Calendar Production

The Faculty of Graduate Studies extends its gratitude to all those dedicated individuals who contributed time and effort towards this Calendar.

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By the act of registration with the University of Calgary, each student shall be deemed to have agreed t 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.

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

FACULTY OF GRADUATE STUDIES

Dean: Fred Hall

UPDATED (Jan. 6, 2010)
Associate Deans: Brian MacIntosh
Michael Sideris (Engineering)
Frans van der Hoorn (Medicine)
Lisa Young

Office Staff UPDATED (Dec. 9, 2009)

Gillian Robinson, Graduate Associate Registrar (Student Services)
Lindsey Rose, Graduate Associate Registrar (Policy and Planning)

Ramona Fodchuk, Graduate Calendar Editor/Administrative Coordinator
Marilyn Mooibroek, Graduate Student Professional Development and Postdoctoral Program Coordinator
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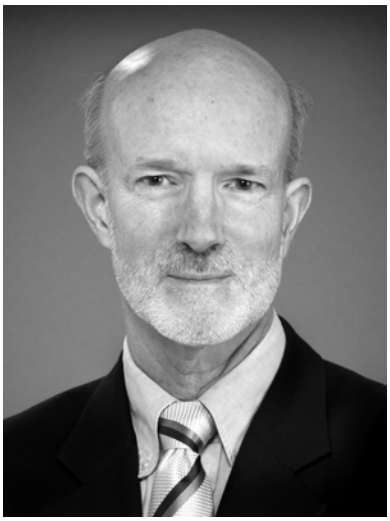
Brad Drebit, Graduate Scholarship Officer
Cristina Rai, Graduate Scholarship Officer
Cathie Stiven, Manager, Graduate Awards

Jennifer de Roaldes, Graduate Program Officer
Catalina Kovacs, Graduate Program Officer
Dawn MacMillan, Technical Analyst
Diane McInnes, Graduate Program Officer
Laura Fitterer, Graduate Program Officer
Corey Wilkes, Graduate Program Officer and Team Lead (Registrations)

Vanessa Gee, Faculty Administrative Assistant
Monica Gollaz, Faculty Administrative Assistant
Nurani Mawji, Administrative Assistant, Financial



Dr. Frederick L. Hall
Vice-Provost (Graduate Education) and
Dean of Graduate Studies

A Message from the Dean

Welcome to the 2009-2010 academic year at the University of Calgary. The on-line Calendar found at http://grad.ucalgary.ca/calendar is now the official version, with this 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 be to improve the graduate program, and therefore to the student's advantage.

This Calendar is meant to serve the needs of three groups of people: current graduate students; the staff and faculty who work with graduate students; and (particularly for the web version of the Calendar) prospective students.

For new and returning students, congratulations on your choice of the University of Calgary, and best wishes for your success here. It is your responsibility to know the regulations of the University and of your program as they are reflected in this Calendar. It is to your advantage because knowing them will assist you in setting a timetable for moving successfully through your program. If you have questions about material in the Calendar, or about any aspect of the graduate enterprise, feel free to come to our offices (Earth Sciences 720) or call (403-220-4938) or e-mail us (graduate@ucalgary.ca). Check our website for useful information (http://www.grad.ucalgary.ca/), including especially the Graduate Awards database. Check also the Graduate Students' Association and their website (http://www.ucalgary.ca/GSA/) for additional valuable information. We welcome any comments you may have about the overall structure and presentation of material in this Calendar.

For staff and faculty who rely on this Calendar for your work with graduate students, let me first thank you for your involvement. You are what defines each of the graduate programs for the students, and that is an important responsibility. The organization of the front matter of the Calendar was revised in an effort to make your job easier (as well as to ease navigation of the material for the students). Please let us know what other changes to structure, or to regulations, would help you to make your program and its functioning even better.

And finally, to those prospective students who are far-sighted enough to look into the University's regulations in this Calendar, as well as investigating the website of the particular program that interests you, you are exactly the kind of inquisitive, forward-looking student that we would like at the University of Calgary! We have many sources of support for students, starting with our most prestigious competitive award, the Killam doctoral scholarship. Details of the internal awards are on the Graduate Awards Database at http://www.grad.ucalgary.ca//funding. Almost all students in research–based programs receive financial support, which is competitive with that offered by other Canadian universities. The University of Calgary is an exciting place at which to pursue your education. Let our office know how we can assist you to make an informed choice on your graduate education.

Dr. Alan Harrison
Provost and Vice-President (Academic)

Welcome from the Provost

Welcome to the 2009-2010 academic year at the University of Calgary. Though relatively young in the context of many universities—we celebrated our 40th anniversary only three years ago—we pursue the highest levels of excellence in scholarship, research, and teaching, as is evidenced by our lofty position among the most research-intensive universities in Canada.

Graduate students are important members of the University of Calgary's academic community. As well as taking courses and undertaking research, many of you will be engaged in teaching, either as teaching assistants or as teaching fellows. This experience will be an important element of your academic development, and, additionally, a valuable contribution to undergraduate education.

The Graduate Students' Association (GSA) has become a strong and effective advocate for graduate students at the University of Calgary, and offers a number of opportunities that will expand your horizons and broaden your graduate experience. I encourage you to avail yourself of the services offered by the GSA, and to consider becoming engaged in the Association's many activities.

Good luck for the coming year. May it be both successful and fulfilling.

Graduate Students' Association

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 advances graduate education through: advocacy, accountability, support, sustainability and integrity. The mission of the GSA is to enable all students to reach the highest possible level of achievement and to support the acquisition of new knowledge and skill. As such, the GSA advocates on behalf of graduate students to the University community, all levels of government as well as the Calgary community as a whole.

GSA Membership

Membership in the GSA consists of active members, associate members and honorary members. All students registered as full or part-time graduate students in the Faculty of Graduate Studies, the Faculty of Environmental Design, and those in Post-Degree Continuous Learning programs are active members. Active members must pay the annual GSA fee and automatically become members of The Last Defence Lounge and Restaurant.

GSA Executive

The affairs of the GSA are managed by an executive body which is elected each spring for a one-year term. The positions include: President, Vice-president Academic, Vice-president Student Life and Vice-president Student Services. The Executive's goals are facilitated by a team of full-time staff members who manage the logistical, day-to-day affairs of the GSA, and report directly to the elected executive.

