offered by members of the Department of Biological Sciences in the Faculty of Science.

Department Head - R.M.R. Barclay

For other courses offered by the Department of Biological Sciences see Biochemistry; Cellular, Molecular and Microbial Biology; Ecology; Marine Sciences; Plant Biology; Zoology.

Biology 501 **H(3-0)**
(Medical Science 501)

Principles and Mechanism of Pharmacology
Basic principles of pharmacology, with specific emphasis on receptor signaling mechanisms.

Prerequisite(s): Consent of the Department and Biochemistry 443, and one of Zoology 461, 463, or Medical Science 404.

Biology 503 **H(3-0)**
(Medical Science 503)

Pharmacology of Organ Systems
Pharmacology of the nervous, cardiovascular, renal and immune systems, as well as anti-cancer therapies. Principles of toxicology.

Prerequisite(s): Biology 501 (Medical Science 501) or consent of the Department.

Biology 505 **H(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.

Note: Enrolment in this course may be limited. See Program Details in the Faculty of Science section of this Calendar.

Biology 515 **H(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 443 and one of Biology 331 or Medical Science 351.

Biology 520 **F(3-3)**

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.

Biology 591 **H(1-5)**

Insect Biodiversity
A field course in the natural history and classification of insects, one of the most diverse groups of organisms known, as they are encountered in their natural habitat. Course material will include: techniques for collection and identification of major groups of insects and related terrestrial arthropods; aspects of behaviour and ecology of local species; use of insects as indicators of environmental change; censusing/monitoring insect populations.

Prerequisite(s): Biology 243 and 313 and consent of the Department.

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 **H(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. Cell, Development and Physiology I

601.04. Cell, Development and Physiology 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 603 **H(3-1)**
(Medical Science 603) (Veterinary Medicine 603)

Biology of Laboratory Animals
The course is 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.

Biology 607 **H(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 **H(3-0)**

Advanced Statistical Applications in Biology
This course 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): Familiarity with statistical inference, regression, and ANOVA-based experimental design (equivalent of Ecology 425) is required.

Note: Offered during odd-even dated academic years.

Biology 617 **H(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, and write a term paper on a related topic of their choice.

Prerequisite(s): Consent of the Department.

Note: The instructor does not assume an advanced background in biology and will not focus on technical scientific issues. May not be offered every year.

Biology 619 **H(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.

Note: Offered during odd-even dated academic years.

Biology 651 **H(3-0)**

Topics in Systems Biology
In-depth discussions of the latest publications in systems biology, with emphasis on the fundamental principles of genome and cell function.

Note: Offered during odd-even dated academic years.

Biology 653 **H(3-0)**

Topics in Functional Genomics
Presentation and discussion of the primary literature in high-throughput methods for global functional and network analysis of genes and proteins (reverse genetics, microarrays, two hybrid, mass spectrometry and RNAi screening).

Note: Offered during even-odd dated academic years.

Biology 703 **H(3-0) or H(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

Instruction offered by members of the Schulich School of Engineering and Faculties of Kinesiology and Medicine.

Associate Dean (Academic & Planning) – R. Brennan

Director, BME Graduate Program – M. Kallos

Graduate Courses

Biomedical Engineering 605 **Q(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 **Q(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 **H(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 611
(formerly Biomedical Engineering 601) **Q(4-0)**

Fundamentals of Biomedical Engineering - Core Area
An introduction to biology, biochemistry, anatomy, physiology and biomedical engineering fundamentals.

Biomedical Engineering 612 **Q(4-0)**
(formerly Biomedical Engineering 601)

Fundamentals of Biomedical Engineering - Research Areas
Detailed discussion on current biomedical engineering topics, including current local and international research and industry, with an emphasis on local strengths.

Biomedical Engineering 613 **Q(4-0)**
(formerly Biomedical Engineering 603)

Frontiers of Biomedical Engineering - Scientific Communication
An introduction to technical (oral and written) communication to diverse audiences.

Biomedical Engineering 614 **Q(4-0)**
(formerly Biomedical Engineering 603)

Frontiers of Biomedical Engineering - Research Methods
An introduction to research methodology in biomedical engineering, experimental design, research integrity, ethics, and preparation and review of research proposals. Satisfactory completion of this course within 1 year of registration will ensure that the Biomedical Engineering Graduate Program Research Proposal requirements are met.

Biomedical Engineering 619 **H(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

Business and Environment BSEN

Instruction offered by members of the Haskayne School of Business.

Business and Environment Chairperson — M. Boivin

Graduate Courses

Business and Environment 691 (Civil Engineering 691) **H(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.

Prerequisite(s): Consent of the Program Director.

Business and Environment 719 **H(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 **H (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 **H(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 **H(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 **H(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 **H(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 analyse and deal with complexities of the business environment.

Corequisite(s): Strategy and Global Management 601 or consent of the Haskayne School of Business.

Business and Environment 789 **H(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 **H(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): Human Resources and Organizational Dynamics 601, Operations Management 601, Management Information Systems 601, Accounting 601 or equivalent.

Business and Environment 797 **H(3S-0)**

Advanced Seminar in Business and Environment
Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Cellular, Molecular and Microbial Biology CMMB

Instruction offered by members of the Department of Biological Sciences in the Faculty of Science.

Department Head - R.M.R. Barclay

Cellular, Molecular and Microbial Biology 505 **H(3S-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 511 **H(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 **H(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 **H(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 **H(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.

Note: Enrolment in this course may be limited. See Program Details in the Faculty of Science section of this Calendar.

Cellular, Molecular and Microbial Biology 531 **H(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. 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.

Prerequisite(s): Biology 331 and one of Biochemistry 401 or 443 or 431.

Cellular, Molecular and Microbial Biology 543 **H(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 or consent of the Department.

Cellular, Molecular and Microbial Biology 545 **H(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 or consent of the Department.

Cellular, Molecular and Microbial Biology 549 **H(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 (Medical Science 561) **H(3-0)**

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 and Cellular, Molecular and Microbial Biology 411 and one of Biochemistry 401 or 443.

Cellular, Molecular and Microbial Biology 563 **H(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 or consent of the Department.

Cellular, Molecular and Microbial Biology 565 (Medical Science 565) **H(3-0)**

Advanced Topics In Pathogenic Microbiology
The course will provide 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.

Cellular, Molecular and Microbial Biology 567 (Medical Science 567) **H(3-0)**

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.

Graduate Course

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.

Cellular, Molecular and Microbial Biology 637 **H(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.

Chemical Engineering ENCH

Instruction offered by members of the Department of Chemical and Petroleum Engineering in the Schulich School of Engineering.

Department Head - U. Sundararaj

Associate Heads - M. Foley, J. Azaiez, N. Mahinpey

Graduate Courses

Chemical Engineering 601 **E(3S-0)**

Research Seminar
Reports on studies of current research in the Department. All Master of Science and Doctoral students (Chemical, Petroleum, Energy & Environment and Energy and Environmental Systems Specializations) are required to register and participate in the course for each of the first two terms of their degree program. Each student must also present one research seminar. For more details, students must refer to the guidelines for the Research Seminar course.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Chemical Engineering 607 **H(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 **H(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.

Chemical Engineering 613 **H(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 **H(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 **H(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 imbedded 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 **H(3-0)**

Special Problems
Advanced studies on specialized topics in chemical, petroleum, biochemical and environmental engineering.

MAY BE REPEATED FOR CREDIT

Chemical Engineering 620 **F(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 both Chemical Engineering 620 and 699 will not be allowed.

Chemical Engineering 621 H(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 or consent of the Department.

Chemical Engineering 623 H(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 or consent of the Department.

Chemical Engineering 625 H(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 H(3-0)

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 H(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 or consent of the Department.

Chemical Engineering 631 H(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 H(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 or consent of the Department.

Chemical Engineering 639 H(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 finites element methods. Numerical stability.

Prerequisite(s): Engineering 407 or consent of the Department.

Note: Knowledge of a programming language is necessary.

Chemical Engineering 643 H(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, SOx, and NOx. Adsorption, absorption and biofiltration of air pollutants. GHG emission control. Recent advances on related topics.

Antirequisite(s): Credit for both Chemical Engineering 643 and Environmental Engineering 641 will not be allowed.

Chemical Engineering 645 H(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 both Chemical Engineering 645 and Environmental Engineering 661 will not be allowed.

Chemical Engineering 647 H(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 or 523 or consent of the Department.

Chemical Engineering 649 H(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 651 H(3-0)
(formerly Chemical Engineering 619.51)

Engineering Fuel Cells
Overview of Fuel Cells. Comparison of fuel cells with other energy technologies. Types of fuel cells; electrochemical reactions; materials and balance of plant.

Chemical Engineering 653 H(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 or consent of the Department.

Chemical Engineering 657 H(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 or consent of the Department.

Note: Prior knowledge of reservoir engineering and analytical solution methods of differential equations is necessary.

Chemical Engineering 659 H(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, biomaterials, bioreactors, and clinical delivery of tissue engineered constructs.

Prerequisite(s): Consent of the Department.

Note: Credit for both Chemical Engineering 659 and Biomedical Engineering 619.06 will not be allowed.

Chemical Engineering 661 H(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 or consent of the Department.

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 H(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 both Chemical Engineering 665 and Environmental Engineering 665 will not be allowed.

Chemical Engineering 677 H(3-0)

Advanced Topics in Oil and Gas Production
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 523 or consent of the Department.

Chemical Engineering 687 H(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.

Chemical Engineering 689 H(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 both Chemical Engineering 689 and 619.91 will not be allowed.

Chemical Engineering 698 F(3-0)
(Geology 698) (formerly Chemical Engineering 619.95 and 619.96)

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 Human Resources and Organizational Dynamics 789 or equivalent.

Note: This course is intended for graduate students in the Master of Engineering with Reservoir Characterization Specialization.

Chemical Engineering 699 H(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 both Chemical Engineering 699 and 620 will not be allowed.

MAY BE REPEATED FOR CREDIT

Chemical Engineering 701 H(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 H(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 both 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

Instruction offered by members of the Department of Chemistry in the Faculty of Science.

Department Head - D.T. Cramb

Chemistry 515 H(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 H(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.

Note: Chemistry 471 is recommended as a prerequisite.

Chemistry 531 H(3-1T)

Advanced Inorganic Chemistry I
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 333 and one of 353 or 355.

Chemistry 533 H(3-1T)

Advanced Inorganic Chemistry II
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 333 and one of 353 or 355.

Chemistry 535 H(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.

Note: Open to students in Chemistry programs and to others by consent of the Department.

Chemistry 551 H(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 H(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 H(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.

Note: Open to students in Chemistry programs and to others by consent of the Department.

Chemistry 559 H(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 H(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 H(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 H(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 **H(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, 357 and Chemical Engineering 427.

Chemistry 599 **H(3-0)**

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

Advanced graduate level courses are listed below. Courses in certain areas are grouped under "Selected Topics" titles. The content and offering of these are decided annually by the Department to meet the requirements of graduate students in the program. A student may receive credit for several courses in a given selected topics area. Details of offerings and course outlines may be obtained from the Department on request.

Unless stated otherwise the prerequisite for entry to all courses at the 600 level and above is “consent of the Department”. Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Chemistry 601 **H(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 **H(2S-0)**

Research Seminar
Continuation of Chemistry 601.

NOT INCLUDED IN GPA

Chemistry 613 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 651 **H(3-0)**

Advanced Organic Stereochemistry
Stereochemical principles in organic chemistry, including: geometry, bonding, symmetry, molecular isomerism, conformational analysis, asymmetric and stereocontrolled reactions.

Chemistry 653 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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

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 individual students may take only one 701 course for credit in program.

Civil Engineering ENCI

Instruction offered by members of the Department of Civil Engineering in the Schulich School of Engineering.

Department Head - R.C.K. Wong

Associate Heads – J.D. Hunt and L.H.J. Grozic

Civil Engineering 513 **H(3-2T)**

Structural Concrete Materials and Design
Practical examination of concrete mix design (Portland cement), processes and systems to improve performance and sustainability of Civil Engineering structures. 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 systems: direct design method, punching shear. Columns. Design principles for concrete members reinforced with Fiber-Reinforced Polymers. Use of computer software for analysis and design of simple concrete structures.

Prerequisite(s): Civil Engineering 413 and 451.

Civil Engineering 523 **H(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 H(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 H(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 H(3-1)

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 F(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 or consent of the Department.

Note: Departmental consent will only be granted in exceptional cases if students are missing no more than one of the courses listed above.

Civil Engineering 571 H(3-1)

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 H(3-1)

Transportation Engineering II

This course is intended to introduce students 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 471 and 473 and Engineering 319 or equivalent.

Civil Engineering 581 H(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 H(3-1)

Special Topics

Current topics in Civil Engineering.

Prerequisite(s): Consent of the Department Head.

MAY BE REPEATED FOR CREDIT

Civil Engineering 597 H(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.

Note: Open to students who have completed the third year Civil Engineering program with a GPA of 3.00 or better and/or Department Heads approval.

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 601 Q(32 hours)

Graduate Research Seminar

Reports on studies of the literature or of current research.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Civil Engineering 611 H(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 H(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 H(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 H(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 H(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 H(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 H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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.

Antirequisite(s): Not open to students with credit in Civil Engineering 553 or 595.05.

Civil Engineering 645 **H(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 **H(3-0)**

Structural Reliability Techniques

The concepts of risk and reliability, uncertainties, and engineering decision making. Focuses on both aspects of uncertain systems, mainly structures, but also soils and environments, namely analysis and design. Techniques for structural reliability-based design and optimization are discussed and supplemented by practical applications.

Civil Engineering 649 **H(3-0)**

Stochastic Dynamics

Basic topics in probability theory. Random processes: time and frequency domain characteristics, differentiation and integration, stationary and ergodic processes; review of basic structural dynamics; random structural vibrations on simple oscillators and multiple degree-of-freedom systems. Response of linear and non-linear systems; examples; threshold crossing, extreme peaks, reliability; applications in earthquake and offshore engineering.

Civil Engineering 651 **H(3-0)**

Finite Element Modelling

Terminology. Conceptual framework of method; shape function; continuity at nodes; numerical integration; matrix assembly; solution methods; sources of error and poor performance; mesh sensitivity; element types, their selection and behaviour; use of software.

Civil Engineering 653 **H(3-0)**

Theory and Applications of the Finite Element Method

Theory of the finite element method with emphasis on applications to structural analysis. Scope of the method, use of basic equations of elasticity, displacement (stiffness) method of analysis, energy theorems applied to finite elements, element matrices; the isoparametric formulation; applications in structural analysis, heat conduction and other non-structural problems. Use of available finite element programs for analysis of space frames, plates subjected to in-plane forces, plates in bending, spatial structures and heat transfer.

Civil Engineering 655 **H(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 665 **H(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 **H(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 analyses; hydraulic fracturing.

Civil Engineering 671 **H(4-0)**

Advanced Foundation Engineering

Design and analysis of foundations. Spread footings, rafts, piled foundations. Marine foundations. Foundations in difficult soils. Embankments, retaining walls, excavations. Soil improvement. Soil liquefaction. Design problems and computer applications in foundation engineering.

Civil Engineering 673 **H(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 **H(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, 697 and consent of the Program Director.

Civil Engineering 691 (Business and Environment 691) **H(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.

Civil Engineering 693 **H(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.

Prerequisite(s): Consent of the Program Director.

Civil Engineering 695 **H(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.

Prerequisite(s): Consent of the Program Director.

Civil Engineering 697 **H(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.

Prerequisite(s): Consent of the Program Director.

Civil Engineering 699 **H(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.

Prerequisite(s): Consent of the Program Director.

Note: This course may not be taken for credit towards the JD or LLM degrees.

Civil Engineering 703 **H(3-0)**

Fundamentals of ITS and Transportation System Performance
Definition of ITS, with particular emphasis on advanced traffic management and control and advanced traveler information issues; traffic assignment and dynamic traffic assignment, traffic simulation tools; various traffic flow models: from microscopic to macroscopic traffic flow theory; traffic and incident management; surface street control; freeway control.

Prerequisite(s): An undergraduate degree in engineering or instructor approval.

Civil Engineering 705 **H(3-0)**

Traffic Engineering
Traffic stream characteristics, related field surveys; advanced probability distributions of headway, flow and speed under peak, off-peak, platoon-flow conditions; analysis of density contours; the generalized car-following model, related macro-models of traffic streams, practical applications; Traffic incident analysis; Two-lane highways; actuated and pretimed traffic signals; two-way co-ordination of signals; introduction to network controls.

Civil Engineering 707 **H(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 **H(2-4)**

Practice of Transport Demand Modelling
Sample enumeration modelling; practical aspects of logit model estimation and calibration; disaggregate choice behaviour data; practical 4-step transport demand modelling using conventional software packages; application of computer-based network assignment models.

Prerequisite(s): Civil Engineering 707 or consent of the Department.

Civil Engineering 711 **H(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 713 **H(3-1)**

Mountain Highway Engineering
Road vehicle performance in mountainous terrain; the slow moving vehicle problem; highway capacity and level of service; terrain classification; alignment elements, cross section elements, intersections, traffic barriers; planning and design of passing lanes, climbing lanes, truck escape ramps, turnouts, and low-volume roads; traffic management in avalanche zones; environmental impact of highways in mountainous terrain. Vehicle operating costs; engineering evaluation of mountain highway projects.

Civil Engineering 715 **H(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 721 **H(2-1)**

Modelling for Water Supply and Distribution
Planning and management of water supply systems. Components of water supply systems. Water supply systems. Water demand forecasting. Simulation modelling of water distribution systems. Design of water distribution systems. Operational control and pump scheduling. Reliability and security of supply. Water losses and leakage control. Water pricing and water conservation. Introduction to optimization.

Prerequisite(s): Civil Engineering 581 or consent of the Department.

Note: Not open to students with credit in Civil Engineering 619.52 or 719.

Civil Engineering 723 **H(3-3)**

Hydrological Theory and Design
Overview of physical and statistical hydrology. Theory of unsteady flow, simplified equations, applications in overland flow and channel flood routing using numerical techniques. Linear theory of hydrologic systems, instantaneous unit hydrograph. Precipitation analysis, probable maximum precipitation, design storms. Design flood hydrograph studies, application of the Soil Conservation Service method. Statistical analysis of hydrological variables, some probability distributions and their applications: regionalization, droughts, reservoir yield analysis and introduction to stochastic modelling.

Prerequisite(s): Civil Engineering 533 or equivalent.

Civil Engineering 741 (Environmental Engineering 663) **H(3-0)**

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.

Note: Credit for both Civil Engineering 741 and Environmental Engineering 663 will not be allowed.

Civil Engineering 743 (Environmental Engineering 625) **H(3-0)**

Computational Methods for Environmental Engineering
Taylor series, numerical integration. Linear and non-linear algebraic equations and solvers. Ordinary and partial differential equations. Finite difference methods: explicit, implicit and Crank-Nicholson methods. Finite difference, finite element or finite volume numerical approximations. Initial and boundary value problems. Boundary conditions, discretization considerations, and design of approximations, accuracy and error reductions. Applications in environmental engineering, such as pollutant dispersion and transport, will be discussed.

Note: Credit for both Civil Engineering 743 and Environmental Engineering 625 will not be allowed.

Civil Engineering 745 H(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 (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.

Note: Credit for both Civil Engineering 745 and Environmental Engineering 655 will not be allowed.

Civil Engineering 747 H(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.

Note: Credit for both Civil Engineering 747 and Environmental Engineering 653 will not be allowed.

Civil Engineering 749 H(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.

Note: Credit for both Civil Engineering 749 and Environmental Engineering 651 will not be allowed.

Civil Engineering 751 H(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 H(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

Graduate Courses

These courses are offered by the Graduate Program in the Department of Communication and Culture in the Faculty of Arts.

Note: Not all courses will be offered each year.

Communication and Culture 601 H(3S-0)
(formerly Communications Studies 601/Culture and Society 601)

Interdisciplinary Approaches to Communication and Culture
An overview of theories, problematics and approaches in communication and culture.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 603 H(3S-0)
(formerly Communications Studies 603)

Media Studies
Theories and perspectives in the study of media production, industries, genres, and reception.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 605 H(3S-0)
(formerly Communications Studies 605)

Organizational Communication
An examination of the application of theory and methodology of administrative communication processes in complex organizations.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 607 H(3S-0)
(formerly Communications Studies 607)

Socio-Cultural Approaches to Communication and Culture
Theoretical perspectives on communication and culture as symbolic processes that produce and reproduce shared meanings, social practices, and social structures.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 609 H(3S-0)
(formerly Communications Studies 609)

Communication Law
An examination of the operation of Canadian law as it relates to the areas of telecommunications, broadcasting and other media.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 611 H(3S-0)
(formerly Communications Studies 611)

Approaches to Development Theory and Praxis
Critical historical processes of development within a global context, competing theoretical and methodological paradigms for evaluating those processes, and their implications for the praxis of development in both the Global North and South.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 613 H(3S-0)
(formerly Communications Studies 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.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 615 H(3S-0)
(formerly Communications Studies/Culture and Society 615)

Research Methods
A survey of research methods appropriate to the study of communication and culture.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 617 H(3S-0)
(formerly Culture and Society 603)

Heritage and Identity - Issues and Approaches
An investigation of various issues related to defining and portraying cultural heritage, ethnic identity, and history within the public sphere.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 619 H(3S-0)
(formerly Communications Studies 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.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 621 H(3S-0)
(formerly Culture and Society 607)

Social and Global Justice
A critical overview of the meaning and implementation of social justice by examining key legal, social and political theories as well as the history of Canadian and international social justice movements.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 623 H(3S-0)
(formerly Communications Studies 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.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 625 H(3S-0)

Interpersonal and Small Group Communication
An examination of theory and research concerning communication processes in face-to-face and small group interaction. Provides opportunities to develop effective practical skills.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 627 H(3S-0)
(formerly Communications Studies 627)

Media and Politics
An examination of political communication in traditional and new media, focusing on the interrelationships of media, political thought, and behaviour.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 629 H(3S-0)
(formerly Communications Studies 629)

Communication Management
An examination of communication management in business organizations. Looks at such topics as marketing, public relations and advertising in the context of rapidly changing business environments.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 641 H(3S-0)
(formerly Communications Studies 641)

Intercultural and International Communication
An examination of cultural/communication issues and practices in Canadian and international contexts. Examines the role of media systems in processes of culture, development, and identity formation.

Prerequisite(s): Consent of the Graduate Program Director.

Communication and Culture 711 H(3S-0)
(formerly Communications Studies 711)

Directed Studies
Prerequisite(s): Consent of the Graduate Program Director.

MAY BE REPEATED FOR CREDIT

Communication and Culture 713 H(3S-0)
(formerly Communications Studies 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): Consent of the Graduate Program Director.

Note: Open only to PhD students in Communication and Culture.

Communication and Culture 717 H(3S-0)
(formerly Communications Studies 717)

Selected Topics in Communication and Culture
A variety of communication and cultural topics based on faculty expertise.

Prerequisite(s): Consent of the Graduate Program Director.

MAY BE REPEATED FOR CREDIT

Communication and Culture 790 F(0-6)
(formerly Communications Studies 790)

Master's Project
A full year course required of all MCS students. Students develop a major research project under the supervision of a faculty member, on the basis of their particular interest.

Prerequisite(s): Consent of the Graduate Program Director.

Communications Studies COMS

Graduate Courses

Courses for the graduate programs in the Department of Communication and Culture are listed under Communication and Culture (CMCL).

Community Health Sciences MDCH

Community Health Sciences 600 H(3-0)
(formerly Medical Science 644)

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): Must be registered in the Community Health Sciences or Public Health and Preventative Medicine program. Consent of the instructor required for all other students.

Note: Not available to Open Studies students.

NOT INCLUDED IN GPA

Community Health Sciences 601 H(3-0)
(formerly Medical Science 642)

Determinants of Health
Learners will gain an understanding of the determinants of health within a population health framework. The course begins with an introduction to health and world views on how health is constructed. It then examines the determinants of health and population health frameworks through both an historical context and a contemporary analysis as well as key concepts such as the social gradient. The evidence-base for some of the determinants is then presented. The course ends with the implications for the determinants of health construct in analysing and addressing specific population health problems.

Prerequisite(s): Must be registered in the thesis-based MSc and PhD Community Health Sciences graduate program. Consent of the instructor required for all other students.

Community Health Sciences 602 H(1-0)
(formerly Medical Science 649.01)

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): Must be registered in the Master of Community Medicine specialization or the Public Health and Preventative Medicine program.

NOT INCLUDED IN GPA

Community Health Sciences 603 H(1-0)
(formerly Medical Science 649.02)

Practicum in Healthcare Epidemiology
Clinical or field-based practicum for the Healthcare Epidemiology specialization of the Community Health Sciences graduate program.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program's Healthcare Epidemiology specialization.

NOT INCLUDED IN GPA

Community Health Sciences 604 H(1-0)
(formerly Medical Science 649.03)

Practicum in Community Health Sciences
Clinical or field-based practicum for students in any specialization of the Community Health Sciences graduate program.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program.

NOT INCLUDED IN GPA

Community Health Sciences 610 H(3-2T)
(formerly Medical Science 643.01)

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): Must be registered in the Community Health Sciences graduate program or Public Health and Preventative Medicine program. Consent of the instructor is required for all other students.

Note: There are no formal course prerequisites but good quantitative and mathematical skills are an asset. Not available to Open Studies students.

Community Health Sciences 611 H(3-2T)
(formerly Medical Science 643.02)

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 analyse data. Required course for Biostatistics and Epidemiology specializations.

Prerequisite(s): Community Health Sciences 610 or Medical Science 643.01 and registration in the Community Health Sciences graduate program.

Note: A graduate level course in (bio)statistics is required for all other this course. Not available to Open Studies students.

Community Health Sciences 612 H(3-2T)
(formerly Medical Science 643.03)

Biostatistics III: Models for Repeated Measures Studies and Time-to-Events Studies
Discusses techniques for analysing 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 analyse data.

Prerequisite(s): Community Health Sciences 611 or Medical Science 643.02 and registration in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Note: Not available to Open Studies students.

Community Health Sciences 620 H(1S-4)
(formerly Medical Science 731)

Medical Education
The design, planning, teaching and evaluation of courses in the health science disciplines. Practical experience in teaching methods and curriculum development. Intended for graduate students, faculty and resident physicians, and approved for

study credit by the College of Family Physicians of Canada.

Prerequisite(s): Must be registered in the Medical Education Specialization of the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 621 H(3-1)
(formerly Medical Science 733)

Research Design and Statistics in Medical Education

Research design and statistical analysis including a broad overview of the variety of methods for research in medical education and related sciences. There is both a theoretical basis in lectures and seminars as well as applied approaches in laboratory exercises. A variety of research tools will be explicated and utilized.

Prerequisite(s): Must be registered in the Medical Education Specialization of the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 622 H(3-0)
(formerly Medical Science 734)

Qualitative Measurements for Medical Education

Provides an introduction to qualitative methods as adapted for medical education research and evaluation. Designed to focus on the rationale for qualitative research, the appraisal of qualitative research, methods of data collection (e.g. focus groups, interviews, and text), data handling, data analysis and writing a qualitative research proposal. Specific approaches used in qualitative research including: grounded theory, ethnographic designs, phenomenology, action research and discourse analysis will be discussed.

Prerequisite(s): Must be registered in the Medical Education Specialization of the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 623 H(3-0)
(formerly Medical Science 735)

Teaching Methods in the Medical Sciences

Examines traditional and innovative methods used in medical and science education and clinical teaching to enhance student and practitioner knowledge, skills and attitudes. Discussions and presentations will focus on the role of the teacher and teaching strategies that include the lecture, small group teaching, inquiry and problem solving methods, reflective tools, simulation, surgical skills, computer-based instruction, bedside learning, one-on-one teaching and self-directed learning. The content will be presented within the context of contemporary research, practice and educational theory. Participants will be expected to identify, critique literature, and prepare instructional activities that link research and theory to practice.

Prerequisite(s): Must be registered in the Medical Education Specialization of the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 624 H(3-0)
(formerly Medical Science 736)

Medical Education Cognition Principles

Focus on the study of cognition as it relates to medical education. Begins with a broad overview of principles of adult education, including the fundamental theories of cognition, behaviourism, and social learning theory. From this foundation, the course will review key concepts in medical education cognition, including memory, analytical/non-analytical problem solving, and cognitive load theory. Sessions will provide both didactic lecture material and interactive small group discussion.

Prerequisite(s): Must be registered in the Medical Education Specialization of the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 625 H(3-0)
(formerly Medical Science 737)

Curriculum Design and Evaluation in the Medical Sciences

Presents an overview of the key elements of curriculum design and evaluation within the context of contemporary medical education research, learning and teaching theory, and teaching. Through classroom and electronic discussion, reading and assignments, participants will explore learning needs, objectives, the selection of teaching methods, the identification of resources, the implementation and monitoring of curriculum and evaluation.

Prerequisite(s): Must be registered in the Medical Education Specialization of the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 626 H(3-0)
(formerly Medical Science 738)

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 healthcare 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): Must be registered in the Medical Education Specialization of the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 627 H(3-0)
(formerly Medical Science 739)

Medical Education Measurement

Focuses on the assessment issues related to the measurement of student achievement, competency, and performance in educational settings. The principles of Classical Test Theory, Item Response Theory, and Generalizability Theory will be introduced and explored through both formal lectures and computer lab activities. Specifically, the course will focus on the measurement issues and concerns related to undergraduate and post-graduate medical education programs.

Prerequisite(s): Must be registered in the Medical Education Specialization of the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 640 H(3-2T)
(formerly Medical Science 647.01)

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): Registration in the Community Health Sciences graduate program or Public Health and Preventative Medicine program. Consent of the instructor is required for all other students.

Corequisite(s): Community Health Sciences 610 or Medical Science 647.01.

Note: Not available to Open Studies students.

Community Health Sciences 641 H(3-0)
(formerly Medical Science 659.04)

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): Community Health Sciences 610 and 640 or Medical Science 643.01 and 647.01 and registration in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 643 H(3-0)
(formerly Medical Science 647.07)

Research in Healthcare 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): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 644 H(3-0)
(formerly Medical Science 647.10)

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 analyse data used in Infection control; (3) to properly interpret and draw appropriate conclusions from data used in infection control.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students

Note: This is an online course.

Community Health Sciences 645 H(3-0)
(formerly Medical Science 647.11)

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 registration in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Note: This is an online course.

Community Health Sciences 646 H(3-0)
(formerly Medical Science 647.12)

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 registration in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 647 H(3-0)
(formerly Medical Science 647.15)

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 registration in the Community Health Sciences graduate program with a clinical background. Consent of the instructor is required for all other students.

Community Health Sciences 648 F(3-1.5)
(formerly Medical Science 660)

On-line 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): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Note: This is an online course.

Community Health Sciences 649 H(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): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 660 H(3-0)
(formerly Medical Science 645.18)

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): Must be registered in the Community Health Sciences Graduate Program. Consent of the instructor is required for all other students.

Community Health Sciences 661 H(3-0)
(formerly Medical Science 679/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): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 662 H(3-0)
(formerly Medical Science 659.08)

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): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 663 H(3-2)
(formerly Medical Science 659.06)

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 registration in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 664 H(3-0)
(formerly Medical Science 659.07)

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 analysing 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 instructor.

Note: Consent of the Instructor must be obtained by September 30.

Community Health Sciences 665 H(3-0)
(formerly Medical Science 645.10)

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): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 666 H(3-0)
(formerly Medical Science 645.15)

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): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 667 H(3-0)
(formerly Medical Science 645.17)

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): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 680 H(3S-0)
(formerly Medical Science 651.04)

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): Registration in the Community Health Sciences graduate program or Public Health and Preventive Medicine program. Consent of the instructor is required for all other students.

Community Health Sciences 681 H(3-2T)
(formerly Medical Science 659.02)

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 registration in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Note: Not available to Open Studies students.

Community Health Sciences 683 H(3-0)
(formerly Medical Science 659.05)

Qualitative Health Research
A focus on interpreting published examples of qualitative health research as well as qualitative data relevant to health. The importance of both methods and theories for sound interpretation will be emphasized. Examples relevant to people's experiences of health services as well as influences

on population health outcomes other than health services and technologies will be considered.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 687 H(3-0)
(formerly Medical Science 651.06)

Environmental Health
Examination of the interaction between natural and man-made environments in human health/illness.

Prerequisite(s): Must be registered in the Community Health Sciences graduate program or the Public Health and Preventative Medicine program. Consent of the instructor is required for all other students.

Community Health Sciences 689 H(3-0)
(formerly Medical Science 651.08)

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): Must be registered in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 700 H(1-6)

Community Health Directed Study
Independent study in special topics at an advanced level in Community Health Sciences.

Prerequisite(s): Consent of the instructor.

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Community Health Sciences 710 H(3-0)
(formerly Medical Science 712.01)

Advanced Topics in Biostatistics
Advanced topics and methods used in Biostatistics.

Prerequisite(s): Consent of the instructor.

Community Health Sciences 720 H(2-3)

Pro Doctoral Seminar
Pertinent topics discussed to prepare students for thesis preparation.

Community Health Sciences 740 H(3-2T)
(formerly Medical Science 709)

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 instructor is required for all other students.

Community Health Sciences 741 H(3-0)
(formerly Medical Science 711)

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 registration in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 742 H(3-0)
(formerly Medical Science 712.02)

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 instructor.

Community Health Sciences 760 H(3-0)
(formerly Medical Science 712.03)

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 instructor.

Community Health Sciences 761 H(3-0)
(formerly Medical Science 705)

Advanced Methods in Health Research
Advanced health research designs and measurement techniques.

Prerequisite(s): Community Health Sciences 681 or Medical Science 659.02 and registration in the Community Health Sciences graduate program. Consent of the instructor is required for all other students.

Community Health Sciences 780 H(3-0)
(formerly Medical Science 712.04)

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 instructor.

Community Rehabilitation CORE

Instruction offered by members of the Community Rehabilitation and Disability Studies interdisciplinary team.

Director — E. A. Hughson

Graduate Courses

Community Rehabilitation 624 F(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 H(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 both Community Rehabilitation 630 and 603.15 will not be allowed.

Community Rehabilitation 631 H(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 cooperation 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 both Community Rehabilitation 631 and 603.12 will not be allowed.

Community Rehabilitation 632 H(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 both Community Rehabilitation 632 and 603.13 will not be allowed.

Community Rehabilitation 633 H(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 both Community Rehabilitation 633 and 603.18 will not be allowed.

Community Rehabilitation 634 H(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 both Community Rehabilitation 634 and 603.16 will not be allowed.

Community Rehabilitation 641 H(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 H(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 both Community Rehabilitation 650 and 691.04 will not be allowed.

Community Rehabilitation 651 H(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 both Community Rehabilitation 651 and 691.32 will not be allowed.

Community Rehabilitation 652 H(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 both Community Rehabilitation 652 and 691.33 will not be allowed.

Community Rehabilitation 653 H(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 both Community Rehabilitation 653 and 603.02 will not be allowed.

Community Rehabilitation 654 H(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 both Community Rehabilitation 654 and 691.42 will not be allowed.

Note: This is an online course.

Community Rehabilitation 655 H(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 both Community Rehabilitation 655 and 691.44 will not be allowed.

Note: This is an online course

Community Rehabilitation 656 H(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 both Community Rehabilitation 656 and 603.03 will not be allowed.

Community Rehabilitation 676 F(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 H(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

Computer Science CPSC

Instruction offered by members of the Department of Computer Science in the Faculty of Science.

Department Head - C. Williamson

Note: Computer Science students should also see courses listed under Software Engineering.

Note: 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.

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 H(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 H(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 H(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 H(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 both Computer Science 609 and Software Engineering 697 will not be allowed for programs offered by the Department of Computer Science.

Computer Science 610 H(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 H(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.

Note: Computer Science 413 or equivalent is recommended as preparation for this course.

Computer Science 617 H(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.

Note: Computer Science 513 or 521 or equivalent is recommended as preparation for this course.

Computer Science 619 **H(3-0)**

Quantum Computation
Quantum information, quantum algorithms including Shor's quantum factoring algorithm and Grover's quantum searching technique, quantum error correcting codes, quantum cryptography, nonlocality and quantum communication complexity, and quantum computational complexity.

Computer Science 622 **H(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.

Computer Science 625 **H(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.

Note: Computer Science 457 and Mathematics 271, or equivalents, are recommended as preparation for this course.

Computer Science 626 **H(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.

Note: Computer Science 418 and 441, or equivalents, are recommended as preparation for this course.

Computer Science 627 **H(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 or equivalents and consent of the Department.

Computer Science 628 **H(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 or equivalents and consent of the Department.

Computer Science 629 **H(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.

Note: Pure Mathematics 315 is recommended as preparation for this course.

Computer Science 630 **H(3-2T)**

Information Theoretic 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.

Note: One of Computer Science 219, 233 or 235 and one of Mathematics 271, 273 or Pure Mathematics 315 and one of Statistics 205 or 211 or 213 or 321 or Mathematics 321, or equivalents, are recommended as preparation for this course.

Computer Science 635 **H(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.

Computer Science 641 **H(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 **H(3-0)**

Modern Wireless Networks
An introduction to the fundamentals and applications of wireless networks.

Computer Science 653 **H(3-0)**

Computational Geometry
Geometric searching, hull proximity and intersection data structures and algorithms and their complexity.

Note: Computer Science 517 or equivalent is recommended as preparation for this course.

Computer Science 657 **H(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 morphogensis. Genotype-to-phenotype mapping. Modelling of plant ecosystems. Rendering and visualization of the models. A survey of applications and research directions.

Note: Computer Science 453 or equivalent is recommended as preparation for computer science students taking this course.

Computer Science 661 **H(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.

Prerequisite(s): Computer Science 561 or equivalent.

Computer Science 662 **H(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.

Computer Science 667 **H(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.

Note: Computer Science 413, 491 and Pure Mathematics 315, or equivalents, are recommended as preparation for this course.

Computer Science 669 **H(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.

Note: Students should not have taken any previous course in cryptography.

Computer Science 671 **H(3-0)**

Database Management Systems
Foundations of database applications and database systems, plus some advanced topics in data management systems will be introduced.

Computer Science 672 **H(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): Students may not have credit for more than one of Computer Science 672, 572 or 599.77

Computer Science 673 **H(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 **H(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 **H(3-0)**

Research Methods in Human-Computer Interaction
Application of the theory and methodology of human-machine studies to real systems; theory and practice.

Note: Computer Science 481 or equivalent is recommended as preparation for this course.

Computer Science 683 **H(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.

Note: Computer Science 583 or equivalent is recommended as preparation for this course.

Computer Science 687 **H(3-0)**

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.

Computer Science 689 **H(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.

Computer Science 691 **H(3-0)**

Rendering
Physical foundations of illuminations techniques. Color. 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.

Computer Science 695 **H(3-0)**

Advanced Geometric Algorithms in 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 triangulization, 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 **H(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 both Computer Science 696 and 699 will not be allowed.

Note: This course is intended to help students identify a project topic for Computer Science 698 and meets for one and one-half hours per week during the Fall and Winter Terms.

Computer Science 697 **H(3-0)**

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. Multimodal biometrics and biometric security.

Computer Science 698 **F(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 **H(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 both Computer Science 699 and 696 will not be allowed.

Note: This course meets for one and one-half hours per week during the Fall and Winter Terms.

NOT INCLUDED IN GPA

Computer Science 701 **H(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 **H(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 **H(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 **H(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 or equivalent.

Note: Computer Science 581 or 681 or equivalent is highly recommended as preparation for this course.

Computer Science 785 **H(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, meta-morphosis, 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 **H(3-0)**

Advanced Geometric Modelling
Current research topics including spline modelling, Subdivision Surfaces, multiresolution, wavelets, analysis of the subdivision surfaces and reverse subdivision.

Culture and Society CUSP

Courses for the graduate programs in the Department of Communication and Culture are listed under Communication and Culture (CMCL).

Dance DNCE

Instruction offered by members of Dance in the School of Creative and Performing Arts in the Faculty of Arts. An audition and consent of Dance is necessary before students register in certain courses.

Acting Division Chair – M. Monteros

Graduate Course

Dance 681 **H(2S-2)**

Special Topics in Dance
Prerequisite(s): Consent of the Division Chair, Dance.

MAY BE REPEATED FOR CREDIT

Drama DRAM

Instruction offered by members of Drama in the School of Creative and Performing Arts in the Faculty of Arts.

Acting Division Chair - V. Campbell

Senior Courses

Drama 517 **H(2S-2)**

Advanced Design for Theatre I
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, Dance.

Drama 519 **H(2S-2)**

Advanced Design for Theatre II
Continuation of Drama 517.

Prerequisite(s): Drama 517 and consent of the Division Chair, Dance.

Drama 531 **H(2S-2)**

Scene Painting I
Theory and technique of scene painting for a variety of theatre genres.

Prerequisite(s): Consent of the Division Chair, Dance.

Drama 533 **H(2S-2)**

Scene Painting II
Continuation of theory and technique of scene painting for a variety of theatre genres.

Prerequisite(s): Drama 531 and consent of the Division Chair, Dance.

Drama 540 **F(4S-0)**

Seminar in Drama III
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 or consent of the Division Chair, Dance.

Drama 560 **F(2S-2)**

Performance Creation III
Independent research, creation and facilitation of original solo or group performances.