Graduate Representative Council (GRC)

The Graduate Representative Council (GRC) meets once a month and is the policy-generating and decision-making body of the GSA. Every department in every faculty is guaranteed one or more GRC representatives based on departmental graduate enrollment figures. Representatives are normally elected by their department's graduate students in the fall term to act as liaisons between the GSA and their Departmental Graduate Associations (DGAs). It is the GRC that gives direction to the elected Executive body and, as the governing body, the GRC has the power to modify or review GSA policies.

Departmental Graduate Associations (DGAs)

Through the GSA, each department of the university is able to form a Departmental Graduate Association (DGA). Start-up grants, the ability to apply for group funding, and receiving a discount for DGA functions at The Last Defence Lounge are just some of the benefits for DGAs. 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 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.

Grad 601

Grad 601 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/opportunities provided to graduate students. Plus, it gives graduate students a chance to network with other graduate students. For more information on Grad 601, please visit: http://www.ucalgary.ca/ose/grad601.

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 and the GG 13.

The GSA Office and The Last Defence Lounge and Restaurant

The GSA main office is located on the third floor of the MacEwan Student Centre (MSC 350) which houses all of the GSA's operations, including the Health and Dental Plan. Adjacent to the office is The Last Defence Restaurant and Lounge: a members-only lounge to which active graduate students are automatically given a membership. Proof of membership can be obtained from the GSA main office during business hours: it is simply a sticker placed on student ID cards. Recently renovated and with a new menu, The Last Defence offers food and beverage service, a full bar, a patio and hosts special social events and promotions in a modern and chic atmosphere. Undergraduate students are ineligible for memberships, but U of C staff and faculty can purchase memberships for $10 per year. University of Calgary alumni graduate students are given permanent membership upon graduation.

GSA Services

The GSA provides many key services to graduate students, such as offering a Health and Dental Plan for all active members. 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. The GSA also provides a Career and Mentorship Program 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 Career and Mentorship Coordinator, email: careers@gsa.ucalgary.ca . The GSA 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 GSA Ombudsperson, please email: ombuds@gsa.ucalgary.ca. As well, each spring, the GSA hosts The U of C Graduate Conference: an inter-disciplinary conference for all graduate students in all departments of the university. This is a great way to get involved, get credit for your CV and meet other graduate students. For more information, you can visit: www.gradconference.ca . Through the GSA, graduate students also have access to GSA Bursaries, various academic and professional skills workshops, free sports leagues, a free daytimer and much, much more. To access a complete list of GSA services, visit the GSA website at: http://www.gsa.ucalgary.ca . 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
350, MacEwan Student Centre
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 to Friday
8:30 AM to 12 PM and 1 PM to 4:30 PM

Message from the GSA President

On behalf of the Graduate Students' Association, I am pleased to welcome you to the University of Calgary. I would like to wish you every success in your graduate work and I hope that you will enjoy a fulfilling experience at one of Canada's top universities.

Graduate students at the U of C typically lead full and productive lives, both on-campus and in their own personal time. The Graduate Students' Association, now in its forty-second year of operation, exists to facilitate the needs and concerns of the students it represents. As a student-run organization, the GSA works hard with our full-time staff members to organize a host of activities to entertain and enrich the graduate student experience, including academic and professional skill development workshops, intramurals, and social events (karaoke, dance parties, trivia tournaments, etc.).

Along with all of these services, the GSA is primarily here for you. We represent the interests of graduate students at the University of Calgary to university administration, all levels of government, and the Calgary community. We work closely with our various lobbying groups and other graduate student organizations to ensure your needs and interests are represented. In order to succeed, however, we need your input. There are many ways to get involved: send us an e-mail telling us what you want; participate in one of our campus-wide surveys; volunteer for Grad 601; join or form your own Departmental Graduate Association (DGA); or become your department's rep to the Graduate Representative Council (GRC). Remember, if your department doesn't have a rep for GRC or a DGA, it's easy to sign up—just contact the GSA main office and we'll guide you through the process.

In addition to services and representation, the Graduate Students' Association is responsible for The Last Defence Lounge, located on the third floor of the MacEwan Student Centre. It's a great place to come for a meal, to attend GSA social events or partake in a casual get-together with friends or colleagues.

On behalf of the entire GSA executive, the Graduate Representative Council 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,

Véronique Dorais
GSA President 2009-2010
pres@gsa.ucalgary.ca

ACADEMIC SCHEDULE 2009-2010

JULY 2009

1 Wednesday	2009-2010 University year begins. Canada Day University Closed.
2 Thursday	SUMMER SESSION LECTURES BEGIN.
4 Saturday	Weekend University Summer Session lectures begin.
6 Monday	Last day for registration and change of registration for Summer Session six-week and first-term half courses (without pres-session study). Fee payment deadline for Summer Session fees for six-week courses and first-term half courses. No fee refunds for withdrawals from Summer Session six-week courses and first-term half courses after this date.
22 Wednesday	Last day of first-term lectures in Summer Session. Last day to withdraw with permission from first-term half courses in Summer Session.
23 Thursday	First-term final examinations for Summer Session. Mid-term break for six-week courses. No Lectures.
24 Friday	Lectures begin for the second-term of Summer Session.
28 Tuesday	Last day for registration and change of registration for second-term half courses after this date.

AUGUST 2009

3 Monday	Alberta Heritage Day. University closed. No lectures.
8 Saturday	Weekend University Summer Session lectures end. Last day to withdraw with permission from Weekend University Summer Session courses.
14 Friday	Summer Session lectures end. Last day to withdraw with permission from full-courses, half courses given over a six-week period and second-term half courses offered from May 14 to August 14.
15 Saturday	Last day to submit Application for all degrees and diplomas to be conferred at Fall Convocation. Weekend University Final Examinations.
17,18 & 19 Monday to Wednesday	Summer Session Final Examinations except first-term courses. Final Examinatins for thirteen-week courses.
31 Monday	Fall Session begins. Lectures begin in Block Week courses.