Prerequisite(s): Drama 460 or consent of the Division Chair, Dance.

Drama 564 **F(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 460 or consent of the Division Chair, Dance.

Drama 571 **H(2S-0)**

Directed Studies I
MAY BE REPEATED FOR CREDIT

Drama 572 **F(2S-0)**

Directed Studies II
Prerequisite(s): Consent of the Division Chair, Dance.

MAY BE REPEATED FOR CREDIT

Drama 591 **H(4 months)**

Professional Theatre Internship I
Internship experience with a local professional theatre organization.

Prerequisite(s): Consent of the Division Chair, Dance.

Antirequisite(s): Drama 590.

Note: Only open to Drama students with fourth-year standing.

NOT INCLUDED IN GPA

Drama 593 **H(4 months)**

Professional Theatre Internship II
Furthere internship experience with a local professional theatre organization.

Prerequisite(s): Drama 591 and consent of the Division Chair, Dance.

Antirequisite(s): Drama 590.

Note: Only open to Drama students with fourth-year standing.

NOT INCLUDED IN GPA

Graduate Courses

Drama 605 **H(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 **H(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 **F(2S-3)**

Selected Problems in Directing

Drama 623 **H(2S-2)**

Seminar in Scene Design
MAY BE REPEATED FOR CREDIT

Drama 625 **H(2S-2)**

Seminar in Costume Design
MAY BE REPEATED FOR CREDIT

Drama 627 **H(2S-2)**

Seminar in Lighting Design
MAY BE REPEATED FOR CREDIT

Drama 629 **H(2S-2)**

Seminar in Technical Direction
MAY BE REPEATED FOR CREDIT

Drama 647 **H(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 **H(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 **H(2S-0)**

Directed Studies
MAY BE REPEATED FOR CREDIT

Drama 660 **F(2S-3)**

Seminar and Practicum in Performance Creation

Drama 671 **H(3S-0)**

Selected Problems in Playwriting I

Drama 673 **H(3S-0)**

Selected Problems in Playwriting II

Ecology ECOL

Instruction offered by members of the Department of Biological Sciences in the Faculty of Science.

Department Head - R.M.R. Barclay

Ecology 507 **H(0-8) or H(3-0)**

Special Problems in Ecology
Independent research or reading project that may include seminars, lectures, seminars, term papers and training in theoretical and/or laboratory methods.

Prerequisite(s): Completion of at least 9 full-course equivalents and consent of the Department.

Note: Students completing a typical course sequence in their program would normally be eligible to enrol in their 3rd or 4th year. After consultation with a departmental faculty member who will supervise the chosen problem, a permission form obtained from the department office or website must be signed by the course supervisor before a student can register.

MAY BE REPEATED FOR CREDIT

Ecology 527 **H(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 477.02.

Note: Offered during even-odd dated academic years.

Ecology 528 **F(0-8)**

Independent Studies in Ecology
Original and independent thought, practical research and the completion of written and oral reports.

Prerequisite(s): Completion of at least 15 full-course equivalents and consent of the Department.

Note: After consultation with a departmental faculty member who will supervise the chosen problem, a permission form obtained from the department office or website must be signed by the course supervisor before a student can register.

MAY BE REPEATED FOR CREDIT

Ecology 529 **H(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 analysing genetic variation to test quantitative predictions from ecological and evolutionary theory. Students will learn all of the steps required to undertake a

molecular ecology project of an applied or fundamental nature.

Prerequisite(s): Biology 311 and 313.

Ecology 530 **F(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): Completion of at least 15 full-course equivalents and consent of the Department.

Note: After consultation with a departmental faculty member who will supervise the chosen problem, a permission form obtained from the department office or website must be signed by the course supervisor before a student can register.

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 **H(3-0)**

Advanced Behavioural Ecology
Current problems and recent research in areas of particular significance. Topics will vary from year to year.

Note: Offered during even-odd dated academic years.

MAY BE REPEATED FOR CREDIT

Ecology 607 **H(0-6)**

Limnology and Oceanography
Lectures, seminars and projects in the areas of limnology, aquatic ecology and oceanography.

Ecology 677 **H(0-6)**

Advanced Population Ecology
The theory and practice of the study of populations, methods of population estimation, factors affecting populations, and systems approaches to the modelling of populations.

MAY BE REPEATED FOR CREDIT

Ecology 731 **H(3-0)**

Advanced Plant 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

Instruction offered by members of the Department of Economics in the Faculty of Arts.

Department Head – D. Gordon

Graduate Courses

Students are required to have departmental consent before registering in any of the following courses:

Economics 611 **H(3-0)**

Independent Study
MAY BE REPEATED FOR CREDIT

Economics 615 **H(3-0)**

Advanced Econometrics I
The study of the interrelated but conceptually distinct problems of identification and statistical inference in the context of economically interesting applications. The identification "problem" in economics is the problem of characterizing parameters of an econometric model from innumerable observable data, while statistical inference is the practice of using statistical tools to draw conclusions about the parameters of the model given finite observable data.

Economics 617 **H(3-0)**

Advanced Econometrics II
Prerequisite(s): Economics 615 or consent of the Department.

Economics 619 **H(3-0)**

Economics of International Commercial Policy
Examines important longstanding as well as contemporary issues from the economic literature on international trade. This course focuses on quantitative and empirical analysis. Specific topics typically covered are 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 **H(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 **H(3-0)**

Energy in the Production Sector of the Economy
The object is to teach students to use the tools of microeconomic analysis, institutional economics, and econometrics, to understand energy markets. There will be a focus on empirical studies of the energy business including (but not limited to) natural gas markets, crude oil markets, gasoline markets, electricity markets, coal markets, and public policies affecting energy markets.

Economics 633 **H(3-0)**

Labour Markets
A study of aspects of labour markets using both microeconomic theory and empirical evidence. Focus will be on the econometric methods of analysis that are currently applied beyond the traditional boundaries of labour economics into public economics, the economics of crime, the economics of education, the economics of immigration, etc.

Economics 635 **H(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 **H(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 645 **H(3-0)**

Topics on Institutions and Economic Performance
A focus on the role of economic, social and political institutions in economic backwardness and development.

Economics 651 **H(3-0)**
(formerly Economics 611.13)

Redistribution and Social Insurance
A focus on the role of economic, social and political institutions in economic backwardness and development.

Economics 653 **H(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 **H(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 **H(3-0)**

Microeconomic Theory
Introduction to advanced microeconomic theory. Standard topics include consumer theory, theory of the firm, and general equilibrium.

Economics 659 **H(3-0)**

Macroeconomic Theory
Introduction to the basic structure of the dynamic general equilibrium framework that forms the backbone of most modern macroeconomics research. It also covers a number of selected topics such as economic growth, income inequality, inflation and unemployment.

Economics 661 **H(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 **H(3-0)**

Seminar in Industrial Organization
A focus on marker 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 675 **H(3-0)**

Advanced Topics in Natural Resource Economics

Examines economic models of the structure and nature of natural resource industries and their interaction with the rest of the economy. Studied are 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 **H(3-0)**

Seminar in Economics of the Environment

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, economic growth and the environment, biodiversity, global warming and international environmental treaties.

Economics 679 **H(3-0)**

Health Economics I

An overview of topics in health economics. An introduction to economic principles and techniques which are of use in analysing and planning health policy, in particular the delivery of health services, and for understanding the health behaviour of individuals.

Prerequisite(s): Consent of the Department.

Economics 681 **H(3-0)**

Health Economics II

A general introduction to current research in the economics of health and medical care, geared to students with significant research interests related with these fields. Content of the course will be tailored to these interests. Topics such as: the Demand for Health and the Production of Health; Patient Behaviour and Insurance; Physician-induced Demand and Target Income; Physician Agency; Not-for-profit and For-profit Hospital; Hospital Competition will be included.

Economics 691 **Q(3-0)**

Research Methods I

Survey of research methods in economics. For course-based MA students.

Economics 693 **Q(3-0)**

Research Methods II

Survey of research methods in economics. For course-based MA students.

Economics 695 **H(3-0)**

Research Methods III

Economics 711 **H(3-0)**

Independent Study

MAY BE REPEATED FOR CREDIT

Economics 715 **H(3-0)**

Advanced Topics in Econometrics

A survey of selected topics in modern applied microeconometrics. Recent developments in instrumental variables methods, methods to estimate treatment effects, notions of local causal effects, endogenous switching regressions, are among the topics that may be covered.

Economics 757 **H(3-0)**

Advanced Microeconomic Theory

Building on Economics 657, 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.

Economics 759 **H(3-0)**

Advanced Macroeconomic Theory

A survey of the ideas, controversies, and techniques that constitute modern macroeconomics. The principal issues it covers lie at the heart of such important social problems as inflation, deficits and debts, and economic growth. The empirical study of many issues raised in theoretical and political debates is also emphasized.

In addition to the numbered and titled courses shown above, the Department offers a selection of advanced level graduate courses specifically designed to meet the needs of individuals or small groups of students. These courses are numbered in the series 800.01 to 899.99. Such offerings are, of course, conditional upon the availability of staff resources.

Educational Psychology EDPS

Instruction is offered by members of Graduate Programs in Education.

Associate Dean – M. Jacobsen

Note: Additional graduate education courses are offered under the course headings Educational Research (EDER) and undergraduate courses are offered under the course heading Education (EDUC).

Note: Only Psychology courses may be used to fulfill the requirements for the Major or Minor in Psychology.

Effective May 2012 Applied Psychology (APSY) changed its name to Educational Psychology (EDPS). All courses originally listed under the APSY acronym will be under the EDPS acronym.

Graduate Courses

Note: Graduate courses within Graduate Programs in Education: Educational Psychology can be taken only with consent of Graduate Programs in Education, and in specific cases additional requirements may be necessary (see below).

Educational Psychology 602 **H(3S-0)**
(formerly Applied Psychology 602, formerly Campus Alberta Applied Psychology 601)

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.

Educational Psychology 604 **H(3-0)**
(formerly Applied Psychology 603, formerly Campus Alberta Applied Psychology 603

Professional Ethics in Applied Psychology

Ethical, legal and professional knowledge to inform practice in educational, counselling and mental health contexts.

Antirequisite(s): Educational Psychology 603 or equivalent.

Educational Psychology 606 **H(3S-0)**
(formerly Applied Psychology 606)

Methods of Inquiry in Professional Practice

Helps students critically analyse other research efforts and in the process learn how to think through their own research questions in a critically evaluative manner.

Educational Psychology 608 **H(3S-0)**
(formerly Applied Psychology 608, formerly Campus Alberta Applied Psychology 608)

Introduction to Statistical Analyses

An introductory course on descriptive and inferential statistics designed to give students with minimal 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.

Educational Psychology 609 **H(3-2)**
(formerly Applied Psychology 605)

Research Design in Statistics II

Research design and statistics, including methods for research in psychology and related laboratory instruction.

Antirequisite(s): Educational Psychology 605 or equivalent.

Educational Psychology 610 **H(3-0)**
(formerly Campus Alberta Applied Psychology 617)

Research Methodology in Counselling

Survey course on research methodologies in counselling, which addresses issues of research design, methods and interpretation of research findings.

Antirequisite(s): Credit for Educational Psychology 610 and Applied Psychology 605 or Educational Psychology 605 or equivalent will not be allowed.

Educational Psychology 611 **H(3-2)**
(formerly Applied Psychology 611)

Qualitative Research Methodologies

Advanced study of qualitative research methods for use in applied psychology and education.

Educational Psychology 612 **H(3-0)**

Research Methods in School Psychology

Advanced study of qualitative research methods for use in applied psychology and education.

Antirequisite(s): Credit for Educational Psychology 612 and Applied Psychology 605 or Educational Psychology 605 will not be allowed.

MAY BE REPEATED FOR CREDIT

Educational Psychology 614 **H(3-0)**
(formerly Applied Psychology 603, formerly Campus Alberta Applied Psychology 603)

Ethics in Educational Psychology

Engages students in ethical and legal issues in educational psychology, and professional issues in practice settings.

Antirequisite(s): Educational Psychology 603 or equivalent.

Educational Psychology 615 **H(3-0)**
(formerly Applied Psychology 615)

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.

Educational Psychology 616 H(3S-0)
(formerly Applied Psychology 616, formerly Campus Alberta Applied Psychology 613)

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 and 622 or equivalents.

Educational Psychology 617 H(3-3)
(formerly Applied Psychology 617)

Psychological Assessment of Adults
Provides students with the knowledge and skills necessary to select, administer, score and interpret formal psychological tests and other assessment instruments commonly used within counselling contexts.

Prerequisite(s): Educational Psychology 615 or equivalent.

Educational Psychology 618 H(3-2)
(formerly Applied Psychology 607)

Multivariate Design and Analysis
Research design and statistics in psychology, with special reference to large sample techniques.

Prerequisite(s): Educational Psychology 609 or consent of the instructor.

Antirequisite(s): Educational Psychology 607 or equivalent.

Educational Psychology 619 H(3-0)
(formerly Applied Psychology 619)

Counselling Girls and Women
Sex role development; stereotyping and social roles; counselling theories; counselling approaches.

Educational Psychology 621 H(2-2)
(formerly Applied Psychology 621)

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): Applied Psychology 419 or equivalent or consent of Graduate Programs in Education.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 623 or equivalent.

Note: Not open to Open Studies students.

Educational Psychology 622 H(3S-0)
(formerly Applied Psychology 622, formerly Campus Alberta Applied Psychology 605)

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.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 602 or equivalent.

Educational Psychology 623 H(3-0)
(formerly Applied Psychology 623)

Theory in Counselling
History and systems involved in counselling psychology and client change.

Educational Psychology 624 H(3-0)
(formerly Campus Alberta Applied Psychology 607)

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.

Antirequisite(s): Credit for Educational Psychology 624 and Applied Psychology 625 or Educational Psychology 625 will not be allowed.

Educational Psychology 625 H(3-0)
(formerly Applied Psychology 625)

Cultural Influences on Professional Practice
An examination of cultural influences on theory and practice in applied psychology.

Educational Psychology 626 H(3-0)
(formerly Campus Alberta Applied Psychology 637)

Group Interventions and Processes
Examines theoretical, research, experiential knowledge helpful in facilitating diverse educational and psychological groups.

Antirequisite(s): Credit for Educational Psychology 626 and Applied Psychology 627 or Educational Psychology 627 will not be allowed.

Educational Psychology 627 H(3-1)
(formerly Applied Psychology 627)

Group Processes in Applied Psychology
Theory of group practice in applied psychology, with experiential laboratory.

Antirequisite(s): Credit for Educational Psychology 627 and 626 will not be allowed.

Educational Psychology 629 H(3S-2)
(formerly Applied Psychology 629)

Theory and Applications: Selected Topics
MAY BE REPEATED FOR CREDIT

Educational Psychology 630 H(3-0)
(formerly Campus Alberta Applied Psychology 621)

Foundations of Career Counselling
Review and application of theoretical and research literatures relevant to counselling clients with career concerns.

Antirequisite(s): Credit for Educational Psychology 630 and Applied Psychology 631 or Educational Psychology 631 will not be allowed.

Educational Psychology 631 H(3-0)
(formerly Applied Psychology 631)

Theories of Career Development
Study of career development theory and related research; implications for the applied field.

Antirequisite(s): Credit for Educational Psychology 632 and Educational Psychology 630 will not be allowed.

Educational Psychology 632 H(3S-0)
(formerly Applied Psychology 632, formerly Campus Alberta Applied Psychology 627)

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 and 625

Educational Psychology 633 H(2-2)
(formerly Applied Psychology 633, formerly Campus Alberta Applied Psychology 623)

Career Counselling
Laboratory and field experiences in career counselling.

Prerequisite(s): Educational Psychology 631.

Educational Psychology 634 H(3S-0)
(formerly Applied Psychology 634, formerly Campus Alberta Applied Psychology 629)

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 and 646 or equivalent.

Educational Psychology 635 H(3-0)
(formerly Applied Psychology 635)

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.

Note: Open to students in Psychology and Educational Research programs.

Educational Psychology 636 H(3S-0)
(formerly Applied Psychology 636, formerly Campus Alberta Applied Psychology 625)

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.

Educational Psychology 637 H(3-0)
(formerly Applied Psychology 637)

Relationship Counselling
Review of theory and systems in marriage and family counselling. Structured observation activities.

Corequisite(s): Prerequisite or Corequisite: Educational Psychology 640 or consent of Graduate Programs in Education.

Educational Psychology 638 H(3S-0)
(formerly Applied Psychology 638, formerly Campus Alberta Applied Psychology 615)

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 and 622 or equivalents.

Educational Psychology 639 H(2-2)
(formerly Applied Psychology 639)

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 and 623 or equivalents or consent of Graduate Programs in Education.

NOT INCLUDED IN GPA

Educational Psychology 640 F(2-7)
(formerly Applied Psychology 640)

Practicum in Counselling Psychology
Supervised counselling experience and related seminars.

Prerequisite(s): Educational Psychology 621, 623, 625 or equivalents or consent of Graduate Programs in Education.

Corequisite(s): Prerequisites or Corequisites: Educational Psychology 614, 615, 639 and 695, or equivalent.

Note: Not open to Open Studies students.

NOT INCLUDED IN GPA

Educational Psychology 641 H(3-0)
(formerly Applied Psychology 641)

Development, Learning and Cognition - Child and Adolescence
The interactions of development, learning and cognition in childhood and adolescence.

Educational Psychology 642 H(3S-0)
(formerly Applied Psychology 642, formerly Campus Alberta Applied Psychology 611)

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 602, 604, 616, 622, 624, and 638.

NOT INCLUDED IN GPA

Educational Psychology 643 H(3-0)
(formerly Applied Psychology 643)

Development, Learning and Cognition - Adult
The interactions of development, learning and cognition in childhood and adulthood.

Educational Psychology 644 H(3S-0)
(formerly Applied Psychology 644, formerly Campus Alberta Applied Psychology 619)

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 and 642 or equivalents.

NOT INCLUDED IN GPA

Educational Psychology 646 H(3S-0)
(formerly Applied Psychology 646, formerly Campus Alberta Applied Psychology 631)

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.

Educational Psychology 648 H(3S-0)
(formerly Applied Psychology 648, formerly Campus Alberta Applied Psychology 633)

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 typical and atypical human development in children, adolescents and adults.

Educational Psychology 650 H(3-0)
(formerly Applied Psychology 650)

Family and Social Bases of Behaviour
Course explores theoretical perspectives and contemporary research on socialization processes in childhood and adolescence, with particular emphasis on family and peer interpersonal relations.

Educational Psychology 651 H(3-0)
(formerly Applied Psychology 651)

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.

Note: Open to students in Educational Psychology programs or consent of Graduate Programs in Education.

Educational Psychology 652 H(3-0)
(formerly Applied Psychology 652)

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.

Antirequisite(s): Not open to students with credit in Educational Psychology 667 or equivalent.

Note: Open to students in School and Applied Child Psychology program.

Educational Psychology 653 H(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.

Note: Open to students in Educational Psychology programs or consent of Graduate Programs in Education.

Educational Psychology 654 H(3-0)
(formerly Applied Psychology 654)

Neurobiological and Developmental Bases of Learning and Behaviour
Course examines the field of cognitive neuroscience from an assessment framework. It explores the evolving understanding of neurobehavioural disorders and new testing techniques and practices.

Note: Open to students in Educational Psychology programs or consent of Graduate Programs in Education.

Educational Psychology 655 H(3-0)

Advanced Child Development
Explores the theory and research supporting recent advances in select areas of child development. Topics will include: developmental methodologies; parent and peer relations; personality, self, and self-concept; language and thought; emotion and motivation; and prosocial, antisocial, and moral development.

Note: Open to students in Educational Psychology programs or consent of Graduate Programs in Education.

Educational Psychology 656 H(1-14)
(formerly Applied Psychology 656)

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.

Note: Open to students in Educational Psychology programs.

NOT INCLUDED IN GPA

Educational Psychology 657 H(3-0)
(formerly Applied Psychology 657)

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.

Note: Open to students in School and Applied Child Psychology program.

Educational Psychology 658 H(3-0)
(formerly Applied Psychology 658)

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.

Note: Open to students in School and Applied Child Psychology program.

Educational Psychology 659 H(3-0)

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.

Note: Open to students in School and Applied Child Psychology program.

Educational Psychology 660 H(3-0)
(formerly Applied Psychology 660)

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.

Note: Open to students in School and Applied Child Psychology program.

Educational Psychology 661 H(3-0)
(formerly Applied Psychology 661)

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.

Note: Open to students in School and Applied Child Psychology program.

Educational Psychology 662 H(3-1)

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 659.

Note: Open to students in School and Applied Child Psychology program.

NOT INCLUDED IN GPA

Educational Psychology 663 H(3-1)

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 665.

Note: Open to students in School and Applied Child Psychology program.

NOT INCLUDED IN GPA

Educational Psychology 664 H(3S-0)
(formerly Applied Psychology 664, formerly Campus Alberta Applied Psychology 635)

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, and 610 or equivalents.

Educational Psychology 665 H(3-0)

Cognitive Assessment and Intervention
The theory and practice of intellectual/cognitive, memory, and neuropsychological 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): Educational Psychology 662.

Note: Open to students in School and Applied Child Psychology program.

Educational Psychology 667 H(3-3)
(formerly Applied Psychology 667)

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.

Antirequisite(s): Credit for both Educational Psychology 667 and 652 or equivalent will not be allowed.

Note: Open to students in School and Applied Child Psychology program.

Educational Psychology 668 H(3S-0)
(formerly Applied Psychology 668, formerly Campus Alberta Applied Psychology 681)

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.

Educational Psychology 669 H(3-0)

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 663.

Note: Open to students in School and Applied Child Psychology program.

Educational Psychology 670 H(3S-0)
(formerly Applied Psychology 670, formerly Campus Alberta Applied Psychology 693)

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, 638, and 642.

Educational Psychology 671 H(1-3)
(formerly Applied Psychology 671)

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. Focus on general assessment, analysis, intervention, and strategies in applied settings.

Prerequisite(s): Educational Psychology 661 or equivalent.

Educational Psychology 672 H(3S-0)
(formerly Applied Psychology 672, formerly Campus Alberta Applied Psychology 641)

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.

Educational Psychology 673 H(3-3)
(formerly Applied Psychology 673)

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 or equivalent.

Educational Psychology 674 H(3-0)
(formerly Applied Psychology 674)

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 or equivalent.

Educational Psychology 675 H(1-14)
(formerly Applied Psychology 675)

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 658 or equivalent.

NOT INCLUDED IN GPA

Educational Psychology 676 H(1-14)
(formerly Applied Psychology 676)

Practicum in Social, Emotional, and Behavioural Assessment and Intervention
This 200-hour practicum provides opportunities to develop competencies in social, emotional, and behavioural assessment and intervention within an approved setting.

Prerequisite(s): Educational Psychology 674 or equivalent.

NOT INCLUDED IN GPA

Educational Psychology 677 H(3-0)
(formerly Applied Psychology 677)

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.

Educational Psychology 678 H(3S-0)
(formerly Applied Psychology 678, formerly Campus Alberta Applied Psychology 661)

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, and 638 or equivalents.

Educational Psychology 679 H(3-0)
(formerly Applied Psychology 679)

Fundamentals of Solution-Oriented Therapy
Provides a working knowledge of the theory and practice of solution-oriented therapy and related models.

Educational Psychology 680 H(3S-0)
(formerly Applied Psychology 680, formerly Campus Alberta Applied Psychology 695)

Counselling Graduate Practicum: Selected Topics
Graduate Practicum: Selected Topics.

MAY BE REPEATED FOR CREDIT

Educational Psychology 682 H(3-3)
(formerly Applied Psychology 682, formerly Campus Alberta Applied Psychology 691)

Special Topics: Counselling
Graduate Seminar: Special Topics.

MAY BE REPEATED FOR CREDIT

Educational Psychology 683 H(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.

Note: Open to students in Educational Psychology or consent of Graduate Programs in Education.

Educational Psychology 684 H(3-0)
(formerly Applied Psychology 684)

Advanced Seminar in the Domains of School Psychology Leadership and Function in the Schools
An advanced study of the domains and functions of school and applied child psychologists. Constituting a final course within the MEd program, students are required to demonstrate a comprehensive understanding of competencies in ten domains identified by the National Association of School Psychologists as central to the school psychology profession.

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 H(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.

Note: Open to students in Educational Psychology or consent of Graduate Programs in Education.

Educational Psychology 686 H(3S-0)
(formerly Applied Psychology 686)

Counselling Graduate Seminar: Selected Topics
Graduate Seminar: Selected Topics.

MAY BE REPEATED FOR CREDIT

Educational Psychology 691 Q(1.5S-0)
(formerly Applied Psychology 691)

Graduate Seminar: Selected Topics
MAY BE REPEATED FOR CREDIT

Educational Psychology 692 F(3S-0)
(formerly Applied Psychology 692)

Graduate Seminar: Selected Topics
MAY BE REPEATED FOR CREDIT

Educational Psychology 693 H(3S-0)
(formerly Applied Psychology 693)

Graduate Seminar: Selected Topics
MAY BE REPEATED FOR CREDIT

Educational Psychology 694 F(1S-3)
(formerly Applied Psychology 694)

Graduate Practicum: Selected Topics
MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 695 H(1S-3)
(formerly Applied Psychology 695)

Graduate Practicum: Selected Topics
Note: Open only to students in the Counselling Psychology program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 698 F
(formerly Applied Psychology 698)

Pre-Master's Internship in School and Applied Child Psychology
This 1200 hour internship requires the integration and application of the full range of school psychology competencies and domains within an approved setting.

Prerequisite(s): Consent of Training Director.

Note: Open only to students in the MEd or MSc in School and Applied Child Psychology programs.

NOT INCLUDED IN GPA

Note: 700-level courses are normally available only to students in the doctoral program.

Educational Psychology 701 H(3-0)
(formerly Applied Psychology 701)

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 607 or equivalent.

Educational Psychology 702 H(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 607 or equivalent.

MAY BE REPEATED FOR CREDIT

Educational Psychology 703 H(3-0)
(formerly Applied Psychology 703)

Advanced Seminar in Applied Psychology
Doctoral seminar on issues in applied psychology. Dissertation development.

NOT INCLUDED IN GPA

Educational Psychology 705 H(3-0)
(formerly Applied Psychology 705)

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 or equivalent.

Educational Psychology 709 H(3-0)
(formerly Applied Psychology 709)

Advanced Seminar in Applied Learning and Developmental Psychology I
Advanced study of theory and practice in human development and learning.

Educational Psychology 731 H(3-0)
(formerly Applied Psychology 731)

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.

Note: Open only to doctoral students in Educational Psychology or consent of Graduate Programs in Education.

Educational Psychology 732 H(3-0)
(formerly Applied Psychology 732)

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.

Note: Open only to doctoral students in Educational Psychology or consent of Graduate Programs in Education.

Educational Psychology 741 H(3-2)
(formerly Applied Psychology 741)

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.

Educational Psychology 742 F(2-7)
(formerly Applied Psychology 742)

Advanced Practicum in Counselling
Advanced practicum in counselling psychology, and related seminars.

Note: Open only to doctoral students in Counselling Psychology program

NOT INCLUDED IN GPA

Educational Psychology 760 H(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.

Note: Open only to doctoral students in Educational Psychology or consent of Graduate Programs in Education.

Educational Psychology 761 H(3-1)

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.

Note: Open only to doctoral students in Educational Psychology.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 762 H(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.

Note: Open only to doctoral students in Educational Psychology.

Educational Psychology 764 H(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.

Note: Open only to doctoral students in Educational Psychology.

Educational Psychology 766 **H(3-1)**

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.

Note: Open only to doctoral students in School and Applied Psychology.

NOT INCLUDED IN GPA

Educational Psychology 788 **F**
(formerly Applied Psychology 788)

Pre-Doctoral Internship in Counselling Psychology
One full calendar year, full-time (or two years, half-time) supervised training 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): Consent of Training Director.

Note: Open to students enrolled in the PhD program in Counselling Psychology.

NOT INCLUDED IN GPA

Educational Psychology 792 **F(3-0)**
(formerly Applied Psychology 792)

Advanced Seminar: Selected Topics
MAY BE REPEATED FOR CREDIT

Educational Psychology 793 **H(3S-0)**
(formerly Applied Psychology 793)

Graduate Seminar: Selected Topics
MAY BE REPEATED FOR CREDIT

Educational Psychology 794 **F(1S-3)**
(formerly Applied Psychology 794)

Advanced Practicum: Selected Topics
MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 795 **H(1S-3)**
(formerly Applied Psychology 795)

Advanced Practicum: Selected Topics
MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Psychology 798 **F**
(formerly Applied Psychology 798)

Pre-Doctoral Internship in School and Applied Child Psychology
Supervised 1600 hour pre-doctoral internship in School and Applied Psychology 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): Consent of the Training Director.

Note: Open only to doctoral students in School and Applied Child Psychology.

NOT INCLUDED IN GPA

Educational Research EDER

Additional graduate education courses are offered under the course heading Educational Psychology(EDPS) and undergraduate courses are offered under the course heading Education (EDUC).

Instruction offered by members of Graduate Programs in Education.

Associate Dean – M. Jacobsen

Graduate Courses

Educational Research 603 **H(3-0)**

Research Methods
Introduction to various approaches to research in education.

MAY BE REPEATED FOR CREDIT

Educational Research 605 **Q(1.5-0)**

Special Topics in Professional Development
Note: Consult Schedule of Classes for offerings.

MAY BE REPEATED FOR CREDIT

Educational Research 613 **H(3-0)**

Change and Innovation in Education
Examines both traditional and contemporary research literature relevant to change and innovation in educational settings.

Educational Research 617 **H(3-0)**

Organizational Theory and Analysis in Education
Human organization as the setting for the delivery of educational services.

Educational Research 619 **H(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.

Note: Consult Schedule of Classes for offerings.

MAY BE REPEATED FOR CREDIT

Educational Research 621 **H(3-0)**

Assessment of Classroom Learning
Examines both traditional and emerging assessment techniques, including Performance Assessment and Learning Portfolios, for examining students' learning outcomes.

Educational Research 623 **H(3-2)**

Topics in Educational Technology
Topics and issues in educational technology.

MAY BE REPEATED FOR CREDIT

Educational Research 625 **H(3-0)**

Teacher Evaluation
Examines both traditional and emerging techniques, e.g. Portfolios, for assessing teacher performance.

Educational Research 629 **H(3-0)**

Special Topics in Assessment/Evaluation
Consult Schedule of Classes for offerings.

MAY BE REPEATED FOR CREDIT

Educational Research 631 **H(3-0)**

Special Topics in Workplace and Adult Learning
Examines topics in Workplace and Adult Learning.

MAY BE REPEATED FOR CREDIT

Educational Research 635 **H(3-0)**

Topics in Adult Learning
Explores a variety of current topics and discourses pertaining to adult education and adult learning.

Note: Consult current timetable for offerings. This course is for master's and doctoral students in Adult Learning.

MAY BE REPEATED FOR CREDIT

Educational Research 641 **H(3-0)**

Research on the Reading Process
Examination and criticism of competing theoretical discourses about the teaching and learning of reading in the elementary school.

Educational Research 649 **H(3-0)**

Special Topics in English Language Education
Explores a variety of theoretical perspectives and discourses in English Language Education.

MAY BE REPEATED FOR CREDIT

Educational Research 651 **H(3-0)**

Philosophy of Education
Philosophical topics in the context of education. Consult Schedule of Classes for offerings.

MAY BE REPEATED FOR CREDIT

Educational Research 653 **H(3-0)**

Sociology of Education
Sociological topics in the context of education. Consult Schedule of Classes for offerings.

MAY BE REPEATED FOR CREDIT

Educational Research 655 **H(3-0)**

Comparative Education
Topics in comparative education. Consult Schedule of Classes for offerings.

MAY BE REPEATED FOR CREDIT

Educational Research 657 **H(3-0)**

Culture and Gender Studies
Culture and gender topics in the context of education. Consult Schedule of Classes for offerings.

MAY BE REPEATED FOR CREDIT

Educational Research 659 **H(3-0)**

History of Education
Historical topics in the context of education. Consult Schedule of Classes for offerings.

MAY BE REPEATED FOR CREDIT

Educational Research 667 **H(3-0)**

Second Language Reading and Writing
Research and practice in second language reading and writing; instructional techniques for specific audiences; theories of reading and writing.

Educational Research 668 **H(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.

Note: Consult current timetable for offerings.

MAY BE REPEATED FOR CREDIT

Educational Research 669 H(3-0)

Aspects of Second Language and Culture
Introduction to research and issues on various aspects of second language and culture.

MAY BE REPEATED FOR CREDIT

Educational Research 671 H(3-0)

Conceptualizing Educational Technology
Seminar to familiarize students with the terrain of educational technology.

Educational Research 673 H(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 instructional strategies to characteristics of learners and content.

Educational Research 675 H(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.

Educational Research 677 H(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. Other topics include media selection, online team-building, social context issues, and leadership of distributed learning organizations.

Educational Research 679 H(3-0)

Special Topics in Educational Technology
Examination of current topics and issues in educational technology and related areas.

MAY BE REPEATED FOR CREDIT

Educational Research 681 H(3-0)

Studying Curriculum
Curriculum research, theory, and practice with particular reference to curriculum aims, content, organization and change.

Antirequisite(s): Not open to students with credit in Educational Research 665, 669.27 or 699.42.

Educational Research 682 H(3-0)

Conceptualizing Interpretive Inquiry
An introduction to the various approaches to conducting interpretive studies in curriculum.

Note: Required course in MA and MSc Curriculum & Learning programs.

Educational Research 683 H(3-0)

Curriculum Development, Implementation and Assessment
Making sense of what happens when curriculum policy becomes reality and affects students, teachers, parents and politicians.

Educational Research 685 H(3-0)

Interpretive Curriculum Discourses
The field of interpretive work in curriculum theory.

Educational Research 687 H(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.

Antirequisite(s): Credit for both Educational Research 687 and either 681 or 683 are not allowed.

Note: Required course in MA and MSc Curriculum & Learning programs.

Educational Research 688 H(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.

Antirequisite(s): Credit for both Educational Research 688 and 685 is not allowed.

Note: Required course in MA and MSc Curriculum & Learning programs.

Educational Research 689 H(3-0)

Aspects of School Curriculum
Introductory systematic study of research and issues focused on various areas of the school curriculum.

MAY BE REPEATED FOR CREDIT

Educational Research 692 H(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.

MAY BE REPEATED FOR CREDIT

Educational Research 693 H(3-0)

Interpretive Study of Curriculum
Introduction to the various forms of educational inquiry.

MAY BE REPEATED FOR CREDIT

Educational Research 696 H(3-2)

Special Topics in Education
Topics designed to prepare foreign-prepared teachers to meet Alberta Education teacher certification requirements.

Note: Normally restricted to students in the Bridge to Teaching program.

MAY BE REPEATED FOR CREDIT

Educational Research 697 Q(1.5-0)

Special Topics
MAY BE REPEATED FOR CREDIT

Educational Research 698 F(3-0)

Special Topics
MAY BE REPEATED FOR CREDIT

Educational Research 700 F(3-0)

Seminar for First-Year PhD/EdD Students
Seminar on selected topics.

Note: Normally restricted to doctoral students.

NOT INCLUDED IN GPA

Educational Research 701 H(3-0)

Advanced Research Methods
Advanced study in the conduct of research.

Note: Normally restricted to doctoral students.

MAY BE REPEATED FOR CREDIT

Educational Research 703 H(3-0)

Directed Study
Individual doctoral study in a selected area.

MAY BE REPEATED FOR CREDIT

Educational Research 705 H(3-0)

Doctoral Seminar in Educational Leadership
Provides doctoral students with a contemporary Canadian focus on significant issues in educational leadership.

Note: Normally restricted to doctoral students.

Educational Research 707 H(3-0)

Collaboratory of Practice I
Review the theoretical and research literature and use analytical framework to explore problems of practice.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Research 708 H(3-0)

Collaboratory of Practice II
Integrate theoretical, research, and practical knowledge through a focus on data collection and analysis.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Educational Research 709 H(3-0)

Dissertation Seminar I
Undertaking a doctoral research study and successful passing of the candidacy exam.

NOT INCLUDED IN GPA

Educational Research 710 H(3-0)

Dissertation Seminar II
Ongoing doctoral research that culminates in a dissertation defence.

NOT INCLUDED IN GPA

Educational Research 719 H(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.

Note: Normally restricted to doctoral students.

MAY BE REPEATED FOR CREDIT

Educational Research 733 H(3-0)

Advanced Workplace and Adult Learning
Advanced exploration of diverse topics in workplace and adult learning.

Note: Normally restricted to doctoral students.

MAY BE REPEATED FOR CREDIT

Educational Research 735 H(3-0)

Advanced Topics in Adult Learning
Drawing from a foundational understanding and appreciation of adult education and adult learning, this course provides a deeper exploration of current topics and discourses that inform this field of scholarship and practice.

Note: Normally restricted to doctoral students. Consult current timetable for offerings. Doctoral students are encouraged to discuss enrolment in this course with their supervisor, to determine if they have a foundational understanding of adult education and adult learning (acquired through previous course work or related work experience).

MAY BE REPEATED FOR CREDIT

Educational Research 741 H(3-0)

Advanced Seminar in Theory and Research in Literacy Education
A critical examination of theories, models, and research that underpin literacy education.

Note: Normally restricted to doctoral students.

Educational Research 768 H(3-0)

Theory and Research in Languages and Diversity
Topics include current issues in languages and diversity, assessment and evaluation, language policy and planning, and language-identity-democracy.

Note: Normally restricted to doctoral students. Consult current timetable for offerings,

MAY BE REPEATED FOR CREDIT

Educational Research 771 H(3S-0)

Doctoral Seminar in Educational Technology
An examination of the historical and philosophical foundations of field informs the critical analysis of current and emerging research in educational technology. In this seminar, doctoral students study research and methodology across domains of the field, standards for practice, emerging trends and leading, teaching and learning with technology in diverse contexts.

Note: Normally restricted to doctoral students in Educational Technology specialization.

Educational Research 773 H(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; investigate collaboration and community; participatory cultures, innovation and change research, learning science theory, and knowledge building.

Note: Open to doctoral students from across specializations.

Educational Research 775 H(3S-0)

Advanced Seminar in Technology Enabled Learning Environments
An evaluation of prevalent and promising distributed, blended and collaborative learning environments through design, development and inclusive learning perspectives; analysis of affordances and constraints of mobile, dynamic and participatory realities and integrative networks.

Note: Open to doctoral students from across educational specializations.

Educational Research 777 H(3S-0)

Advanced Seminar in Leading Systemic Change
Key concepts include issues of systemic change, network/systems theory, diffusion of innovations and change theories, complex adaptive leadership, and opportunities for transformed leadership, teaching and learning in agile and changing education systems and networks.

Note: Open to doctoral students from across specializations.

Educational Research 779 H(3-0)

Advanced Educational Technology
Advanced concepts in educational technology.

Note: Normally restricted to doctoral students.

MAY BE REPEATED FOR CREDIT

Educational Research 781 H(3-0)

Conceptualizing Curriculum Research
Analysis of different approaches to curriculum research, especially assumptions, meaning frameworks, and views of the theory/practice relationship.

Note: Normally restricted to doctoral students.

Educational Research 782 F(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): Educational Research 681 and 685, or 687 and 688, or equivalent.

Note: Normally restricted to doctoral students. Required course in PhD Curriculum & Learning.

Educational Research 784 H(3-0)

Doctoral Seminar on Perspectives of Learning
Study of particular aspects of Learning Theory at the doctoral level.

Note: Normally restricted to doctoral students.

MAY BE REPEATED FOR CREDIT

Educational Research 785 H(3-0)

Advanced Study of Interpretive Curriculum Discourses
An advanced study of interpretive curriculum discourses focussing on cutting-edge examples of such work.

Note: Normally restricted to doctoral students.

Educational Research 786 H(3-0)

Doctoral Seminar in Interpretive Curriculum Discourses
Study of particular aspects of Interpretive Curriculum Discourses at the doctoral level.

Note: Normally restricted to doctoral students.

MAY BE REPEATED FOR CREDIT

Educational Research 798 F(3-0)

Advanced Special Topics
Provides doctoral students with advanced exploration and study of emerging topics in education.

Note: Normally restricted to doctoral students.

MAY BE REPEATED FOR CREDIT

Electrical Engineering ENEL

Instruction offered by members of the Department of Electrical and Computer Engineering in the Schulich School of Engineering.

Department Head - D. Westwick

Associate Heads – M. Potter (Undergraduate), A. Fapojuwo (Graduate)

Director of Undergraduate Program for Electrical and Computer Engineering – N. Bartley

Director of Undergraduate Program for Software Engineering – D. Krishnamurthy

Electrical Engineering 519 H(3-2)

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 H(3-2)

Neuro-Fuzzy and Soft Computing
Neural networks: neuron models and network architectures; preceptrons; Widrow-Hoff learning and the backpropagation algorithm; associative memory and Hopfield networks; unsupervised learning. Fuzzy systems: basic operations and properties of fuzzy sets; fuzzy rule generation and defuzzification of fuzzy logic; fuzzy neural networks. Applications in areas such as optimization, signal and image processing, communications, and control. Introduction to genetic algorithms and evolutionary computing. Introduction to chaos theory.

Prerequisite(s): Electrical Engineering 327.