SEPTEMBER 2009 UPDATED (June 3, 2009) (Nov. 23, 2009)

August 31-4 September Tuesday to Friday	Block Week
4 Friday	Last day to withdraw with permission from Fall Session Block Week course.
7 Monday	Labour Day. University closed.
8 Tuesday	FALL SESSION LECTURES BEGIN (except Block Week courses).
12 Saturday	Weekend University Fall Session lectures begin.
18 Friday	No refunds for withdrawals from full courses (Multi-term) or Fall Session half courses after this date. Last day to drop full courses and Fall half courses.
22 Tuesday	Last day for registration and changes of registration for full courses and Fall Session half courses. Last day for change of registration from audit to credit or credit to audit. Last day to add or swap full courses and Fall Session half courses.
25 Friday	Fee payment deadline for Fall Session full and half courses.

OCTOBER 2009

12 Monday	Thanksgiving Day. University closed (except MacKimmie, Law, Medical and Gallagher Libraries. No lectures.

NOVEMBER 2009

11 Wednesday	Remembrance Day. University closed (except MacKimmie, Law, Medical and Gallagher Libraries. No lectures.
11-15 Wednesday to Sunday	Reading Days. No lectures.
12 Thursday	Fall Convocation
28 Saturday	Weekend University Fall Session lectures end. Last day to withdraw with permission from Weekend University Fall Session half courses.

DECEMBER 2009

5 Saturday	Weekend University Fall Session Final Examinations (except common examinations). National Day of Remembrance and Action on Violence Against Women.
8 Tuesday	FALL SESSION LECTURES END. (For practicum students, the length of the session may be extended.) Last day to withdraw with permission from Fall Session half courses (except Weekend University).
11-21 Friday to Monday	Fall Session Final Examinations and consolidated end-of-session tests in full courses.
25-31 Friday to Thursday	Holiday observance. Session Break. University closed.

JANUARY 2010 UPDATED (Oct. 26, 2009) (Nov. 23, 2009)

1 Friday	New Year's Day. University closed.
4 Monday	Winter Session begins. Lectures begin in Block Week courses.
4-8 Monday to Friday	Block Week.
8 Friday	Last day to withdraw with permission from Winter Session Block Week courses.
11 Monday	WINTER SESSION LECTURES BEGIN (except Block Week courses).
16 Saturday	Weekend University Winter Session lectures begin.
22 Friday	Last day to drop Winter Session half courses. No refunds for withdrawals from Winter Session half courses after this date.
26 Tuesday	Last day for registration and changes of registration for Winter Session half courses. Last day for change of registration from audit to credit or credit to audit. Last day to add or swap Winter Session half courses.
29 Friday	Fee payment deadline for Winter Session half courses.

Spring and Summer Session Schedule of Classes will be available mid-January. Visit Special Sessions website at http://springsummer.ucalgary.ca/index-main.html.

FEBRUARY 2010 UPDATED (Oct. 27, 2009)

1 Monday	Last day to submit Application for Degree for all degrees and diplomas to be conferred at May and Spring (June) Convocations.
14-21 Sunday to Sunday	Reading Week. No lectures. University open (except Family Day).
15 Monday	Alberta Family Day. University closed (except MacKimmie, Law, Medical and Gallagher Libraries. No lectures.

Spring and Summer Session registration for continuing students begins early February. Visit the Special Sessions website at http://springsummer.ucalgary.ca/index-main.html.

MARCH 2010

Spring and Summer Session registration for Open Studies and Visiting students begins early March. Visit the Special Sessions website at http://springsummer.ucalgary.ca/index-main.html.

APRIL 2010 UPDATED (Nov. 19, 2009)

2 Friday	Good Friday. University closed (except MacKimmie, Law, Medical and Gallagher Libraries). No lectures.
10 Saturday	Weekend University Winter Session lectures end. Last day to withdraw with permission from Weekend University Winter Session full and half courses.
16 Friday	WINTER SESSION LECTURES END. (For practicum students, the length of session may be extended.) Last day to withdraw with permission from full-courses or Winter Session half courses (except Weekend University).
17 Saturday	Weekend University Winter Session Final Examinations (except common examinations).
19-29 Monday to Thursday	Winter Session Final Examinations.
30 Friday	Winter Session ends.

MAY 2010 UPDATED (Nov. 23, 2009)

1 Saturday	Last day to register for Spring term first-term half courses, six week and thirteen-week courses (Multi-term) courses with pre-session study
13 Thursday	May Convocation for Faculties of Law and Medicine.
17 Monday	SPRING SESSION LECTURES BEGIN.
21 Friday	Last day for registration and changes of registration for Spring Session first-term half courses, six-week sand thirteen-week courses (Multi-term) (without pre-session study), except for Weekend University. Fee payment deadline for Spring Session fees for first-term, six-week and thirteen-week courses. No fee refunds for withdrawals from Spring Session first-term half courses, six-week and thirteen-week courses (multi-term) after this date.
24 Monday	Victoria Day. University closed. No lectures.

JUNE 2010 UPDATED (Nov. 23, 2009)

3 Thursday	First-term lectures in Spring Session end. Last day to withdraw with permission from first-term half courses in Spring Session.
4 Friday	First-term final examinations for Spring Session. Mid-term break for six-week courses. No lectures.
7 Monday	Lectures begin for the second-term of Spring Session.
7-11 Monday to Friday	Spring (June) Convocation for all Faculties except Law and Medicine.
9 Wednesday	Last day for registration and changes of registration for Spring Session second-term half courses (without pre-session study). Fees for additional or new second-term half course are due on this date. No fee refunds for withdrawals from Spring Session second-term half courses after this date.
22 Tuesday	Last day for registration and changes of registration for Summer Session courses (with pre-session study).
25 Friday	SPRING SESSION 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 Session.
28-30 Monday to Wednesday	Spring Session Final Examinations except first-term courses. Mid-term break for thirteen-week courses. No lectures.
30 Wednesday	University year ends.

JULY 2010 UPDATED (Nov. 23, 2009)

1 Thursday	2010-2011 University year begins. Canada Day. University closed.
5 Monday	SUMMER SESSION LECTURES BEGIN.
9 Friday	Last day for registration and change of registration for Summer Session six-week and first-term half courses (without pres-session study), except Weekend University. Fee payment deadline for Summer Session fees for six-week courses and first-term half courses. No fee refunds for withdrawals from Summer Session six-week courses and first-term half courses after this date.
23 Friday	Last day of first-term lectures in Summer Session. Last day to withdraw with permission from first-term half courses in Summer Session.
26 Monday	First-term final examinations for Summer Session. Mid-term break for six-week courses. No Lectures.
27 Tuesday	Lectures begin for the second-term of Summer Session.
29 Thursday	Last day for registration and change of registration for second-term half courses after this date. Fees for additional or new second-term half courses are due on this date. No refunds for withdrawals from Summer Session second-term half courses after this date.

AUGUST 2010 UPDATED (Oct. 26, 2009)

2 Monday	Alberta Heritage Day. University closed. No lectures.
15 Sunday	Last day to submit Application for Degree for all degrees and diplomas to be conferred at Fall Convocations.
17 Tuesday	SUMMER SESSION LECTURES END. Last day to withdraw with permission from full-courses, half courses given over a six-week period and second-term half courses offered from May 13 to August 13.
18-20 Wednesday to Friday	Summer Session Final Examinations except first-term courses.

SEPTEMBER 2010 UPDATED (Oct. 27, 2009) (Nov. 20, 2009)

6 Monday	Labour Day. University closed.
7 Tuesday	Fall Session begins.
7-11 Tuesday to Saturday	Block Week
11 Saturday	Last day to withdraw with permission from Fall Session Block Week course.
13 Monday	FALL SESSION LECTURES BEGIN (except Block Week courses).
24 Friday	Last day to drop full courses and Fall Session half courses.
28 Tuesday	Last day for registration and changes of registration for full courses and Fall Session half courses. Last day for change of registration from audit to credit or credit to audit.

OCTOBER 2010 UPDATED (Oct. 27, 2009) (Nov. 20, 2009)

1 Friday	Fee payment deadline for Fall Session full and half courses No refunds for withdrawals from full courses (Multi-term) or Fall Session half courses after this date.
11 Monday	Thanksgiving Day. University closed (except MacKimmie, Law, Medical and Gallagher Libraries. No lectures.

NOVEMBER 2010 UPDATED (Oct. 27, 2009)

11 Thursday	Remembrance Day. University closed (except MacKimmie, Law, Medical and Gallagher Libraries. No lectures.
11-14 Thursday to Sunday	Reading Days. No lectures.
12 Friday	Fall Convocation.
27 Saturday	Weekend University Fall Session lectures end.

DECEMBER 2010

10 Friday	FALL SESSION LECTURES END. Last day to withdraw with permission from Fall Session half courses.
13-22 Monday to Wednesday	Fall Session Final Examinations and consolidated end-of-session tests in full courses.
25-31 Saturday to Friday	Holiday observance. Session Break. University closed.

JANUARY 2011 UPDATED (Oct. 26, 2009) (Nov. 20, 2009)

1 Saturday	New Year's Day. University closed.
3 Monday	Winter Session begins. Lectures begin in Block Week courses.
3-7 Monday to Friday	Block Week.
7 Friday	Last day to withdraw with permission from Winter Session Block Week course.
10 Monday	WINTER SESSION LECTURES BEGIN (except Block Week courses).
15 Saturday	Weekend University Winter Session lectures begin.
21 Friday	Last day to drop Winter Session half courses.
25 Tuesday	Last day to add Winter Session half courses. Last day for change of registration from audit to credit or credit to audit.
28 Friday	Fee payment deadline for Winter Session half courses. No refunds for withdrawals from Winter Session half courses after this date.

FEBRUARY 2011 UPDATED (Oct. 27, 2009)

1 Tuesday	Last day to submit Application for Degree for all degrees and diplomas to be conferred at May and Spring (June) Convocations.
20-27 Sunday to Sunday	Reading Week. No lectures. University open.
21 Monday	Alberta Family Day. University closed (except MacKimmie, Law, Medical and Gallagher Libraries. No lectures.

MARCH 2011 UPDATED (Oct. 27, 2009)

Spring and Summer Session registration for Open Studies and Visiting students begins early March. Visit the Special Sessions website at http://springsummer.ucalgary.ca.

APRIL 2011

15 Friday	WINTER SESSION LECTURES END. (For practicum students, the length of session may be extended.) Last day to withdraw with permission from full-courses or Winter Session half courses (except Weekend University).
22 Friday	Good Friday. University closed (except MacKimmie, Law, Medical and Gallagher Libraries). No lectures.
18-29 Monday to Thursday	Winter Session Final Examinations.
30 Saturday	Winter Session ends.

Note: The dates for the 2010-2011 Academic Year are tentative and subject to review and change.

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 $35 million annually in financial awards for graduate study.

Contact Information

Location: Earth Sciences 720
Faculty number: (403) 220-4938
Fax: (403) 289-7635
Email address: graduate@ucalgary.ca
Website: http://www.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.

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 LLB or MD that normally admits students with undergraduate degrees). The University of Calgary presently offers the following combined degree programs: LLB/MBA, MBT/MBA, MSW/MBA, MSc/MBA, PhD/MBA, MD/Master's and MD/PhD. Information and application packages are available from the relevant graduate programs.

Post Degree Continuous Learning

In line with the University of Calgary's Strategic Direction, the faculty of Graduate Studies encourages and facilitates the development of new Graduate Certificate and Diploma programs, which 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. The Post Degree Continuous Learning Calendar is web-based and may be found at http://www.ucalgary.ca/pdcl.

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 Arts (MA)
Master of Biomedical Technology (MBT)
Master of Business Administration (MBA)
Master of Communications Studies (MCS)
Master of Community and Disability Studies (MCDS)
Master of Community Medicine (MCM)
Master of Continuing Education (MCE)
Master of Counselling (MC) (a Campus Alberta degree offered in conjunction with the University of Lethbridge and Athabasca University)
Master of Education (MEd)
Master of Engineering (MEng)
Master of Fine Arts (MFA)
Master of Geographic Information Systems (MGIS)
Master of Kinesiology (MKin)
Master of Laws (LLM)
Master of Music (MMus)
Master of Nursing (MN)
Master of Science (MSc)
Master of Social Work (MSW)
Master of Strategic Studies (MSS)