Electrical Engineering 529 H(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 H(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 H(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 H(3)

Photovoltaic Systems Engineering
Prospect of photovoltaics in Canada; solar radiation; fundamentals of solar cells; photovoltaic system design; grid connected photovoltaic systems; mechanical and environmental considerations

Prerequisite(s): Electrical Engineering 362 or equivalent

Antirequisite(s): Credit for both Electrical Engineering 562 and 519.07 will not be allowed.

Electrical Engineering 563 H(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 H(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 H(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 both Electrical Engineering 567 and 519.47 will not be allowed.

Electrical Engineering 569 H(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 H(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 H(3-1T-1)

Telecommunications and Computer Communications
Fundamentals of telecommunication system and teletraffic engineering; transmission systems; switching networks and congestions. Characterization of teletraffic; queueing theory; mathematical modelling of queueing systems; the birth and death process. Erlang loss and delay formulas; Engset loss and delay formulas. Computer communication networks; multiple access techniques.

Prerequisite(s): Engineering 319 or Electrical Engineering 419.

Electrical Engineering 575 H(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 583 H(2-4)

Fourth Year Computer, Electrical, and Software Engineering Team Design Project, Part A
Preliminary and detailed engineering design of a system with the emphasis on the design process as it is associated with electrical, computer and software engineering. Topics include design methodology and general design principles for engineers, and project management. The team-based design project may be sponsored by industry or the department.

Prerequisite(s): Fourth year standing or above.

Electrical Engineering 585 H(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 587 H(3-1T-3/2)

Power Systems
Three-phase systems, per unit representation, power system elements and configurations, transmission system representation and performance, power flow studies, symmetrical components, fault studies, economics of power generation, transient and steady-state stability, swing equation.

Prerequisite(s): Electrical Engineering 487 or 489.

Electrical Engineering 589 H(2-4)

Fourth Year Computer, Electrical, and / Software Engineering Team Design Project, Part B
Continues upon the foundations of theory, experience and practice established in Part A.

Prerequisite(s): Electrical Engineering 583.

Note: Electrical Engineering 107, 583 and 589 are a required three-course sequence that shall be completed in the same academic year.

Electrical Engineering 591 H(2-4)

Individual Computer, Electrical, and Software Engineering Design Project
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): Formal approvals from the project supervisor and course co-ordinator(s).

Electrical Engineering 592 H(0-6)

Undergraduate Research Thesis
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): Formal approvals from the project supervisor and course co-ordinator(s).

Note: Only open to undergraduate students in the Electrical, Computer and Software Engineering majors.

Electrical Engineering 593 H(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 H(0-6)

Undergraduate Research Thesis - Part B
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 and formal approval from the project supervisor and course co-ordinator(s).

Note: Only open to undergraduate students in the Electrical, Computer & Software Engineering majors.

Electrical Engineering 597 H(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, hydro-thermal 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 H(0-6)

Individual Computer, Electrical, and Software Engineering Design Project - Part B
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 formal approval from 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 H(3-1.5)

Power System Operation
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.

Electrical Engineering 603 H(3-0)

Rotating Machines
General theory of rotating machines providing a unified approach to the analysis of machine perfor-

mance. General equations of induced voltage and torque. Transient performance of machines.

Electrical Engineering 605 Q(1.5S-0)

Research Seminar
Reports of studies of the literature or of current research. This course is compulsory for all full-time graduate students.

NOT INCLUDED IN GPA

Electrical Engineering 607 Q(1.5S-0)

Research Seminar
Reports of studies of the literature or of current research. This course is compulsory for all full-time graduate students.

NOT INCLUDED IN GPA

Electrical Engineering 609 Q(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 611 H(3-1)

Digital Systems
Introduction to digital system design for mask programmable and field programmable gate arrays. CMOS digital logic design. Flip-flop timing and metastability. Design for testability. CAD tools for digital systems design.

Electrical Engineering 615 H(3-1)
(formerly Electrical Engineering 619.16)

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.

Electrical Engineering 617 H(3-0)

RF Integrated Circuit Design
Introduction to complementary metal oxide semiconductor (CMOS) wireless communication circuits; computer-aided design; impedance matching concepts; passive circuit elements in monolithic circuits; radio frequency integrated circuit building blocks.

Prerequisite(s): Electrical Engineering 567 or 647.

Antirequisite(s): Credit for both Electrical Engineering 617 and 619.31 will not be allowed.

Electrical Engineering 619 H(3-1)

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 H(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 H(3-1)

Estimation Theory
Estimation theory as applied in communication systems, signal processing, measurement systems, geophysical systems, biomedical engineering and geomatics engineering. Estimators covered include: MVU, BLUE, LS, ML, Bayesian and MMSE. Concepts covered include: CRLB, Neyman-Fisher and Sufficient Statistics.

Electrical Engineering 627 H(3-1)

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.

Note: Students registering in this course should have a background in electromagnetics and basic microwave engineering.

Electrical Engineering 629 H(3-1)

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 H(3-1)

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 H(3-0)

Wireless Networks
Wireless networks' architectures and standards. Wireless communication protocols including network access control protocols, routing, congestion and flow control protocols, mobility and resource management protocols. Modelling and analysis of wireless network performance. Current and future research challenges in wireless networks.

Note: A senior undergraduate course in wireless communications is suggested as preparation for this course.

Electrical Engineering 635 H(3-1)

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 H(3-1)

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 form 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 both Electrical Engineering 637 and 619.88 will not be allowed.

Electrical Engineering 639 H(3-1)

Radio Frequency and Microwave Circuit Design
Circuit design via transmission line elements: special emphasis on microstrip circuits and effects of discontinuities (corners, Tees, and impedance steps). Analysis of passive impedance matching and filtering circuits using distributed and lumped elements. Narrow band matching and wide band matching techniques as well as wide band matching to a complex load. One and two port small signal amplifiers. Scattering parameter design methods: amplifier gain, input and output matching and stability. Computer aided design methods and broadband design methods. Large signal transistor amplifiers: device non-linearities and design methodologies.

Electrical Engineering 641 H(3-0)
(formerly Electrical Engineering 619.05)

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 structures, algorithm complexity, LU factorization. Unconstrained optimization methodology and engineering applications. Constrained optimization techniques and engineering applications.

Prerequisite(s): Engineering 407 or the consent of the instructor.

Antirequisite(s): Credit for both Electrical Engineering 641 and 619.05 will not be allowed.

Electrical Engineering 643 H(3-1)

Fibre Optics Transmission
Fundamental theory of cylindrical optical waveguides by way of Maxwell's equation and the modal analysis of the slab waveguides, step-index and graded-index fibres, review of fibre chemistry and production techniques. Problem areas relating to measurement of fibre parameters. Optical transmitters, photodetectors and receivers, modulation and multiplexing techniques, splices and connectors. Multiterminal analog and digital system analysis and design. Optical switching and amplification, integrated optics.

Electrical Engineering 645 H(3-1)
(formerly Electrical Engineering 619.51)

Data Mining and Knowledge Discovery
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.

Electrical Engineering 647 H(3-0)

Analog Integrated Circuit Design
Review of static and dynamic models of bipolar and 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 bipolar and complementary metal oxide semiconductor (CMOS) designs. CMOS analog integrated circuit design project.

Electrical Engineering 649 H(3-1)
(formerly Electrical Engineering 619.22)

Random Variables and Stochastic Processes
Axiomatic view of probability; continuous and discrete random variables; expectation; functions of random variables; conditional distributions and expectations; stochastic processes; stationarity and ergodicity; correlation and power spectrum; renewal processes and Markov chains; Markov and non-Markovian processes in continuous time.

Electrical Engineering 651 H(3-1)
(formerly Electrical Engineering 619.04)

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 third generation (3G) and beyond 3G wireless Internet Protocol (IP) networks; open research challenges in resource management for wireless networks.

Electrical Engineering 653 H(3-1T-3/2)
(formerly Electrical Engineering 619.23)

Theory and Practice Advanced DSP Processor Architecture
Architecture and capabilities of SISD, SIMD and VLIW processors; Developing high speed algorithms: code timing, reliability, background DMA activity, maintainability; Developing a personal software process appropriate for embedded systems.

Electrical Engineering 655 H(3-1)

Discrete Time Signal Processing
Foundations of discrete time signal processing of deterministic and stochasitic signals. Transform analysis: Laplace, Fourier, discrete time Fourier, Z transform, DFT/FFT and Hilbert. Time sampled signals, mixed digital/analog LTI system design and analysis with practical DSP implementations. Fundamentals of FIR/IIR/multirate DSP filter implementation and analysis. Application of DSP in communications receiver, audio, image and video processing.

Electrical Engineering 657 H(3-1)
(formerly Electrical Engineering 619.73)

Detection of Signals in Noise
Detection of distorted and noise corrupted deterministic and random signals. Application to optimum statistical signal processing algorithms in data communications, GPS, radar, synchronization and image processing.

Prerequisite(s): At least one of Electrical Engineering 675, 649, or 625 or consent of the instructor.

Electrical Engineering 659 H(3-1)

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 H(3-1)
(formerly Electrical Engineering 619.18)

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.

Electrical Engineering 663 H(3-1)
(formerly Electrical Engineering 619.09)

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.

Electrical Engineering 665 H(3-1)
(formerly Electrical Engineering 619.21)

Bioelectromagnetism
Generation, transmission, and measurement of electromagnetic events generated by excitable cells (heart, brain, muscle). Topics cover the scale from membrane and cell dynamics to tissue behaviour and body surface recordings.

Electrical Engineering 667 H(3-1)
(formerly Electrical Engineering 619.25)

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): At least one undergraduate level course in control systems.

Electrical Engineering 669 H(3-1)
(formerly Electrical Engineering 619.52)

Renewable Energy and Solid State Lighting for the Developing World
History of Lighting, Illumination Measurements & Standards - Incandescent, Fluorescent, LEDs & OLEDs. Generation using Hydro, Solar, Photovoltaic, Wind, Thermoelectric, Biomass, Thermal. Energy Storage & Supply Chains. System Design, Analysis & Life Cycle Assessment. Kyoto Protocol, Carbon Credits and Trading.

Electrical Engineering 671 H(3-1)

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 673 H(3-1)

Wireless Communications Engineering
The basics of mobile radio telephone: mobile telephone frequency channels, components of mobile radio, objectives of mobile telephone systems, major problems and tools available. The mobile radio environment: fading and propagation loss, propagation loss prediction, channel and signal models, fading statistics, classification of fading channels. Methods of reducing fading effects: diversity techniques and diversity combining methods. Signaling over fading channels. Frequency reuse schemes: cellular concept, mobile radio interference, FDMA, TDMA, and spread spectrum techniques. Portable systems, air-to-ground systems, and land mobile/satellite systems, processing.

Prerequisite(s): Electrical Engineering 571 or equivalent.

Electrical Engineering 675 H(3-1)

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 connection using channel codes. Advanced techniques for high speed communications.

Prerequisite(s): Electrical Engineering 571 or equivalent.

Electrical Engineering 677 H(3-1)

Information Theory Applied to Digital Communications
Understanding of the digital communication link in a noisy channel with distortion. Fundamentals of information theory applicable to the statistical signal processing of digital communication receivers, presented in depth that will provide insights into optimum receiver architecture, processing and error coding. Capacity analysis of SISO and MIMO multiple antenna communication systems as well as other forms of diversity, derived within the framework of information theory.

Prerequisite(s): Electrical Engineering 675 or equivalent.

Electrical Engineering 679 H(3-1)
(formerly Electrical Engineering 619.60)

Digital Video Processing
Fundamentals of digital video representation, filtering and compression, including popular algorithms for 2-D and 3-D motion estimation, object tracking, frame rate conversion, deinterlacing, image enhancement, and the emerging international standards for image and video compression, with such applications as digital TV, web-based multimedia, videoconferencing, videophone and mobile image communications.

Prerequisite(s): At least one undergraduate level course in Signal Processing.

Electrical Engineering 681 H(3-1)
(formerly Electrical Engineering 619.76 and 619.82)

VLSI and SOC
Timing and power models; Issues in BIST for SOC; System and Circuit Optimization for SOC applications using compiler techniques; System-on-a-chip design methodology; Topics in Architectural low-power techniques; Design methodology for embedded architectures; Advanced architectures for image/video/speech/audio/Internet/wireless ap-

plications; Topics in algorithm/architecture design under timing and throughput constraints.

Prerequisite(s): At least one undergraduate level course in Microelectronics or VLSI.

Electrical Engineering 683 H(3-1)
(formerly Electrical Engineering 619.19)

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.

Electrical Engineering 685 H(3-0)
formerly Electrical Engineering 619.64

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 system. 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): Engineering 574 or equivalent, or the consent of the Instructor

Antirequisite(s): Credit for both Electrical Engineering 641 and 619.64 will not be allowed.

Electrical Engineering 687 H(3-1)

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 factory.

Electrical Engineering 691 H(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 both Electrical Engineering 691 and 619.26 will not be allowed.

Electrical Engineering 693 H(3-0)

Restructured Electricity Markets
Market design and auction mechanisms, role of independent system operator (ISO) in different markets, generation scheduling in deregulation, transmission operation and pricing. Transmission rights, procurement and pricing ancillary services, system security in deregulation, and resource management in a market environment.

Antirequisite(s): Credit for both Electrical Engineering 693 and 619.98 will not be allowed.

Electrical Engineering 695 H(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 or equivalent.

Antirequisite(s): Credit for both Electrical Engineering 695 and either of 519.42 or 619.95 will not be allowed.

Electrical Engineering 697 H(3-1)

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 or equivalent.

Electrical Engineering 698 F(0-4)

Graduate Project
Individual project in the student's area of specialization under the guidance of the student's supervisor.

Note: Open only to students in the MEng Courses Only Route.

Electrical Engineering 699 H(3-1)

Multidimensional Signal Processing
Characterization of multidimensional (MD) signals, the MD Laplace, Fourier and Z transforms. Practical analog and digital signals and their MD energy density spectra. Aliasing, convolution, boundary conditions, causality, and stability in MD. Characterization of linear shift-invariant systems using MD transform transfer functions. State variable representations of MD systems. Elementary decompositions of MD transfer functions and bounded-input bounded-output stability. Design and implementation of MD digital filters. Applications of MD signal processing in engineering systems. Two- and three-dimensional digital signal processing in seismic, sonar, imaging and broadcast television.

Energy and Environmental Systems EESS

Graduate Courses

Energy and Environmental Systems 601 H(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 H(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 H(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 H(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 H(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

English ENGL

Instruction offered by members of the Department of English in the Faculty of Arts.

Department Head - B. Beaty

Graduate Courses

English 603 H(3-0)

Studies in Genre
MAY BE REPEATED FOR CREDIT

English 605 H(3-0)

Studies in National or International Literatures
MAY BE REPEATED FOR CREDIT

English 607 **H(3-0)**

Theoretical and Cultural Studies
MAY BE REPEATED FOR CREDIT

English 609 **H(3-0)**

Studies in a Literary Period
MAY BE REPEATED FOR CREDIT

English 612 **F(3-0)**

Studies in Medieval and Renaissance Literature
MAY BE REPEATED FOR CREDIT

English 618 **F(3-0)**

Studies in Restoration and Eighteenth-Century Literature
MAY BE REPEATED FOR CREDIT

English 676 **F(3-0)**

Studies in Canadian Literature
MAY BE REPEATED FOR CREDIT

English 680 **F(3-0)**

Studies in Literary Criticism
MAY BE REPEATED FOR CREDIT

English 684 **F(3-0)**

Special Topics
MAY BE REPEATED FOR CREDIT

English 693 **H(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 694 **H(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 695 **H(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 696 **F(1-0)**

Studies in Bibliography, Research Methods, and Palaeography
Note: Required of all graduate students who have not had an equivalent course.

NOT INCLUDED IN GPA

English 698 **F(1-0)**

Studies in Creative Writing
A close examination and discussion of the student's own work, with emphasis on advanced technique.

Note: By mid-August, 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 701 **H(1-0)**

Major Field
Note: Required of all doctoral students.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

English 703 **H(1-0)**

Minor Field
Note: Required of all doctoral students.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

English 710 **H(1-0)**

Capstone Project
Prerequisite(s): Consent of the Department.

Note: Restricted to and required of all Master of Arts (one year project-based) students. By June 1, students must submit a topic proposal to the Graduate Program Director for approval. Details of this procedure are available from the Department of English.

NOT INCLUDED IN GPA

Entrepreneurship and Innovation ENTI

Instruction offered by members of the Haskayne School of Business.

Entrepreneurship and Innovation Chairperson — M. Boivin

Graduate Courses

Entrepreneurship and Innovation 781 **H(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 **H(3-1)**

Opportunity Development
A project- and case-based course designed to explore concepts of opportunity development.

Entrepreneurship and Innovation 785 **H(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 **H(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 791 **H(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 **H(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 **H(3S-0)**

Advanced Seminar in Venture Development
797.02. Strategic Legal Planning for New Ventures

Prerequisite(s): Consent of the Haskayne School of Business.

Entrepreneurship and Innovation 799 **H(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

The following list of courses, offered by members of the Faculty of Environmental Design and members of other departments in the University, is specific to the 2014-2015 academic year. Students are advised that some of the courses listed below may not be offered in 2014-2015 if special circumstances require that they be dropped. Students should consult with the EVDS Graduate Program Administrator before registering for any course.

Environmental Design 501 **H(4-0)**

Interdisciplinary Seminar
Conceptual frameworks in Environmental Design and theories related to design and environment

that influence environmental design thinking and practice.

Prerequisite(s): Admission to the MArch degree program.

Antirequisite(s): Credit for both Environmental Design 501 and Architectural Studies 483 will not be allowed.

Note: Students are strongly encouraged to complete Environmental Design 501 prior to entering their second year of study. Open only to students in the MArch degree program.

Environmental Design 523 H(3-0)
(formerly Environmental Design 623)

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 both Environmental Design 523 and Architectural Studies 423 will not be allowed.

Environmental Design 583 H(3-0)

Special Topics in Environmental Design
Thematic inquiry and design related to urban design, architecture, environmental science, industrial design and planning.

MAY BE REPEATED FOR CREDIT

Environmental Design 597 Q(3-0)

Special Topics in Environmental Design
Thematic inquiry and design related to urban design, architecture, environmental science, industrial design and planning.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Environmental Design 601 H(4-0)

Interdisciplinary Seminar
Conceptual frameworks in Environmental Design and theories related to design and environment that influence environmental design thinking and practice.

Antirequisite(s): Credit for both Environmental Design 601 and 501 will not be allowed.

Note: Students are strongly encouraged to complete Environmental Design 601 prior to entering their second year of study.

Environmental Design 602 H(2-2)

Computer Modelling of the Environment I
Introduction to the use of computer modelling, animation and virtual reality in architecture and 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.

Environmental Design 603 H(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.

Antirequisite(s): Credit for Environmental Design 603 and Environmental Design Architecture 580 will not be allowed.

Environmental Design 611 H(2-2)

Geographic Information Systems for Environmental Design
Introduction to the use of GIS in urban planning and environmental management. Discussions on GIS modelling focus 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 616 H(3-0)

Urban Transportation, 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: transportation, water and waste management, open space, energy and communication. Discusses the relationship between infrastructure systems and land use, and 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 618 H(0-8)

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. Development of a portfolio will be a requirement of the course.

Prerequisite(s): Environmental Design Planning 625 or permission of the instructor.

Environmental Design 621 H(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 H(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 H(3-0)

Impact Assessment and Risk Management
EIA is the process of identifying, predicting, evaluating and mitigating the 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 impact assessment policies and procedures will be critically addressed.

Environmental Design 626 H(0-8)

Landscape Planning and Ecological Design
Project oriented course focusing on interdisciplinary methods, process and theoretical foundations of ecological design and its applications in the built environment and urban and regional landscapes. Principles of landscape ecology, systems theory, technology design and transfer ecosystem science, landscape process form and function, environmental gradients, habitat, trophic organization and nutrient flows will be used in design of interventions for problem solving in built environment and urban-regional contexts including: sustainable urban form, ecological infrastructure and ecosystem services, urban environmental management and water management in urbanizing watersheds.

Environmental Design 628 H(3-0)

Housing, Neighbourhood Change and Equity
Recent developments in Canadian Cities have indicated a need for planners and other urban professionals concerned with the provision of affordable housing in the context of urban growth management. This course provides both theoretical understanding and practical insights into these issues through assessment of the social, economic, and spatial aspects of neighbourhood change. Practical work focuses on inner city neighbourhoods and planning strategies for unique transformation of brownfield sites, intensification, regeneration without displacement and building of sustainable and diverse communities.

Environmental Design 643 H(3-0)
(formerly Environmental Design 683.40)

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): Open only to students in Environmental Design degree programs.

Antirequisite(s): Not open to students with credit in Environmental Design 683.40

Environmental Design 671 H(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 a short project.

Environmental Design 675 H(3-0)
(formerly Environmental Design 683.72)

Urban Systems (Barcelona Studies)
Provides a general overview of Barcelona's urban history, development and planning traditions. Lectures and field studies give a chronological overview of the city's urban, architectural and design history and the inter-relation to political programs, economic and strategic planning as well as cultural nationalism. From the Barcelona case the course

will extract a number of more general issues about contemporary cities for debate.

Prerequisite(s): Open only to students in Environmental Design degree programs.

Environmental Design 683 H(3-0)

Advanced Special Topics in Environmental Design
Thematic inquiry and design related to urban design, architecture, environmental science, industrial design and planning.

Note: Block courses labelled EVDB will be graded on a CR/F basis.

MAY BE REPEATED FOR CREDIT

Environmental Design 697 Q(3-0)

Advanced Special Topics in Environmental Design
Thematic inquiry and design related to urban design, architecture, environmental science, industrial design and planning.

Note: Block courses labelled EVDB will be graded on a CR/F basis.

MAY BE REPEATED FOR CREDIT

Environmental Design 703 Q(0-3)

Directed Study in Environmental Design
Thematic research, readings or design studio project related to urban design, architecture, environmental science, ecological design, history and theory, industrial design or planning.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Environmental Design 705 Q(0-3)

Directed Study in Environmental Design
Thematic research, readings or design studio project related to urban design, architecture, environmental science, ecological design, history and theory, industrial design or planning.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Environmental Design 711 H(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 H(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 752 F(6-0)
(formerly Environmental Design 751, formerly Environmental Design 651)

Research Skills and Critical Thinking
Exploration of the research process in a design context and using design as a method of research. Design of innovative research methods appropriate for environmental design research in thematic areas related to urban design, industrial design, ecological design, sustainable design and digital design.

MAY BE REPEATED FOR CREDIT

Environmental Design 753 H(3-0)

Research Skills and Critical Thinking
Exploration of the research process in a design context and using design as a method of research. Design of innovative research methods appropriate for environmental design research in thematic areas related to urban design, industrial design, ecological design, sustainable design and digital design.

MAY BE REPEATED FOR CREDIT

Environmental Design 783 H(0-3)

Directed Study in Environmental Design
Thematic research, readings or design studio project related to urban design, architecture, environmental science, ecological design, history and theory, industrial design or planning.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Environmental Design 785 H(0-3)

Directed Study in Environmental Design
Thematic research, readings or design studio project related to urban design, architecture, environmental science, ecological design, history and theory, industrial design or planning.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Environmental Design 793 H(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 Department.

Environmental Design 799 H(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. An approved preceptorship assignment is equivalent to full-time studies.

MAY BE REPEATED FOR CREDIT

Environmental Design Architecture EVDA

Instruction offered by members of the Faculty of Environmental Design.

Environmental Design Architecture courses are only open to students in the Master of Architecture program or with consent of the Instructor. Priority will be given to students in the MArch program.

Environmental Design Architecture 511 H(3-1)

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.

Antirequisite(s): Credit for both Environmental Design Architecture 511 and Architectural Studies 449 will not be allowed.

Environmental Design Architecture 523 H(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.

Antirequisite(s): Credit for both Environmental Design Architecture 523 and Architectural Studies 457 will not be allowed.

Environmental Design Architecture 541 H(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): Environmental Design Architecture 580

Antirequisite(s): Credit for both Environmental Design Architecture 541 and Architectural Studies 451 will not be allowed.

Environmental Design Architecture 543 H(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.

Corequisite(s): Environmental Design Architecture 582.

Antirequisite(s): Credit for both Environmental Design Architecture 580 and Architectural Studies 453 will not be allowed.

Environmental Design Architecture 580 F(0-8) (formerly Environmental Design 503)

Studio I – Design Thinking
Instruction and supervised experience in drafting, sketching and rendering; drawing and presentation conventions. A variety of instruction may be offered to accommodate the varied level of student development.

Prerequisite(s): Environmental Design Architecture 541.

Antirequisite(s): Credit for both Environmental Design Architecture 580 and Architectural Studies 484 will not be allowed.

Environmental Design Architecture 582 F(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 theoretical concerns of architectural design in today's cultural context.

Prerequisite(s): Environmental Design Architecture 543.

Antirequisite(s): Credit for both Environmental Design Architecture 582 and Architectural Studies 444 will not be allowed.

Graduate Courses

Environmental Design Architecture 611 H(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.

Corequisite(s): Environmental Design Architecture 682.04.

Environmental Design Architecture 613 H(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 Q(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.

Corequisite(s): Environmental Design Architecture 682.04.

Environmental Design Architecture 617 Q(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 and performance and energy efficiency. Development of skills in the selection and design of lighting systems.

Environmental Design Architecture 619 H(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.

Corequisite(s): Environmental Design Architecture 682.04.

Environmental Design Architecture 621 H(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 H(3-0) (formerly Environmental Design Architecture 561)

Architectural Professional Practice I
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 663 H(3-0)

Architectural Professional Practice II
An overview of the structure, organization and changing roles of the design professions through history with emphasis on emerging patterns of practice. The procedures, constraints and opportunities of practice in its legal, ethical and technical dimensions will be analysed using a case study method.

Environmental Design Architecture 682 F(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. They 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

Corequisite(s): Environmental Design Architecture 611, 615, and 619.

Note: Environmental Design Architecture 682.02 and 682.04 must be successfully completed in numerical order.

Environmental Design Architecture 703 H(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 F(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.

MAY BE REPEATED FOR CREDIT

Environmental Design Planning EVDP

Instruction offered by members of the Faculty of Environmental Design.

Environmental Design Planning courses are only open to students in the Master of Planning program or with consent of the Instructor. Priority will be given to students in the Master of Planning program.

Graduate Courses

Environmental Design Planning 621 H(3-0)

Professional Planning Practice
Familiarizes students with the various plans, policies, regulatory processes, legal institutions and administrative frameworks of urban and regional planning. Topics include the Municipal Government Act, the Alberta Land Use Framework, environmental law and various legal planning tools such as Municipal Development Plans, Land Use By-Laws, and Area Structure Plans. Examines municipal development processes related to land use re-designations, development permits, subdivision and appeals.

Environmental Design Planning 623 H(3-0)

Regional Planning and Land Use Management
History, theory and rationales for regional planning. Conservation planning concepts: ecological assets, goods and services; biodiversity conservation; protected areas and networks. Regional land use planning tools: spatial analysis, environmental assessment, risk assessment, cost/benefit analysis, fiscal assessment, regulatory approaches (zoning), market-based incentives. Application to industrial land use in Alberta.

Environmental Design Planning 625 H(0-8)

Physical Planning and Site Design
Introduction to urban design practice. Emphasizes sense of place, human behaviour – built from relationships and environment conservation goals. Formulation of a major physical planning and site design concept and strategy. Skills development in drawing and in utilizing graphic conventions to describe, analyse and interpret urban form and processes.

Environmental Design Planning 627 H(3-0)

Planning History, Theory, and Ethics
An introduction to planning history and theory. Develops a critical awareness of key historical, theoretical, and ethical frameworks; legal, political, and economic institutions; and an understanding of their implications for Canadian planning. Examines the historical evolution of community planning, and its influence on contemporary planning and the built environment. Develops an understanding of decision-making which integrates technical, social, environmental and political factors, and the professional roles of planners in this framework. A normative procedural approach to planning is presented, one which is appropriate for a pluralistic liberal democratic society.

Environmental Design Planning 631 H(3-0)

Planning and Public Engagement
Provides students with an understanding of the principles and practice of public participation in community development. Various methods/approaches are analysed in terms of their characteristics, advantages and limitations. Practices to support facilitation, negotiation and conflict management are examined. Development and implementation of public engagement plans is also discussed.

Environmental Design Planning 633 H(2-2)

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 are also addressed.

Environmental Design Planning 635 H(3-0)

Analytic Methods for Planners
Approaches to identify, gather and critically analyse strategic information needed to assess planning situations and support decision-making. Focuses on both quantitative and qualitative planning methods. Potential topics include: population forecasting, trend analyses, needs assessment, program and policy evaluation, and SWOT analysis. Techniques to present information effectively

Environmental Design Planning 637 H(0-8)

Community Planning
Overall objective is to introduce students to land use planning and development issues in the suburban context. Addresses one of the most important urban challenges related to smart growth management. 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 friendly.

Environmental Design Planning 644 F(1.5-4)

Advanced Professional Planning Project
A research oriented project studio that explores contemporary themes in planning and provides training in advanced professional planning practice. Centres on a real world problem or project; involves the analysis of issues and context, and the formulation of a policy, plan or design solution. Culminates in a professional report and presentation.

Prerequisite(s): Environmental Design Planning 633 or consent of the Department.

Note: A minimum of two stream courses that correspond to the selected Studio section is recommended as preparation for this course.

Environmental Engineering ENEN

Instruction and services offered by Centre for Environmental Engineering Research & Education (CEERE), Schulich School of Engineering.

Director of CEERE- A.K. Mehrotra

Graduate Courses

Environmental Engineering 601 E(0-3S)

Research Seminar
Oral presentations consisting of reports on studies of the literature or of current research. Required of all full-time graduate students registered in MSc and PhD degree programmes in Environmental Engineering and Energy & Environment (Engineering).

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Environmental Engineering 603 H(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 H(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.

Antirequisite(s): Credit for both Environmental Engineering 605 and Chemical Engineering 619.19 will not be allowed.

Environmental Engineering 619 H(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 621 H(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 any of Chemical Engineering 619.45, 619.82 or 701 will not be allowed.

Environmental Engineering 623 H(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 H(3-0)

Computational Methods for Environmental Engineering
Taylor series, numerical integration. Linear and non-linear algebraic equations and solvers. Ordinary and partial differential equations. Finite difference methods: explicit, implicit and Crank-Nicholson methods. Finite difference, finite element or finite volume numerical approximations. Initial and boundary value problems. Boundary conditions, discretization considerations, and design of approximations, accuracy and error reductions. Applications in environmental engineering, such as pollutant dispersion and transport, will be discussed.

Antirequisite(s): Credit for Environmental Engineering 625 and any of Chemical Engineering 639, Civil Engineering 743 or Mechanical Engineering 631 will not be allowed.

Environmental Engineering 627 H(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 631 H(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 use to illustrate the concepts.

Environmental Engineering 633 H(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.

Antirequisite(s): Credit for Environmental Engineering 633 and any of Civil Engineering 619.30 or 619.91 will not be allowed.

Environmental Engineering 635 H(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 H(3-0)
(Geomatics Engineering 637)

Earth Observation for the Environment
An introduction to environmental earth observation systems, in particular satellite platforms. Techniques for fusing multi-dimensional datasets (i.e., multi-spectral, multi-temporal, multi-resolution, and point-source ground data). A number of environmental issues will be discussed, including carbon sequestration; advanced techniques for estimating biophysical variables that are integral parts in various environmental models; vegetation phenology; and understanding of climatic influence on forested and polar ecosystems, etc.

Antirequisite(s): Credit for any of Environmental Engineering 637 and 619.05 or Geomatics Engineering 637 will not be allowed.

Environmental Engineering 641 H(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, SOx, and NOx. Adsorption, absorption and

biofiltration of air pollutants. GHG emission control. Recent advanced on related topics.

Antirequisite(s): Credit for both Environmental Engineering 641 and Chemical Engineering 643 will not be allowed.

Environmental Engineering 643 H(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.

Antirequisite(s): Credit for Environmental Engineering 643 and any of Mechanical Engineering 619.19 or 619.56 will not be allowed.

Environmental Engineering 651 H(3-0)

Advanced Topics in 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.

Antirequisite(s): Credit for both Environmental Engineering 651 and Civil Engineering 619.80 will not be allowed.

Environmental Engineering 653 H(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 both Environmental Engineering 653 and Civil Engineering 619.62 will not be allowed.

Environmental Engineering 655 H(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 both Environmental Engineering 655 and Civil Engineering 619.60 will not be allowed.

Environmental Engineering 661 H(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 both Environmental Engineering 661 and Chemical Engineering 645 will not be allowed.

Environmental Engineering 663 H(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 any of Civil Engineering 619.21 or 741 will not be allowed.

Environmental Engineering 665 H(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 any of Chemical Engineering 619.79 or Chemical Engineering 665 will not be allowed.

Environmental Engineering 671 H(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; exergy analysis; greenhouse gas emissions; air, land and water pollution and their mitigation.

Antirequisite(s): Credit for both Environmental Engineering 671 and Chemical Engineering 619.61 will not be allowed.

Environmental Engineering 673 H(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.

Prerequisite(s): Engineering 311 or equivalent

Antirequisite(s): Credit for Environmental Engineering 673 and any of Mechanical Engineering 619.13 or 637 will not be allowed.

Environmental Engineering 681 H(0-6)

Project in Environmental Engineering I
A one-term half-course which 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.

Antirequisite(s): Credit for Environmental Engineering 681 and any of Engineering 683, Engineering 685 or Environmental Engineering 682 will not be allowed.

Note: Available to course-based MEng degree students only. Cannot be taken following the completion of Environmental Engineering 682.

Environmental Engineering 682 F(0-6)

Project in Environmental Engineering II
A two-term full-course which 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.

Antirequisite(s): Credit for Environmental Engineering 682 and any of Engineering 683, Engineering 685 or Environmental Engineering 681 will not be allowed.

Note: Available to course-based MEng degree students only. Cannot be taken following the completion of Environmental Engineering 681.

Environmental Engineering 691 H(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 H(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.

Finance FNCE

Instruction offered by members of the Haskayne School of Business.

Finance Chairperson — A. Lehar

Graduate Courses

Finance 601 H(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 745 **H(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 **H(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 **H(3-0)**

Problems in Financial Management
The application of financial management principles to actual problems mainly in the corporate sector, including such areas as working capital, management, short, intermediate and long-term financing problems, dividend policy and reorganization.

Prerequisite(s): Finance 601.

Finance 755 **H(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 **H(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 **H(3-0)**

Investment and Portfolio Management
Theory and analysis of investment and portfolio management decisions. Evaluation of performance of individual and professional investors and portfolio managers.

Prerequisite(s): Finance 601.

Finance 765 **H(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 **H(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 785 **H(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 **H(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 **H(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 **H(3S-0)**

Advanced Seminar in Finance
Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

PhD Course

Finance 799 **H(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

Instruction offered by the Faculty of Arts.

Graduate Courses

Fine Arts 601 **H(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

Fine Arts 603 **H(3-0)**

Topics in Fine Arts: Interdisciplinary Seminar
Interdisciplinary seminar in the advanced study and interpretation of the interrelationships between music, the fine arts, and the history of ideas, using a theme-oriented approach.

Note: This is a required course in the PhD program for Music Education, Composition and Musicology.

MAY BE REPEATED FOR CREDIT

Fine Arts 607 **H(3-0)**

Topics in Multi-Media Research
Concentrated instruction in computer applications in the Fine Arts.

Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

French FREN

Programme offert par le Département d'études françaises, italiennes et espagnoles de la Faculté des Arts.

Il est recommandé aux étudiants de consulter le Département à chaque étape de la planification de leur programme.

Remarque: Pour s'inscrire à un cours de français, l'étudiant doit avoir obtenu au moins la note de "C-" dans les cours préalables.

Instruction offered by members of the Department of French, Italian and Spanish in the Faculty of Arts.

Students are encouraged at all times to seek departmental guidance in planning any aspect of their programs.

Note: All university level prerequisites for French courses must be met with a grade of "C-" or better.

French 511 **H(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 l'autre.

Prerequisite(s): Prérequis: Trois demi-cours de français de niveau 400, ou autorisation du Département.

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 **H(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 H(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: Trois demi-cours de français de niveau 400 ou autorisation du Département.

MAY BE REPEATED FOR CREDIT

French 543 H(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: Trois demi-cours de français de niveau 400 ou autorisation du Département.

MAY BE REPEATED FOR CREDIT

French 549 H(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): Préalables: Trois demi-cours de français de niveau 400 ou autorisation du Département.

MAY BE REPEATED FOR CREDIT

French 565 H(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: Trois demi-cours de français de niveau 400 ou autorisation du Département.

MAY BE REPEATED FOR CREDIT

French 579 H(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: Trois demi-cours de français de niveau 400 ou autorisation du Département.

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 F(0-3T)

Mémoire de baccalauréat spécialisé
Prerequisite(s): Prérequis: Trois demi-cours 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 H(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: la littérature française du Moyen-Age, l'autobiographie, l'écriture des femmes de langue française, le créole dans les écrits de langue française, etc.

Prerequisite(s): Préalables: Trois demi-cours de français de niveau 400, ou autorisation du Département.

MAY BE REPEATED FOR CREDIT

Graduate Courses

(Dans des cas considérés comme exceptionnels, le Département accordera des crédits au niveau supérieur pour des cours de niveau 500. L'autorisation du Départment 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 Department will give graduate credit for 500-level courses in cases it deems exceptional. This option is subject to the approval of the Department. Graduate students taking a 500-level course for graduate credit will be asked to complete additional requirements.)

French 605 H(3-0)

Problématiques littéraires
MAY BE REPEATED FOR CREDIT

French 609 H(3-0)

Problématiques linguistiques
MAY BE REPEATED FOR CREDIT

French 625 H(3-0)

Études cinématographiques
MAY BE REPEATED FOR CREDIT

French 635 H(3-0)

Le texte narratif
MAY BE REPEATED FOR CREDIT

French 637 H(3-0)

Études théâtrales
MAY BE REPEATED FOR CREDIT

French 639 H(3-0)

Poésie de langue française
MAY BE REPEATED FOR CREDIT

French 655 H(3-0)

Francophonies
MAY BE REPEATED FOR CREDIT

French 675 H(3-0)

Féminismes et Gender
MAY BE REPEATED FOR CREDIT

French 685 H(3-0)

Voix québécoises et canadiennes
MAY BE REPEATED FOR CREDIT

French 689 H(3-0)

Arts et Cultures
MAY BE REPEATED FOR CREDIT

French 691 H(3-0)

Autour d'un auteur
MAY BE REPEATED FOR CREDIT

French 695 H(3-0)

Profession et recherche
MAY BE REPEATED FOR CREDIT

Geography GEOG

Instruction offered by members of the Department of Geography in the Faculty of Arts.

Department Head – J. Yackel

All students interested in taking Geography courses, Geography Majors and Graduate Students, should read the pertinent Undergraduate and Graduate program sections of the Calendar.

Graduate Courses

Geography 601 H(0-1.5S)

Graduate Research Seminar
Presentation and evaluation of graduate research seminars.

Prerequisite(s): Consent of the Department.

Note: Normally offered in fall and winter semesters. Normally open to Geography thesis-based graduate students only.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Geography 603 H(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 H(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 H(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 **H(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 **H(3-3)**

Research and Applications in Remote Sensing
Review of basic and advanced principles of image analysis; advanced laboratory techniques. Integration of remote sensing with GIS; current research in remote sensing. Project organization; data sources for remote sensing.

Prerequisite(s): Consent of the Department.

Geography 635 **H(3-3)**

Active Microwave Remote Sensing
Theoretical and applied aspects of active microwave remote sensing for geophysical parameter estimation. Discussion of sensor configuration, dielectric mixture modelling, microwave-surface interactions, microwave scattering (surface and volume) modelling and polarimetry. Laboratory work includes field scatterometer use, computer modelling, and polarimetric analysis.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for both Geography 635 and 699.35 will not be allowed.

Geography 639 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(3-0)**

Seminar in Geographic Research Methods
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 696 **H(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 **H(3-0)**

Seminar in the Philosophy and Nature of Human Geography
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 699 **H(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 **H(3-0)**

Selected Topics in Geographic Research Methods
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 797 **H(3-0)**

Selected Topics in Human Geography
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geography 799 **H(3-0)**

Selected Topics in Physical Geography
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Geology GLGY

Instruction offered by members of the Department of Geoscience in the Faculty of Science.

Department Head - C.M. Henderson

Geology 503 **H(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, controls on aqueous geochemistry including mineral dissolution, ion exchange, sorption and redox processes, theory and application of geochemical models.

Prerequisite(s): Geology 323.

Geology 505 **H(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 503.

Antirequisite(s): Credit for both Geology 505 and Geology 609 will not be allowed.

Geology 510 **F(0-9)**

Senior Thesis
A written report based on independent study. Originality is emphasized, laboratory and field studies are encouraged. Published material may be included.

Prerequisite(s): Consent of the Department and of a departmental faculty member who will act as a supervisor.

MAY BE REPEATED FOR CREDIT

Geology 523 **H(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.

Geology 527 **H(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 443.

Note: Normally offered in even-odd dated academic years. However, this course may be offered in any year in which sufficient interest is indicated to the Department prior to November 1 of the preceding academic year. A weekend field trip will be run in September.