Degrees Offered

ANTH	APSY	ARKY	ART	BISI	BMEN	CHEM	CMSS	CPSY	COMS	CPSC	CUSP	DRAM	ECON
PhD	PhD	PhD		PhD	PhD	PhD	PhD	PhD	PhD	PhD	PhD		PhD
MA		MA							MA		MA		MA
	MSc			MSc	MSc	MSc		MSc		MSc			
	MEd		MFA		MEng		MSS		MCS			MFA	
	MC												
ENCH	ENCI	ENEL	ENGO	ENME	ENGL	EVDS	FISL	GDER	GEOG	GLGP		GRST	GSEA
PhD	PhD	PhD	PhD	PhD	PhD	PhD		PhD	PhD	PhD			
								EdD					
					MA		MA	MA	MA	MSc		MA	MA
MSc	MSc	MSc	MSc	MSc				MSc	MSc				
MEng	MEng	MEng	MEng	MEng		MEDes		MEd	MGIS				
						MArch		MCE					
HIST	KNES	IGP	LAW	LING	MDBC	MDBT	MDCV	MDCH	MDGI	MDIM	MDMI	MDNS	MDSC
PhD	PhD	PhD		PhD	PhD		PhD	PhD	PhD	PhD	PhD	PhD	PhD
		MA		MA									
MA	MSc	MSc			MSc		MSc	MSc	MSc	MSc	MSc	MSc	MSc
	MKin		LLM			MBT							MPM
			LLB/MBA		MD/ Master's	MBT/MBA	MD/ Master's	MD/ Master's	MD/ Master's		MD/ Master's	MD/ Master's	MD/ Master's
					MD/PhD		MD/PhD	MD/PhD	MD/PhD		MD/PhD	MD/PhD	MD/PhD
								MCDS					
MGMT	MTST	MUSI	NURS	PHIL	PHAS	POLI	PSYC	RELS	SEDV	SOCI		SOWK	VMS
PhD	PhD	PhD	PhD	PhD	PhD	PhD	PhD	PhD		PhD		PhD	PhD
		MA		MA		MA		MA		MA			
	MSc				MSc		MSc		MSc				MSc
MBA		MMus	MN									MSW	
LLB/MBA													
MBT/MBA													
MSW/MBA													

Admissions UPDATED (Oct. 20, 2009)

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. Taking these considerations into account, graduate programs are expected to act in an equitable manner in their admission procedures.

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 a recognized institution. Degrees and grades from other institutions are evaluated for their equivalency to those of the University of Calgary. A grade point average equivalent to 3.00 or better (on the University of Calgary four-point system) is required. This is based on the last two years of the undergraduate degree consisting of a minimum of 10 full-course equivalents of appropriate content for the graduate program applied for, and adequate senior level courses to ensure preparation for graduate work. Any graduate work is also 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 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 MELAB test is conveniently offered once a month at the University of Calgary by the Effective Writing Program. For test information and test dates, please see the MELAB tab at http://efwr.ucalgary.ca.

d) By By successful completion of Level 3 of the English for Academic Purposes (EAP) program. 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; e-mail: eapp@ucalgary.ca.

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.

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

Students who do not meet admission standards and wish to pursue graduate work are advised to enroll 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). 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. Students are advised to discuss this option with the appropriate graduate program before embarking on such a course.

Application for Admission

Applications for admission to the Faculty should be submitted through the on-line 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 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. Cheques or money orders must be made payable to the University of Calgary. Applications will be processed only if the fee has been paid.
Official transcripts from all post-secondary institutions attended

Two appropriate letters of reference dated within twelve months of the date of application
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, must 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.

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

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.

All graduate programs have limited enrollment 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 can be applied for only when applying for admission. See "Advanced Credit" below.
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.

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.

UPDATED (Oct. 22, 2009)

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 specialization, 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 interdisciplinary specialization. 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 an extra year of full program fees. A qualifying student in a course-based program will pay tuition fees for the extra required courses on a per-course basis. Tuition fees for courses taken during the qualifying year will not count toward the tuition fee for the degree program.

Visiting

A student who is registered in a graduate degree program at another university that does not have an exchange agreement with the University of Calgary, and who wishes to engage in course work and/or research at the graduate level at the University of Calgary for credit at 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 files are forwarded to the Faculty of Graduate Studies in the normal way. 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.

An exchange student must submit the appropriate application/approval form (http://www.grad.ucalgary.ca//forms/registration).

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. No fee credit will be given for work done as an exchange student.

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
- 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 coordinator, 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://www.grad.ucalgary.ca//policies/westerndean.

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, 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.

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 more than five years in the past must submit such original transcripts of post-secondary education institutions attended as are required by the program or the Faculty of Graduate Studies, and two appropriate letters of reference.

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, 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 course requirements, any full-time requirements, and any 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.

NEW! (Oct. 20, 2009)
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 coordinator, 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.

Advanced Credit

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.

Course-based programs: The student must request advanced credit in writing at the time of application for admission, endorsed by the graduate coordinator and submitted to the Faculty of Graduate Studies with the admission recommendation.

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 may not exceed either one-third of

the program or two full-course equivalents, whichever is less. 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.

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.

No fee credit is given for courses that are used for advanced credit, or for courses taken as an unclassified or qualifying student.

Readmission

A student who has withdrawn from program not more than five years previously and wishes to apply for readmission must submit an updated application form and a $180 fee along with a letter requesting readmission and a time line detailing the remaining program requirements and when each will be completed. If the student has taken courses at any post-secondary institutions since withdrawing from program, updated transcripts and one relevant letter of appraisal must be submitted. Each application for readmission is dealt with individually. There is no guarantee of readmission for any student.

A student who withdrew, or was withdrawn from program, more than five years previously, and wishes to be readmitted to the program must re-apply by following the normal course of application through the graduate program, including the submission of transcripts and appropriate letters of reference, and a fee of $180.

The remaining allowable time in program will be stipulated in the offer of readmission. Previous time in program will be credited.

A fee assessment, taking into account the specific circumstances of the student's activities during the period of withdrawal, will be made as part of the offer of readmission.

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 *Annual Registration* form, and a $180 fee. The student's supervisor and graduate coordinator 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 above).

Academic Regulations

The general regulations apply to all graduate students. Regulations specific to particular degree programs are outlined under the heading "Degree Regulations".

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://www.grad.ucalgary.ca//policies/thesis).

Notes:
Students are advised to consult with their Graduate Coordinator and Graduate Program Administrator regarding all aspects of their graduate programs.

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

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.

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 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.

For further details regarding the Graduate Studies Policy on Conflict of Interest at:
http://www.grad.ucalgary.ca//policies/conflictofinterest

Registration

Each year of the program, no later than the deadline date for the annual registration month, each graduate student must register using the Student Centre, which is accessible through https://my.ucalgary.ca. Students enrolled in thesis-based Master's or doctoral programs will be considered full-time.

A student who does not register by the appropriate deadline date will be withdrawn for failure to register.

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

Students should always consult with their graduate programs concerning course selection. A *Registration Confirmation for First Year Students* form or, for continuing students, an *Annual Progress Report,* must be completed and signed by both the student and supervisor/interim advisor, and endorsed by the graduate coordinator. Refer to the deadlines in the Academic Schedule at the beginning of this Calendar.

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 Student Centre. 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 fails to re-register by the deadline indicated in the Academic Schedule will be withdrawn from the program for failure to register. Information about readmission or reactivation appears above.
UPDATED (Dec. 17, 2009)
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 pay the non-refundable tuition fee assessment of the equivalent to a graduate half-course fee. 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.

Student Status

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 listing 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 coordinator for approval.

Course-Based Programs

Full-time Students

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

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.

Only programs that stipulate a part-time enrolment option under their respective listing in this calendar may approve part-time enrolment requests.

UPDATED (Sept. 4, 2009)

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 registration deadline must be done on a *Change of Course Registration* form and a $60 late registration fee will be charged.

Registration to audit a course must be done on a *Change of Course Registration* form.

Changes to full-time/part-time status subsequent to the registration 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
http://www.grad.ucalgary.ca//forms/registration.

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.

Transcripts and Statements

A student requiring a transcript of his/her University of Calgary record, for personal use or to be sent to another institution, must request such transcripts in writing by sending a personal letter to the Registrar's Office, or by completing the appropriate form available from the Registrar's Office or online at http://www.ucalgary.ca/registrar/order_transcript. The cost of ordering a transcript is noted on the website.

Course Withdrawal

A graduate student may withdraw online from a course in which he/she is registered via My UofC, 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 before the last day for payment of the appropriate fees.

Note: all withdrawals after the registration deadline will be recorded on the student transcript.

Program Withdrawal

A student wishing to withdraw from the Faculty of Graduate Studies should complete a *Graduate Withdrawal* form, available at http://www.grad.ucalgary.ca//forms/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 to 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.

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 coordinator that specifies the grounds for the extension and provides a detailed schedule for the completion of the program.

NEW! (Aug. 13, 2009)

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.

Leave of Absence

The Leave of Absence policy was created to assist graduate students who require a leave from their program. Effective July 2, 2009 Such leaves are granted for one of the following reasons:

- Bereavement
- Care-giving responsibilities
- Medical requirements
- Military service
- Parental responsibilities
- Political service
- Exceptional circumstances

Leaves of absence may be granted for a minimum of one term and up to one year. They may be renewed so long as the total length of leave time with renewals does not exceed five years. 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.

During a leave of absence, all University of Calgary funding is cancelled. Students should be aware that supervisory and/or funding arrangements cannot 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 http://www.alis.gov.ab.ca/ps/fo/studentsfinance/elig-req.html . International students should consult the International Student Centre and immigration authorities regarding their immigration status during the proposed leave.

Leave of Absence Procedure:

1. The student should discuss the leave and its implications with the supervisor and any other appropriate people, e.g., members of the supervisory committee.
2. The student and supervisor seek the recommendation of the graduate coordinator.
3. The completed and signed *Application for Leave of Absence* form is forwarded to the Faculty of Graduate Studies for approval. (See http://www.grad.ucalgary.ca>Forms)

Program Work

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: LLB/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.

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. Further details regarding the application process to an interdisciplinary degree program are available at http://www.grad.ucalgary.ca/policies/interdisciplinarity .

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 for courses may not exceed one third of the program or two full-course equivalents, whichever is less. 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.

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.

Distribution of Grades

Grade	Grade Point Value	Graduate Description
A+	4.0	Outstanding
A	4.0	Excellent – superior performance showing comprehensive understanding of the subject matter
A-	3.7	Very good performance
B+	3.3	Good performance
B	3.0	Satisfactory performance Note: The grade point value (3.0) associated with this grade is the minimum acceptable average that a graduate student must maintain throughout the program as computed at the end of each registration anniversary year of the program.
B-	2.7	Minimum pass for students in the Faculty of Graduate Studies Note: A student who receives a B- or lower in two or more courses will be required to withdraw regardless of their grade point average unless the program recommends otherwise. Individual programs may require a higher minimum passing grade.
C+	2.3	All grades below B- are indicative of failure at the graduate level and cannot be counted toward Faculty of Graduate Studies course requirements. A student who receives a grade of F will normally be required to withdraw unless the program recommends otherwise.
C	2.0	
C-	1.7	
D+	1.3	
D	1.0	
F	0.0	

Student Standing

While "B-" is the minimum passing grade in any one course for students in the Faculty of Graduate Studies, a grade point average (GPA) of at least 3.00 must be maintained in each year of program. A student must have a GPA of at least 3.0 in order to graduate.

A student who receives a "B-" or lower in two or more courses or whose GPA at the annual registration anniversary falls below 3.00 will be required to withdraw unless the program recommends otherwise. A student who receives a grade of F will normally be required to withdraw unless the program recommends otherwise.

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 Student Centre at https://my.ucalgary.ca/.

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* of this Calendar). The handbooks are also available on the Graduate Studies website at http://www.grad.ucalgary.ca//policies/exams.

Supervisors/ Advisors

All students in 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.

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.

Annual Reports

UPDATED (Dec. 17, 2009)
Each thesis-based graduate student must file an annual progress report with his or her graduate program. Consult the program for deadlines. Delinquent students may be denied registration.

Research and Ethics Approval

All research involving human subjects 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 http://www.ucalgary.ca/research/compliance/ethics/info/grad/ for information about the ethics approval process.

Program Transfers

Program transfers must take place before a student's third annual registration. Students should consult the supervisor and graduate coordinator. 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.

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 Department of Germanic, Slavic and East Asian Studies, the Department of French, Italian and Spanish, and in the French Education sub-specialization in the Graduate Division of Educational Research.

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.

Thesis

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.

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

Once all the examiners have signed the approval pages, the student must submit one unbound copy of the thesis, the signed original approval page, a *Departmental Clearance for Convocation for Thesis Students* form that is appropriately signed, a *Thesis Distribution* form and a *University of Calgary Partial Copyright Licence* form, to the Faculty of Graduate Studies. The Faculty of Graduate Studies will arrange to have the unbound thesis deposited in the University of Calgary Archives.