Geology 531 **H(3-1T-3)**

Advanced Igneous Petrology
Mineralogical and chemical classifications of igneous rocks. Physics and chemistry of igneous rock formation. Laboratory includes hand specimen and microscopic petrology.

Prerequisite(s): Geology 323, 341 or 343, and 443.

Geology 533 **H(3-1T-3)**

Metamorphism and Lithosphere Evolution
Application of metamorphic petrology to pure and applied problems in Earth science, especially lithosphere evolution. Integration of metamorphic petrology with structure, geochronology and tectonics. Interpretation of mineral assemblages; pressures and temperatures of formation of metamorphic rocks; rates and controls of metamorphic processes. Laboratory will consist of petrographic studies of rock suites, instrumental analysis (electron probe, XRD), and elementary use of phase equilibrium software packages.

Prerequisite(s): Geology 323 and 443.

Note: Normally offered in odd-even dated academic years. However, this course may be offered in any year in which sufficient interest is indicated to the Department prior to November 1 of the preceding academic year.

Geology 535 **H(3-3)**

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 443.

Antirequisite(s): Credit for both Geology 535 and 599.18 will not be allowed.

Geology 537 **H(160 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 preceding the Fall Term or following the Winter Term.

Prerequisite(s): Geology 435, 443, and 461. A minimum grade of "B" is required in Geology 435.

Note: This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. It may occur outside Canada. Students will be required to cover food and accommodation costs, and a supplemental fee will be assessed to cover the costs of equipment and other resources.

Geology 541 **H(3-3)**

Advanced Structural Geology
Structural features of complexly folded strata; simple statistical analysis of data; structural analysis in plutonic and metamorphic rocks; applications to exploration and exploitation.

Prerequisite(s): Geology 341 or 343 and completion of at least 15 full-course equivalents.

Antirequisite(s): Credit for both Geology 541 and 641 will not be allowed.

Note: There is a weekend field excursion during the term.

Geology 543 **H(3-3)**

Advanced Igneous and Metamorphic Petrology
Advanced study of igneous and metamorphic petrology, and application to problems in earth science. Includes use of microscopy and geochemistry, as well as possible application of instrumental methods.

Prerequisite(s): Geology 443.

Geology 550 **F(320 hours)**

Advanced Geology Field Camp
Application of advanced field methods to complex geologic regions in or outside of Canada. Location and duration will vary from year-to-year.

Prerequisite(s): Geology 311 or 313, 341 or 343, 381, 435 and consent of the Department.

Antirequisite(s): Credit for Geology 550 and two of Geology 599.19, 599.24 and 599.25 will not be allowed.

Note: This course occurs in rugged field conditions. Variable weather is to be expected. Participants must be prepared and properly equipped. Students will be required to cover all field-related expenses. This course may be associated with an additional 0.5 FCE, such as Science 507, to be counted as an elective. This is dependent upon the instructor, location, and course content.

Geology 555 **H(3-3)**

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 443 or Geophysics 457.

Geology 561 **H(3-3)**

Sequence Stratigraphy
Integrated approach to the study of 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 435 or 441, and 461.

Geology 563 **H(3-3)**

Geological History of the Western Canadian Sedimentary Basin
Stratigraphic assembly, tectonic evolution and resources of the WCSB within the Precambrian crystalline basement to the Jurassic-Paleogene Foreland Basin succession in the subsurface and exposures in the Rocky Mountains.

Prerequisite(s): Geology 443 and 461; or Geophysics 457.

Geology 571 **H(3-3)**

Engineering Geology
Application of geology to engineering problems with emphasis on the geologic aspects of site and environmental investigations. Characterization of rock masses and surficial deposits and examination of their behaviour; special mapping methods, air photo interpretation and the application of some geophysical techniques.

Prerequisite(s): Geology 341 or 343 and Geophysics 351 or 355.

Note: Completion of Geology 401 is highly recommended prior to taking this course. Students who have not completed Geology 401 are advised to attend the tutorial session of Geology 571, offered during January block week.

Geology 575 **H(3-3)**
(formerly Geology 463)

Subsurface Methods in Petroleum Geology
Principles and methods of correlation and mapping of subsurface geological features emphasizing oil and gas exploration and development. Sedimentary and structural geology concepts as well as petrophysical log evaluation are incorporated.

Prerequisite(s): Geology 449 or Geophysics 449.

Antirequisite(s): Credit for more than one of Geology 575 or 599.01 will not be allowed.

Geology 577 **H(3-3)**

Petroleum Geology
Principles and theory of hydrocarbon generation, migration and accumulation. Global occurrences of petroleum. Introduction to techniques of subsurface geology applied to the evaluation and quantification of oil and gas reservoirs.

Prerequisite(s): Geology 435 or 441 and 461; or Geophysics 457.

Note: Not open for credit to Honours or Majors in Geology (Petroleum Geology Concentration), or to students who have taken Geophysics 449, Geology 449, 463, or 589.

Geology 583 **H(3-3)**

Advanced Carbonate Sedimentology
Sedimentological, biological, climatic and economic significance of modern and ancient carbonate rocks. Warm- and cool-water carbonate factories. Lacustrine, peritidal, neritic, reef, slope, seep and pelagic environments. Ocean chemistry of carbonate systems. Diagenesis and the origin of dolomite. Carbonate petroleum plays.

Prerequisite(s): Geology 461 and 491.

Geology 585 **Q(3-3)**

Biostratigraphy
Principles of applied biostratigraphy for siliceous and calcareous microfossils and conodonts with emphasis on their use in basin analysis, sequence stratigraphy, and economic resource exploration.

Prerequisite(s): Geology 491.

Antirequisite(s): Credit for both Geology 585 and 685 will not be allowed.

Geology 589 **E(3-3)**

Selected Topics in Petroleum Geology I
589.01. Aqueous Fluids

589.02. Petroleum Fluids

589.06. Professional Practice for Geoscientists

589.07. Analytical Techniques for Petroleum Geochemistry

589.08. Petroleum Generation and Migration

Prerequisite(s): Geology 449 or Geophysics 449, and Geology 461 or Geophysics 457.

Antirequisite(s): Credit for both Geology 589 and 689 will not be allowed.

Geology 591 **H(3-1T-3)**

Reservoir Characterization and Resource Evaluation
Geological reservoir characterization: pore types, permeability, relative permeability, pay cut-off determination, reservoir architecture and heterogeneity, fluid contacts, reservoir drive mechanisms. Hydrocarbon assessment: classification of reserves and resources, reserve estimation methods.

Prerequisite(s): Geology 449 or Geophysics 449, Geology 461 and 575.

Antirequisite(s): Credit for both Geology 591 and 595.03 will not be allowed.

Geology 593 **Q(3-3)**

Selected Topics in Petroleum Geology II
593.05. Ichnology

593.06. Professional Practice for Geoscientists.

Prerequisite(s): Geology 449 or Geophysics 449, and Geology 461 or Geophysics 457.

Antirequisite(s): Credit for both Geology 593 and 693 will not be allowed.

Geology 595 **H(3-3)**

Selected Topics in Petroleum Geology III
595.01. Petroleum Geology III Core Examination

595.05. Basin Analysis

Prerequisite(s): Geology 449 or Geophysics 449, and Geology 461 or Geophysics 457.

Antirequisite(s): Credit for both Geology 595 and 694 will not be allowed.

Note: Students who have taken Geology 561 should take Geology 694.01, not 595.01.

Geology 596 **F(3-3)**

Selected Topics in Petroleum Geology IV
Courses are offered in specific topics related to Petroleum Geology. Topics may include subsurface mapping, play assessment, reservoir characterization, reservoir geology, reserves and resources, basin analysis, petroleum geochemistry.

Prerequisite(s): Geology 449 or Geophysics 449, and Geology 461 or Geophysics 457.

Antirequisite(s): Credit for both Geology 596 and 696 will not be allowed.

MAY BE REPEATED FOR CREDIT

Geology 597 **H(3-3)**

Geostatistics
Statistical analysis of spatial data, multivariate data analysis, regression, variogram analysis, kriging, co-kriging and stochastic simulation.

Prerequisite(s): Mathematics 253 or 267 or 277 or 283 or Applied Mathematics 219 and Mathematics 211 and completion of at least 15 full-course equivalents or consent of the Department.

Antirequisite(s): Credit for both Geology 597 and 697 will not be allowed.

Geology 599 **H(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): 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 **H(3-2)**

Advanced Physical Hydrogeology
An advanced treatment of topics covered in Geology 401.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for both Geology 601 and 401 will not be allowed.

Geology 605 **H(3-1T)**

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 or consent of the Department.

Geology 607 **H(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; or consent of the Department.

Geology 609 **H(3-3)**

Advanced Contaminant Hydrogeology
An advanced treatment of topics covered in Geology 505.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for both Geology 609 and Geology 505 will not be allowed.

Geology 611 **H(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 613 **H(3-1T-3)**

Flow in Porous Media
Fundamentals of fluid flow in porous media: pore structure; capillarity; single phase flow; immiscible and miscible fluid flow; pore level modelling of porous media. Concepts applied to hydrocarbon reservoirs and fluid migration in soils including: characterization of pore space, single phase flow in porous media, capillarity, wettability, routine and advance core analysis, miscibility in porous media. Similarities and differences between hydrocarbon reservoirs and soils. Introduction to enhanced oil and gas processes.

Prerequisite(s): Chemical Engineering 331 or Geology 401.

Antirequisite(s): Credit for both Geology 613 and either 699.20 or Petroleum Engineering 513 will not be allowed.

Geology 623 **H(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 or equivalent.

Note: Offered every alternate Fall Term

Geology 627 **H(3-3)**

Advanced Topics in Ore Deposits
A detailed study of ore occurrences with special emphasis on Canadian deposits. Laboratory: the study of comprehensive suites from deposits.

Prerequisite(s): Geology 527.

Geology 633 **H(3-3)**

Advanced Igneous and Metamorphic Petrology
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 443 or equivalent or consent of the Department.

Geology 639 **H(160 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. Geology 639 normally runs for two to three weeks following Winter Term Final Examinations or prior to the Fall Term.

Prerequisite(s): Geology 401 or 601 and consent of the Department.

Antirequisite(s): Credit for both Geology 639 and 441 will not be allowed.

Note: This course has limited enrolment.

Geology 641 **H(3-3)**

Advanced Structural Methods
Analysis of mesoscopic and megascopic structural data; the construction and analytical use of cross-sections, subsurface maps and 3-dimensional models; structural analysis of the Canadian Cordillera.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for both Geology 641 and 541 will not be allowed.

Note: There is a weekend field excursion during the term.

Geology 649 **H(3-2)**
(Geophysics 649)

Advanced Petrophysical Techniques
Application of petrophysical well logs and their relation to cores, cuttings, fluids and seismograms. Case studies applied to petroleum exploration and exploitation.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for Geology 649 and any of 649, Geophysics 449, or 649 will not be allowed.

Geology 655 **H(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 instructor.

Antirequisite(s): Credit for both Geology 655 and Geology 699.37 will not be allowed.

Geology 663 **H(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 **H(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 instructor or enrolment in a paleontology-based graduate program.

Geology 677 **H(3-3)**

Advanced Topics in Oil and Gas Production
Advanced study of the problems related to production of conventional oil, heavy oil, and natural gas; analysis of interactions of oil, water and gas; the 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 513 or Geology 613 or consent of the Department.

Antirequisite(s): Credit for both Geology 677 and either Chemical Engineering 619.26 or 677 will not be allowed.

Geology 679 **H(3-1)**

Petroleum and Environmental Organic Geochemistry
Origin of petroleum; sedimentation of organic matter and the carbon cycle; diagenesis of organic matter; hydrocarbon generation and migration; kinetic models; creosote contamination; methods; interpretation of geochemical data; applications of geochemical data to geological and environmental problems.

Prerequisite(s): Consent of the Department.

Geology 685 **Q(3-3)**

Advanced Biostratigraphy
Advanced studies of the principles of applied biostratigraphy for siliceous and calcareous microfossils and conodonts with emphasis on their use in basin analysis, sequence stratigraphy, and economic resource exploration.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for both Geology 685 and 585 will not be allowed.

Geology 689 **E(3-3)**

Advanced Petroleum Geology I
689.01. Aqueous Fluids

689.02. Petroleum Fluids

689.06. Professional Practice for Geoscientists

689.07. Analytical Techniques for Petroleum Geochemistry

689.08. Petroleum Generation and Migration

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for both Geology 689 and 589 will not be allowed.

Geology 693 **Q(3-3)**

Advanced Petroleum Geology II
693.05. Ichnology

693.06 Professional Practice for Geoscientists

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for both Geology 693 and 593 will not be allowed.

Geology 694 **H(3-3)**

Advanced Petroleum Geology III
694.01. Advanced Petroleum Geology III Core Examination

694.03. Reservoir Evaluation and Hydrocarbon Play Assessment

694.05. Basin Analysis

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for both Geology 694 and 595 will not be allowed.

Geology 696 **F(3-3)**

Advanced Petroleum Geology IV
Courses are offered in specific topics related to Petroleum Geology and the application of techniques to case studies of petroleum systems.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for both Geology 696 and 596 will not be allowed.

MAY BE REPEATED FOR CREDIT

Geology 697 **H(3-3)**

Advanced Geostatistics
Advanced treatment of the topics covered in Geology 597 with special emphasis on reservoir characterization.

Prerequisite(s): Mathematics 253 or 267 or 277 or 283 or Applied Mathematics 219 and Mathematics 211; or consent of the Department.

Antirequisite(s): Credit for both 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 **F(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 Human Resources and Organizational Dynamics 789 or equivalent.

Note: This course is intended for graduate students in the Master of Engineering with Reservoir Characterization Specialization.

Geology 699 **H(3-3)**

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.

MAY BE REPEATED FOR CREDIT

Geology 701 **H(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 **H(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 707 **H(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 709 **H(3S-3)**

Seminars on Applied Basin Studies
A seminar-based course that will cover topics that consider the development, evolution, stratigraphic and sedimentologic architecture, and stratigraphic correlation of sedimentary basins. Topics could include biostratigraphy, tectonics and sedimentation, subsurface correlation including sequence stratigraphy, siliciclastic and carbonate sedimentology, geochronology and petroleum geology. Concepts will be developed from discussions,

assigned reading, seminars and field trips to local geological sites.

Prerequisite(s): Graduate student registration in the Department of Geoscience, or consent of the Department.

Geology 711 **H(3S-3)**

Seminars on Applied Basin Field Studies
A seminar-based course that will consider the entire geologic history of a particular basin or sub-basin as well as key sections or geological sites that will be visited at the end of the semester. Topics will range across the full discipline of sedimentary geology with emphasis on applications to Petroleum Geology.

Prerequisite(s): Graduate student registration in the Department of Geoscience, or consent of the Department.

Geology 729 **H(3-3)**

Sedimentary Geochemistry
Application of chemical and isotopic data and techniques to the mineral assemblages observed to form during diagenesis. Water-rock interactions are examined using the thermodynamics of solution-mineral-gas equilibria. Topics may include kinetics, reaction path modelling, fluid flow in sedimentary basins and the relationships between fluid flow and diagenetic events.

Geology 733 **H(3-0)**

Analytical Methods in Petrology
Topics may include scanning electron microscope, electron probe, x-ray diffraction and x-ray fluorescence.

Geomatics Engineering ENGO

Instruction offered by members of the Department of Geomatics Engineering in the Schulich School of Engineering.

Department Head – D. Lichti

Associate Heads – K. O'Keefe, D.J. Marceau

Geomatics Engineering 500 **F(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. Submission and defence of progress reports and a final report are required.

Prerequisite(s): Communications Studies 363.

Corequisite(s): Geomatics Engineering 501.

Geomatics Engineering 501 **H(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 fieldwork 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, 435, 455, 465 and 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.

Geomatics Engineering 531 **H(2-2)**

Advanced Photogrammetric and Ranging Techniques
Analogue and digital imaging systems, frame versus line cameras, stereo-coverage configurations of line cameras, geometric modelling of line cameras (rigorous versus approximate sensor modelling), geo-referencing requirements of frame and line cameras, high-resolution imaging satellites, active imaging systems (LIDAR/RADAR), data integration and fusion.

Prerequisite(s): Geomatics Engineering 421, 431, and 435.

Geomatics Engineering 545 **H(2-2)**

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): Geomatics Engineering 361 and 465.

Geomatics Engineering 551 **H(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 five major geospatial technologies that characterize the so-called Geospatial Revolution; Geoweb, Virtual Globes, Volunteered Geographic Information, Location-Based Services, 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 **H(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: digital image acquisition and sampling, image enhancement in the spatial and frequency domain, colour image processing, image restoration, image segmentation, image compression and multi-source image/data fusion.

Prerequisite(s): Geomatics Engineering 435 and one of Geomatics Engineering 327 or Electrical Engineering 327.

Geomatics Engineering 563 **H(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.

Geomatics Engineering 567 **H(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 343, 361 and 419.

Corequisite(s): Geomatics Engineering 501.

Geomatics Engineering 573 **H(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 techniques used in the acquisition (e.g. photogrammetric data capture, digitized cartographic data sources capturing, other methods: IFSAR, and laser altimeters) processing, storage, manipulation, and applications of DTM. Models of DTM (Grids, Contours, and TINS). 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, orthophotos and drainage networks.

Prerequisite(s): Engineering 407 and Geomatics Engineering 431.

Geomatics Engineering 579 **H(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. Reforms in the Surveying Profession. Field exercises may take place off campus over weekends.

Prerequisite(s): Geomatics Engineering 455 and 443.

Corequisite(s): Geomatics Engineering 501.

Geomatics Engineering 581 **H(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 weekends.

Prerequisite(s): Geomatics Engineering 455.

Corequisite(s): Geomatics Engineering 579.

Geomatics Engineering 583 (Environmental Engineering 635) **H(2-2)**

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 H(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 (http://www.geomatics.ucalgary.ca) for current course listings.

Geomatics Engineering 601 H(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-only route MEng.

Geomatics Engineering 605 Q(0-1S)

Research Seminar I
Seminar presentation of studies related to the student's research.

Note: Compulsory for all MSc graduate students.

NOT INCLUDED IN GPA

Geomatics Engineering 607 Q(0-1S)

Research Seminar II
Seminar presentation of studies related to the student's research. Should not normally be taken in the same term as Geomatics Engineering 609.

Note: Compulsory for all PhD graduate students.

NOT INCLUDED IN GPA

Geomatics Engineering 609 Q(0-1S)

Research Seminar III
Seminar presentation of studies related to the student's research. Should not normally be taken in the same term as Geomatics Engineering 607.

Note: Compulsory for all PhD graduate students.

NOT INCLUDED IN GPA

Geomatics Engineering 615 H(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.

Antirequisite(s): Not open to students with credit in Geomatics Engineering 611 or 617.

Geomatics Engineering 617 H(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 make to undertaking PGIS.

Geomatics Engineering 620 H(2-2)

Estimation for Navigation
Overview of estimation fundamentals including stochastic processes, covariance matrices, autocorrelation 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 H(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 H(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 H(3-0)

Advanced Estimation Methods and Analysis
Concepts of optimal estimation and different optimization criteria. Least squares estimation and different adjustment models. Fundamental of random process and kinematic modelling. Development of the Kalman filter equations. Implementation aspects of Kalman filtering. Concept of signal and least squares collocation. Robust estimation and analysis. Error analysis and advanced statistical testing. Applications to geomatics engineering problems.

Geomatics Engineering 633 H(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 defraction 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 H (3-0)
(Environmental Engineering 637)

Earth Observation for the Environment
An introduction to environmental earth observation systems in particular to satellite platforms. Technique for fusing multi-dimensional datasets (i.e., multi-spectral, multi-temporal, multi-resolution, and point-source ground data). A number of environmental issues will be discussed, including carbon sequestration, advanced techniques for estimating biophysical variables that are integral parts of various environmental models; vegetation phenology; and understanding of climatic influence on forested and polar ecosystems, etc.

Antirequisite(s): Credit for any of Environmental Engineering 637 or 619.05 and Geomatics Engineering 637 will not be allowed.

Geomatics Engineering 638 H(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 H(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 H (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 **H(3-0)**

Spatial Databases and Data Mining
Comprehensive overview of spatial database management systems and issues related to spatial data mining. The topics that will be covered 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 655 **H(3-0)**

Advanced Remote Sensing
Advanced techniques for analysis and interpretation of remotely sensed imagery, with emphasis on data acquired from satellite and airborne platforms. Topics include: review 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; geophysical algorithms such as leaf area index and biomass and land cover classification algorithms.

Geomatics Engineering 658 **H(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 **H(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 **H(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 (Geophysics 681) **H(3-0)**

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 699 **H(3-0)**

Special Studies
Focus on advanced studies in specialized topics. Students may also conduct individual studies under the direction of a faculty member.

MAY BE REPEATED FOR CREDIT

Geophysics GOPH

Instruction offered by members of the Department of Geoscience in the Faculty of Science.

Department Head - C.M. Henderson

Geophysics 517 **H(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 and Applied Mathematics 415.

Geophysics 547 **H(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 355; 351 or 359; Mathematics 331 and Applied Mathematics 415.

Geophysics 549 **H(1T-96 hours)**

Field School
Seismic, gravity, magnetic, electromagnetic, resistivity, induced polarization and topographic surveys will be conducted for about 10-12 days prior to the Fall Term. Data collected will be processed during Fall Term tutorials.

Prerequisite(s): Geophysics 355 and 453.

Note: This course occurs in rugged field conditions and varying weather, for which participants must be prepared and equipped. Students will be required to cover food and accommodation costs, and a supplemental fee will be assessed to cover the costs of equipment and other resources.

Geophysics 551 **H(3-3)**

Seismic Theory and Methods
Seismic wave propagation theory; various techniques of exploration seismology.

Prerequisite(s): Geophysics 355, Physics 321, 323, Applied Mathematics 415, and Mathematics 331.

Geophysics 557 **H(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 **H(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 Geophysics 457 or Geology 461 or 597.

Geophysics 565 (formerly Geophysics 465) **H(3-3)**

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): Mathematics 249 or 251 or 265 or 275 or 281 or Applied Mathematics 217 and completion of 9.5 FCE in Science or Engineering.

Antirequisite(s): Credit for Geophysics 565 and either 365 or 465 will not be allowed.

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 645 **H(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 or consent of the Department.

Geophysics 649 (Geology 649) **H(3-2)**

Advanced Petrophysical Techniques
Application of petrophysical well logs and their relation to cores, cuttings, fluids and seismograms. Case studies applied to petroleum exploration and exploitation.

Prerequisite(s): Consent of the Department.

Antirequisite(s): Credit for more than one of Geology 449, 649, Geophysics 449, 649, will not be allowed.

Geophysics 653 **H(3-0)**

Electromagnetic and Induced Polarization Topics
Topics in electromagnetic and induced polarization exploration as applied to the search for metallic minerals.

Geophysics 657 **H(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 659 **H(3-3/2)**

Practical Seismic Modelling, Migration, and Inversion
Concepts and techniques of seismic imaging (migration) are explored. Practical considerations

such as algorithm characteristics and data geometry are emphasized; poststack and prestack migration and DMO methods are examined from the Kirchhoff, Fourier, and downward continuation perspectives.

Note: Some familiarity with seismic data and computer programming is assumed.

Geophysics 665 **H(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 or consent of the Department.

Geophysics 667 **H(3-3)**

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): Geophysics 355, 551 and Mathematics 221, or the equivalent. Students should be enrolled in the graduate program in geophysics or receive the consent of the Department.

Geophysics 669 **H(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): Basic knowledge of seismic wave theory, Fourier analysis and vector calculus. Students should be enrolled in the graduate program in geophysics or receive consent of the instructor.

Geophysics 671 **H(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): Knowledge of linear algebra and vector calculus, and some familiarity with statistics. Also, students should be enrolled in the graduate program in geophysics or receive consent of the instructor.

Geophysics 673 **H(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): Geophysics 671 or consent of the instructor.

Geophysics 681 **H(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 683 **H(3-0)**

Dynamics of the Earth
Fluid mechanics and Earth rheology, heat flow and mantle convection, magneto hydrodynamics and core dynamics, stresses, folding and diapirism, faulting and earthquake mechanism.

Geophysics 687 **H(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 **H(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 **H(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.

MAY BE REPEATED FOR CREDIT

Geophysics 701 **H(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.

Geophysics 703 **H(0-6)**

Readings in Geophysics
A written report based on a literature review is required.

Note: Open only to graduate students in the Department of Geoscience.

German GERM

Instruction offered by members of the Department of Germanic, Slavic and East Asian Studies in the Faculty of Arts. Students are encouraged to consult the Department website (http://gsea.ucalgary.ca) for more details on course descriptions and titles of topics courses.

Department Head – F. Strzelczyk

Note: Consent of the Department can be received in lieu of a stated prerequisite when equivalent knowledge can be demonstrated.

Note: All university level prerequisites for German language courses must be met with a grade of "C-" or better.

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

German 627 **H(3S-0)**

Seminar in German Literature and Culture
Selected topics in literary history.

MAY BE REPEATED FOR CREDIT

German 629 **H(3S-0)**

Seminar in German Language and Linguistics
MAY BE REPEATED FOR CREDIT

German 631 **H(3S-0)**

Seminar in German Language Pedagogy
MAY BE REPEATED FOR CREDIT

German 696 **F(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 **H(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

Instruction offered by members of the Department of Greek and Roman Studies in the Faculty of Arts.

Department Head – H. Sigismund Nielsen

Note: For courses on Greek Literature in translation, Greek History, Art, Archaeology, etc., see Greek and Roman Studies (GRST).

Enrolment in any higher level Greek course requires a grade of at least "C-" in the prerequisite course(s), or consent of the Department. Greek 551 is a supplementary course.

Graduate Course

Greek 601 **H(3S-0)**

Graduate Seminar
MAY BE REPEATED FOR CREDIT

Greek 602 **H(4-1)**

Introductory Language Class for Graduate Students
Introduction to grammar, vocabulary and translation skills.

MAY BE REPEATED FOR CREDIT

Greek 604 **H(3-1)**

Intermediate Language Class for Graduate Students
Consolidation of grammar, vocabulary and translation skills.

MAY BE REPEATED FOR CREDIT

Greek 607 **Q(0-1T)**

Directed Studies
MAY BE REPEATED FOR CREDIT

Greek and Roman Studies GRST

Instruction offered by members of the Department of Greek and Roman Studies in the Faculty of Arts.

Department Head – H. Sigismund Nielsen

For courses in the ancient Greek and Latin languages see listings under Greek and Latin.

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 601-607.

Greek and Roman Studies 601 **H(3S-0)**

Graduate Seminar
MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 603 **H(1S-0)**

Research and Professional Training
NOT INCLUDED IN GPA

History HTST

Instruction offered by members of the Department of History in the Faculty of Arts.

Department Head – H. Kraay

500-Level Courses

Note: Preference in enrolment will be given to Majors in History, Ancient and Medieval History Majors, and graduate students in History. All others will require special permission from the department to register while registration restrictions are in place. Registration information can be found on the Enrolment Services website http://www.ucalgary.ca/registrar/.

History 503 **H(3S-0)**

Topics in East Asian History
Topics may include Japanese and Chinese responses to western culture and expansion, ideas, politics.

Prerequisite(s): History 300 and one of East Asian Studies 331, 333, History 209, 301, 315, 317, 405, 407.01, 407.02, 407.03, or consent of the Department.

MAY BE REPEATED FOR CREDIT

History 504 **H(3S-0)**

Britain and the Wider World, 1500-1800
Reflects changing focus in the field of British imperial studies away from the Atlantic and the instructor's ongoing research.

Prerequisite(s): History 300.

History 505 **H(3S-0)**

History of Western Monasticism from 600 to 1500
The history of monastic spirituality in Western Europe. The origins, nature, and various forms of monasticism and their evolution from the Benedictine to the Friar in the context of the commercial revolution.

Prerequisite(s): History 300 and 319 or 321, or consent of the Department.

History 506 **H(3S-0)**

The Century of the Black Death: Economy, Society and Religion
A global examination of the fourteenth-century crises: famine, epidemics, civic unrest, warfare, and Papal politics. Selected topics will lead to the comparative study of the period from England, France, Italy and the Holy Roman Empire, with a critical assessment of the impact of the Black Death on late medieval society.

Prerequisite(s): History 300 and 319 or 321, or consent of the Department.

History 507 **H(3S-0)**

Gender and Sexuality in Modern Europe
An overview of gender theory in modern European history, with emphasis on issues of sexuality.

Prerequisite(s): History 300 and a European History course at the 300 or 400 level or consent of the Department.

History 508 **H(3S-0)**

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 and one of 307, 333, 375, 381, 383, 411.02, 413.02, 483, 485, 490, 491, or consent of the Department.

History 509 **H(3S-0)**

Religion, Politics, and Culture in Early Modern Europe
Topics may include 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 323 or 325 or 327, or consent of the Department.

MAY BE REPEATED FOR CREDIT

History 511 **H(3S-0)**

The Age of Enlightenment and the Era of Revolution and Napoleon
Selected themes from the Enlightenment to revolution including the imperial experience in France and Europe in the eighteenth and nineteenth centuries.

Prerequisite(s): History 300.

Note: Not open to students with credit in any one or both of History 511.01 and 511.02.

History 515 **H(3S-0)**

History of the Holocaust
Nazi persecution and destruction of the European Jews during World War II. Topics will include: the roots of modern anti-Semitism; Nazi policy towards the Jews of Germany in the 1930s; the Nazi "New Order" in occupied Europe; the technology of murder; Jewish resistance; the attitudes/actions of occupied peoples and Allied governments; the war crimes trials.

Prerequisite(s): History 300 and 333 or 413.02, or consent of the Department.

History 517 **H(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 519 **H(3S-0)**

Canada from Laurier to Pearson
Political developments in Canada from 1896-1968, with emphasis on the national scene.

Prerequisite(s): History 300 and 337 or 351, or consent of the Department.

History 520 **H(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 postwar military legacy.

Prerequisite(s): History 300.

History 521 **H(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 **H(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 525 **H(3S-0)**

Topics in Canadian Intellectual History
Ideas of Canadian political, economic, and cultural theorists and social reformers in the late nineteenth and twentieth centuries.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 526 **H(3S-0)**

The Canadian Military in the Second World War
Through examination of topics such as leadership and adapting to warfare, this course will examine the Canadian military's ability to cope with the harsh realities of war. Emphasis will be placed on 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.

Prerequisite(s): History 300 and 349 or 431, and consent of the Department.

History 527 **H(3S-0)**

History of Canadian Foreign and Defence Policy from 1919 to the Cold War Era
Selected topics in 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 and consent of the Department.

History 529 **H(3S-0)**

Topics in Native History
A history of the Aboriginal peoples of Canada: the First Nations, Inuit and Metis.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 531 **H(3S-0)**

Canadian Historiography
Major schools of historical writing in Canada: imperial, continental and nationalist interpretations; regional historiography of the Maritimes, central Canada and the West; selected historians and their historical methods.

Prerequisite(s): History 300.

History 533 **H(3S-0)**

Gender History in Canada
The history of women's diverse experience in Canada will be examined through the study of aboriginal, immigrant, working-class and farm women.

Prerequisite(s): History 300.

History 535 **H(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 or consent of the Department.

MAY BE REPEATED FOR CREDIT

History 537 **H(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 both History 537 and History 535.08 will not be allowed.

History 541 **H(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. For further information in the specific topics to be offered in any year, consult the History Department.

Prerequisite(s): History 300 and one 371, 372, 373, or 477.

MAY BE REPEATED FOR CREDIT

History 543 **H(3S-0)**

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, or consent of the Department.

History 545 **H(3S-0)**

Topics in Military History
An examination of selected problems in modern military history. Topics may include: military theory; guerrilla warfare from the 18th century to the 20th 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, or consent of the Department.

MAY BE REPEATED FOR CREDIT

History 551 **H(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): Political Science 321 or History 343, History 300 or consent of the Department.

History 565 **H(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 **H(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 591 **H(3S-0)**

Directed Reading and Research
The analysis of historical problems and the use of primary sources. The content of each course will reflect the interests of the instructor.

Prerequisite(s): History 300 and consent of the Department.

Note: May not be used to fulfill the 500-level requirement for a Major in history without the written consent of the Department.

MAY BE REPEATED FOR CREDIT

History 593 **H(3-0)**

Selected Topics in History
Topics will vary from year to year, and will be announced in advance.

Prerequisite(s): History 300.

MAY BE REPEATED FOR CREDIT

History 597 **H(3-0)**

Honours Directed Reading
Directed readings for Honours students in their third or fourth year.

Prerequisite(s): History 300.

Antirequisite(s): Not open to students with credit in History 596.

History 598 **F(3-0)**

Honours Writing Seminar
The Honours Essay for Honours students in their fourth year.

Prerequisite(s): History 300.

Note: Students will work under the supervision of a faculty member, and are also expected to 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 **H(3-0)**

Topics in Imperial History
MAY BE REPEATED FOR CREDIT

History 603 **H(3-0)**

Topics in Religious History
MAY BE REPEATED FOR CREDIT

History 607 **H(3-0)**

Topics in Western Canadian History
MAY BE REPEATED FOR CREDIT

History 623 **H(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 **H(3-0)**

Topics in Modern European History
MAY BE REPEATED FOR CREDIT

History 637 **H(3-0)**

Topics in Military History
MAY BE REPEATED FOR CREDIT

History 639 **H(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 **H(3-0)**

Topics in Medieval or Early Modern European History
MAY BE REPEATED FOR CREDIT

History 645 **H(3-0)**

Topics in U.S. History
MAY BE REPEATED FOR CREDIT

History 647 **H(3-0)**

Topics in Latin American History
MAY BE REPEATED FOR CREDIT

History 651 **H(3S-0)**

Reading Seminar

History 653 **H(3S-0)**

Research and Methods Seminar

History 655 **H(3-0)**

Classics of Strategy
Strategic thought from Sun Tzu to Clausewitz, Mahan to Corbett. Analyses 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 **H(3-0)**

Topics in Legal History
MAY BE REPEATED FOR CREDIT

History 675 **H(3-0)**

Selected Topics in History
MAY BE REPEATED FOR CREDIT

History 690 **H(3-0)**

Historiography and the Theories of History

History 691 **H(3-0)**

Conference Course in Special Topics
Note: Open only to graduate students.
MAY BE REPEATED FOR CREDIT

History 791 **H(3S-0)**

Conference Course in Special Topics (Advanced Level)
Note: Open only to graduate students.
MAY BE REPEATED FOR CREDIT

History 795 **H(3S-0)**

Advanced Seminar in Historiographical Interpretations

Human Resources and Organizational Dynamics HROD

Instruction offered by members of the Haskayne School of Business.

Human Resources and Organizational Dynamics Chairperson — T. Bryant

Graduate Courses

Human Resources and Organizational Dynamics 601 **H(3-0)**

Managing Human Resources
Survey course on managing the human side of business. Development of leadership and team skills.

Human Resources and Organizational Dynamics 631 **H(3-0)**

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): Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 691 **H(3-0)**

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.

Note: Available only to students in the MEng Program (Project Management). Not open to students in the MBA Program.

Human Resources and Organizational Dynamics 721 **H(3-0)**

Advanced Leadership and Technical Skills
Covers increasing self-awareness, self-understanding and presentation of self. The interpersonal skills necessary for group effectiveness, team management and performance leadership will be analysed and developed through small group exercises.

Prerequisite(s): Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 723 **H(3-0)**

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): Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 725 **H(3-0)**

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): Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 727 **H(3-0)**

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 programs from the orientation of professional human resources management.

Prerequisite(s): Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 729 **H(3-0)**

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): Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 731 **H(3-0)**

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): Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 741 **H(3-0)**

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.

Human Resources and Organizational Dynamics 745 **H(3-0)**

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.

Human Resources and Organizational Dynamics 789 **H(3S-0)**

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): Human Resources and Organizational Dynamics 601 or consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Human Resources and Organizational Dynamics 793 **H(3-0)**

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): Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 797 **H(3S-0)**

Advanced Seminar in Human Resources and Organizational Dynamics
Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

PhD Course

Human Resources and Organizational Dynamics 799 H(3S-0)

Doctoral Seminars in Human Resources and Organizational Dynamics
799.01. Organizational Behaviour

799.02. Organization Theory

799.03. Industrial Relations

799.05. Interorganizational Relationships: Creating and Managing Strategic Alliances

Interprofessional Health Education IPHE

Senior Courses

Interprofessional Health Education 501 H(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, 425, Kinesiology 355, Nursing 303, 305, Psychology 203, 205, Social Work 363, or consent of the Instructor(s).

Interprofessional Health Education 503 H(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, 425, Kinesiology 355, Nursing 303, 305, Psychology 203, 205, Social Work 363, or consent of the Instructor(s).

Interprofessional Health Education 598 H(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 H(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 H(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 H(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 H(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 H(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 H(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

Israel Studies ISST

Instruction and services offered by members of the Faculty of Arts.

Program Director - S. Keren

Graduate Course

Israel Studies 601 H(3-0)

Modern Israel
Discussion of major themes in the origin and establishment of modern Israel. Topics may include emancipation and Zionism; nation building; social, ethnic, and religious composition; human rights, equality and gender, economic, political, and cultural institutions.

MAY BE REPEATED FOR CREDIT

Kinesiology KNES

Instruction offered by members of the Faculty of Kinesiology.

Students should also see course listings under the headings Athletic Therapy, Dance Education, and Physical Education.

Graduate Courses

Kinesiology 603 H(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 605 Q(1-1S)

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 Graduate Program in Kinesiology.

Kinesiology 606 F(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, cardio-respiratory and musculoskeletal fitness.

Prerequisite(s): Admission to a Graduate Program in Kinesiology.

Kinesiology 609 H(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 both Kinesiology 609 and 603.84 will not be allowed.

Kinesiology 611 H(3-0)

Research Methods in Kinesiology
An overview of research methods including study design, data collection, measurement, interpreta-

tion of data, scientific writing, and critical appraisal of the literature relevant to kinesiology.

Prerequisite(s): One graduate course in Biostatistics or Statistics (including Kinesiology 609, Medical Science 643.01, Psychology 614, or equivalent) and admission to a Graduate Program in Kinesiology.

Kinesiology 615 **Q(1-1S)**

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.

Kinesiology 617 **Q(1-1S)**

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.

Kinesiology 637 **H(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 **H(3-1/2)**
(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 673 **H(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 473 and admission to a Graduate Program in Kinesiology.

Kinesiology 690 **F(1T-8)**

Practicum
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 **Q(1-1S)**

Health and Exercise Psychology for Clinical Populations
Addresses the determinants and consequences of exercise engagement within clinical 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 **H(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 715 **H(1-1S)**

Seminar in Clinical and Applied Exercise Physiology
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.

Kinesiology 773 **H(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 **H(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 **H(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

Instruction and services offered by the Departments of French, Italian and Spanish and Linguistics, Languages, and Cultures in the Faculty of Arts and the Werklund School of Education.

For program information please contact one of the Faculty of Arts and Werklund School of Education.

Graduate Courses

Language 605 **H(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 home department.

Language 615 **H(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, on line 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 home department.

Language 625 **H(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 home department.

Language 699 **H(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 home department.

MAY BE REPEATED FOR CREDIT

Latin LATI

Instruction offered by members of the Department of Greek and Roman Studies in the Faculty of Arts.

Department Head – H. Sigismund Nielsen

Note: For courses in Latin Literature in translation, Roman History, Art, Archaeology, etc., see Greek and Roman Studies.

Graduate Courses

Latin 601 **H(3S-0)**

Graduate Seminar
MAY BE REPEATED FOR CREDIT

Latin 602 **H(4-1)**

Introductory Language Class for Graduate Students
Introduction to grammar, vocabulary and translation skills.

MAY BE REPEATED FOR CREDIT

Latin 604 **H(3-1)**

Intermediate Language Class for Graduate Students
Consolidation of grammar, vocabulary and translation skills.

MAY BE REPEATED FOR CREDIT

Latin 607 **Q(0-1T)**

Directed Studies
MAY BE REPEATED FOR CREDIT

Law LAW

Instruction offered by members of the Faculty of Law.

For course descriptions and details of the transition from the old to the new curriculum, consult the electronic Faculty of Law Calendar available at www.law.ucalgary.ca.

600-Level Courses

Law 601 **H(3-0)(3 credits)**

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 605 **H(3-0)(3 credits)**

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 **H(2-0)(2 credits)**

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 611 **H(3-0)(3 credits)**
(formerly Law 639)

Dispute Resolution III: Adjudication
An overview of the binding, third-party decision making process of dispute resolution, and their commonalities and differences. The focus is on two for the following three adjudication processes; arbitrations, administrative hearings and trials.

Note: This course is graded CR, D or F.

Law 612 **H(3-0)(3 credits)**

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, 405 and 551.

Law 613 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

Corporate Finance Law
Legal aspects of corporate finance transactions, including applicable regulatory frameworks. Topics may include equity and debt financing, secured transactions, asses and/or share purchase and sale agreements, and takeover bids.

Corequisite(s): Prerequisite or Corequisite: Law 509.

Law 619 **H(3-0)(3 credits)**

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, 533 and 598.

Law 621 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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.

Corequisite(s): Prerequisite or Corequisite: Law 549.

Law 628 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 653 **H(0-3)(3 credits)**

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 663 **H(3-0)(3 credits)**

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 513.

Note: This course is Graded CR, D or F.

Law 667 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

Jessup Moot
Preparation for and participation in the Philip C. Jessup International Law Moot Court Competition.

Prerequisite(s): Consent of the Faculty.

Law 677 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 687 **H(3-0)(3 credits)**

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 689 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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 **H(2-0)(2 credits)**

Selected Topics I
A variety of subject areas, either doctrinal or theoretical.

MAY BE REPEATED FOR CREDIT

Law 693 **H(3-0)(3 credits)**

Selected Topics II
A variety of subject areas, either doctrinal or theoretical.

MAY BE REPEATED FOR CREDIT

Law 694 **H(4-0)(4 credits)**

Selected Topics III
A variety of subject areas, either doctrinal or theoretical.

MAY BE REPEATED FOR CREDIT

Law 695 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**

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.

Law 697 **H(3-0)(3 credits)**

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 **H(3-0)(3 credits)**
(formerly Law 539)

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 **H(3-0)(3 credits)**
(formerly Law 517)

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 **H(3-0)(3 credits)**

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.

Note: This course is only open to students in the LLM program or by approval of the Graduate Director.

Law 705 **H(0-3)(3 credits)**

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 the areas of natural resources, energy and environmental law.

Note: This course is only open to students in the LLM program or by approval of the Graduate Director.

Law 706 **F(0-5)(5 credits)**

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.

Note: This course is only open to students in the LLM program.

Linguistics LING

Instruction offered by members of the Department of Linguistics in the Faculty of Arts.

Department Head - F. Strzelczyk

Note: A student may not register in any Linguistics course unless a grade of at least "C-" has been achieved in each prerequisite for that course.

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 Department in addition to any other prerequisites which may be stated.

Linguistics 600 **Q(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 **H(3-0)**

Field Methods
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Linguistics 611 **H(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): Linguistics 511 and consent of the Department.

Linguistics 613 **H(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 Department.

Linguistics 631 **H(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 Department.

Note: Consult the Department regarding topics offered in any given year as topics vary. Not offered every year.

Linguistics 633 **H(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 Department.

Note: Consult the Department regarding topics offered in any given year as topics vary. Not offered every year.

Linguistics 635 **H(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 Department.

Note: Consult the Department regarding topics offered in any given year as topics vary. Not offered every year.

MAY BE REPEATED FOR CREDIT

Linguistics 651 **H(3-0)**

Topics in Historical Linguistics
Seminar in historical linguistics.

Note: Consult the Department regarding topics offered in any given year as topics vary. Not offered every year.

MAY BE REPEATED FOR CREDIT

Linguistics 660 **H(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 Department.

Linguistics 697 **H(3-0)**

Thesis Research Development

Linguistics 699 **H(3S-0)**

Conference and Reading Course
MAY BE REPEATED FOR CREDIT

Linguistics 797 **Q(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 Information Systems MGIS

Instruction offered by members of the Haskayne School of Business.

Management Information Systems Chairperson — H. Warsame

Graduate Courses

Management Information Systems 601 H(3-0)

Management Information Systems
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.

Management Information Systems 725 H(3-0)

e-Technology
Technical and managerial issues related to buying, building, and implementing e-technology to enable various organizational and business strategies and relationships including business-to-business, business-to-customer, business-to-employee and employee-to-employee strategies. Topics include: systems internetworking, information management, systems integration, wireless technologies, transmission security and authentication, project management, software design, technology diffusion and evaluation, technology-enabled business process design, and legal and ethical issues.

Prerequisite(s): Management Information Systems 601.

Management Information Systems 735 H(3-0)

Systems Analysis and Design
Planning and implementation of network-enabled (i.e. Intranet and Internet) solutions to facilitate information and knowledge transfer across business environments. Reflects the information explosion of recent years, the new technological advances in information systems, and the exponential growth in electronic business processes. Course emphasis is placed on the management of technology-enabled business processes.

Prerequisite(s): Management Information Systems 601.

Management Information Systems 737 H(3-0)

Enterprise Data Management
Data systems, technologies and management issues associated with information design, capture, storage, search, and dissemination to various stakeholders of an organization. Includes database management technologies, data modelling tools, interface design, structured query language, document and knowledge management systems, and information backup, security and disaster recovery. Brief aspects of the course explore linkages with Internet-based technologies, design issues, web services, search strategies and telecommunication systems for information delivery (wireless and wired; intranet, extranet, and internet).

Prerequisite(s): Management Information Systems 601.

Management Information Systems 743 H(3-0)

Telecommunications
Basic telecommunications and data communications concepts relevant to organizations. Fundamentals of analog and digital signalling and transmission. Wide and local area networking. Protocols and standards; telecommunication applications. The role of the Internet in organizations.

Prerequisite(s): Management Information Systems 601.

Management Information Systems 797 H(3S-0)

Advanced Seminar in Management Information Systems
Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

PhD Course

Management Information Systems 799 H(3S-0)

Doctoral Seminars in Management Information Systems
799.01. PhD Seminar I in Management Information Systems

799.02. PhD Seminar II in Management Information Systems

799.03. PhD Seminar III in Management Information Systems

799.04. PhD Seminar IV in Management Information Systems

Management Studies MGST

Instruction offered by members of the Haskayne School of Business.

Graduate Courses

Management Studies 601 Q(3-0)

Skills Development
Introduction to basic MBA Skills required for effective learning throughout the MBA Program. Specific topics may include business communications and writing, report writing, oral presentations, team roles and responsibilities, critical thinking and case analysis.

Antirequisite(s): Credit for both Management Studies 601 and 790.01 will not be allowed.

Management Studies 611 H(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 H(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 715 H(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 both Management Studies 715 and 615 will not be allowed.

Management Studies 741 H(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 or equivalent.

Management Studies 743 H(3-0)

International Logistics
The management functions of physical distribution, procurement and production are examined in a global context. International purchasing and logistics activities, global sourcing and production, and supply chain management to provide excellent, cost-effective service on a world-wide basis. Both theoretical and practical approaches are applied.

Prerequisite(s): Operations Management 601 or equivalent.

Management Studies 751 H(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 761 H(3-3T)

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 or equivalent.

Note: May not be used as part of a student's major in Finance.

Management Studies 770 Q(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 both Management Studies 770 and 790.02 will not be allowed.

PhD Courses

Management Studies 773 **H(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 **H(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 **H(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 **H(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 790 **Q(3-0)**

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 **H(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 792 **F(1-0)**

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 or equivalent.

Management Studies 793 **H(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 797 **H(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 **H(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

Instruction offered by members of the Department of Mechanical and Manufacturing Engineering in the Schulich School of Engineering.

Department Head – R. Hugo

Director (Manufacturing Engineering Program) – L. Sudak

Director (Graduate Program, Mechanical and Manufacturing Engineering) - A. Ramirez-Serrano

Graduate Courses

Manufacturing Engineering 605 **H(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 **H(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 **H(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 613 **H(3S-0)**

Research Seminar I
Reports on studies of the literature or of current research. This course is compulsory for all MSc and thesis-route MEng students and must be completed before the thesis defence.

NOT INCLUDED IN GPA

Manufacturing Engineering 619 **H(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 **H(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 **H(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 **F(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.

Manufacturing Engineering 713 **H(3S-0)**

Research Seminar II
Reports on studies of the literature or of current research. This course is compulsory for all PhD students and must be completed before the candidacy examination.

NOT INCLUDED IN GPA

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. Instructors are drawn generally from the staffs of the participating universities (University of Alberta, University of Calgary, University of British Columbia, Simon Fraser University, University of Victoria).

Appropriate courses at the 300 level (or higher) in Biology, Plant Biology (Botany) and/or Zoology are prerequisite to these courses.

Each full course will last six weeks (plus four days travelling time) with an average of 50 hours weekly of lectures, laboratories, tutorials and field trips.

Fall Program: The Western Canadian Universities Marine Sciences Society offers an integrated program of courses in Marine Biology at the Bamfield Marine Sciences Centre. Attendance at the program requires residence at Bamfield Marine Sciences Centre for an entire Fall Term. Details are available from the Department of Biological Sciences.

University of Calgary 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. For further information students should consult the Department of Biological Sciences.

†Numbers in parentheses are the course numbers listed by the Bamfield Marine Sciences Centre. In many cases these courses have been renumbered to fulfill University of Calgary requirements. The courses listed below are not necessarily offered every year. Other courses and specific titles in special topics courses will be offered yearly. Students are requested to check current listings in the Department of Biological Sciences.

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 (Marine Science 500†) **F(0-6)**

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.

Marine Science 601 (Marine Science 502†) **H(3-3)**

Special Topics (3 weeks)
Courses of a specialized nature offered, as opportunities arise, by distinguished scientists visiting the Bamfield Marine Sciences Centre.

Marine Science 602 (Marine Science 501†) **F(3-3)**

Special Topics (6 weeks)
Courses of a specialized nature offered, as opportunities arise, by distinguished scientists visiting the Bamfield Marine Sciences Centre.

Marketing MKTG

Instruction offered by members of the Haskayne School of Business.

Marketing Chairperson — M. Boivin

Graduate Courses

Marketing 601 **H(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 735 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(3S-0)**

Advanced Seminar in Marketing
Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

PhD Course

Marketing 799 **H(3S-0)**

Doctoral Seminars in Marketing
MAY BE REPEATED FOR CREDIT

Mathematics MATH

Instruction offered by members of the Department of Mathematics and Statistics in the Faculty of Science.

Department Head - M. Lamoureux

Graduate Courses

Note: In addition to the prerequisites listed below, consent of the Applied Mathematics Department or the Pure Mathematics Department is a prerequisite for these graduate courses.

Mathematics 601 H(3-0)

Measure and Integration
Abstract measure theory, basic integration theorems, Fubini's theorem, Radon-Nikodym theorem, Lp spaces, Riesz representation theorem.

Prerequisite(s): Mathematics 545 or Pure Mathematics 545 or consent of the Department.

Antirequisite(s): Credit for more than one of 501, 601, Pure Mathematics 501 or 601 will not be allowed.

Mathematics 621 H(3-0)

Complex Analysis
Analytic functions as mappings, local properties of analytic functions, Schwarz lemma, Casorati-Weierstrass and Picard theorems, analytic continuation, harmonic and subharmonic functions, approximation theorems, conformal mappings, Riemann surfaces.

Prerequisite(s): Mathematics 335 or 355 or Pure Mathematics 435 or 455 or consent of the Department.

Mechanical Engineering ENME

Instruction offered by members of the Department of Mechanical and Manufacturing Engineering in the Schulich School of Engineering.

Department Head – R. Hugo

Director (Mechanical Engineering Program) - L. Sudak

Director (Graduate Program, Mechanical and Manufacturing Engineering) – A. Ramirez-Serrano

Graduate Courses

Mechanical Engineering 603 H(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 H(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 H(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 H(3S-0)

Research Seminar I
Reports on studies of the literature or of current research. This course is compulsory for all MSc and thesis-route MEng students and must be completed before the thesis defence.

NOT INCLUDED IN GPA

Mechanical Engineering 615 H(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: analog/digital devices and sampling theory. Application of theory to various measurement systems such as pressure, velocity, strain, concentration, temperature.

Mechanical Engineering 619 H(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

Mechanical Engineering 631 H(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.

Mechanical Engineering 633 H(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 637 H(3-0)
(Environmental Engineering 673)

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.

Prerequisite(s): Engineering 311.

Mechanical Engineering 639 H(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 641 H(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 H(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 H(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.

Prerequisite(s): Mechanical Engineering 645, or equivalent.

Mechanical Engineering 653 H(3-0)

Continuum Mechanics in Engineering
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 663 H(3-1/2)
(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 H(3-0)

Elements of Materials Engineering
The course covers a variety of material aspects and provides a fundamental understanding of Materials Science and Engineering. The course 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 H(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 H(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 H(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 H(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 more than one of Mechanical Engineering 685, Medical Science 685 and Kinesiology 685 is not allowed.

Mechanical Engineering 698 F(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 713 H(3S-0)

Research Seminar II
Reports on studies of the literature or of current research. This course is compulsory for all PhD students and must be completed before the candidacy examination.

NOT INCLUDED IN GPA

Medical Physics MDPH

Instruction offered by members of the Department of Physics and Astronomy in the Faculty of Science.

Department Head - R.I. Thompson

Note: For listings of related courses, see Astronomy, Astrophysics, Physics, and Space Physics.

Graduate Courses

Medical Physics 623 H(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 H(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 Q(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.

Medical Physics 633 H(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 H(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 639 H(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 H(0-8)

Clinical Competency I
This three credit hour course extends over the first year of the diploma program and 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 H(0-8)

Clinical Competency II
This three credit hour course extends over the second year of the diploma program and 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 H(0-8)

Clinical Projects I
Two to three clinical projects are completed during this three credit hour course extending over the first year of the program. Projects have clearly defined objectives established by mutual agreement between the student and project supervisor. The project culminates in a written report. Student performance is evaluated against the objectives established at the commencement of the project.

Prerequisite(s): Consent of the Department.

Medical Physics 722 H(0-8)

Clinical Projects II
Two to three clinical projects are completed during this three credit hour course extending over the second year of the program. Projects have clearly defined objectives established by mutual agreement between the student and project supervisor. The project culminates in a written report. Student performance is evaluated against the objectives established at the commencement of the project.

Prerequisite(s): Medical Physics 721 and consent of the Department.

Medical Physics 731 H(2T-0)

Radiation Oncology Physics Tutorials
This three credit hour course requires the student to prepare written answers to 120 pre-set questions published by the Canadian College of Physicists in Medicine as part of the certification process in Radiation Oncology Physics. The course is conducted in a tutorial setting and the students are evaluated on the basis of their answers to a subset of the questions.

Prerequisite(s): Consent of the Department.

Medical Physics 741 H(0-4)

Treatment Planning
This three credit hour course has three components and will be spread over the two years of the program to ensure that the student's increasing knowledge can be consolidated into a thorough understanding of radiation oncology physics. The first component is the observation of simulation and localization under the supervision of a radiation oncologist. The second component is an in-depth study of the physics behind the treatment planning of the main tumour sites. This component

utilizes a web-based tool and is led by adjunct faculty. The final component involves following ten patients through the entire radiation therapy process from immobilization through localization, treatment planning, treatment delivery to verification. The students' progress will be evaluated throughout the course with regular feedback to the student.

Prerequisite(s): Consent of the Department.

Medical Science MDSC

Instruction offered by members of the Faculty of Medicine.

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.

Medical Science 501 H(3-0)
(Biology 501)

Principles and Mechanisms of Pharmacology
Basic principles of pharmacology, with specific emphasis on receptor signaling mechanisms.

Prerequisite(s): Enrolment in the BHSc Honours program, Biochemistry 443, and one of Zoology 461, 463, or Medical Science 404, or consent of the Faculty.

Medical Science 503 H(3-0)
(Biology 503)

Pharmacology of Organ Systems
Pharmacology of the nervous, cardiovascular, renal and immune systems, as well as anti-cancer therapies. Principles of toxicology.

Prerequisite(s): Medical Science 501 (Biology 501) or consent of the Faculty.

Medical Science 507 H(3-3)

Special Problems in Medical Science
Lectures, seminars, term papers and training in theoretical and/or laboratory methods. 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 Honours Program.

MAY BE REPEATED FOR CREDIT

Medical Science 508 2xF(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 2.0 FCE and is offered over two sessions.

Medical Science 509 H(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 511 H(3-0)

Instrumental Analysis
An overview of the analytical laboratory instruments used in research and the diagnosis and treatment of human disease.

Medical Science 515 H(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 443 and one of Biology 331 or Medical Science 351.

Medical Science 517 H(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 H(3-3)

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 instructor.

Medical Science 521 H(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 F(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 Department.

MAY BE REPEATED FOR CREDIT

Medical Science 535 H(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 H(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 H(3-0)

Advance 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, and Medical Science 402 or consent of the instructor.

Note: Previous completion of Medical Science 541 is suggested but not required.

Medical Science 545 H(3-0)

Genomics
Examine the strategies and techniques, including high-capacity DNA sequencing, used in genomic and genetic studies to discover the genes responsible for human diseases. Review how model systems are used to establish the functional consequences of mutant genes. Students can expect to gain a comprehensive understanding and broad appreciation of how to establish the significance of genomic information in context of rare and common human diseases, and its relevance to personalized medicine. Involves a combination of lectures, review of journal articles, student presentations and case studies.

Prerequisite(s): Medical Science 341 or Biology 311 or consent of the instructor.

Medical Science 561 H(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 H(3-0)
(Cellular, Molecular and Microbial Biology 565)

Advanced Topics in Pathogenic Microbiology
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 H(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.

Graduate Courses

Medical Science 603 H(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 postmortem 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 F(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 his/her acquired knowledge to solve complex physiological problems related to integrative human physiology.

Prerequisite(s): Consent of the Faculty.

Medical Science 605 H(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 H(3-0)

Gene Expression
The flow of genetic information from DNA to final protein product. The subject will be covered in two courses offered in alternating years: gene structure and regulation of transcription, including gene structure and organization, chromatin structure, regulation of transcription and post-translational processing; and the activity of genes during development including stored messenger ribonucleoprotein particles and translational control in gametes, the switch from maternal to zygote genome control of development in early embryos and the molecular basis of morphogenesis and differentiation.

609.02. Genes and Development

Prerequisite(s): Medical Science 537 (Biochemistry 537) or equivalent and consent of the Faculty.

Antirequisite(s): Credit for both Medical Science 609.01 and 607.01 will not be allowed. Note: Credit for both Medical Science 609.02 and 751.14 will not be allowed.

Medical Science 612 F(3-1S)

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 241 and 343 or equivalent or consent of the Faculty.

Medical Science 613 H(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

613.02. Pathogenesis of Microbial Disease

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 H(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): Must be registered in the Neuroscience Graduate Program. Consent of instructor(s) is required for all other students.

Note: Not open to undergraduate students.

Medical Science 620 H(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): Consent of the Faculty.

Medical Science 621 H(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 H(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 registration in a Faculty of Medicine graduate program. Consent of instructor is required for all other students.

Note: Open to Psychology graduate students and Psychiatry residents with consent of instructor.

Medical Science 623 H(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 H(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 instructor.

Medical Science 627 H(3-0)

Endocrinology
Normal endocrine physiology and biochemistry. Mechanisms and principles of departure from normal endocrine homeostasis.

627.03. Selected Topics in Advanced Endocrinology

Prerequisite(s): Zoology 597 or consent of the Faculty.

Medical Science 629 H(3-0)

Cardiovascular Dynamics
Includes topics such as basic physiologic mechanisms including excitation-contraction coupling, mechanics, energetics, and cardiovascular control; major diseases 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 H(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 H(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 equivalent or consent of the Faculty.

Medical Science 635 H(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. The course is open to health professionals and researchers, and to advanced undergraduate students in relevant disciplines.

Prerequisite(s): Consent of the Faculty.

Antirequisite(s): Credit for both Medical Science 635 and 645.14 will not be allowed.

Note: This course is open to health professionals and researchers, and to advanced undergraduate students in relevant disciplines.

Medical Science 637 H(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 on-line through Blackboard. 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 H(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 H(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.

639.01. Principles of Immunology

639.02. Cellular and Molecular

639.04. Inflammation

Prerequisite(s): Consent of the Faculty.

Medical Science 641 H(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 H(3-1/2)
(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 668 H(3-3)

Biotechnology Commercialization
Technology commercialization is the process of translating research results, scientific discoveries or processes and methods into a commercially useful and profitable product. Students will study the biotechnology commercialization process and will develop a mock-up i) starting with a new product or service idea, ii) carrying out the early stage development, iii) developing the necessary strategic and business plans, iv) securing adequate and appropriate financing, and v) marketing and selling the product. The primary deliverable will be the creation of a strategic plan for an innovative biotechnology product or service.

Prerequisite(s): Must be registered in the Biomedical Technology Graduate Program. Consent of the instructor(s) is required for all other students.

Medical Science 669 H(3S-3T)

Clinical Trials and Bio-manufacturing
The objective of this course is to provide general understanding and appreciation, regulatory requirements and ethical considerations around conducting clinical trials as well as bio-pharmaceutical manufacturing. An emphasis will be placed on regulatory obligations. The course will provide opportunities in writing protocols, clinical trial applications, auditing facilities and process validation.

Prerequisite(s): Must be registered in the Biomedical Technology Graduate Program. Consent of instructor(s) is required for all other students.

Medical Science 670 F(0-6)

Practicum in Biomedical Technology
A 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): Must be registered in 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 H(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 672 H(2-0)

Biotechnology Business Aspects
Aspects involved in taking an original scientific idea or discovery all the way to a start-up company

will be covered. Lecturers discuss commercialization, venture capital, business plan, patents and law, marketing.

Prerequisite(s): Must be registered in the Biomedical Technology Graduate Program. Consent of instructor(s) is required for all other students.

Medical Science 673 **H(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): Must be registered in the Biomedical Technology Graduate Program. Consent of instructor(s) is required for all other students.

Note: Admission to the Master of Biomedical Technology program is normally required for enrolment in this course.

NOT INCLUDED IN GPA

Medical Science 674 **F(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 Cell Biology of Diagnostic and Vaccine Development

Prerequisite(s): Must be registered in the Biomedical Technology Graduate Program. Consent of the instructor(s) is required for all other students.

Medical Science 675 **H(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 **H(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 **H(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 **H(1-3T-6)**

Project in Biomedical Technology
Students will conduct both business and laboratory-based projects throughout the year. The business-based aspect will include running a business, doing market research for companies or working with their business mentor. The laboratory-based aspect will include new diagnostics development and validation. This course will cover basic principles of project management as well as biotech lab theory and practical aspects covered via tutorials, journal club and laboratory sessions. There will be a combination of monthly meetings, lectures, lab tutorials, commercial technology reviews, tours, demos, and practical labs.

Prerequisite(s): Must be registered in the Biomedical Technology Graduate Program. Consent of the instructor(s) is required for all other students.

Medical Science 683 **H(3-0)**

The Biology and Therapy of Human Cancer
An examination and discussion of current knowledge of the molecular and cellular biology of human cancer and the scientific basis of cancer therapy. Offered in a modular format: each course will consist of one required module and two elective modules. Students can choose the elective modules from a list that is specific for each course. Modules will emphasize student presentations, critical evaluation, and discussions of current and seminal research papers on the module topic. Refer to the Southern Alberta Cancer Research Institute website at www.sacri.ucalgary.ca for more information.

683.01. Cancer Pathology, Epidemiology and Therapy

683.02. Molecular Mechanisms of Cancer

683.04. Cell Biology of Cancer

Prerequisite(s): Must be a Faculty of Medicine graduate student. All other students require consent of the instructor.

Medical Science 685 **H(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 **H(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

689.99. Medical Imaging Project

Prerequisite(s): Consent of the Faculty. Medical Science 689.01 should be taken prior to the advanced courses.

Note: Courses are open to interested graduate students in medicine, engineering, and science and to appropriately prepared undergraduate students enrolled in computer engineering, electrical engineering, and physics.

Medical Science 701 **H(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 **H(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 **H(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): Must be registered in the Faculty of Medicine graduate programs. All others will require consent of the instructor.

Medical Science 707 **H(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 **H(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 713 **H(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 **H(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): Must be registered in the Biochemistry and Molecular Biology Graduate Program. Consent of the instructor is required for all other students.

Medical Science 751 **H(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 **H(1-6)**

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 Faculty of Medicine.

MAY BE REPEATED FOR CREDIT

In addition to the numbered and titled courses shown above, the department may offer advanced level graduate courses specifically designed to meet the needs of individuals or small groups of students at the advanced doctoral level. These courses are numbered in the series 800.01 to 899.99. Such offerings are, of course, conditional upon the availability of staff resources.

Music MUSI

Instruction offered by members of Music in the School of Creative and Performing Arts in the Faculty of Arts.

Division Chair - W. Jordan

Graduate Courses

Music 611 **H(3-1)**
(formerly Music Theory and Composition 673)

Selected Topics in Theory and Composition

Various topics (master's level).

Prerequisite(s): Consent of the Division Chair, Music.

Music 613 **H(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.

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 615 **H(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.

Prerequisite(s): Consent of the Division Chair, Music.

Note: Required course for all PhD (Composition) students.

Music 621 **H(2-3)**
(formerly Music Performance 691)

Advanced Performance Practicum I

Applied instruction in instrument or voice.

Prerequisite(s): Consent of the Division Chair, Music.

Music 623 **H(2-3)**
(formerly Music Performance 693)

Advanced Performance Practicum II

Continuation of Music 621.

Prerequisite(s): Music 621 or Music Performance 691 or consent of the Division Chair, Music.

Music 625 **H(3-0)**
(formerly Music Performance 671)

Topics in Music Performance

Various topics such as applied music literature, applied pedagogy, accompanying, phonetics and others.

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 629 **H(0-3)**
(formerly Music Performance 657)

Studies at the Banff Centre

Advanced music studies.

Prerequisite(s): Consent of the Division Chair, Music.

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 **H(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.

Prerequisite(s): Consent of the Division Chair, Music.

Note: Required course for all MMus and MA (Musicology) students.

Music 633 **H(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.

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 637 **H(3S-0)**
(formerly Music History and Literature 603)

Pro-Seminar in Music for Graduate Students

Selected works of music from the middle ages to the present in an analytical and historical context.

Prerequisite(s): Consent of the Division Chair, Music.

Note: Required course for all MMus and MA (Musicology) students.

Music 641 **H(2-2)**
(formerly Music Theory and Composition 695)

Composition

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 645 **H(2S-2)**
(formerly Music Theory and Composition 691)

Composition Seminar

Prerequisite(s): Consent of the Division Chair, Music.

Music 651 **H(3-3)**
(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 **H(3-3)**
(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 **H(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.

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 711 **H(3-0)**
(formerly Music Theory and Composition 775)

Advanced Topics in Theory and Composition
Various topics (doctoral level).

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 733 **H(3-0)**
(formerly Music History and Literature 771)

Selected Topics in Musicology
Various topics in the field of Musicology (doctoral level).

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 741 **H(3-0)**
(formerly Music Theory and Composition 795)

Composition
Individual study in musical composition (doctoral level).

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music 751 **H(3-3)**
(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 **H(3-3)**
(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 **H(3-0)**
(formerly Music Theory and Composition 755)

Independent Study
Individual study in a selected area of music (doctoral level).

Prerequisite(s): Consent of the Division Chair, Music.

MAY BE REPEATED FOR CREDIT

Music Education MUED

Instruction offered by members of Music in the School of Creative and Performing Arts in the Faculty of Arts.

Division Chair – W. Jordan

Graduate Courses

Music Education 655 **H(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 **H(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 **H(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 **H(2-4)**

Practicum in School Music II
Continuation of Music Education 695.

Music Education 755 **H(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 **H(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

Instruction offered by members of Music in the School of Creative and Performing Arts in the Faculty of Arts.

Division Chair - W. Jordan

Students are cautioned that notwithstanding the given prerequisite, registration in any of the performing ensembles is subject to the approval of the ensemble director.

Graduate Courses

Music Performance 632 **F(2-3)**

Advanced Choral Conducting
Prerequisite(s): Consent of the Division Chair, Music.

Music Performance 634 **F(2-3)**

Advanced Instrumental Conducting
Prerequisite(s): Consent of the Division Chair, Music.

Music Performance 641 **H(0-4)**

Advanced Chamber Ensemble I
Intensive coaching in chamber ensembles.

Prerequisite(s): Consent of the Division Chair, Music.

Music Performance 643 **H(0-4)**

Advanced Chamber Ensemble II
Continuation of Music Performance 641.

Prerequisite(s): Music Performance 641 or consent of the Division Chair, Music.

Nursing NURS

Instruction offered by members of the Faculty of Nursing.

Note: The University of Calgary Bachelor of Nursing program is presently in a development stage and therefore the University reserves the right to make whatever changes are necessary to the content and the hours of instruction of individual Nursing courses in the program. Some of the Nursing course prerequisites and corequisites are waived for Bachelor of Nursing Accelerated Track students in order to accommodate block scheduling.

Note: Where applicable, Clinical Practice courses must be taken concurrently with the theoretical components.

Graduate Courses

Nursing 601 **H(3S-0)**

Seminar on Special Topics Related to Health Care and Nursing
Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Nursing 603 **H(156 hours)**

Independent Supervised Clinical Practicum
Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Nursing 605 **H(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 philosophi-

cally informed analysis of the knowledge practices activated during the conduct of nursing work.

Prerequisite(s): Consent of the Faculty.

Nursing 607 **H(39 hours)**

Independent Guided Study
Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Nursing 609 **H(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 analyse 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 **H(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.

Prerequisite(s): Consent of the Faculty.

Nursing 617 **H(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 621 **H(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 623 **H(3-0)**
(formerly Nursing 601.23)

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.

Prerequisite(s): Consent of the Faculty.

Nursing 627 **Q(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 629 **Q(18 hours)**

Evidence-Based 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 **H(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 healthcare 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 **F(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, analysing 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 **F(52S-180 within 6-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 equivalent, 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 **F(52S-180 within 6-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 **F(52S-180 within 6-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 **F(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 661 **H(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 663 **H(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 665 **H(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 683 **H(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 691 **H(2S-1T-12)**

Advanced Nursing Practice I
Application of advanced nursing knowledge to practice in student's area of specialty. Emphasis on applying and evaluating assessment and intervention skills for advanced practice with individuals, families, or communities. Beginning development of a conceptual framework for advanced nursing practice.

Prerequisite(s): Nursing 605 and 611.

Antirequisite(s): Not open to students with credit in Nursing 675.

Nursing 693 **H(2S-1T-12)**

Advanced Nursing Practice II
Extension and application of a conceptual framework for advanced practice in student's specialty area. Further clinical practice in assessments, interventions, and evaluation with individuals, families, or communities

Prerequisite(s): Nursing 691.

Nursing 695 **H(2S-1T-12)**

Advanced Nursing Practice III
Evaluation of how advanced nursing practice provides a new framework for leadership in the clinical and research areas. Development of strate-

gies whereby advanced nursing practice enables clients, their families and communities, including organizations and regions, to design innovative responses across the continuum of care.

Prerequisite(s): Nursing 693.

Nursing 701 **H(3-0)**

Doctoral Special Topics
Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Nursing 705 **H(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 **H(39 hours)**

Directed Study
Prerequisite(s): Consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Nursing 711 **H(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 **H(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 or equivalent.

Nursing 723 **H(3-0)**
(formerly Nursing 701.23)

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 **H(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 **H(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 **H(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 or equivalent.

Operations Management OPMA

Instruction offered by members of the Haskayne School of Business.

Operations Management Chairperson — A. Lehar

Graduate Courses

Operations Management 601 **H(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 715 **H(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 **H(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 743 **H(3-0)**

Simulation of Operational Systems
Computer simulation as a decision-making methodology for all areas of organizations. Topics include model development and validation, design of simulation experiments, generation of appropriate values of random variables, interactive procedures and interpretation of results. A user-oriented language is utilized and an applied project is carried out.

Prerequisite(s): Operations Management 601 and Management Studies 613.

Operations Management 745 **H(3-0)**

Operations Planning and Supply Chain Management
An in-depth treatment of inventory management and operations planning as related to supply chain management. Topics treated include commonly used inventory control systems, various extensions of the basic economic order quantity model, aggregate planning, materials requirement planning, production scheduling, just-in-time manufacturing, and managing materials along the supply chain. Case studies will be used as well as illustrations of spreadsheet modelling.

Prerequisite(s): Operations Management 601 and Management Studies 613.

Operations Management 797 **H(3S-0)**

Advanced Seminar in Operations Management
Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

Operations Management 799 **H(3S-0)**

Doctoral Seminars in Operations Management
799.01. Strategic Research Issues

799.02. Tactical Research Issues

799.03. Operational Research Issues

Philosophy PHIL

Instruction offered by members of the Department of Philosophy in the Faculty of Arts.

Department Head – A. Kazmi

Graduate Courses

With the exception of Philosophy 590 and Philosophy 595, courses numbered 500-599 may be taken for credit in the Graduate program in Philosophy. Details of the specific topics to be taught in all 600-level courses in Philosophy will be announced in the Department brochure and, when possible, in the Schedule of Classes.

Philosophy 601 **H(3-0)**

Seminar in Selected Problems
MAY BE REPEATED FOR CREDIT

Philosophy 603 **H(3-0)**

Graduate Proseminar

Philosophy 609 **H(3-0)**

Topics in the History of Philosophy
MAY BE REPEATED FOR CREDIT

Philosophy 623 **H(3-0)**
(formerly Philosophy 621)

Topics in Metaphysics
MAY BE REPEATED FOR CREDIT

Philosophy 627 **H(3-0)**

Topics in the Philosophy of Religion
MAY BE REPEATED FOR CREDIT

Philosophy 649 **H(3-0)**

Topics in Ethics
MAY BE REPEATED FOR CREDIT

Philosophy 653 **H(3-0)**

Topics in Social and Political Philosophy
MAY BE REPEATED FOR CREDIT

Philosophy 661 **H(3-0)**
(formerly Philosophy 663)

Topics in Epistemology
MAY BE REPEATED FOR CREDIT

Philosophy 667 **H(3-0)**

Topics in Philosophy of Science
MAY BE REPEATED FOR CREDIT

Philosophy 671 **H(3-0)**

Topics in Philosophical Logic and the Philosophy of Language
MAY BE REPEATED FOR CREDIT

Philosophy 679 **H(3-0)**

Topics in Logic
MAY BE REPEATED FOR CREDIT

Philosophy 683 **H(3-0)**
(formerly Philosophy 681)

Topics in the Philosophy of Mind
MAY BE REPEATED FOR CREDIT

Philosophy 691 **H(3-0)**

Topics in Philosophical Analysis
MAY BE REPEATED FOR CREDIT

Philosophy 695 **H(3-0)**

Graduate Directed Reading
MAY BE REPEATED FOR CREDIT

Physics PHYS

Instruction offered by members of the Department of Physics and Astronomy in the Faculty of Science.

Department Head - R.I. Thompson

Note: For listings of related courses, see Astronomy, Astrophysics, Medical Physics and Space Physics.

Students intending to register in any Physics course should read the relevant Faculty of Science Program section of this Calendar.

Physics 501 **H(3-0)**

Special 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; applications, primarily to relativistic electrodynamics.

Prerequisite(s): Physics 325 and 457; and one of Mathematics 353 or 377 or Applied Mathematics 309.

Physics 507 **H(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 **H(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 **H(3-0)**

Non-linear Dynamics
Topics: Introduction to non-linear dynamical systems: Phase space representation, non-linear oscillators, bifurcations, normal forms, pattern formation, amplitude equations, deterministic chaos, attractors, fractals, synchronization

Prerequisite(s): Applied Mathematics 433 and Physics 381 and 449 or consent of the Department

Physics 543 **H(3-0)**

Quantum Mechanics II
Theory of angular momentum and applications, perturbation theory and applications. Identical particles. Introduction to relativistic wave equations.

Prerequisite(s): Physics 443 or Chemistry 373.

Physics 561 **H(2-1)**

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 575 **H(3-3)**

Optics
Geometrical Optics: lenses, mirrors, and other basic optical components. Matrix Methods. Physical Optics: Interference, Diffraction, and Polarization. Fourier Optics. Modern Optics: Lasers and Fibre Optics.

Prerequisite(s): Physics 325 and 457 and Applied Mathematics 433.

Antirequisite(s): Credit will not be allowed for both Physics 575 and 471.

Physics 581 **H(3-3)**
(formerly Physics 535)

Computational Physics III
Solution of problems associated with the analysis of physical systems, using digital computers, high level programming languages, and mathematical computation systems (e.g., Maple, Macsyma).

Prerequisite(s): Physics 443 or Chemistry 373; and Physics 481 and 455.

Note: A knowledge of a high level programming language (C, C++, Fortran or Pascal) is highly recommended.

Physics 593 **H(3-0) or H(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 **H(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 325 and 497.

Physics 598 **F(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 **H(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: This course may be repeated once for credit.

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Physics 603 **H(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 **H(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 **H(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.

Note: It is expected that a student's background will include Physics 343 or equivalent.

Physics 611 **H(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.

Note: It is expected that a student's background will include Physics 449 or equivalent.

Physics 613 **H(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.

Note: It is expected that a student's background will include Physics 457 and 501 or equivalents.

Physics 615 **H(3-0)**

Advanced Quantum Mechanics I
Basic formalism of the theory and its interpretation, symmetry generators. Scattering theory. Bound states. Charged particles in electric and magnetic fields. Approximation methods.

Note: It is expected that a student's background will include Physics 543 or equivalent.

Physics 617 **H(3-0)**

Advanced Quantum Mechanics II
Second quantized description of N-particle systems. Quantum theory of the electromagnetic field, coherent states. Relativistic quantum mechanics.

Note: It is expected that a student's background will include Physics 543 or equivalent.

Physics 619 **H(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.

Note: It is expected that a student's background will include Physics 481 or its equivalent.

Physics 621 **H(3-0)**

Non-linear 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

Note: It is expected that a student's background will include Physics 451, 481 and 521 or equivalents.

Physics 629 **H(3-0)**

Gravitation
An introduction to Einstein's theory of gravitation. Applications to the solar system, black holes, and cosmology.

Note: It is expected that a student's background will include Physics 501 or equivalent.

Physics 663 (Geology 663) **H(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 **H(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 **H(3-0)**

Quantum and Non-linear Optics
Fundamentals of quantum and non-linear optics including atom-photon interactions, coherence, electromagnetically induced transparency, open systems and decoherence, and applications to quantum information technology.

Physics 675 **H(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 **H(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 **Q(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-need 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 **H(3-0) or H(0-6)**

Topics in Contemporary Physics
Topics will be from the research areas of staff members.

MAY BE REPEATED FOR CREDIT

Physics 699 **H(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 **H(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

Instruction offered by members of the Department of Biological Sciences in the Faculty of Science.

Department Head – R.M.R. Barclay

Senior Courses

Plant Biology 541 (formerly Botany 541) **H(3-3)**

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 (formerly Botany 543) **H(3-3)**

Plant Cell and Developmental Biology
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.

Note: Offered during odd-even dated academic years. Enrolment in this course may be limited. See Program Details in the Faculty of Science section of this Calendar.

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 **H(3-0)**

Current Topics in Plant Biology
Lectures, discussions and student seminars on topics of current interest in plant biology. Topics will include functional genomics, advances in

forward and reverse genetics, hormone signaling, plant-microbe and plant-environment interactions.

Note: Senior undergraduate students in the Botany program are strongly encouraged to register in this course.

MAY BE REPEATED FOR CREDIT

Plant Biology 645 (formerly Botany 645) **H(3-2S)**

Dynamic Aspects of Plant Ultrastructure
The ultrastructural and functional aspects of the cell, tissue, and organ systems of vascular plants. Analysis and interpretation of electron micrographs. Seminars on recent research development.

Note: Offered during even-odd dated academic years.

Plant Biology 745 (formerly Botany 745) **H(0-6)**

Plant Biology Microtechniques
Principles and practice of preparation of plant tissues for light microscope study. Plastic embedding techniques, histochemistry, immunohistochemistry, quantitative cytochemistry, fluorescence microscopy, confocal laser scanning microscopy and photomicroscopy are included.

Note: Offered during odd-even dated academic years.

Political Science POLI

Instruction offered by members of the Department of Political Science in the Faculty of Arts.

Department Head – B. O'Neill

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 **H(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 both Political Science 605 and 505 will not be allowed.

Political Science 615 **H(3S-0)**

Advanced History of Political Thought
An intensive study of selected major political thinkers within the history of political thought.

Political Science 617 **H(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 **H(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 **H(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 **H(3-0)**

Canadian Political Process
Examination of Canadian political behaviour within its institutional context, including political parties, interest groups, voting and socialization. Computer use is optional.

Political Science 631 **H(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 **H(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 **H(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 **H(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 **H(3-0)**

Policy Studies
Critical review of major themes, issues, and approaches in the study and evaluation of public policy.

Political Science 653 **H(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 671 **H(3-0)**

Advanced Comparative Politics: Political Development
Analysis of comparative methods and paradigms of political development.

Political Science 673 **H(3-0)**

Advanced Comparative Politics: Institutions and Systems
Comparative analysis of political institutions and systems.

Political Science 675 **H(3-0)**

Selected Topics in Advanced Comparative Politics
Selected regions and topics in Comparative Politics.

MAY BE REPEATED FOR CREDIT

Political Science 681 **H(3-0)**

Advanced Analysis of International Relations
Selected issues and approaches in the analysis of world politics.

Political Science 683 **H(3-0)**

Advanced Studies in Foreign Policy
Selected themes in the formation and implementation of foreign policies.

Political Science 684 **H(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 both Political Science 684 and 571 will not be allowed.

Political Science 685 **H(3-0)**

Strategic Studies
Advanced seminar in major topics in strategic studies, such as arms control, deterrence, and other military doctrines.

Political Science 687 **H(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 both Political Science 687 and 523 will not be allowed.

Political Science 689 **H(3-0)**

Unconventional Warfare
Analysis of warfare conducted by, or against, substate groups. This may include in-depth studies of guerrilla warfare, asymmetric conflict, or terrorism.

Political Science 691 **H(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 **H(3-0)**

Advanced Quantitative Analysis in Political Science
Examination of empirical research methods and techniques of multivariate quantitative analysis in the study of political phenomena.

Prerequisite(s): Political Science 691 or consent of the Department.

Political Science 699 **H(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 or consent of the Department.