A second copy of the thesis, submitted in electronic format or as an unbound printed copy, with a *Library and Archives Canada Subject Term Classification*

form and a *Library and Archives Canada Non-Exclusive Licence to Reproduce Theses*, will become part of the national thesis database, and available in microfiche format from the Library and Archives Canada. (See the *Thesis Guidelines* for further information about the submission format.) The Faculty of Graduate Studies will arrange to have the thesis submitted to the Library and Archives Canada. The compulsory thesis levy collected for the first two years of a thesis program covers Library and Archives Canada microfiche costs.

Note: Copies of the thesis approval or ethics approval pages with signatures should not be included in submissions to the Library and Archives Canada.

The student may decide not to have a copy of the thesis submitted to the Library and Archives Canada. This decision must be made when the thesis is submitted to the Faculty of Graduate Studies. The Faculty of Graduate Studies will not be responsible for later submission of the thesis to the Library and Archives Canada.

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.

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.

Application for Degree

All students who expect to receive degrees or diplomas at one of the May, Spring (June) or Fall Convocations must complete an online *Application for Degree,* available through the Student Centre via the Portal at https://my.ucalgary.ca. Students who do not complete an *Application for Degree* form will not be included in the graduation list. The deadlines for such applications are March 31 for Spring (May and June) Convocations and August 15 for Fall Convocation.

Convocation Requirements

In order to be cleared to graduate, thesis-based students must successfully pass a final thesis oral examination, submit an unbound copy of the thesis, 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.

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 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 Committee to Hear and Determine Student Academic Appeals 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.

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.

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.

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).

Teaching Faculty Appeals Committee

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.

General Faculties Council's Committee to Hear and Determine Student Academic Appeals

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

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.

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://www.grad.ucalgary.ca/policies/appeals.

General Faculties Council's Committee to Hear and Determine Student Academic Appeals

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 Committee to Hear and Determine Student Academic Appeals must do so within fifteen days of the unfavourable decision from the Faculty Appeals Committee. A letter of appeal should be sent to the Secretary to General Faculties Council (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.

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 procedures to guide its Petitions 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 Petitions 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 Petitions Committee of the Board of Governors do not have any jurisdiction to determine petitions received from students pursuant to section 45(2) and 42(1)(a) of the *Universities 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 directed in writing to the President. 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 Petitions 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 Petitions Committee may allow a hearing if it accepts jurisdiction in the matter and deems the facts to warrant such a hearing.

The Petitions 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 Petitions 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.

Continued Registration While Under Appeal

Students who appeal academic decisions to the teaching Faculty Appeals Committee or the General Faculties Council's Committee to Hear and Determine Student Academic Appeals 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.

Statement on Principles of Conduct

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.

Statement

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

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.)

Student Misconduct

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

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.

Plagiarism/Cheating/Other Academic Misconduct

Definitions

1. Plagiarism - Plagiarism involves submitting or presenting work in a course as if it were the student's own work done expressly for that particular course when, in fact, it is not. Most commonly plagiarism exists when:
(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.

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 from 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.

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.

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.

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.

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.

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.

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 Committee to Hear and Determine Student Academic Appeals 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 Committee to Hear and Determine Student Academic Appeals 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).

Disciplinary Action for Non-Academic Misconduct

1. Definition

The term "non-academic misconduct" includes but is not limited to:
(a) conduct which causes injury to a person and/or damage to University property and/or the property of any member of the University community;

(b) unauthorized removal and/or unauthorized possession of University property;

(c) conduct which seriously disrupts the lawful educational and related activities of other students and/or University staff.

2. Temporary Suspension

(a) Deans have the authority to suspend temporarily any student for alleged non-academic misconduct as defined above. Such suspension shall be effective immediately. The authority to suspend temporarily includes the power to suspend from a course or courses, or from the University, as may be appropriate. Until such time as the Review Committee meets, the Dean may, at his/her discretion, allow a student to continue attending classes and taking examinations. The power to suspend may be exercised either by the Dean in whose Faculty the student is enrolled or by the Dean in whose Faculty the course is being taught. In the absence of an appropriate Dean, the authority to suspend temporarily any student for alleged non-academic misconduct rests with the Vice-President (Academic) or his/her designate.

(b) Where a case of alleged non-academic misconduct is brought to the attention of a Dean, the student shall be required to appear immediately before the Dean to respond to the allegations. If the Dean is not satisfied with the student's response, or if the student fails to appear before the Dean, the Dean may exercise the power of temporary suspension and in that event convey the decision immediately to the Secretary to General Faculties Council and the Registrar.

(c) Where the severity of misconduct does not warrant suspension, the Dean may place a student on probation for a specified period of time, with conditions attached as deemed necessary. Failure to adhere to conditions of probation may result in suspension. Probation is appealable by the student to the General Faculties Council's Review Committee, but on the understanding that the Review Committee may change probation to suspension. In this circumstance the Review Committee should discuss the proposed suspension with the Dean before making a final decision.

3. Review Committee

(a) Upon the temporary suspension of a student by a Dean, a Review Committee of the University shall be convened expeditiously by the Secretary to General Faculties Council to determine whether the Dean's action has been justified and also whether or not other disciplinary action is warranted. Such other disciplinary action may include probation, longer-term suspension or expulsion from the University. It shall also be open to the Review Committee to recommend to the President reference of the case to the law enforcement authorities.

(b) The Dean, or other members of the University community concerned with the alleged misconduct, and the student, shall be called to appear and to give evidence before the Review Committee. The Dean may present all the evidence taken into account in making his/her decision.

(c) The Review Committee's decision shall be binding and it shall be reported in writing immediately to the student, the Dean, the Registrar, and the Secretary to General Faculties Council.

4. Composition of the Review Committee

A Review Committee panel shall be established annually by the General Faculties Council's Striking Committee. The panel shall have twelve members, appointed for two years and representing various faculties and units. Six members of the panel shall retire each year. For any case referred to consideration, a Review Committee of three members of the panel shall be formed, one of whom shall be named as chairperson. The Secretary to General Faculties Council shall be responsible for constituting review committees and providing, where possible, that one member of each committee has served previously at a hearing.