Political Science 715 **H(3-0)**

Special Topics in Political Theory
MAY BE REPEATED FOR CREDIT

Political Science 721 **H(3-0)**

Special Topics in Canadian Politics
MAY BE REPEATED FOR CREDIT

Political Science 723 **H(3-0)**

Special Topics in Political Science
MAY BE REPEATED FOR CREDIT

Political Science 725 **H(3-0)**

Special Topics in Public Administration
MAY BE REPEATED FOR CREDIT

Political Science 741 **H(3-0)**

Special Topics in Public Law
MAY BE REPEATED FOR CREDIT

Political Science 755 **H(3-0)**

Special Topics in Public Policy
MAY BE REPEATED FOR CREDIT

Political Science 781 **H(3-0)**

Special Topics in International Relations
MAY BE REPEATED FOR CREDIT

Political Science 791 **H(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

Each year, depending on the needs of students, a number of 600- and 700-level graduate courses are offered from the foregoing list. In addition to the numbered and titled courses shown above, the Department offers a selection of advanced level graduate courses specifically designed to meet the needs of individuals or small groups of students. These courses are numbered in the series 800.01 to 899.99. Such offerings are, however, contingent upon the availability of staff resources.

Psychology PSYC

Instruction offered by members of the Department of Psychology in the Arts.

Department Head - D.C. Hodgins

Graduate Courses

Psychology 601 **H(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 **H(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 **H(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 **H(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 **H(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 **H(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 **H(3-3)**

Special Topics in the Design of Psychological Research
Prerequisite(s): Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 620 **H(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 630 **H(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 **H(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 **H(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 **F(1S-0)**

Research Seminar in Clinical Psychology
An introduction to research and design issues in clinical psychology.

Note: Open only to students enrolled in the Clinical Psychology program.

MAY BE REPEATED FOR CREDIT

Psychology 651 **H(3-0)**

Psychopathology
Current theory, issues, and research regarding the epidemiology, etiology, diagnosis, and prognosis of psychopathology. Implications for assessment and treatment.

Psychology 659 **H(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.

Note: Open only to students enrolled in the Clinical Psychology program.

Psychology 660 **F(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.

Note: Open only to students enrolled in the Clinical Psychology program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Psychology 671 **H(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.

Note: Open only to students enrolled in the Clinical Psychology program.

Psychology 673 **H(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.

Note: Open only to students enrolled in the Clinical Psychology program.

Psychology 681 **H(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.

Note: Open only to students enrolled in the Clinical Psychology program.

Psychology 683 **H(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.

Note: Open only to students enrolled in the Clinical Psychology program.

Psychology 700 **H(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 **H(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 **H(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 **H(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 **F(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 **F(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 **F(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 **H(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 **H(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 **H(3S-0)**

Seminar in Industrial/Organizational Psychology
Application of psychological principles and methods to business, industry and other organizational settings.

Prerequisite(s): Psychology 639 or consent of the Department.

MAY BE REPEATED FOR CREDIT

Psychology 750 **Q(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

Note: Open only to students enrolled in the Clinical Psychology program.

NOT INCLUDED IN GPA

Psychology 751 **H(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 **F(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.

Note: Open only to students enrolled in the Clinical Psychology program.

NOT INCLUDED IN GPA

Psychology 762 **F(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.

Note: Open only to students enrolled in the Clinical Psychology program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Psychology 765 **H(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.

Note: Open only to students enrolled in the Clinical Psychology 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.

Note: Open only to students enrolled in the Clinical Psychology program.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Public Policy PPOL

Instruction offered by members of the School of Public Policy and individual faculties.

Public Policy 601 **H(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 above.

NOT INCLUDED IN GPA

Public Policy 603 **H(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 **H(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 **H(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 **H(3-0)**

Decision Analysis
Students learn to apply quantitative methods including cost-benefit analysis, statistical and econometric analysis of policy-relevant data, survey design and interpretation, and formal policy models based on decision theory.

Public Policy 611 **H(3-0)**

Independent Study
Supervised individual study in a selected public policy area.

MAY BE REPEATED FOR CREDIT

Public Policy 613 **H(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 **H(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 **H(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 **H(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 **H(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, on-line 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 **H(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 with input provided by an expert from the private sector or public sector.

Pure Mathematics PMAT

Instruction offered by members of the Department of Mathematics and Statistics in the Faculty of Science.

Department Head - M. Lamoureux

Note: For listings of related courses, see Actuarial Science, Applied Mathematics, Mathematics, and Statistics.

Pure Mathematics 503 **H(3-0)**

Topics in Mathematics
According to interests of students and instructor.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Pure Mathematics 505 **H(3-0)**

Topology I
Basic point set topology: metric spaces, separation and countability axioms, connectedness and compactness, complete metric spaces, function spaces, homotopy.

Prerequisite(s): Pure Mathematics 435 or 455 or Mathematics 335 or 355; or consent of the Department.

Pure Mathematics 511 **H(3-0)**

Algebra III
Linear algebra: Modules, direct sums and free modules, tensor products, linear algebra over modules, finitely generated modules over PIDs, canonical forms, computing invariant factors from presentations; projective, injective and flat modules.

Prerequisite(s): Pure Mathematics 431 or Mathematics 411; or consent of the Department.

Antirequisite(s): Credit for both Pure Mathematics 511 and 611 will not be allowed.

Note: Pure Mathematics 431 is recommended.

Pure Mathematics 513 **H(3-0)**

Advanced Galois Theory
Existence of separable and algebraic closures of fields, infinite Galois extensions, profinite groups, Krull topology.

Prerequisite(s): Pure Mathematics 431.

Antirequisite(s): Credit for both Pure Mathematics 513 and 613 will not be allowed.

Pure Mathematics 527 **H(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): Pure Mathematics 427 or 429.

Antirequisite(s): Credit for both Pure Mathematics 527 and 627 will not be allowed.

Pure Mathematics 529 **H(3-0)**

Advanced Cryptography and Cryptanalysis
Cryptography based on quadratic residuacity. Advanced techniques for factoring and extracting discrete logarithms. Hyperelliptic curve cryptography. Pairings and their applications to cryptography. Code-based and lattice-based cryptography. Additional topics may include provable security, secret sharing, more post-quantum cryptography, and new developments in cryptography.

Prerequisite(s): Pure Mathematics 429.

Antirequisite(s): Credit for both Pure Mathematics 529 and 649 will not be allowed.

Pure Mathematics 571 **H(3-0)**

Discrete Mathematics
Discrete aspects of convex optimization; computational and asymptotic methods; graph theory and the theory of relational structures; according to interests of students and instructor.

Prerequisite(s): Pure Mathematics 471.

Antirequisite(s): Credit for both Pure Mathematics 571 and 671 will not be allowed.

Graduate Courses

Note: Students are urged to make their decisions as early as possible as to which graduate courses they wish to take, since not all these courses will be offered in any given year.

Pure Mathematics 603 **H(3-0)**

Conference Course in Pure Mathematics
This course is offered under various subtitles. Consult Department for details.

MAY BE REPEATED FOR CREDIT

Pure Mathematics 607 **H(3-0)**

Topology II
Fundamental groups: covering spaces, free products, the van Kampen theorem and applications; homology.

Prerequisite(s): Pure Mathematics 505 or consent of the Department.

Pure Mathematics 611 **H(3-0)**

Algebra III
Linear algebra: modules, direct sums and free modules, tensor products, linear algebra over modules, finitely generated modules over PIDs, canonical forms, computing invariant factors from presentations; projective, injective and flat modules.

Prerequisite(s): Pure Mathematics 431 or Mathematics 411; or consent of the Department. Pure Mathematics 431 is recommended.

Antirequisite(s): Credit for both Pure Mathematics 511 and 611 will not be allowed.

Pure Mathematics 613 **H(3-0)**

Advanced Galois Theory
Existence of separable and algebraic closures of fields, infinite Galois extensions, profinite groups, Krull topology.

Prerequisite(s): Pure Mathematics 431.

Antirequisite(s): Credit for both Pure Mathematics 613 and 513 will not be allowed.

Pure Mathematics 621 **Q(2S-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 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.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Pure Mathematics 627 **H(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): Pure Mathematics 427 or 429; or consent of the Department.

Antirequisite(s): Credit for both Pure Mathematics 527 and 627 will not be allowed.

Pure Mathematics 629 (Computer Science 629) **H(3-0)**

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 efficient implementation of point addition. Applications to cryptography will be discussed, including elliptic curve-based Diffie-Hellman key exchange, El Gamal encryption, and digital signatures, as well as the associated computational problems on which their security is based.

Prerequisite(s): Pure Mathematics 315 or consent of the Department.

Pure Mathematics 649 **H(3-0)**

Advanced Cryptography and Cryptanalysis
Cryptography based on quadratic residuacity. Advanced techniques for factoring and extracting discrete logarithms. Hyperelliptic curve cryptography. Pairings and their applications to cryptography. Code based and lattice based cryptography. Additional topics may include provable security, secret sharing, more post-quantum cryptography, and new developments in cryptography.

Prerequisite(s): Pure Mathematics 429 or consent of the Department.

Antirequisite(s): Credit for both Pure Mathematics 529 and 649 will not be allowed.

Pure Mathematics 669 (Computer Science 669) **H(3-0)**

Cryptography
An overview of the basic techniques in modern cryptography, with emphasis on fit-for-application primitives and protocols. Topics include symmetric and public-key cryptosystems; digital signatures; elliptic curve cryptography; key management; attack models and well-defined notions of security.

Prerequisite(s): Consent of the Department.

Note: Computer Science 413 and Mathematics 321 are recommended as preparation for this course. Students should not have taken any previous courses in cryptography.

Pure Mathematics 671 **H(3-0)**

Discrete Mathematics
Discrete aspects of convex optimization; computational and asymptotic methods; graph theory and the theory of relational structures; according to interests of students and instructor.

Prerequisite(s): Pure Mathematics 471.

Antirequisite(s): Credit for both Pure Mathematics 671 and 571 will not be allowed.

Religious Studies RELS

Instruction offered by members of the Department of Religious Studies in the Faculty of Arts.

Department Head – V. Tumasz

Graduate Courses

Religious Studies 601 **H(3-0)**

Studies in Western Religions
MAY BE REPEATED FOR CREDIT

Religious Studies 603 **H(3-0)**

Studies in Eastern Religions
MAY BE REPEATED FOR CREDIT

Religious Studies 605 **H(3-0)**

Studies in the Nature of Religion
MAY BE REPEATED FOR CREDIT

Religious Studies 607 **H(0-3T)**

Supervised Master's Thesis Inquiry

Religious Studies 609 **H(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 **H(3-0)**

Specialized Studies in Western Religions
MAY BE REPEATED FOR CREDIT

Religious Studies 683 **H(3-0)**

Specialized Studies in Eastern Religions
MAY BE REPEATED FOR CREDIT

Religious Studies 685 **H(3-0)**

Specialized Studies in the Nature of Religion
MAY BE REPEATED FOR CREDIT

Religious Studies 701 **H(3-0)**

Studies in Western Religions
MAY BE REPEATED FOR CREDIT

Religious Studies 703 **H(3-0)**

Studies in Eastern Religions
MAY BE REPEATED FOR CREDIT

Religious Studies 705 **H(3-0)**

Studies in the Nature of Religion
MAY BE REPEATED FOR CREDIT

Religious Studies 707 **H(3-0)**

PhD Departmental Colloquium
MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Religious Studies 709 **H(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

Instruction offered by members of the Haskayne School of Business.

Risk Management and Insurance Chairperson — A. Lehar

Graduate Courses

Risk Management and Insurance 763 (formerly Finance 763) **H(3-0)**

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.

Social Work SOWK

Instruction offered by members of the Faculty of Social Work.

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 621 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 625 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 627 **H(3S-0)**

Practice with Organizations and Communities
A basic understanding of social work practice theory with respect to work with organizations and communities.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 629 **H(3S-0)**

Professional Communication and Interviewing
Offers experiential learning aimed at developing basic professional competencies and practice skills along with critical self-reflection.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 632 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 633 **H(426 hours-2T)**

Foundational Field Practicum
Direct and indirect social work practice opportunities with professional supervision.

Note: Restricted to Social Work MSW students or consent of the Faculty.

NOT INCLUDED IN GPA

Social Work 637 **H(3S-0)**

Human Behaviour in the Environment
Human development and diversity within a social work context.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 641 **H(3S-0)**

Models of Practice
Provides the conceptual and theoretical foundation for students to acquire the skills to practice in Social Work.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 645 **H(3S-0)**

Issues in Social Work Research
An overview of social work research topics and issues.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 651 **H(3S-0)**

Policy as Context for Clinical Work
Policies and their impacts on the delivery of clinical work will be examined.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 653 **H(3S-0)**

Comparative Approaches to Change
Various clinical change applications will be examined and critiqued.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 655 **H(3S-0)**

Thesis Research
An introduction to preparing a thesis proposal.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 657 **H(3S-0)**

Clinical Social Work Applications
Specific issues involved in the effective application of clinical approaches will be studied.

Prerequisite(s): Social Work 653.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 659 **H(3S-0)**

Evidence and Clinical Practice
Research as utilized in the clinical arena will be the focus of this course.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 665 **H(3S-0)**

Influencing Policy Development
The focus of this course is leadership in policy practice and in particular policy advocacy at all levels of policy (i.e., organizational, community, and provincial or national levels).

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 667 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 669 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 671 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 673 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 675 **H(3S-0)**

Advanced International Social Work Modules
This set of modules will give students tools for social change.

Prerequisite(s): Social Work 673.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 677 **H(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

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 679 **H(3S-0)**

Special Topics Seminar I
Selected topics related to area of specialization or interest.

Note: Restricted to Social Work MSW students or consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Social Work 682 **E(3S-0)**

Special Seminar II
Selected topics related to an area of specialization or interest.

Note: Restricted to Social Work MSW students or consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Social Work 693 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 695 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 696 **F(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): Consent of the Faculty.

Note: Restricted to Social Work MSW students or consent of the Faculty.

NOT INCLUDED IN GPA

Social Work 697 **H(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.

Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 699 **H(3S-0)**

Special Topics Seminar II
Advanced selected topics related to area of specialization or interest.

Note: Restricted to Social Work MSW students or consent of the Faculty.

MAY BE REPEATED FOR CREDIT

Social Work 721 **H(2S-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.

Note: Restricted to Social Work PhD students. Social Work 721 can only be taken once all other required courses have been completed.

Social Work 741 **H(2S-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.

Note: Restricted to Social Work PhD students. PhD students from other disciplines may register with consent of the Faculty.

Social Work 743 **H(2S-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 in emphasized.

Note: Restricted to Social Work PhD students. PhD students from other disciplines may register with consent of the Faculty.

Social Work 745 **H(2S-0)**

Research Methods I: Quantitative
Quantitative methodological and design options in social work research.

Note: Restricted to Social Work PhD students. PhD students from other disciplines may register with consent of the Faculty.

Social Work 747 **H(2S-0)**

Research Methods II: Qualitative
Qualitative methodological and design options in social work research.

Note: Restricted to Social Work PhD students. PhD students from other disciplines may register with consent of the Faculty.

Social Work 749 **H(2S-0)**

Quantitative Data Analysis
Statistical analysis of quantitative data.

Note: Restricted to Social Work PhD students. PhD students from other disciplines may register with consent of the Faculty.

Social Work 799 **H(3S-0)**

Special Topics Seminar
Advanced selected topics related to the PhD focus area.

Note: Restricted to Social Work PhD students.

MAY BE REPEATED FOR CREDIT

Sociology SOCI

Instruction offered by members of the Department of Sociology in the Faculty of Arts.

Department Head – E.G. Van Brunschot

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Sociology 601 **H(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 **F(3/2S-0)**

Master's Seminar in Professional Sociology
NOT INCLUDED IN GPA

Sociology 603 **H(3S-0)**

Seminar in Sociology of Health and Illness
Prerequisite(s): Consent of the Department.

Sociology 611 **H(3S-3)**

Social Statistics: The General Linear Model
Multiple regression and correlation with applications to sociological research; regression diagnostics; extensions of linear regression such as non-linear models, analysis of variance, analysis of covariance, and causal modelling.

Prerequisite(s): Consent of the Department. (Sociology 311 and 315 normally required.)

Sociology 613 **H(3S-2)**

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 or consent of the Department.

Sociology 615 **H(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 or consent of the Department. Sociology 413 is recommended.

Sociology 625 **H(3S-0)**

Seminar on Deviant Behaviour
Prerequisite(s): Sociology 325 or consent of the Department.

Sociology 631 **H(3S-0)**

Seminar in Sociological Theory
Prerequisite(s): Sociology 331 and 333 or equivalents; or consent of the Department.

Sociology 653 **H(3S-0)**

Seminar on Urban Sociology
Prerequisite(s): Sociology 353 or consent of the Department.

Sociology 667 **H(3S-0)**

Seminar on Ethnic Relations
Prerequisite(s): Sociology 375 or consent of the Department.

Sociology 671 **H(3S-0)**

Seminar on the Sociology of Families
Prerequisite(s): Sociology 471 or consent of the Department.

Sociology 677 **H(3S-0)**

Seminar in Sociology of Gender Relations
Prerequisite(s): Consent of the Department.

Sociology 699 **Q(0-3)**

Special Topics in Sociology
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 701 **H(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 **F(3/2S-0)**

Doctoral Seminar in Professional Sociology
Prerequisite(s): Consent of the Department.

NOT INCLUDED IN GPA

Sociology 705 **Q(3S-0)**

Selected Topics in Advanced Methodological Issues
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 711 **Q(3S-3)**

Selected Topics in Advanced Quantitative Methods
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 715 **Q(3S-0)**

Selected Topics in Advanced Qualitative Methods
Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Sociology 731 **H(3S-0)**

Doctoral Seminar in Sociological Theory
Prerequisite(s): Consent of the Department.

Software Engineering SENG

Instruction offered by members of the Department of Computer Science in the Faculty of Science and the Department of Electrical and Computer Engineering in the Schulich School of Engineering.

Computer Science Department Head - C. Williamson

Electrical and Computer Engineering Department Head - D. Westwick

Registration in each course requires the consent of the Department teaching the course.

Graduate Courses

Software Engineering 605 **Q(3-1)**

Industrial Topics in Software Engineering
A study of practical approaches of industrial relevance to students specializing in Software Engineering.

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 607 H(3-1)

Special Topics in Software Engineering
A study of problems of particular interest to students specializing in Software Engineering.

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 609 Q(3-1)

Special Topics in Software Engineering
A study of problems of particular interest to students specializing in Software Engineering.

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 611 Q(3-1)

Requirements Engineering I
The elicitation, modelling, expression, and validation of requirements.

Software Engineering 615 H(3-1)

Agile Software Engineering
Investigation and application of agile software development practices.

Antirequisite(s): Credit for both Software Engineering 615 and Computer Science 601.93 will not be allowed.

Note: Students are expected to have some background in software development as preparation for this course.

Software Engineering 622 H(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 systematics process trying to optimize resources available towards the functionality most requested by customers and stakeholders.

Antirequisite(s): Credit for both Software Engineering 622 and 607.25 will not be allowed.

Software Engineering 627 H(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.

Antirequisite(s): Credit for both Software Engineering 627 and 625 will not be allowed.

Software Engineering 629 Q(3-0)
(formerly Software Engineering 609.17)

Software Engineering Standards and Models
Formal description of algorithms for current software engineering standards and models. Trends and future development in software engineering standardization.

Software Engineering 637 H(3-2)

Dependability and Reliability of Software Systems
Principles of software dependability techniques, and techniques to improve and predict software reliability.

Antirequisite(s): Credit for both Software Engineering 637 and 521 will not be allowed.

Note: Engineering 319, Software Engineering 511, and Software Engineering 437 or 421, or their equivalents, are recommended as preparation for this course.

Software Engineering 639 H(3-0)
(formerly Software Engineering 607.22)

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.

Note: Software Engineering 437 or equivalent is recommended as preparation for this course.

Software Engineering 641 H(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 both Software Engineering 641 and 541 will not be allowed.

Note: Software Engineering 301 or Computer Science 301 or equivalents are recommended as preparation for this course.

Software Engineering 651 H(3S-0)

Half-Course Project
A project in either software development or software best practice and experience.

Antirequisite(s): Credit for both Software Engineering 651 and 652 will not be allowed.

Note: This course is only available to students registered in the course-based MSc in Computer Science with the Software Engineering Specialization. Students should register for this course in the semester when they will complete it.

Software Engineering 652 F(3S-0)

Full-Course Project
A project in either software development or software best practice and experience.

Antirequisite(s): Credit for both Software Engineering 652 and either 651 or Electrical Engineering 698 will not be allowed.

Note: This course is only available to students registered in the course-based MSc in Computer Science with the Software Engineering Specialization or to MEng students with a specialization in Software Engineering. Students should register for this course in the semester when they will complete it.

Software Engineering 697 Q(3-0)
(formerly Software Engineering 609.22)

Agent-Based Software Engineering
Principles and practices of engineering agent-based software systems.

Antirequisite(s): Credit for both Software Engineering 697 and Computer Science 609 will not be allowed for programs offered by the Department of Computer Science.

Software Engineering for Engineers ENSF

Instruction offered by members of the Department of Electrical and Computer Engineering in the Schulich School of Engineering.

Department Head – D. Westwick

Associate Heads – M. Potter (Undergraduate), A. Fapojuwo (Graduate)

Director of Undergraduate Program for Electrical and Computer Engineering – N. Bartley

Director of Undergraduate Program for Software Engineering – D. Krishnamurthy

Graduate Courses

Registration in all courses requires the approval of the Department of Electrical and Computer Engineering.

Software Engineering for Engineers 602 H(3-1)
(formerly Software Engineering for Engineers 619.71)

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.

Prerequisite(s): Objected-Oriented Programming (C++ or equivalent).

Software Engineering for Engineers 603 H(3-1)

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 both Software Engineering 603 and 619.02 will not be allowed.

Software Engineering for Engineers 604 H(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 both Software Engineering for Engineers 604 and Software Engineering 609.19 will not be allowed.

Software Engineering for Engineers 619 H(3-1)

Special Topics Half Course
A study of problems of particular interest to students specializing in Software Engineering.

Note: Consult Department of Electrical and Computer Engineering for details regarding offerings in the upcoming academic year.

MAY BE REPEATED FOR CREDIT

Space Physics SPPH

Instruction offered by members of the Department of Physics and Astronomy in the Faculty of Science.

Department Head - R.I. Thompson

Note: For listings of related courses, see Astronomy, Astrophysics, Medical Physics and Physics.

Graduate Course

Space Physics 671 **H(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

Instruction offered by members of the Department of French, Italian and Spanish in the Faculty of Arts.

Undergraduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Spanish 533 **H(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, 407, 421 and 423, or consent of the Department.

Spanish 553 **H(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, 407, 421 and 423, or consent of the Department.

MAY BE REPEATED FOR CREDIT

Spanish 555 **H(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, 407, 421 and 423, or consent of the Department.

Spanish 557 **H(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, 407, 421 and 423, or consent of the Department.

Spanish 563 **H(3-0)**

Medieval Literature
Representative works of literature in the Spanish language from the tenth to the fifteenth centuries. Format and content of course may vary from year to year.

Prerequisite(s): Spanish 405, 407, 421 and 423, or consent of the Department.

Antirequisite(s): Not for credit with Spanish 565.

Spanish 567 **H(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, 407, 421 and 423, or consent of the Department.

Antirequisite(s): Not for credit with Spanish 565.

Spanish 571 **H(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, 407, 421 and 423, or consent of the Department.

Spanish 573 **H (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 latinomericano, New cinemas, etc.). Use of contemporary theories and study of cinematographic techniques.

Prerequisite(s): Spanish 405, 407, 421, and 423 or consent of the Department.

Spanish 581 **H(3-0)**
(formerly Spanish 481)

Spanish Literature and Culture from the 18th Century to the Spanish Civil War
Survey of major works and cultural movements from the 18th century to the early 20th century. Focus on reading and analytical skills. Format and content of the course may vary from year to year.

Prerequisite(s): Spanish 405, 407, 421 and 423, or consent of the Department.

Spanish 583 **H(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 sociopolitical background. Format and content of course may vary from year to year.

Prerequisite(s): Spanish 405, 407, 421 and 423, or consent of the Department.

Spanish 593 **H(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, 407, 421 and 423, or consent of the Department.

Note: This course is mandatory for students registered in the Spanish Honours Program.

MAY BE REPEATED FOR CREDIT

Spanish 598 **F(0-3T)**

Honours Thesis
Corequisite(s): Spanish 593 and consent of the Department.

Note: Restricted to Spanish Honours students. The thesis must be written in Spanish.

Spanish 599 **H(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, 407, 421 and 423, or consent of the Department.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Note: The Department will give graduate credit for 500-level courses in cases it deems exceptional. This option is subject to the approval of the Department. Graduate students taking a 500-level course for graduate credit will be asked to complete additional requirements.

Spanish 601 **H(3-0)**

Literary and Cultural Theory
MAY BE REPEATED FOR CREDIT

Spanish 613 **H(3-0)**

Critical Analysis of Medieval Texts
MAY BE REPEATED FOR CREDIT

Spanish 615 **H(3-0)**

Golden Age Literature
MAY BE REPEATED FOR CREDIT

Spanish 617 **H(3-0)**

Theatre and Performance in the 19th or 20th Centuries
MAY BE REPEATED FOR CREDIT

Spanish 619 **H(3-0)**

Post-Franco Literature, Art and Film
MAY BE REPEATED FOR CREDIT

Spanish 621 **H(3-0)**

Art, Film and Literature in the Spanish Avant-Garde
MAY BE REPEATED FOR CREDIT

Spanish 623 **H(3-0)**

Spanish American Literature and Culture to 1900
MAY BE REPEATED FOR CREDIT

Spanish 625 **H(3-0)**

20th Century Spanish American Literature
MAY BE REPEATED FOR CREDIT

Spanish 627 **H(3-0)**

Avant-Garde Movements in Spanish America
MAY BE REPEATED FOR CREDIT

Spanish 631 **H(3-0)**

Popular Culture
MAY BE REPEATED FOR CREDIT

Spanish 633 **H(3-0)**

Writings in Exile
MAY BE REPEATED FOR CREDIT

Spanish 635 **H(3-0)**

Literature and the Visual Arts in Hispanic Culture
MAY BE REPEATED FOR CREDIT

Spanish 637 **H(3-0)**

Identities and Post-Colonial Voices
MAY BE REPEATED FOR CREDIT

Spanish 639 **H(3-0)**

Hispanic Female Voices
MAY BE REPEATED FOR CREDIT

Spanish 641 **H(3-0)**

Hispanic Cinema
MAY BE REPEATED FOR CREDIT

Spanish 643 **H(3-0)**

Special Topics in Hispanic Culture, Language or Literature
MAY BE REPEATED FOR CREDIT

Statistics STAT

Instruction offered by members of the Department of Mathematics and Statistics in the Faculty of Science.

Department Head - M. Lamoureux

Undergraduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Statistics 505 **H(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 or consent of the Department.

Statistics 507 **H(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): Mathematics 321 or Statistics 321.

Statistics 517 **H(3-1)**

Practice of Statistics
This is 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): At least two of Statistics 423, 425, 429 and 505; or consent of the Department.

Antirequisite(s): Not open to students with Statistics 513 or 515.

Statistics 519 **H(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 or Mathematics 323; and Mathematics 267 or 277 or 353 or 381; or consent of the Department.

Note: Completion of Statistics 421 is highly recommended as preparation for this course.

Statistics 523 **H(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 or Mathematics 323; and Mathematics 353 or 381; or consent of the Department.

Note: May not be offered every year. Consult the department for listings.

Statistics 525 **H(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 or consent of the Department.

Note: May not be offered every year. Consult the department for listings. Completion of Mathematics 311 or 313 is highly recommended as preparation for this course.

Statistics 529 **H(3-1)**

Special Topics in Applied Statistics
Content of the course will vary from year to year. Consult the Statistics Department for information on choice of topics.

Prerequisite(s): Consent of the Department.

MAY BE REPEATED FOR CREDIT

Statistics 531 **H(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 or Mathematics 323; and Mathematics 267 or 277 or 353 or 381; or consent of the Department.

Statistics 533 **H(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 or Mathematics 323.

Graduate Courses

Note: Some 500- and 600-level statistics courses may have concurrent lectures. Extra work in these courses (e.g., extra assignments, advanced examination questions, a term project) will be required for credit at the 600 level.

Statistics 601 **H(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.

MAY BE REPEATED FOR CREDIT

Statistics 603 **H(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.

Statistics 619 **H(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.

Statistics 621 **Q(2S-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 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.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Statistics 625 **H(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.

Statistics 633 H(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.

Statistics 635 H(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.

Statistics 637 H(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 DEs; graphical summaries of inference regions; curvature measures.

Statistics 639 H(3-0)

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

Statistics 701 H(3-0)

Theory of Probability I

Statistics 703 H(3-0)

Theory of Probability II

Statistics 721 H(3-0)

Theory of Estimation

Statistics 723 H(3-0)

Theory of Hypothesis Testing

Statistics 761 H(3-0)

Stochastic Processes I
In addition to the numbered and titled courses shown above, the department offers a selection of advanced level graduate courses specifically designed to meet the needs of individuals or small groups of students at the advanced doctoral level. These courses are numbered in the series 800.01 to 899.99. Such offerings are, of course, conditional upon the availability of staff resources.

Strategic Studies STST

Instruction offered by members of the Faculty of Arts.

Graduate Co-ordinator – J. Keeley

Graduate Courses

Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Strategic Studies 601 (4.5 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 (4.5 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 H(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): Open only to Military and Strategic Studies graduate students.

NOT INCLUDED IN GPA

Strategic Studies 609 H(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 H(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 H(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.

Note: Credit for both Strategic Studies 613 and History 520 will not be allowed

Strategic Studies 649 H(3S-0)

Special Topics in Military and Strategic Studies
MAY BE REPEATED FOR CREDIT

Strategic Studies 651 H(3-0)

Reading Seminar
Prerequisite(s): Permission of the Graduate Co-ordinator.

MAY BE REPEATED FOR CREDIT

Strategic Studies 653 H(3-0)

Research Seminar
Prerequisite(s): Permission of the Graduate Co-ordinator.

MAY BE REPEATED FOR CREDIT

Strategic Studies 655 H(3-0)
(formerly History 655)

Classics of Strategy
Strategic thought from Sun Tzu to Clausewitz, Mahan to Corbett. Analyses 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 H(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 H(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 H(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 H(3S-0)

War – 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 H(3-0)

Reading Seminar
Prerequisite(s): Permission of the Graduate Co-ordinator.

MAY BE REPEATED FOR CREDIT

Strategic Studies 753 H(3-0)

Research Seminar
Prerequisite(s): Permission of the Graduate Co-ordinator.

MAY BE REPEATED FOR CREDIT

Strategy and Global Management SGMA

Instruction offered by members of the Haskayne School of Business.

Strategy and Global Management Chairperson — T. Bryant

Graduate Courses

Strategy and Global Management 601 H(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 both Strategy and Global Management 601 and 701 will not be allowed.

Strategy and Global Management 725 H(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): Management Information Systems 725.

Strategy and Global Management 751 H(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 H(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 H(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 H(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 797 H(3S-0)

Advanced Seminar in Strategy and Global Management
Prerequisite(s): Consent of the Haskayne School of Business.

MAY BE REPEATED FOR CREDIT

PhD Course

Strategy and Global Management 799 H(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

Sustainable Energy Development SEDV

Instruction offered by members of the Faculties of Environmental Design, Law, Schulich School of Engineering and the Haskayne School of Business.

Note: The following courses are taught at the Universidad San Francisco de Quito (USFQ) campus in Quito, Ecuador and at the University of Calgary. Enrolment is limited to students admitted to the MSc in Sustainable Energy Development program, or approved by the Director, Sustainable Energy Development Program.

Graduate Courses

Sustainable Energy Development 601 H(3-0)
(formerly Energy and the Environment 601)

Energy Systems I: Non-Renewable Energy
Explore the interaction between non-renewable resources (petroleum, natural gas, coal, thermal stations, hydro) and the environment. Consider the technical and environmental aspects within the energy and environment cycle for evaluation and management.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 603 H(3-0)
(formerly Energy and the Environment 603)

Energy Systems II: Renewable Energy
Study renewable energy sources as prospective energy suppliers for the future, along with conditions for sustained implementation of renewable energy technologies (biomass, solar, wind, geothermal, co-generation).

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 605 H(3-0)
(formerly Energy and the Environment 605)

Ecology, Sustainable Development and Indigenous Cultures
Examines the inter-relationships between ecological systems, indigenous cultures and sustainable global development. Provides a case based analysis of selected issues and strategic management mechanisms for dealing with these issues in the energy project development and approval process.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 607 H(3-0)
(formerly Energy and the Environment 607)

Water Pollution and its Impact on the Energy Sector
Causes and consequences of water pollution and management practices and technologies for prevention, mitigation and control of pollutant effluents, water usage and management in energy development.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 609 H(3-0)
(formerly Energy and the Environment 609)

Air Pollution and its Impact on the Energy Sector
Causes and consequences of air pollution and management practices and technologies for prevention, mitigation and control of pollutant emissions.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 611 H(3-0)
(formerly Energy and the Environment 611)

Land Pollution and Waste Management in the Energy Sector
Causes and consequences of land pollution and management practices and technologies for prevention, mitigation and control of pollution. Waste management principles and effective practices in the development of energy projects.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 613 H(3-0)
(formerly Energy and the Environment 613)

Energy Systems III: Planning and Energy Economics
Financial principles and evaluation techniques and their application to energy investment planning and to assessment of foundations in energy economics and policies.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 615 H(3-0)
(formerly Energy and the Environment 615)

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 Director.

Sustainable Energy Development 617 H(3-0)
(formerly Energy and the Environment 617)

Human Resource and Management in the Energy Sector
The 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. An application, skill development, managerial issues, and workplace trends focus.

Prerequisite(s): Admission to the Sustainable Energy Development Program only or consent of the Program Director.

Sustainable Energy Development 619 H(3-0)
(formerly Energy and the Environment 619)

Environmental Law in the Energy Sector
Legal systems, nature and sources; international environmental law and its implementation; fundamental legal concepts including jurisdiction, procedural fairness, liability, property and contract; environmental regulatory systems and alternative instruments; judicial review; enforcement and compliance; non-judicial dispute resolution.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 621 H(3-0)
(formerly Energy and the Environment 621)

Environmental Management Tools in the Energy Sector
Environmental management tools including strategic policies; structures; impact and production assessment; audits; indicators and reporting; life cycle assessment; risk management; and economic instruments.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 623 H(3-0)
(formerly Energy and the Environment 623)

Strategic Environmental Planning for Energy Organizations
A strategic approach to managing environmental and social issues facing energy organizations and its economic rationale in a competitive global market place.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 625 H(3-0)
(formerly Energy and the Environment 625)

Research Project
An introduction to research methodology and to energy environmental issues. Knowledge and skill are demonstrated through the completion of an interdisciplinary project.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 627 H(3-0)
(formerly Energy and the Environment 627)

Group Research Project
Completion and presentation of a group project that is related to a current environmental issue or problem.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

Sustainable Energy Development 629 H(3-0)
(formerly Energy and the Environment 629)

Advanced Seminars
Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

MAY BE REPEATED FOR CREDIT

NOT INCLUDED IN GPA

Sustainable Energy Development 699 H(3-0)
(formerly Energy and the Environment 699)

Topics in Energy and the Environment
Intensive study of selected topics in energy and the environment and related subjects. Course will reflect changing content needs and faculty interests.

Prerequisite(s): Admission to the Sustainable Energy Development Program or consent of the Program Director.

MAY BE REPEATED FOR CREDIT

Tourism Management TOUR

Instruction offered by members of the Haskayne School of Business.

Tourism Management Chairperson: M. Boivin

Graduate Courses

Tourism Management 741 H(3-0)

Policy Planning and Development in Tourism
The planning process. The nature of tourism, and its role in national and regional development. Economic, social, psychological, environmental and technological impacts of tourism on the host community. Trade-offs. Strategies in development. Planning and public policy. National, provincial and local tourism programs. The Alberta example.

Prerequisite(s): Consent of the Haskayne School of Business.

Tourism Management 745 H(3-0)

International Tourism
The structure, environment and special characteristics of international tourism. Nature, importance and measurement of country/destination image. Host-visitor interaction. Factors motivating, facilitating and constraining international travel. Types of international tourists and their needs. Measurement, forecasting and promotion of international travel. Major issues and elements of planning for international visitors.

Prerequisite(s): Consent of the Haskayne School of Business.

PhD Course

Tourism Management 799 H(3S-0)

Doctoral Seminars in Tourism
799.01. General Fields in Tourism Management

799.02. Special Fields in Tourism Management

799.03. Tourism Policy and Strategy

799.04. Theory in Tourism

University UNIV

Instruction offered by the University and individual Faculties depending on the topic(s) being covered.

Graduate Courses

University 601 H(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 Co-ordinator.

University 611 H(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 H(0-8)

Introduction to Interdisciplinary Design Practice

University 615 H(0-8)

Advanced Interdisciplinary Design Practice
Prerequisite(s): University UNIV 611.01.

Veterinary Medicine VETM

Instruction and services offered by the Faculty of Veterinary Medicine.

Associate Dean (Curriculum): J.V. Bailey

Graduate Courses

The following courses are delivered through the Veterinary Medical Sciences Graduate Program. Enrolment in these courses is not open to DVM students. Please consult the Graduate Studies calendar for additional details and requirements for students in other graduate programs.

Associate Dean (Graduate Education): J.R. Matyas

Veterinary Medicine 600 H(0-1S-0)

Seminars in Veterinary Medical Sciences
Provides instruction in effective oral presentation and provide feedback on annual seminars to the Faculty.

NOT INCLUDED IN GPA

Veterinary Medicine 601 H(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 H(3-0)
(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 H(3-1T)

Introduction to Research Methods
An introductory course on how to design and analyse veterinary research. Emphasis is placed upon formulating good research questions, evaluating the appropriateness of different research designs, planning a well-designed experiment or clinical trial, and performing statistical analyses on the results.

Prerequisite(s): Consent of the Faculty.

Veterinary Medicine 690 H(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 **H(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 **H(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 **H(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.

Zoology ZOOL

Instruction offered by members of the Department of Biological Sciences in the Faculty of Science.

Department Head - R.M.R. Barclay

Undergraduate Courses

Only when appropriate to a student's program may graduate credit be received for courses numbered 500-599.

Zoology 567 **H(3-3)**

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 or 477.

Antirequisite(s): Credit for both Zoology 567 and Marine Science 546 will not be allowed.

Note: Offered during even-odd dated academic years. Enrolment in this course may be limited.

Zoology 571 **H(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.

571.01 Dinosaurs, Birds and Mammals.

571.02 Fishes, Amphibians and Reptiles.

Prerequisite(s): Zoology 377.

Antirequisite(s): Credit for Zoology 571 and either of Zoology 571.01 or 571.02 will not be allowed.

Note: Prior completion of Zoology 477.01 or 477.02, and Geology 201 or 209 are strongly recommended. Courses can be taken in either order. Zoology 571.01 is offered during odd-even dated academic years. Zoology 571.02 is offered during even-odd dated academic years.

Zoology 577 **H(3-3)**

Mammalogy
A detailed examination of the evolution, morphology, physiology, ecology and behaviour of mammals.

Prerequisite(s): Biology 313 and Zoology 477.01 or consent of the Department.

Note: Offered during even-odd dated academic years. Limited amounts of non-scheduled class time involvement. Enrolment in this course may be limited.

Zoology 583 **H(3-0)**

Ornithology
An overview of the biology of birds, including their evolution, morphology, ecology and behaviour. The course will emphasize the influence that being a flying homeotherm has had on almost every aspect of avian biology.

Prerequisite(s): Biology 313 and Zoology 477.01.

Note: Offered during odd-even dated academic years.

Zoology 595 **H(3-0)**

Comparative Neuromuscular Physiology
Examination of the nervous and muscular systems of selected invertebrate animals spanning phyla from the Protozoa to the Echinodermata. Material will be selected that relates the behaviour to the nervous and muscular systems unique to each group. Specializations unique to various groups will be examined as well as the increasing complexity at various levels of organization. Instructional format includes lectures and student seminars.

Prerequisite(s): Zoology 461.

Antirequisite(s): Credit for both Zoology 595 and Neuroscience 541 will not be allowed.

Zoology 597 **H(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.

Zoology 697 **H(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 both Zoology 697 and 597 will not be allowed.

Student 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 Academic Foundations of the U of C.

Our services exist so that you, as a University of Calgary student, can make the most of your experience at our university. We see students through from the moment they make contact with us as a prospective student through to graduation and beyond.

To achieve our mission we adhere to the highest standards of personal, interpersonal and professional behaviour and we comply with all institutional and legal requirements.

We stand on four core values:

- Community: We endeavour to develop a University community that promotes lifelong citizenship and societal engagement.
- Development: We foster an environment that inspires self-confidence, nurtures personal achievement and actively connects the student experience and the classroom.
- Diversity: We recognize that our campus community is diverse and we celebrate this rich environment.
- Accountability: We recognize that as individuals we are responsible for our actions, learning, development and the impact we have on others.
- We are committed to involving students in our planning and our decision-making, and encourage you to make contact with our departments and staff members if you have any ideas, comments or questions.

Susan Barker

Vice-Provost (Student Experience)

Contact Information:

Vice-Provost (Student Experience): Susan Barker, PhD

Telephone: 403.220.6580

Fax: 403.220.6800

Location: MacKimmie Block 137

Associate Vice-Provost (Enrolment) and Registrar: David Johnston, BA, MA

Telephone: 403.220.3833

Fax: 403.289.1253

Location: MacKimmie Block 117

Senior Director, Student Services: Jennifer Quin, BA, MSc

Telephone: 403.210-6300

Location: MacEwan Student Centre, 293

Director, SU Wellness Centre: Debbie Bruckner

Telephone: 403.210.8904

Location: MacEwan Student Centre, 370

Website: http://www.ucalgary.ca/ses/

Career Services

Manager: Colleen Bangs

Vision: Career Services inspires students and alumni to embrace their potential, achieve career excellence and contribute to the betterment of their communities; employers benefit through access to future leaders and innovators.

Mission: Career Services facilitates and supports mutually beneficial relationships between students, alumni and employers. We connect passion to purpose and students to opportunity.

Values: Career Services is committed to providing transparency and excellence through: service and support, collaboration and community, teamwork and trust.

Programs and services at Career Services include:

- One to one Career Development & Education, Drop-in Appointments, Career Workshops, Strong & MBTI Assessments.
- CareerLink provides online access to full-time, summer, part-time and co-op and internship positions, online interview sign-up, company profiles, an event calendar and more.
- Meet potential employers at career fairs, information sessions, and networking events. Event listings and online sign-up are found on CareerLink.
- Attend industry panels and Career LIVEbrary events that help students define career options through interaction with industry professionals.

Peak recruitment times for most employers are September, October and January through March.

Telephone: 403.220.8020

Fax: 403.282.8342

Recruiting: recruit@ucalgary.ca

Student inquiries: csstdnt@ucalgary.ca

Location: MacEwan Student Centre 188

Website: http://www.ucalgary.ca/careers

Centre for Community-Engaged Learning

Erin Kaipainen, BA, MA

The Centre for Community-Engaged Learning is a division of Student Services that supports curricular and co-curricular service-learning programs. The CCEL supports students' learning and leadership development and encourages life-long community engagement through projects and partnerships with the non-profit sector. The CCEL offers:

- Ucalgarycares programs, co-curricular service-learning programs ranging from a few hours to a few weeks
- Immersion service-learning programs over Reading Week or the Spring/Summer Term in places such as Calgary, New Orleans, and rural Costa Rica
- Projects and campaigns on food security through Meal Exchange
- Senior leadership experiences through the Peer Helper Program
- Support to faculty developing service-learning courses
- A place of contact for community organizations

Telephone: 403.210.7998

Fax: 403.210.9877

Website: http://www.ucalgary.ca/CCEL

Centre for International Students and Study Abroad (CISSA)

Ricky Ramdhaney, Manager International Student Services

Colleen Packer, Manager Study Abroad Office

The Centre for International Students & Study Abroad (CISSA) provides support to international students related to their adjustment to the university and Canada, and promotes an understanding of international issues among Canadians by involving them in programs (study abroad, work and volunteer overseas), which develop a global experience.

Programs and services at CISSA include:

- Study/work/volunteer abroad resource library
- Selection and administration for Student Exchange Programs and Group Study Programs (semester, spring and summer)
- International student advising and support
- Bridging programs (bringing Canadians and international students together): Global Friends, Language Bank
- Volunteer opportunities in CISSA and referral to other organizations in Canada and abroad
- Handbooks for international students and study abroad students
- Arrival orientations and workshops for new international students and a term long Mentorship/Buddy Program to assist new students
- Workshops to prepare U of C students going abroad and returning home: Risk and Safety; Academic Issues, Cultural Differences and Culture Shock, and Re-entry - Coming Home.

Telephone: 403.220.5581

Fax: 403.289.4409

Email: cissa@ucalgary.ca

Location: MacEwan Student Centre 275

Website: http://www.ucalgary.ca/uci/

Enrolment Services

Enrolment Services assists students in carrying out a variety of administrative functions at the University of Calgary. Enrolment Services provides front-line services and phone student support services in the following areas: prospective student inquiry, admissions, student awards and scholarships, course registration support, financial aid and student fees. Enrolment Service Advisors are available to support and assist students with questions.

Enrolment Service Advisors can be accessed as follows:

By Telephone: 1.403.210.ROCK (7625)*

**Limited information and service can be provided on the phone due to the Freedom of Information and Protection of Privacy Act legislation.*

In-person Service:

- Transcript orders and printing on demand (online service)
- Proof of Enrolment forms completed for undergraduate students (online service)
- Fee payments, undergraduate assessment and account inquiries
- Student loan inquiries, signing and completion of Interest Free forms
- Undergraduate registration support and referral
- Undergraduate adding/dropping/withdrawing from courses
- Undergraduate award/scholarship support/assistance and general inquiries
- Prospective student inquiries

Online services are available 24 hours a day, 7 days a week via MyUofC online Student Centre:

- Transcript Request, by mail and/or courier
- Add/drop/edit/swap courses
- Update personal information
- Print T2202A tax receipts (available online only)
- Print Proof of Enrolment letters (not for government student loans)
- Change of program and Letter of permission requests
- Tuition and Fees assessment, view account details, and due dates

Contact Information:

Telephone: 1.403.210.ROCK(7625)

Fax: 1.403.289.1253

Location: MacKimmie Block 117

Website: http://www.ucalgary.ca/registrar

Hours of Operation: Monday to Friday - 09:30-16:30, and Thursday - 10:00 - 16:30*

**Enrolment Services may stop generating tickets prior to 4:30 depending on service demands.*

Enrolment Services may experience temporary closures throughout the year for staff training and professional development. For current updates on closures and wait times please visit: http://www.ucalgary.ca/currentstudents/serviceinformation.

International Recruitment and Admissions

Prospective Graduate students: graduate@ucalgary.ca

Location: MacKimmie Tower, Room 213

Website: www.grad.ucalgary.ca

Leadership and Student Engagement

Erin Kaipainen, BA, MA

The Leadership and Student Engagement office provides undergraduate and graduate students with the opportunity to develop their leadership potential through a series of programs and events. Leadership and Student Engagement is committed to providing all students with a well rounded university experience from first-year through to graduation and beyond. Programs include:

- University of Calgary Leadership (UCL) Program with certificates in Personal, Team, Community and Organizational Leadership
- One-to-one and group leadership advising
- Leadership-on-Demand - facilitated leadership training and team building, customized to meet the needs of student clubs and teams
- Leadership Exchange - an annual leadership conference
- An Emerging Leaders Program and Sophomore Leadership Program
- Summer and Fall Orientation
- The Common Reading Program - bringing together students, staff, faculty and community leaders to build community, inspire discussion, and support students' transitions to university life
- Senior volunteer opportunities through the Peer Helper Program

Telephone: 403.210.5824

Fax: 403.210.9877

Location: MacEwan Student Centre 293

Website: http://www.ucalgary.ca/leadership

The Native Centre

Director: Shawna Cunningham, BA, MA

The primary mandate of The Native Centre is to provide a culturally appropriate learning environment that encourages and supports the success of Aboriginal students in their pursuit of knowledge and higher education at the University of Calgary. The Native Centre provides academic, personal, and cultural support services and programs to prospective and current Aboriginal Students, and is a welcome and supportive learning environment for the whole campus community.

Services:

- Pre-admissions advising
- Program advising for Open Studies students
- Advocacy for academic and non-academic student issues
- Information and referrals to campus-wide services
- Advising and advocacy for Aboriginal student funding
- Peer tutoring and remedial support
- Retention workshops
- Cultural and spiritual advising

Programs:

- NAPI Ambassador Aboriginal Youth Outreach Program
- LYNX: Aboriginal Student Career and Employment Program
- ASSERT: Aboriginal Student Retention Program
- Student Volunteer Opportunities
- Aboriginal Student Access Program (ASAP)
- Old Sun Community College Academic Outreach Program

Events:

- Pipe Ceremonies
- Women's Tea Ceremonies
- Red Lodge Speakers Series
- Potlucks
- Recreational Field Trips and Social Events
- TNC Annual Graduation Banquet and Pow-wow
- First Nations Student Association's Annual Native Awareness Days

Facilities:

- The Red Lodge, Student Lounge
- First Nations Student Association Offices
- Computer Lab
- Study Space

For more information, please contact us at:

Telephone: 403.220.6034

Fax: 403.220.6019

Location Room 390z MacEwan Student Centre

Website: www.ucalgary.ca/nativcr

Residence Services

Associate Director: Randy Maus

Living the Residence experience at the University of Calgary helps students connect to one another in a community where people matter. It provides easier access to campus resources and opportunities, and support for students academically as they work toward their degree. Residence is open to all full-time students, and includes accommodations that meet a variety of needs from first year to graduate to students with families. To apply or find out more about the residence experience, facilities and services, please visit http://www.ucalgary.ca/residence.

Single Student Housing

Single student housing is located on the southwest corner of the University Campus and consists of ten buildings offering a variety of accommodation styles. 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.

First-year students coming directly from high school live in traditional dormitory-style residence in the Rundle and Kananaskis Halls. Accommodating approximately 720 students in double and single rooms, housing in these buildings consists of single-gender and co-ed wings or floors to best meet the needs of individual students. Laundry facilities, recreational lounges and academic lounges are all available for student use. To ease the transition to university, students living in these buildings purchase a meal plan. More information on meal plans can be found at http://www.ucalgary.ca/unicard/meal-plans.

Second year students experience hybrid living in furnished 2- and 3-bedroom suite-style apartments in Yamnuska Hall, the newest residence on campus. Equipped with a kitchenette, not a full kitchen, students in Yamnuska Hall need to purchase a meal plan so that they can have at least one hot, prepared meal every day. The in-suite kitchenettes are used to prepare small meals and snacks.

Upper-year, international and transfer students live more independently in furnished studio, 1-bedroom, 2-bedroom, and 4-bedroom apartments with full kitchens in Cascade Hall, Norquay Hall, Brewster Hall and Olympus Hall. They can also choose to live in the suite-style apartments in Yamnuska Hall and Global Village.

Glacier Hall and Castle Hall are designated graduate student apartment buildings.

Many building offer Living-Learning Communities (LLC). Students can choose to live in an LLC with other students who share a common interest. Global Village is focused on developing multicultural, global, and local awareness as well as leadership development. The Scholars' Advantage community is focused on academic success and excellence and available to students accepted under the SUCCESS Program. The Business Living Learning Community is for students studying in the Haskayne School of Business at the university. The Kananaskis Leadership Community fosters leadership development and academic and career success, both individually and collaboratively as a community. The Civic Engagement Living Learning Community helps students develop the practical skills, experiences, and resources to help them influence change.

Each building has trained staff of Community Advisors and Residence Life Co-ordinators who are available 24 hours a day to assist students with the challenges faced in university. They are specifically trained in responding to personal crisis, directing students to appropriate university resources, academic learning strategies, and community building.

Students with specific accessibility, mobility or medical needs are asked to indicate these needs when applying. Residence Services works with students to meet their specific needs wherever possible.

Applications can be found online at http://www.ucalgary.ca/residence. Students applying directly from high school (or who are under the age of 21 by September 1) are offered the Multi-year Residence Guarantee. Applying by April 30, will guarantee a place in residence for both first and second year.

All new students are encouraged to apply as soon as possible, as demand for residence is high, and student housing assignments are completed on a first-come, first-served basis. Applications are available each year in December.

Telephone: 403.220.3210

Email: residence@ucalgary.ca

Location: Dining Centre 01

Website: http://www.ucalgary.ca/residence

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 all family members' needs, including community barbecues, summer camps, ESL conversation groups, and the Jenna Chang Children's Resource Library.

To apply online or to learn more about student family housing, please contact us.

Telephone: 403.220.7227

Location: 3735 - 32 Avenue N.W., Calgary, Alberta T3B 2X1

Website: http://www.ucalgary.ca/residence

Scholars Academy Program

The Scholars Academy provides talented students with the privilege of developmental opportunities that enhance their eligibility for prestigious scholarships and graduate/professional programs. Through this program, high level students can fully engage in their studies and in their community through mentorship and relevant volunteer and leadership opportunities.

Admission to the Scholars Academy Program requires students to be at the top of their class academically (minimum 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. Students from all faculties who have completed one year of undergraduate study are welcome to apply.

For more information, please contact the Scholars Academy Program Co-ordinator:

Jessica Cohen, PhD

Email: sap@ucalgary.ca

Telephone: 403.220.7551

Website: www.ucalgary.ca/sap

Student Accessibility Services

Director: Johanne Tottle, PhD

- Advising and support for students seeking academic accommodations;
- Arranging assistive services such as learning strategists, note-takers, and sign language interpreters
- Guidance and information regarding student funding
- Referrals to on-campus services and community/government agencies
- Access to a variety of adaptive technologies such a voice-recognition and speech synthesis
- Accommodated exam support

Telephone: 403.220.8237

Fax: 403.210.1063

Email: access@ucalgary.ca

TTY: 403.220.2823

Location: MacEwan Student Centre 452

Website: www.ucalgary.ca/access

The Student Success Centre

Manager: Roxanne Ross, BA, MA

From when you first arrive at the University of Calgary through to when you graduate, the Student Success Centre provides services and programs to ensure you make the most of your time here at the U of C. These programs and services are available to ALL undergraduate and graduate students:

- Academic development advisors provide personalized academic planning and learning support advising sessions to help students achieve their academic goals.
- Central Academic Advisors help current, prospective and open studies students with the exploration of academic programs and effective program choices.
- Writing Support tutors are available by appointment or drop-in for all students wanting to learn strategies to write more effectively and gain a better understanding of how to improve their written assignments. Writing workshops are also held in the fall and winter semesters.
- Student Success Seminars are offered throughout the fall and winter semesters covering a variety of topics to help support your academic success.

Telephone: 403.220.5881

Fax: 403.220.0190

Location: Taylor Family Digital Library, 3rd Floor

Website: http://www.ucalgary.ca/ssc

SU Wellness Centre

SU Wellness Centre Director: Debbie Bruckner

The SU Wellness Centre is the collaboration of Student Health, Counselling Services and the Faith and Spirituality Centre to provide wellness in mind, body and spirit to support academic and personal success. Integration has created a culture of wellness on campus – a place where students can truly experience an opportunity to grow in health and wellbeing through partnership with Wellness Centre professionals.

Counselling Centre

Programs and services at the Counselling Centre include:

- Individual and couples counselling provided by registered psychologists and counsellors-in-training
- Workshops including stress management, emotional wellness, healthy relationships, social anxiety, presentation anxiety, test anxiety, life balance
- Career Clinic, appointment bookings to assist with your educational and career decisions
- Academic Clinic, appointment bookings to assist you with educational success strategies
- Counsellor Training Program for provisionally registered psychologists and graduate level practicum placements
- Website information including FAQ's, tip sheets and useful links to personal, academic and career information

Telephone: 403.210.9355(WELL) #2 for Counselling

Fax: 403.284.0069

Location: MacEwan Student Centre 370

Website: http://www.ucalgary.ca/wellness-centre/counselling/ and http://www.ucalgary.ca/wellnesscentre/guide

Faith and Spirituality Centre

The Faith and Spirituality Centre consists of several Chaplains from various faith/religious traditions (Catholic, Protestant, Jewish, Buddhist, Muslim). We offer spiritual and faith-based programs, events and support to students, staff and faculty on campus. The Centre operates under four guiding principles: connecting, learning, serving, and practicing.

We offer a variety of services that are open to all:

- Drop-in Centre
- Meditation and Prayer Rooms
- Multi-Faith support, guidance and worship services
- Community/Social events
- Lunch and Learns
- Spiritual and Social Justice programs
- Crisis support

Telephone: 403.220.5451

Website: http://www.ucalgary.ca/wellnesscentre/fsc

Email: artuliss@ucalgary.ca

Location: MacEwan Student Centre 373

Health Promotion & Outreach

The SU Wellness Centre's Health Promotion and Outreach program is designed to support the campus community by building resiliency and community by providing training, education and awareness opportunities to promote wellness in mind, body and spirit. We offer a variety of education and outreach opportunities:

- Workshops and Service Fairs
- Training opportunities
- Wellness Health Awareness Team (student-led health outreach team)
- Community Helpers Program
- Wellness Guide

Telephone: 403.220.3075

Website: http://www.ucalgary.ca/wellnesscentre/healthpromotion

Email: amhumeni@ucalgary.ca

Location: MacEwan Student Centre 373

University Health Services

University Health Services offers the following services to students and their dependents:

- Confidential health services from family physicians with extensive experience in collegiate health care - including family medicine and walk-in services
- Physician referrals to specialists as indicated
- Health promotion and education
- Immunization programs
- Psychiatric services
- Chiropractic services (Traditional, ART, Acupuncture and Graston)
- Massage therapy
- Nutrition services
- Travel Clinic

For faculty and staff:

- Walk-in clinic hours for urgent care only
- Massage, chiropractic and nutrition services
- Travel Clinic

Telephone: 403.210.9355 (WELL) #3 for Health Services

Fax: 403.282.5218

Location: MacEwan Student Centre 370

Website: http://www.ucalgary.ca/wellnesscentre

Women's Resource Centre

Co-ordinator: Nanako Furuyama

The Women's Resource Centre provides a safe and supportive place to advance women's equality and build community where all experiences are valued, and everyone is offered the resources necessary to make informed choices. The WRC strives to create a more inclusive campus environment where each individual's agency and voice are nurtured to contribute to the collective spirit of a community where citizenship and leadership is made possible for all, regardless of gender. We celebrate diversity based on – but not limited to – gender, ethnicity, race, class, ability age and sexual orientation and we believe that the key to achieving empowerment is through the cycle of reflection and action, creating positive social change. The WRC uses three pillars of work to achieve our goals: Wellness, Leadership, and Diversity.

Programs and services at the WRC include:

Student Services:

- Peer Support (peer to peer counseling on a diversity of issues)
- Meaningful volunteer opportunities, training and recognition
- Training and certificates in Leadership, Wellness and Diversity
- Workshops (health and wellness, global and cultural issues, etc.)
- Online Resource Database (with hundreds of resources accessible through the WRC website)
- Social Gatherings (knitting circles, craft groups, movie nights – all free of charge)
- The WRC Awards - To celebrate women's Wisdom, Resilience and Compassion by identifying and honouring an alumna and a female University of Calgary student
- Special Events - December 6th Memorial: National Day of Remembrance and Action on Violence Against Women, International Women's Day Celebration

Facilities:

- Lounge
- Study Space
- Resource Library
- Club and group meeting space
- Quiet meeting space for women experiencing challenging situations

Telephone: 403.220.8551

Fax: 403.210.7970

Email: women@ucalgary.ca

Website: http://www.ucalgary.ca/women/

Location: MacEwan Student Centre 482

Hours: Monday to Friday, 8:30am – 4:30pm

Writing Support Services

Writing Support Services offers free half-hour individualized writing tutorials for all students who want to improve their writing. In a tutorial, students can

- Discuss their writing process and learn strategies to write more effectively
- Review returned papers to understand how to improve their written assignment
- Work with an instructor on an ongoing basis to improve essay structure, paragraph development, sentence structure and style, grammar, and punctuation
- Receive information on writing papers, book reviews, or other assignments
- Get advice on how to use and document sources
- Get help with English as a Second Language
- Writing Support Services instructors will give general advice on any written document; however, they will not proofread.

To book a half-hour appointment, please visit http://www.ucalgary.ca/ssc/writing-support.

For Writing Support help via email, write to wconline@ucalgary.ca, describing your writing assignment, questions, and concerns in detail.

Telephone: 403.220.5881

Email: wconline@ucalgary.ca

Tutoring Location: Student Success Centre, 3rd Floor TFDL

Website:
http://www.ucalgary.ca/ssc/writing-support

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. You pay for this membership with a fee that is assessed with your tuition. Students can also purchase family memberships at special student rates. Community members, alumni and staff are also welcome to become members.

You can find complete, detailed information about our facilities and programs (including fitness classes and open recreation time) online at http://www.activeliving.ucalgary.ca/, or by calling 403.220.7749. For our automated schedule, please call 403.220.6942 (24 hours). Look for Active Living and Outdoor Centre Program Guides in display racks located around campus.

Facilities:

Our giant Fitness Centre features free weights, weight machines, cardio equipment, a Super Circuit and a six lane, 200 meter indoor track. Certified staff are available for fitness appraisals, fitness and nutrition counseling, and customized programs.

We have the largest Racquet Centre in Calgary with squash, racquetball, badminton, pickleball and tennis courts. Students pay no court fees.

Our Aquatic Centre boasts an Olympic sized pool. Aquatic instruction and certification is available for adults, children and youth. The Aquatic Centre hires new lifeguards on a regular basis.

The University of Calgary Gymnastics Centre has a large variety of Olympic-standard equipment, including: sprung gymnastics floor, sprung tumble strip, trampoline, foam pits, ropes, bars, rings, beams, resi-pit and vaults. If you love gymnastics we are always looking to hire new, active people to join our team!

The Outdoor Centre offers equipment rental and a fantastic range of outdoor recreational and instructional programs for summer and winter activities. The "OC" also features an indoor climbing wall, specifically designed for climbing instruction and free for U of C students to access.

Programs:

Active Living offers a wide variety of programs from health and wellness, to recreation programs and certifications. Instruction is offered in fitness, first aid and CPR, pre-hospital care, skating, swimming, gymnastics, court sports and many more. Intramural Sports as well as Competitive and Recreational Club Sports are open to students, staff, faculty and the general public for a nominal fee. Information for all registered programs can be found online and in the Active Living Guide.

If you have children, we offer gymnastics, swimming, skating, court sports, outdoor activities and Karate programs for all ages from pre-school to teens. We are also one of Calgary's largest summer camp providers with a huge range of camps for every kind of kid or teen.

Telephone: 403.220.7749

Website: http://www.activeliving.ucalgary.ca/

Location: Kinesiology Complex

Bookstore

The Bookstore is where you'll find the textbooks and other course material you need for classes, Dinos gear and other merchandise to show your school spirit, books for leisure reading, and a full-service Starbucks to get you going in the morning.

We focus on having the exact course material students need online or in-store for the beginning of every semester. You can choose new, used, digital or rental textbooks. New books are listed at publisher's list price. Used books are sold at 75 per cent of the new book price. Or, you can rent your textbooks online and have them delivered right to your door. Visit the online price comparison shopping system to find the best options for you. At the end of the semester, you can sell your textbooks through the Buyback program.

More than textbooks, the Bookstore carries pens, paper, sticky notes, binders, folders and all the rest of the stationary you need.

Cheer on the Dinos in your Dino gear from the Bookstore, the official supplier of Dino merchandise. Faculty hoodies, t-shirts and other faculty apparel, as well as University of Calgary merchandise are also found at the Bookstore.

When you need to relax remember that the Bookstore has one of Calgary's largest selections of general reading books, and the wide selection of art supplies can help bring out the artist in you.

All proceeds from the Bookstore stay on campus to support student programming, academic and research initiatives.

Telephone: 403.220.5937

Toll free: 1.877.220.5937

Email: bkstore@ucalgary.ca

Website: http://www.calgarybookstore.ca/

Food Services

Regional Director Chartwells, Jan Morel

University of Calgary Food Services oversees food related operations on campus including meal plans, a variety of campus food retailers and catering.

Meal Plans, administered through the debit accounts on the UNICARD, are a safe and convenient way for students, staff and faculty to purchase food at the various food retailers across campus without having to carry cash.

Campus Dining includes the Dining Centre, operated by Chartwells, and 19 other food retailers across campus. The Dining Centre offers a daily variety of healthy choices with everything from home-style comfort foods to authentic international cuisine. Retail food vendors offer a variety of choices, from a quick cup of coffee to full entrees.

Campus Catering, operated by Chartwells, provides any type of catering anywhere on campus, inside or out.

Food Services works with its suppliers to ensure that goods sold on campus come from farmers and artisans who work in safe environments and receive fair wages. The University of Calgary has received the Fair Trade Campus designation for its efforts.

Telephone: 403.220.5541

Email: food.services@ucalgary.ca

Location: Dining Centre 110

Website: http://www.ucalgary.ca/foodservices/

Healthy U of C

Health and Wellness is a key focus of the University of Calgary Human Resources' People Strategy; it contributes to the University's goal of being an employer that suc-

cessfully attracts and retains valued staff. A commitment to organizational and individual health and wellness will lend to a supportive environment where faculty and staff feel valued and are proud of their achievements and their contributions to the University's organizational goals. The University of Calgary promotes a healthy learning and work environment for students and University staff members. We offer services and facilities that will help you with your physical, social and mental well-being. When you feel well, you are more resilient and better able to do your best in your studies, work and life.

The Wellness Guide is an online resource for students with everything you need to know about academic success, and emotional, spiritual, physical and social stuff. Visit www.ucalgary.ca/wellnessguide.

2008 was the formal launch of a new Wellness Centre and the integration of Health Services (family physicians, chiropractors, massage therapists, nutritionist, psychiatrists), Counselling and the Chaplaincy. Integration will create a culture of wellness on campus – a place where students can truly experience a commitment to improving health and wellbeing.

Smoking Reduction Policy

With its Smoking Reduction Policy, the University strives to provide a safe and healthy work, learning and living environment for all staff, faculty, students and visitors. As a champion of health and wellness, the University believes that a reduction in smoking on campus is beneficial to all. Smoking is not permitted indoors nor within five metres of building entrances and air intake vents. As of January 1, 2009, tobacco product sales have been prohibited on campus in compliance with provincial legislation, the Alberta Tobacco Reduction Act. Please respect everyone's right to clean air and a healthy environment. For details see the Smoking Policy at https://www.ucalgary.ca/policies/files/policies/Smoking%20Policy.pdf.

Scent-Free Initiatives

The Scent Free Awareness Campaign "We Share the Air" asks for your support in limiting or eliminating the use of scented personal care products whenever possible. Please see the website http://www.ucalgary.ca/safety/indoor for information about the health effects related to scented personal care products and alternatives that you can choose.

Thank you for helping make the University of Calgary campus a healthy environment for everyone.

The University of Calgary was honoured to receive the Calgary Chamber of Commerce Gold level H.E.A.L.T.H. (Helping Employees Achieve LifeTime Health) award in 2005 for our workplace health initiatives. We believe that the quality of our workplace influences the quality of student experience.

The University of Calgary is the proud recipient of the Premier's Award for Healthy Workplaces (2006), and received the highest accolade as the recipient of the Award of Distinction for employers with greater than 1000 employees. This award recognizes Alberta employers who demonstrate commitment to improving the health of employees and provide healthy workplace programs that encourage employees to make healthy eating choices and live an active lifestyle to remain healthy at work and beyond.

Healthy U of C recognizes that health and wellness is a shared responsibility between the organization and its people. Health, Safety and Wellness is one of the thirteen portfolios in the Campus Sustainability Plan, and the Sustainability Stewardship Working Group is an interdisciplinary team co-ordinating initiatives designed to actively engage the campus community in promoting a healthy campus culture. The portfolio's mission is to further understand the interrelationships between quality of life and sustainability, and seek local and global solutions; to enhance awareness of the interrelationships between the built environment, health, and wellness; and to enhance the quality of life on campus and in the community at large. As a post-secondary institution, we have a special responsibility to create a healthy community that enhances the student experience and models healthy choices.

Use of Alcohol Policy

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: http://www.ucalgary.ca/UofC/departments/RISK/riskmgmt/.

If there are concerns about student misconduct, please refer to: http://ucalgary.ca/conduct/.

UNICARD Office

The UNICARD is a multi-purpose card for students, staff and faculty. It is the official University of Calgary ID card and access card. It can also be used as a library card, Active Living membership card and debit card for purchasing meals, merchandise and completing print and photocopying jobs on campus. Full-time students use the UNICARD with attached UPass sticker for access to Calgary Transit.

You can get your UNICARD at the UNICARD Office, located in the Dining Centre. To avoid the line-ups at the beginning of the semester, submit your photo online at: ucalgary.ca/unicard.

Telephone: 403.220.7290 (Monday-Friday 8:30 – 4:30)

Email: unicard@ucalgary.ca (report lost or stolen card via email)

Location: Dining Centre 18

Website: ucalgary.ca/unicard

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.

Accounts

To ensure you are able to access all the online services available to you, please register for the following accounts:

eID

Your eID identifies you as member of the university community or as a prospective student, giving you access to a variety of online services available to you through the myUofC portal.

IT Account

Other IT services (including webmail) require an IT Account. Students registered in at least one full-time course can sign up for an IT Account by visiting www.ucalgary.ca/it/register. Services that require login with an IT Account include: student email, login access to lab computers, free software downloads and wireless Internet access (AirUC Secure). For more information, visit www.ucalgary.ca/it/access/itaccount.

Forgot your password? Reset all passwords online at www.ucalgary.ca/it/forgot.

Computer Labs and Printing

There are a number of open-access and drop-in computer labs on campus. The 2nd floor of the Taylor Family Digital Library (TFDL) houses the Learning Commons - a space where visitors have 24 hour access, five days a week, to over 200 computer workstations.

Having trouble finding a computer lab? Check out the interactive campus maps at www.ucalgary.ca/map.

Wireless Networks

Browse the web, check your email, and work online from anywhere on campus. AirUC Secure is the preferred wireless network on campus, available in all buildings, as well as outdoors. Living in residence? Reznet is the network available to all students living in residence buildings on campus.

Other IT Services

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 www.ucalgary.ca/it/services.

myUofC

The myUofC portal features single sign-on capabilities, providing you with a streamlined gateway to web-based applications, services and tools, including your Student Centre, university email account and Desire2Learn. https://my.ucalgary.ca/.

Desire2Learn

Desire2Learn (D2L) is the university's new learning management system that offers a 'virtual classroom' for teaching and learning. Many instructors will post course notes and assignments, as well as administer quiz-

zes through D2L. http://elearn.ucalgary.ca/desire2learn/.

Research Services

IT offers High Performance Computing (HPC), General Scientific Computing (Linux), Geographic Information Systems (GIS), and Research Systems Design. Expert consultation and training on various mathematical and statistical software (i.e. SPSS, MINITAB, MATLAB) is also available.

www.ucalgary.ca/it/research.

Audio Visual Services

In need of Audio Visual (AV) equipment? IT's Com Media team provides AV services, including classroom equipment bookings, videography and AV conferencing and event support. Students can also rent a variety of audio-visual equipment for on or off campus use. www.ucalgary.ca/it/commedia.

Software

Free software is available for members of the campus community, and is accessible through IT's software download page. Remote access to specialized software is also available through Virtual Desktop. www.ucalgary.ca/it/computers-printing-software.

Need Help?

Contact the IT Support Centre:

Phone: 403.220.5555 or 888.342.3802

Email: itsupport@ucalgary.ca

Location: 7th Floor, Mathematical Sciences Building

Website: www.ucalgary.ca/it

Dinos Athletics (The Interuniversity Athletic Program)

A big part of your University of Calgary experience is Dinos Athletics. There is no better way to feel the proud 45-year history of our school than to join your fellow students in the stands, cheering the Dinos to victory. With a mission of lifting the spirit and pride of all members of the University community, Dinos Athletics belongs to everyone and we encourage you to enjoy the experience.

Dinos Athletics is a full member of the Canada West Universities Athletic Association. Canada West is one of the most competitive conference 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.

Professional coaches and world-class equipment, facilities and support services are provided for the interuniversity athletic program. Students will find interuniversity athletics challenging and exciting as participants, and interesting and entertaining as spectators.

Don't forget, all undergraduate and graduate students are admitted free of charge to all regular season games upon presentation of proper I.D.

For further information contact:

Dinos Athletics - Faculty of Kinesiology

Kinesiology Complex A 147

Telephone: 403.220.6803

Email: goDinos@ucalgary.ca

Website: http://www.goDinos.com

Parking and Transportation Services

The university has approximately 9,900 parking stalls on campus. A flat rate per entry applies most days and evenings. Hourly parking is also available for short-term visitors. Arrangements can be made to purchase a lot assignment by the year or term. In addition to the on campus facilities, parking capacity for some 700 cars is available just south of the campus at McMahon Stadium.

The Parking Department is also responsible for issuing infraction tickets to vehicles on campus. Tickets can be paid on line (see our website) or in person at either the main Parking office or the Campus Ticket Centre in MacEwan Students Centre.

Further information on the department, permit on sale dates, and other available services can be found on the Parking Services website.

Before you consider driving to campus, check out our sustainable options at www.ucalgary.ca/parking.

Telephone: 403.220.6771 or 403.220.6772

Email: parking@ucalgary.ca

Location: Olympic Volunteer Centre (OVC), North end of McMahon Stadium

Hours of operation: 07:30 - 17:00 Monday to Friday

Website: http://www.ucalgary.ca/parking

Student Legal Assistance (SLA)

Executive Director: Michelle Christopher

Student Legal Assistance (SLA) is the on-campus law clinic staffed by U of C law students who, with the assistance of volunteer advising lawyers, provide free representation and legal assistance to U of C students and needy Calgary and area residents who are unable to afford a lawyer.

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.

SLA student caseworkers can assist with academic appeals and with most matters in Provincial Court and administrative tribunals, including contract disputes, landlord-tenant matters, employment and wrongful termination disputes, traffic and by-law infractions, criminal law matters where the Crown proceeds by summary conviction and is not seeking jail time and some family law matters, excluding divorce and child welfare. SLA also provides commissioner for oaths and notarial services free of charge for students. A disbursement charge may apply.

For donation purposes, please note that SLA is a registered charitable organization.

For further information, to make a donation or to book an intake appointment, please call during business hours.

Telephone: 403.220.6637

Location: 3390 Murray Fraser Hall

University Child Care Centre (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. The UCCC is a not-for-profit charitable organization governed by a Board of Directors. Six of these Board members are U of C Board of Governor appointed representatives, four are elected parent representatives, one is a Student's Union representative and one is a Graduate Student representative. The UCCC's Executive Director reports to the Board. Each centre has a Leadership Team which includes a Program Director and a Program Co-ordinator. Both of our centres are licensed, monitored and regulated by both Alberta Human Services Child development branch and Alberta Environmental Health. UCCC strives for excellence and high quality early childhood care, education and development and therefore maintains voluntary "accredited" status through Alberta Accreditation of Early Learning and Care Services (AELCS).

Mandate:

Our mandate is to provide and promote childcare services and early childhood education and development for the children of students, faculty and staff that make up the University of Calgary community.

Mission Statement:

To enrich the lives of our UCCC Society family by celebrating and building a foundation of excellence in early care and life-long learning.

Vision Statement:

UCCC – leaders in early learning and care; *Dynamic for children *Empowering for staff *Partnering with families.

Philosophy:

At the UCCC we believe that play is imperative during the early years of life. This belief is the basis of our emergent curriculum that focuses on the children's interests, abilities and learning styles. Our goal is to provide an exemplary inclusive program that supports and encourages the unique potential within each child. We do this by promoting the natural process of play in an enriched setting that provides optimal conditions for each child to grow at their own pace.

Hours of Operation:

The Centre is open from 7:30 am to 5:30 pm Monday through Friday. UCCC Society closes on all days that the U of C ceases regular operation. We are closed on all U of C holidays, statutory holidays, two profes-

sional development days per year (which take place during student reading weeks in February and November) as well as the U of C assigned “floater days” that occur during the week between Christmas and New Year, with a traditional early closure on Christmas Eve.

Waitlist and Admission to UCCC Society:

Applicants are prioritized within each age group on the basis of their waiting list application date. At our Main Campus location the order of priority placement is first given to University of Calgary full-time students followed by University of Calgary faculty, and staff, with the exception of children who have a sibling attending the UCCC Society, in which case sibling placement takes priority. At our West Campus location, staff and faculty have priority over full-time students. To be on our waiting list you must turn in a completed waiting list application form accompanied by a non-refundable registration fee and confirmation or your University affiliation. Being placed on the waitlist does NOT guarantee you a spot at the centre. On average, most children are on the waitlist 1 to 3 years.

Kindergarten at UCCC:

UCCC is proud to offer a private kindergarten program delivered from our West Campus site. The kindergarten curriculum is mandated by Alberta Education and is taught by a certified teacher. We currently offer both morning and afternoon classes with a maximum of 19 students in each class. Full-time child care is included in the kindergarten monthly fee. Our enhanced kindergarten classes include numerous field trips, community connections and the delivery of additional on-site programs such as yoga, music, Fit Kids, and Seeds of Empathy.

For more information on The University Child Care Centre Society please visit our website at:

Website: http://www.ucalgary.ca/uccc

Information and Inquiry line: 403.220.3303

Email: waitlist@ucalgary.ca

University Library

See Libraries and Cultural Resources in About the University of Calgary.

About the University of Calgary

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 has a clear strategic direction – Eyes High – to become one of Canada's top five research universities by 2016, 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, under construction now, the university will take 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 80 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.

The U of C is the first university in Canada to offer a four-year graduation guarantee to students embarking upon four-year undergraduate degree programs in the faculties of Arts and Science. The guarantee program offers incoming students an agreement that ensures they will be able to graduate within four years, or the university will pay the tuition for any extra courses needed to finish.

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 significant returns and tangible benefits to our community and economy.

Facilities

The MacEwan Student Centre is a hub of activity at the university. There is also a museum and art gallery, four performance theatres, two childcare centres and residences for single students and students with families.

The U of C is currently expanding the Engineering Complex, establishing the Taylor Institute for Teaching and Learning, and creating new residences.

The Faculty 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 new 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 U of C 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.

http://www.ucalgary.ca/secretariat

Coat of Arms/Logo

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 that spirit. The logo has two components: the Coat of Arms (including the escroll with our motto) and the wordmark. The coat of arms represents and respects our historical roots while the more contemporary wordmark reflects our focus on the future and leading edge.

The Coat of Arms consists of a shield, an escroll containing the motto and the wordmark in either a horizontal (with the wordmark to the right of the crest) or vertical (with the wordmark below the crest) 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 shuile 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 U of C in 1966 by Lord Lyon King of Arms at Edinburgh.

Official Colours

The university has three official colours that appear in the Coat of Arms:

Red PMS 485; Gold PMS 116 and Black.

Tartan

The University has an official tartan that incorporates the U of C's official colours of red, black and gold in its design. It was designed by Jim Odell, a U of C Education and Fine Arts graduate and accredited in a 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.

Historical Highlights

1905

- Alberta becomes a province. The Alberta Normal School for training teachers is established in Calgary.

1906

- Premier A.C. Rutherford names Edmonton as the site of the University of Alberta (U of A).

1907

- Strathcona (now a part of Edmonton) is named as the site of the provincial university. Enraged, Calgarians conduct an unsuccessful battle to have the university relocated to Calgary.

1910

- Calgary College is created.

1912

- Calgary College opens its doors as a private post-secondary institution. It has no degree-granting status.

1914

- A provincial commission recommends against giving Calgary College degree-granting status.

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 U of A Faculty of Education.

1946

- Citizens form the Calgary University Committee.

1947

- The Calgary Branch of the U of A 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.
- The timetable for the fall term includes folk dancing and tumbling on Saturday.

1950

- Land in Houndsfield Heights is exchanged for the present campus site.
- The Board of Governors at the U of A 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

- Radio broadcasts and ads on top of milk cartons are designed to encourage enrolment at the Calgary Branch of the University of Alberta.
- The Calgary University Committee urges an expansion of the Calgary Branch of the U of A and succeeds. 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 levelling the land.

1960

- The new campus opens with two new buildings, Arts and Science A. McMahon Stadium opens. M.G. Taylor is appointed principal.
- April 1, Gauntlet editor Alan Arthur launches the first Bermuda Shorts Day by writing on a chalkboard "Wear shorts tomorrow." The major events are a huge marble tournament and a game called squamish.

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. More buildings open: Social Sciences, Mathematical Sciences and Physical Plant.

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.
- Students' Union takes over management of MacEwan Hall.

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. Arctic Institute of North America is relocated here.

1978

- Norman E. Wagner is named President.
- The Nickle Arts Museum opens.

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.
- The Office of Technology Transfer is established.

1985

- Calgary Hall is re-named Craigie Hall in memory of former Vice-President (Academic) Peter Craigie.

1986

- The International Centre is established.

1987

- The University acquires the land under McMahon Stadium in a trade with the city for a piece of northeast campus to expand the Light Rail Transit system.
- The footbridge spanning Crowchild Trail is relocated to the entrance of the University. It was originally designed by Engineering Professor Bob Loov.

1988

- The Winter Olympics come to campus. Murray Fraser is named President. Enrolment is frozen at approximately 16,000 full-time undergraduate students.

1989

- The University of Calgary athletic teams win five national championships. Employment Equity program is adopted.

1990

- Total outside funding for research reaches $60 million from government and private sources.

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

- The University acquires the Higher Education Reserve Lands west of Campus.
- Site dedication ceremony held for the new Rozsa Centre.

1996

- Construction of the Rozsa Centre for International Understanding and Fine Arts begins.
- Terry White is appointed U of C 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. The program aims to help students make the most out of their university experience - both inside and outside the classroom.
- 1998.
- U of C cancer researchers receive international recognition after discovering a naturally-occurring human virus that kills cancer in mice.

1999

- Largest Information Commons of its kind in North America opens in MacKimmie Library.
- New 400-bed Cascade Hall residence welcomes students.

2000

- Science professor Alan Hildebrand is part of an international research team that tracks down and recovers meteorites in northern B.C. The meteorites are discovered to be one of the most primitive solar system materials ever found.
- International researches led by U of C archaeology professor William Glanzman partially uncover a 3,000-year-old temple in Yemen that is linked with the legendary Queen of Sheba. Experts believe the temple could be as significant a discovery as the ruins of Pompeii, the Pyramids of Giza, or the Acropolis of Athens.

2001

- Dr. Harvey P. Weingarten is appointed as seventh President and Vice-Chancellor of the University of Calgary.
- Information and Communication Technology (ICT) Building opens. It features state-of-the-art teaching and Research labs. The building is strategically located between the faculties of Science and Engineering, and provides a link between the two.

2002

- President Weingarten unveils "Raising our Sights", a four-year academic plan designed to propel the University of Calgary into the upper echelon of Canadian universities by strategically allocating resources towards four distinct areas of strength where the university can truly become an international leader.
- The Calgary Centre for Innovative Technology (CCIT) officially opens. CCIT fosters multidisciplinary initiatives through teams comprised of researchers, students and professors from such faculties as engineering, science, medicine, kinesiology collaborating with colleagues for industry, government agencies and other universities to find solutions to problems facing society and industry in several key areas.

2003

- Ground for the new Alberta Children's Hospital was broken on the West Campus.
- The Libin Cardiovascular Institute of Alberta was 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

- Fine Arts professor Eric Cameron is awarded one of the highest honours for a Canadian artist: a Governor General's Award in Visual and Media Arts.
- Allan Markin, chairman of Canadian Natural Resources, donates $18 million to establish an Institute for Public Health.

2005

- Seymour Schulich, a director and the largest private shareholder of Newmont Mining Corp., the largest gold mining company in the world, donates $25 million to the University's engineering faculty, an amount matched by the provincial government. The faculty is renamed the Schulich School of Engineering in honour of the donation. Schulich's donation

creates an endowment, more than 100 new scholarships, three new research chairs, and invests In enhanced learning opportunities for students.

- The University launches Fast-Track 05, an initiative to enhance the quality of the student experience. Projects include more opportunities for experiential learning, a wireless campus, improved student spaces, and a new cyber café.

2006

- The university marked its 40th anniversary with a series of celebrations touching on almost every area of the campus community. One of the biggest 40th anniversary projects was the Take Your Place initiative, which saw student designers renovate 40 student spaces on campus.

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.
- The Child Development Centre officially opened on October 9, 2007. The centre will house a second child-care facility on campus and be home to a full continuum of researchers and clinicians dedicated to the study of child development-related issues. It will ultimately house other community groups with similar interests. Canada's most advanced child development centre is also Calgary's most environmentally advanced structure, built to Leed Platinum standards.

2008

- University of Calgary scientist Samuel Weiss, PhD, director of the Hotchkiss Brain Institute at the U of C Faculty of Medicine wins one of the world's most prestigious medical science awards, a Gairdner International Award.
- U of C launches Canada's fifth veterinary program in the new Faculty of Veterinary Medicine. Student involvement beyond the classroom is recognized as part of a new initiative called co-curricular record. The record is a first for western Canadian universities.
- U of C becomes the first university in Canada to offer students guaranteed access to classes for timely graduation.
- Student involvement beyond the classroom will be recognized as part of a new initiative called co-curricular record. The record is a first for Western Canadian universities.

2009

- The university finalizes the site of its new downtown campus, which will open its doors in the fall of 2010 for students and researchers in a variety of programs.
- International House opens housing Global Village (the university's first multicultural living-learning residence) and Hotel Alma (the university's first on-campus hotel).
- Alumnus and celebrated Canadian astronaut Robert Thirsk, BSc'76, LLD'09, began his 189-day mission aboard the International Space Station. While in space, he accepted an honorary degree from U of C.

2010

- A new chapter in the U of C's 44-year history begins as Elizabeth Cannon, Dean of the Schulich School of Engineering, is officially selected as the University of Calgary's eighth president and vice-chancellor on March 24.

2011

- In a short amount of time, construction has transformed the hole in the ground outside of MacEwan Hall into the Taylor Family Digital Library (TFDL). The first two floors of the building, including the Information Commons opened January 2011. The building is fully operational in summer 2011.
- U of C's Ward of the 21st Century Research and innovation Centre welcomed the Duke and Duchess of Cambridge on July 7, 2011.
- The new Energy Environment and Experiential Learning (EEEL) Building was opened to the University community September 6, 2011.
- A new strategic direction for the next five years, Eyes High, is launched Fall 2011.

2012

- The Haskayne School of Business and the Department of Economics at the University of Calgary announce the new Centre for the Digital Economy (CDE@) sited at the University of Calgary's downtown campus.
- The University of Calgary's Hotchkiss Brain Institute (HBI) has united with local businessman Ronald P. Mathison to create a centre dedicated to finding innovative treatments and providing early intervention for mental illness.

2013

- The Taylor family donates $40 million to establish a home for the Taylor Institute for Teaching and Learning.

2014

- The Faculty of Education was re-named Werklund School of Education in recognition of Dr. David P. Werklund's $25 million donation to the Faculty.

Campus Services

Campus Security

Campus Security is dedicated to maintaining the campus as a safe and pleasant place to live, work and study. Campus Security is responsible for the security and protection of people on campus in addition to the buildings and grounds. Close liaison is maintained with police and other security agencies in addition to City of Calgary emergency services. 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 or by dialing 403.220.5333.

Telephone: 403.220.5333

Fax: 403.282.2765

Location: MacEwan Student Centre, Room 260

Website: http://www.ucalgary.ca/security

Hotel Alma & Seasonal Residence

Stay in the Heart of it All

Convenient, affordable accommodations on campus

Hotel Alma & Seasonal Residence is a department on campus that offers accommodations to individuals or groups visiting Calgary or the University Campus. We offer a variety of accommodations and meeting space, to meet the needs of various guests.

Seasonal Residence

Summer Residence

Through the summer season (mid May to early August), the student residence buildings open to welcome all types of travelers. Guests do not need to be affiliated with a group or the university to stay on campus, making Summer Residence perfect for the budget conscious traveler who does not wish to compromise on quality or comfort.

Summer Residence accommodations include one, two and three bedroom apartments as well as traditional dormitory rooms. From mid-May to early August, Summer Residence can accommodate groups of up to 1,500 people.

Fall and Winter Residence at Alma

Through the fall and winter season (late August through April), Seasonal Residence provides two bedroom, short-term residences exclusively to current and prospective students and visiting electives.

Long-Term Accommodations

Within our residence complex there are two fully furnished, two bedroom apartments. These apartments are available to guests year round on a month to month basis.

For more information please contact Hotel Alma & Seasonal Residence at:

Telephone: 403.220.3203

Email: confserv@ucalgary.ca

Website: http://www.seasonalresidence.ca/

Hotel Alma

In addition to our Seasonal Residence operation, we were proud to open Hotel Alma in October of 2009. Hotel Alma is one of the first full service hotels in Canada to be located in the heart of a university campus.

Hotel Alma features 96 rooms and suites, a stylish bistro, and meeting facilities for up to 125 attendees – all conveniently close to campus activities and amenities. Hotel Alma welcomes guests from the campus community and beyond all year round.

Free Continental Breakfast in Bistro Alma

Free Local Calls

Free Long Distance Call within North America (excluding Hawaii and Alaska)

Free Wi-fi

For more information, please contact Hotel Alma at:

Telephone: 403.220.3203

Email: stay@hotelalma.ca

Website: http://hotelalma.ca

Location: Hotel Alma – 169 University Gate NW, Calgary, Alberta T2N 1N4

Meeting and Special Events

Whether you need to arrange a one day meeting or multi-day conference, our meetings and special event staff will assist you in organizing the essential details. Services include:

- Book appropriate venue
- Room set-up requirements
- Equipment rental
- Decor design
- Creative staging

We provide meeting and special event planning for:

- Hotel Alma
- Olympic Volunteer Centre
- The Dining Centre
- Energy, Environment, Experiential Learning Building (EEEL)
- Outdoor Campus Green Spaces
- Lecture Theatres (for non-academic purposes)

For more information please contact Meetings and Special Events at:

Telephone: 403.220.3111

Email: mse@ucalgary.ca

Website: www.ucalgary.ca/mse

Residence Services

Please see the Student Services section of this Calendar for further information on Residence Services for students.

Environment, 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.

Students are expected to take the necessary training to allow them to anticipate, recognize, evaluate and control the hazards they may encounter during course activities on campus, and to follow established procedures. These activities may include working in a laboratory, workshop or during field studies off site. By understanding and following safe work practices at the University, the student will be better prepared when entering their vocation.

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.

Environment, Health and Safety can be contacted at:

Telephone: 403.220.6345

Website: http://www.ucalgary.ca/safety

Libraries and Cultural Resources

Libraries and Cultural Resources combines the expertise and services of the University's information providers - Institutional Repository, the Nickle Galleries, Special Collections, University Archives, University Library, and the University of Calgary Press - to ensure provision of full access to the best recorded knowledge and creativity in a variety of formats and media.

Institutional Repository

The Institutional Repository is a stable, sustainable model for dissemination of the intellectual output of the faculty, graduate students and research groups affiliated with the University of Calgary. Submission to the repository fulfills granting agency requirements and supports open access. Collections like the Students' Union Undergraduate Research Symposium and the University of Calgary Theses provide access and exposure for student work alongside faculty research collections. Alumni may request the deposit of their graduate thesis and any accompanying files in the Retrospective Theses Collection while current Graduate Students can submit to the Vault.

Email: digitize@ucalgary.ca

Website: http://dspace.ucalgary.ca

Nickle Galleries

Nickle Galleries houses collections of art, numismatics and textiles to support its role as an outstanding centre for exhibitions, academic research and aesthetics. The art collection concentrates on Western Canadian art of the twentieth century incorporating artists of regional and national importance. The numismatic collection's primary focus is on the ancient Mediterranean region, but also includes paper money and ethnographic numismatic items from around the world. The carpet and textile collection is the largest of any Canadian university museum, comprised of hand-woven carpets and textiles of Central and West Asia. The collections support teaching and research from across the University of Calgary, and are available to visiting scholars and classes by appointment. Nickle Galleries is also central to the minor program in Museum and Heritage Studies offered through Interdisciplinary Programs in the Faculty of Arts.

Originally opened in 1979 as The Nickle Arts Museum, Nickle Galleries initiates the next chapter for the programs and collections first made possible by a bequest to the University of Calgary by Samuel C. Nickle and furthered by the subsequent donation dedicated to numismatics by his son Dr. Carl Nickle. The Nickle Galleries has completed its move to the Taylor Family Digital Library and the High Density Library which places its activities and collections in a new space at the heart of the most vibrant and heavily visited facility on campus – a facility that provides improved conditions and integrated technology to enhance exhibitions and access to collections.

Nickle Galleries promotes critical thinking, visual literacy, and experiential learning through provocative exhibitions, tours, lecture series and symposia. Its programming is centred on modern and contemporary Canadian art, on numismatics, and on carpets and textiles and extends to historic and international art, indigenous heritage, archaeology, anthropology, history, and popular culture. Now a part of the Centre for Arts and Culture, Nickle Galleries is also formally connected to the unique and special research collections held by Libraries and Cultural Resources, and is a catalyst for the promotion and combined use of object-based and textual collections.

Museo, located next to Nickle Galleries, is a museum shop offering a wide selection of unique giftware, stationery and jewellery, in addition to an excellent selection of art publications.

Admission to Nickle Galleries is free for all visitors.

For hours of operation and upcoming events, please contact Nickle Galleries.

Telephone: 403.220.7234

Fax: 403.210.3075

Email: nickle@ucalgary.ca

Website: http://www.ucalgary.ca/~nickle

Special Collections

Archives and Special Collections is comprised of Canadian Architectural Archives and Special Collections that together acquire, maintain and provide access to print and archival collections of enduring value to support inquiry, learning, teaching, research and effective recordkeeping at the University of Calgary.

Canadian Architectural Archives collects, preserves and ensures access to the records of twentieth-century Canadian architects and architectural firms to support learning and teaching through instruction, reference, exhibitions and publications. Website: http://caa.ucalgary.ca/ **;** Email: archives@ucalgary.ca.

Special Collections acquires, preserves and makes accessible print and archival collections with a strong focus on Canadian literature, art, music and Western Canadian history. It includes archives of authors like W.O. Mitchell, Mordecai Richler, and Alice Munro, and rare books and incunabla including a leaf of the Gutenberg Bible. Website: http://specialcollections.ucalgary.ca/ ; Email: archives@ucalgary.ca.

Special Collections is located within the Centre for Arts and Culture on the 5th floor of the Taylor Family Digital Library. Research services are available Monday to Friday, from 10:00 am to 4:30 pm. Please contact Special Collections in advance of your visit since any materials you wish to access will need to be retrieved from our vaults.

Web: http://asc.ucalgary.ca/

Email: archives@ucalgary.ca

University Archives

The University Archives preserves and builds the institutional, administrative, research and cultural heritage of the University of Calgary by acquiring, maintaining, preserving and facilitating access to records of permanent value created and received by university. It also contributes to the development of information management strategies and projects across campus.

The University Archives is located within the Centre for Arts and Culture on the 5th floor of the Taylor Family Digital Library. Research services are available weekdays from 10:00 am–4:30 pm. Please contact the Archives at least one day in advance of your visit since any materials you wish to access will need to be retrieved from our vaults.

Telephone: 403-220-3024

Web: http://archives@ucalgary.ca

Email: uarc@ucalgary.ca

University Library

Libraries and Cultural Resources (LCR) offers students, faculty, and staff easy access to a wealth of research materials, expertise and services. Many of these resources are housed in the six-storey Taylor Family Digital Library (TFDL), a unique combination of library, student advising, alumni office, music centre, cafe, archives, special collections and art gallery.

All of these resources come alive with technology that encourages exploration and new ways of learning, making the Taylor Family Digital Library one of the most information-rich facilities in Canada.

The Library is ranked among the largest research libraries in Canada, with a collection that spans over nine million objects including books, journals, maps, artifacts, works of art, rare books, special collections, music scores.

The Learning Commons, located on the first three floors of the TFDL, is the centre of activity for students, faculty, staff and visitors. It is a light-filled area with comfortable furniture, 100 per cent wireless and cellular coverage, collaborative work rooms, individual workstations, and access to plug-ins for laptops.

The upper floors on the TFDL house more than half a million of the latest and most frequently used books, journals and research materials. The Centre for Arts and Culture encourages closer study of fine art and archival materials, while researchers can browse the wealth of resources on performing arts, art, architecture and music. Other distinctive facilities include the Visualization Studio dedicated to supporting faculty research, Spatial and Numeric Data Services providing access to cartographic materials, GIS and statistical data and software, and the Digital Media Commons facilitating the exploration and creation of new media forms.

The Taylor Family Digital Library is located at the heart of the campus, with six branch libraries: Health Sciences Library, Bennett Jones Law Library, Gallagher Library, the Doucette Library of Teaching Resources, the Business Library, the Downtown Campus Library, and The Military Museums Library and Archives.

The University Library is open 90 hours each week, offering access to the resource materials as well as reference assistance, specialized information consulting and instruction in the skills and process of information retrieval and management to equip independent learners for success in the knowledge era.

Library resources and services are also "delivered to your desktop" via our online information system, featuring the Library catalogue, an extensive selection of networked databases, electronic information resources and services for distance learning.

Telephone: 403.220.8895

Fax: 403.282.1218

Email: libinfo@ucalgary.ca

Web: http://library.ucalgary.ca/

University of Calgary Press

The University of Calgary Press publishes peer-reviewed scholarly work that makes a difference. We disseminate research that makes us think, that moves the conversation forward. Our books explore a sense of place in western Canada, the relevance of history in our lives, and our impact on the world around us. We publish in print, eBook, and open access formats.

Publishing interests include: Canadian art and architecture, African studies, environment and history; Latin American and Caribbean studies, the West, Northern studies, cinema, and Canadian defence and strategic studies.

U of C Press offices are located on the sixth floor of the Taylor Family Digital Library. Usual business hours are 8:30 am to noon and 1:00 to 4:30 pm, Monday to Friday.

Telephone: 403.220.7578

Fax: 403.282.0085

Email: ucpress@ucalgary.ca

Website: http://www.uofcpress.com

The Teaching and Learning Centre

Inspiring a Community of Excellence

The Teaching and Learning Centre provides leadership and support for teaching and learning through a variety of programs, workshops, media, resources and consultation services. Watch our website for additional offerings.

Teaching Development Programs

Teaching development programs are interactive, interdisciplinary learning opportunities that are founded on evidence-based best practices and geared to skills development. Programs include:

- Instructional Skills Workshops and University Teaching Certificate for graduate students
- Instructional Skills Workshops and Faculty Teaching Certificate for faculty members
- Course Design Workshop for faculty and graduate students

A variety of short workshops are also offered on an ongoing basis.

E-Learning and Design

Learning technologies are becoming increasingly popular. These programs show you how to use the e-learning tools to support effective learning.

- Videoconferencing facilities and support
- Teaching Online Program for faculty and graduate students
- Introduction to Elluminate
- Getting Started With Adobe Presenter
- Blackboard Essentials
- Assessment Tools in Blackboard
- First Steps Series for Online Teaching
- Introduction to the learning management system
- A variety of other e-learning topics

Video Production

Professionally produced video provides the target audience with a consistent, easily accessible (online, DVD, etc.) message using visuals, graphics, music and narrative. Full video production services with an award winning team include:

- Project Conceptualization and Planning
- Location Shooting
- Post-production services (editing)

Resources

Online access to resources for teaching and learning in higher education http://tlc.ucalgary.ca.

Books and media resources in the Teaching and Learning Centre, 5th Floor Biological Sciences Building.

Consultation with Individuals and Faculties

Educational Developers, Instructional Designers, E-learning experts, and media professionals are available to the campus community for consultations. TLC staff work with:

- Faculties to develop workshops or approaches to meet their specific needs
- Individuals who wish to explore teaching and learning, course design or the production of resources
- Curriculum Mapping: assistance with aligning program-level goals to individual courses

Contact information: For more information and to register, please see our website http://tlc.ucalgary.ca or call 403.220.4949.

University Theatre Services

Website: http://arts.ucalgary.ca/theatres/

Boris Roubakine Recital Hall

The Boris Roubakine Recital Hall is a 200-seat lecture theatre converted to provide performance facilities for small music recit-

als, film presentation, slide shows and similar events. It is available for both academic and community use.

The Reeve Theatre

The Reeve Theatre is the Department of Drama's primary research and public performance facility, a strategic site of experiential learning for both undergraduate and graduate programs in Drama.

This facility is an experimental theatre laboratory, a unique concept combining the requirements of performance with responsibilities for experimental instruction in the dramatic arts. The Reeve Theatre is not available for community booking.

The Rozsa Centre

The Rozsa Centre houses the 384-seat Eckhardt-Gramatte Hall, a music performance and teaching facility for the Department of Music and the Husky Oil Great Hall, a conference facility for the International Centre. It also houses the Rozsa Recording studio - a state-of-the-art digital audio recording studio capable of producing professional quality recording masters. The Rozsa Centre is available for community booking through University Theatre Services.

The University Theatre

The University Theatre provides seating for 505 persons, with performance facilities for drama, music, dance, films, exhibitions and lectures. After academic needs are met, the University Theatre is available for a wide variety of community uses.

Research Centres, Groups and Affiliations

University Research Institutes and Centres

- Alberta Children's Hospital Research Institute for Child and Maternal Health
- Alberta Ingenuity Centre for In-Situ Energy (AICISE)
- Arctic Institute of North America
- Biogeoscience Institute
- Calgary Centre for Research in Finance
- Calgary Centre for Clinical Research
- Calgary Institute for the Humanities
- Canadian Institute of Resources Law
- Calvin, Phoebe and Joan Snyder Institute for Chronic Diseases
- Canadian Centre for Advanced Leadership in Business
- Canadian Centre for Advanced Supply Chain Management and Logistics
- Centre for Advanced Solar Materials
- Centre for Advanced Technologies
- Centre for Bioengineering Research and Education
- Centre for Computational & Discrete Geometry
- Centre for Environmental Engineering and Research and Education
- Centre for Military & Strategic Studies
- Centre for Public Interest Accounting
- Centre for Research in the Fine Arts
- Clinical Simulation Learning Centre
- Creating Organizational Excellence
- Enbridge Centre for Corporate Sustainability
- Hotchkiss Brain Institute
- Human Performance Laboratory
- Hunter Centre for Entrepreneurship and Innovation
- Infomatics Research Centre
- Institute for Gender Research
- Institute for Public Health
- Institute for Quantum Science and Technology
- Institute for Security, Privacy and Information Assurance
- Institute for Space Imaging Science Radio Astronomy
- Institute for Sustainable Energy, Environment and Economy
- International Institute for Infrastructure Renewal and Reconstruction
- Language Research Centre
- Latin American Research Centre
- Libin Cardiovascular Institute of Alberta
- McCaig Institute for Bone and Joint Health
- Pipeline Engineering Centre
- Population Health and Inequities Research Centre
- Running Injury Clinic
- Southern Alberta Cancer Research Institute
- Werklund Foundation Centre for Youth Leadership Education
- Westman Centre for Real Estate Studies

Faculty Research Groups

Faculty of Arts

- Ethics and Political Philosophy (http://phil.ucalgary.ca/research/ethics.html)
- History and Philosophy of Science (http://phil.ucalgary.ca/research/hps.html)
- Logic and Language (http://phil.ucalgary.ca/research/logic.html)
- The Medieval and Renaissance Cultural Studies Research Group(http://mems.ucalgaryblogs.ca/research/marcs/)
- Postcolonial Studies Research Group (http://english.ucalgary.ca/content/postcolonial-studies-research-group)
- Syneme (http://syneme.ucalgary.ca/tiki/tiki-index.php)
- Traditional Authority Applied Research Network (TAARN) (http://people.ucalgary.ca/~taarn/)

Faculty of Environmental Design

- Cities, Policy and Planning Lab (http://www.ucalgary.ca/cities/)
- History and Theory of Modern Architecture and Urbanism in Canada (http://evds.ucalgary.ca/content/history-and-theory-modern-architecture-and-urbanism-canada)
- Laboratory for Integrative Design (http://evds.ucalgary.ca/content/laboratory-integrative-design)
- Urban Lab (http://www.ucalgary.ca/urbanlab/)

Faculty of Kinesiology

- Sport Technology Research Laboratory (STRL)

Faculty of Law

- Natural Resources, Energy and Environmental Law Research Group (http://law.ucalgary.ca/research/nreel)

Schulich School of Engineering

- Advanced Geomechanics Testing Laboratory Advanced Hydraulics Laboratory
- Advanced Micronanosystems Integration Facility (AMIF)
- Advanced Technology Information Processing Systems (ATIPS)Analog Electronics Research Laboratory
- Anechoic Research Laboratory
- Applied Snow and Avalanche Research
- Asphaltene and Emulsion Research Autonomous Reconfigurable Robotic Systems Laboratory
- Biomedical Engineering Laboratory Suites
- Biomedical Signal and Image Analysis Laboratory
- Biometric Systems Research Laboratory
- Biometric Technologies Laboratory
- Biosystems Research and Application Group (BRAG)
- Bituminous Materials Research Laboratory
- Bone Imaging Laboratory
- CARP Biosystems Modeling Laboratory
- Catalysis For Bitumen Upgrading and Hydrogen Production Research Group
- Construction Monitoring and Visualization Laboratory
- Corrosion Science and Electrochemical Technology Research Lab
- Creep Laboratory Diffusion Bonding and Joining Laboratory
- Digital Signal Processing Research Laboratory
- Durability Laboratory
- Dynamics Power Research Laboratory Energy and Environment Research Group (EERG)
- Energy Systems and Control Group
- Environmental Information Systems Laboratory
- Environmental Research Laboratory
- Embedded System Research Laboratory Fully Integrated Systems and Hardware Laboratory
- Fundamental Research in Reservoir Modeling Gas Hydrates
- Gassy Soils Research Laboratory
- Geotechnical Gas Hydrates Research Laboratory
- Green Catalysis Research Group

- Healthcare Operational Excellence (HOPE) Laboratory
- Human-Computer Interaction Research Laboratory
- Improved Heavy Oil Science and Technology
- In Situ Combustion Research Group
- Information and Communication Technology: Radio Systems
- Information and Communication Technology: Software Engineering
- Intelligent RF Radio Technology Laboratory (iRadio Lab)
- Intelligent Sensors, Integrated Systems (ISIS) Laboratory
- Intelligent Software Systems Research Laboratory
- Intelligent Transportation Laboratory
- Intelligent Video Systems Research Laboratory
- Internal Combustion Testing Facility
- Laboratory for Environmental Catalytic Applications
- Laboratory for Research in Air Pollution
- Laboratory for Software Engineering Decision Support
- Low-Frequency Instrumentation Laboratory
- M.A. Ward Structural Laboratory
- Materials Preparation Laboratory
- Materials Testing Laboratory
- Micro Engineering Dynamics and Automation Laboratory (MEDAL)
- Micro/Nano Systems
- Microsystems Dynamics Laboratory (MDL)
- Mobile Multi-Sensor Systems Research Group
- Multimedia Signal Processing Research Laboratory
- Multiphase Flow Research Laboratory Nanoscale Technology and Engineering Laboratory
- Petroleum Reservoir Integrated Modelling and Engineering Group
- Pharmaceutical Production Research Group Porous Media and Process Tomography
- Research Group Position, Location and Navigation (PLAN) Group
- Power Electronics Research Laboratory
- Power Research Laboratory
- Product Design and Realization Laboratory
- Project Management and Simulation Laboratory
- Radio Frequency Integrated Circuits (RFIC) Laboratory
- Radio Frequency/ Microwave Research Laboratory
- Reservoir Simulation Group (http://www.ucalgary.ca/reservoir_simulation/)
- RF Radio Technology Printed Circuits Laboratory
- Robotics Research Laboratory Schlumberger iCentre
- Secure System-on-Chip (SOC) Laboratory
- Sensor Network Research Laboratory
- Small Specimen Testing Laboratory
- Software Engineering Decision Support Laboratory
- Software Quality Engineering Research Laboratory
- Solid State Lighting and Human Development Research Laboratory
- System Identification Research Laboratory
- Theoretical and Empirical Software Engineering Research Centre
- Thermal Testing Laboratory
- Tomographic Imaging and Porous Media Laboratory Visualization Research Laboratory
- Wind Tunnel Research Cluster
- Wireless Networking Research Laboratory
- Wireless/Optical Fiber Communications Research Laboratory

Faculty of Science

- Biological Modelling and Visualization Research Group
- Applied Sulfur Chemistry and High-Pressure Thermodynamics
- Artificial Intelligence Research Laboratory
- Calgary Advanced Energy Storage and Conversion Research (CAESR) group
- Centre for Molecular Simulation
- Complexity Science Group
- GroupLab
- ICORE Information Security Laboratory
- Innovations in Visualization Laboratory
- Interactive Reservoir Modeling, Visualization and Analytics Research Group
- Piers Group Research
- Spatial Analysis and Research in Computational Science

Faculty of Social Work

- Consortium for Peace Studies
- Oikos Centre for the Environment

Werklund School of Education

- ASERT Lab
- BRAINGAIN Lab
- Canadian Oil Sands Early Mathematics Initiative
- CORE Connections (Creating Opportunities for Resilience and Engagement)
- Imperial Oil Science Technology Engineering and Mathematics (IOSTEM) Education Initiative
- Strengths in ADHD

Faculty Affiliated Groups

Faculty of Arts

- Arctic Institute of North America (Arts/Science)
- Canadian Society for the Study of Higher Education
- Families and Youths Research Group
- Van Horne Transportation Institute
- Vecova Centre for Disability Services and Research

Faculty of Law

- Alberta Civil Liberties Research Centre
- Alberta Law Reform Institute
- Canadian Research Institute for Law and the Family

Faculty of Medicine

- Clinical Research Unit

Faculty of Science

- Advancing Canadian Wastewater Assets
- Alberta Sulphur Research Ltd.
- Arctic Institute of North America (Arts/Science)
- Bamfield Marine Sciences Centre (http://www.bms.bc.ca/)
- Banff International Research Station
- Canadian Energy Research Institute
- Carbon Management Canada
- Pacific Institute for the Mathematical Sciences
- SurfNet Network (http://www.nsercsurfnet.ca/)

Faculty of Social Work

- Healthy Minds Healthy Children
- RESOLVE Alberta

Werklund School of Education

- Galileo Educational Network
- U-CAPES

International Education

Becoming a Global Intellectual Hub

http://www.ucalgary.ca/uci/system/files/international+strategy-final-sm.pdf

The University of Calgary Academic Plan, 2012-2016 has identified Internationalization as one of seven institutional priorities.

"We will create a campus that also attracts scholars from around the world to this hub – one that promotes diversity of thought, culture, and respect for alternatives. We will leverage our expertise to share capacity with targeted institutions in the developing world." Academic Plan 2012-2016.

"Becoming a Global Intellectual Hub", the International Strategy (2013) has stated four general goals for the University of Calgary:

1. Increase the diversity of the campus community: including increasing the percentage of undergraduate international students to 10 per cent of the student body and to 25 per cent of the graduate student body.
2. Improve global and cross-cultural competencies within the campus commu-

nity: including having 50 per cent of domestic undergraduate students offered opportunities for study abroad; and increasing cross-cultural competencies through on-campus experiences.

3. Enhance opportunities for international collaborations and partnerships in a research and education.
4. Leverage our unique areas of expertise to engage in international development.

"Our University will be a "global intellectual hub" where our students, staff, and faculty at the centre of this hub will radiate new discoveries, ideas, and applications that have global impact." Academic Plan 2012-2016.

We are committed to raising the profile of the University of Calgary worldwide, making it an attractive destination for international students, academics and researchers. As well, we provide options for students to study around the world as part of their University of Calgary degree. Problems are international in their dimensions and require global solutions as countries are linked culturally, economically and ecologically. University graduates require skills which enable them to find solutions in a world characterized by a diversity of languages, religions, living standards, technological standards, historical perspectives and cultural values.

The University of Calgary has over 3000 international students registered on campus (Fall 2013) from over 100 countries. In addition, our alumni, including Canadians, are living in all areas of the world, proving the importance of an international education. The University of Calgary offers major entrance scholarships and awards for first year undergraduate international students as well as awards for continuing students as a part of the University of Calgary support for internationalization and to international students.

The University of Calgary has agreements to receive funded/scholarship students from a number of countries at both the graduate (Masters and Doctoral) and undergraduate (Baccalaureate) level. We encourage international graduate and undergraduate students to consider spending time at the University of Calgary working with academics in disciplines assisting in cutting edge research.

"Calgary is a global community – and we must prepare our graduates to work in a globalized world." Academic Plan 2012-2016.

The University of Calgary has developed an ambitious plan that would encourage 50 per cent of undergraduate students to have a study abroad or international experience. All undergraduate programs provide an international component to the program which may include study abroad (Student Exchange, Groups Study Programs, research, practicum, Internships or independent study). Students may enhance their academic program, employment prospects and personal growth by studying abroad for a term or year.

The University of Calgary offers study abroad options in more than 50 countries including: Student Exchange Programs for a term or full year; Semester Abroad Programs in Czech Republic and Spain with University of Calgary courses taught on site; Field Schools to selected sites which offer intensive study opportunities abroad with University of Calgary faculty members during Spring and Summer Terms and Block Weeks. Students may also use their initiative to design their own program of study or undertake a research project.

While some study programs require knowledge of a language other than English, not all the University of Calgary exchange partners expect a student to be fluent in order to participate. It is possible to combine study abroad with language learning.

Students unable to study abroad may get involved with international activities on campus: volunteering with international offices such as UCInternational or Centre for International Students and Study Abroad and taking part in events to promote discussion and an international understanding: refer to "Make Your Degree More International" section of University Calendar for more information.

We will leverage our expertise to share capacity with targeted institutions in the developing world. International partnerships will be equitable, respectful of differences in culture, and mutually beneficial. We will be a global source for objective information, expertise, and productive collaborations across all sectors of government, industries, and non-governmental organizations." Academic Plan 2012-2016.

The University of Calgary has over 250 international partnerships that include collaborative research, joint academic and scientific studies, collaborative degrees and student exchanges, training programs, internships and practicums. University of Calgary staff/faculty have led development projects in Water Management in Central and South America; Child Health in Uganda; Health care Accessibility, Rehabilitation and Education in South Sudan. University of Calgary students may complete a semester-long internship/practicum through our participation with NGO's in Ghana, Uganda and Bolivia.

The University of Calgary opened its first branch campus "UC Qatar" in Fall 2007 offering a Bachelors of Nursing and post-degree diploma programs to residents of the Gulf region. The University of Calgary celebrated its first graduating class from UCQatar in June 2010 and has approximately 400 students enrolled in the Nursing Program. In addition to Baccalaureate degrees, UC Qatar offers a Masters Program.

FastFacts

- There are more than 3000 international students at the University of Calgary and the five countries from which we receive the largest number of international students are: China, Iran, India, the USA, and Saudi Arabia.
- The University of Calgary has developed a "Global Energy MBA" program which is unique in drawing on resources in the oil and gas industry in Calgary and from major centres around the world.
- Through the American Friends of the UofC, Antje Graupe Pryor Foundations and UofC International Studentships, the University of Calgary awards more than $350,000 each year for students spending a period of time studying abroad.
- The Student Refugee Committee of the Students' Union sponsors a new refugee student at the University of Calgary each year through World University Services of Canada (WUSC).
- New student orientation programs assist International students to become comfortable with their new environment. Opportunities include a "Buddy" or "Mentor" program for new students.
- The top destination countries for University of Calgary exchange programs are Australia, the UK, South Korea and the Netherlands.
- The University of Calgary offers Semester Abroad programs for undergraduates in the Czech Republic, and Spain. Architecture graduate students may spend the Fall Term in Barcelona Spain and/or the Winter Term in Melbourne, Australia.
- In 2013, 1000 (est.) University of Calgary undergraduate students studied abroad as part of their degree programs. Many participate in spring or summer schools abroad.
- The University of Calgary offers more than $750,000 a year in academic scholarships and awards to undergraduate international students attending the university for degree programs.

Main offices involved in international education:

http://www.ucalgary.ca/international

University of Calgary International
(Partnerships, Delegations, International Development)

Room 14 Dining Centre

Tel: 403.220.7702

Fax: 403.289.0171

Email: uci@ucalgary.ca

http://www.ucalgary.ca/uci

Centre for International Students & Study Abroad (CISSA)

Room 275 MacEwan Student Centre

Tel: 403.220.5581

Fax: 403.289.4409

Email: cissa@ucalgary.ca

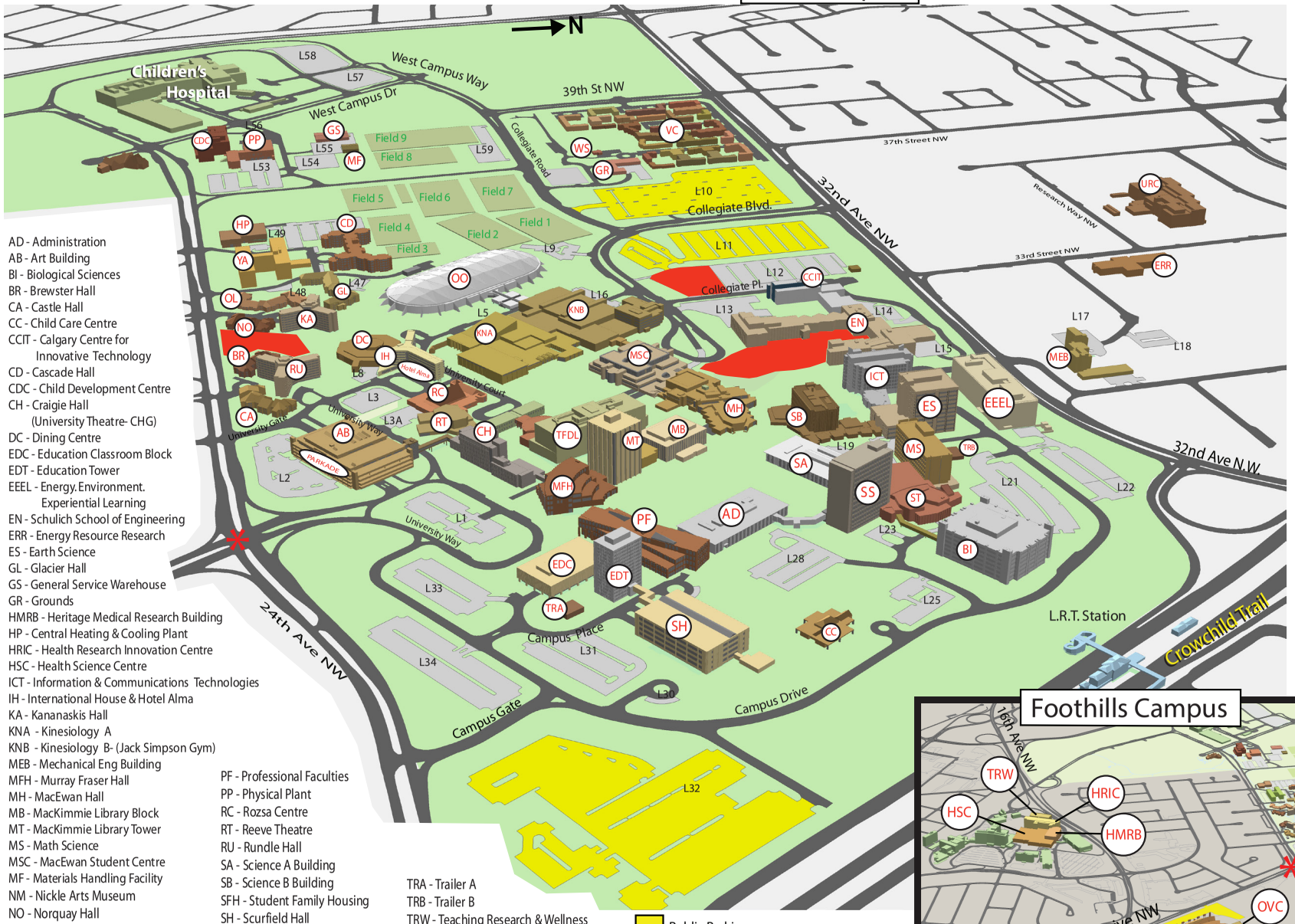
International Student Recruitment & Prospective Students Information

Tel: 1+403.210.7625

http://www.ucalgary.ca/prospectivestudents

http://www.ucalgary.ca/admissions

Main Campus



AD - Administration
AB - Art Building
BI - Biological Sciences
BR - Brewster Hall
CA - Castle Hall
CC - Child Care Centre
CCIT - Calgary Centre for Innovative Technology
CD - Cascade Hall
CDC - Child Development Centre
CH - Craigie Hall (University Theatre- CHG)
DC - Dining Centre
EDC - Education Classroom Block
EDT - Education Tower
EEEL - Energy. Environment. Experiential Learning
EN - Schulich School of Engineering
ERR - Energy Resource Research
ES - Earth Science
GL - Glacier Hall
GS - General Service Warehouse
GR - Grounds
HMRB - Heritage Medical Research Building
HP - Central Heating & Cooling Plant
HRIC - Health Research Innovation Centre
HSC - Health Science Centre
ICT - Information & Communications Technologies
IH - International House & Hotel Alma
KA - Kananaskis Hall
KNA - Kinesiology A
KNB - Kinesiology B- (Jack Simpson Gym)
MEB - Mechanical Eng Building
MFH - Murray Fraser Hall
MH - MacEwan Hall
MB - MacKimmie Library Block
MT - MacKimmie Library Tower
MS - Math Science
MSC - MacEwan Student Centre
MF - Materials Handling Facility
NM - Nickle Arts Museum
NO - Norquay Hall
OL - Olympus Hall
OO - Olympic Oval
OVC - Olympic Volunteer Centre

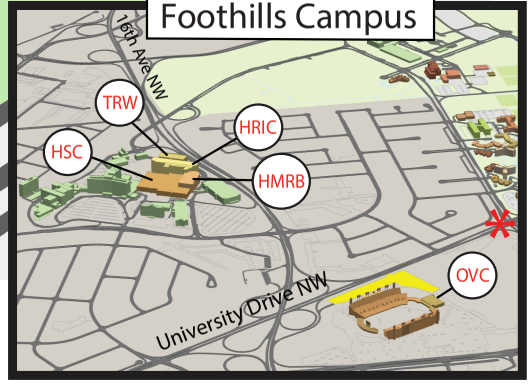
PF - Professional Faculties
PP - Physical Plant
RC - Rozsa Centre
RT - Reeve Theatre
RU - Rundle Hall
SA - Science A Building
SB - Science B Building
SFH - Student Family Housing
SH - Scurfield Hall
SS - Social Science
ST - Science Theatres
TFDL - Taylor Family Digital Library

TRA - Trailer A
TRB - Trailer B
TRW - Teaching Research & Wellness
URC - University Research Centre
WS - Weather Station
YA - Yamnuska Hall

Public Parking
- construction areas
Main Entrance

UCMAPS Nov 28, 2013

Foothills Campus



For detailed Campus maps for Main Campus, South Campus, Parking, Construction Zones and future campus projects, go to http://www.ucalgary.ca/map/.

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