5. Challenges to Composition of the Committee

A student whose conduct is under review has the right to challenge, for cause, any member of the Review Committee. The validity of the challenge shall be left to the discretion of the chairperson. If the chairperson is challenged, the challenge shall be judged by the Secretary to General Faculties Council. Such cause may include teacher/student relationships, evident or published bias or any other factor likely to prejudice a fair hearing. The student shall inform the chairperson in writing of his or her desire to challenge any member of the Committee within three days of being informed of the composition of the Review Committee. In the event of the temporary unavailability of the chairperson, the Secretary to General Faculties Council shall exercise the chairperson's responsibilities.

6. Time Limit for Review

The review of disciplinary action for non-academic misconduct shall be carried out expeditiously and, if possible, within fifteen days of the decision by a Dean to suspend a student temporarily.

7. Notice of Hearing

The Secretary to General Faculties Council shall normally give seven days written notice of hearing to the Dean, the student, and other individuals concerned with the alleged misconduct.

8. Effect on a Student's Permanent Record

The regulations given above for academic misconduct will also apply to non-academic misconduct.

9. Presidential Discretion

The President may, with good and sufficient cause as in cases where members of the University community, the learning environment and/or University property is threatened, exclude the student or students concerned from access to the campus prior to and following the hearing.

Further details may be obtained from the Secretary to General Faculties Council.

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 post-doctoral fellowships or their equivalent. The policy and procedures are titled Integrity in Scholarly Activity and apply to both teaching and research.

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.

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.

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.

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.

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 Adviser at 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 237-5888 or the Calgary Police at 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 Adviser. Individuals are free to simply make a report of the incident to the Adviser. 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 Adviser who will then attempt to affect an "informal resolution" to the problem. Informal resolutions usually involve the Adviser 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 Adviser to obtain a copy of the latest official document. The Adviser is located in MacEwan Student Centre, University Counselling Services, Room 375 and may be reached by telephone at 220-4086.

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

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.

GRADUATE STUDIES | UNIVERSITY OF CALGARY

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, 2008)

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//policies/supervision.

2. Judgement 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 Coordinator 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 Faculty of Graduate Studies Academic Program Committee.

4. Transfers

4.1 Transfers at the Master's Level

Application for Change of Area of Specialization

A student requires approval of both the Graduate Coordinator 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 Coordinator 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.

[1] All quotations are from http://www.caqc.gov.ab.ca/pdfs/Graduate_Program_Asessment_Standards_REVISED_8_July_2008_3_pdf as at 2008 October 10

GRADUATE STUDIES | UNIVERSITY OF CALGARY

HANDBOOK OF SUPERVISION AND EXAMINATION

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 Coordinator. 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 Coordinator 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. For detailed policy and the required forms, see http://www.grad.ucalgary.ca > Policies and Procedures.

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 Coordinator who can consult with an Associate Dean or the Dean if the Coordinator is unable to resolve the situation. (See Graduate Studies Conflict of Interest Policy: http://www.grad.ucalgary.ca//policies/conflictofinterest).

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 Coordinator 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]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 Coordinator 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 Coordinator 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 Coordinator 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] 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."

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;

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 UPDATED (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 Coordinator, 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 Coordinator 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 Coordinator, and then the Department Head or equivalent. If it appears that a solution cannot be reached, the student and/or the Graduate Coordinator 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.

The Faculty of Graduate Studies will recognize a formal Supervisory Committee at the Master's level only when program Calendar entries refer to this requirement. When such a committee is required by the program, the program must file an Appointment of Supervisor/Supervisory Committee form with the Faculty of Graduate Studies. 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 an introductory and concluding chapter 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 is the contribution of other researchers.

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.

EXAMINING COMMITTEES, EXAMINATIONS AND STANDARDS

4.0 Standards of Performance

4.1 Judgement of Student Performance

Supervisors and Graduate Coordinators 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 judgement 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 Coordinator, 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 Coordinator 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. 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. The Faculty of Graduate Studies must be informed of minor changes in the scheduling of the examination (e.g., for illness or weather). Changes of more than two weeks will need prior approval by the Faculty 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 Coordinator 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 Coordinator 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 Coordinator 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 Coordinator. 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 Coordinator 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 Coordinator 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 Coordinator, 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 Coordinator and the Dean of Graduate Studies, or designate, must be posted at least two weeks before the date of the examination. The Graduate Coordinator 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 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 UPDATED (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 Coordinator 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 Master's 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 "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 Master's 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.

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 Coordinator. 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 Coordinator and the Supervisor. After consultation with the Supervisor, the Graduate Coordinator 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 Coordinator, 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 Coordinator. 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 Coordinator. 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 Coordinator and the Supervisor. After consultation with the Supervisor, the Graduate Coordinator 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 Coordinator, 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 Coordinator. 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 Coordinator, 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 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.

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 Coordinator 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 Coordinator 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.

GRADUATE STUDIES | UNIVERSITY OF CALGARY

HANDBOOK OF SUPERVISION AND EXAMINATION

Part III: Doctor of Philosophy / Doctor of Education 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 Coordinator. 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 Coordinator 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. For detailed policy and the required forms, see http://www.grad.ucalgary.ca > Policies and Procedures.

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 Coordinator who can consult with an Associate Dean or the Dean if the Coordinator is unable to resolve the situation. (See Graduate Studies Conflict of Interest Policy: http://www.grad.ucalgary.ca//policies/conflictofinterest).

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 Coordinator 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 Coordinator 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 Coordinator 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 Coordinator 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. Doctoral students admitted as special case admissions must have an approved Supervisor and Supervisory Committee 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;

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 UPDATED (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 Coordinator, 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 Coordinator 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 Coordinator, and then the Department Head or equivalent. If it appears that a solution cannot be reached, the student and/or the Graduate Coordinator 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 Coordinator 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 Coordinator 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.

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 Coordinator 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 an introductory and concluding chapter 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 is the contribution of other researchers.

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 fulfilment of the requirements for the degree". The thesis may vary in quality from passable to outstanding.

For information on formatting, printing, binding and distribution of theses, see the *Thesis Guidelines* at http://www.grad.ucalgary.ca >Policies and Procedures > Thesis.

EXAMINING COMMITTEES, EXAMINATIONS AND STANDARDS

5.0 Standards of Performance

5.1 Judgement of Student Performance

Supervisors and Graduate Coordinators 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 judgement 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 Coordinator, 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 Coordinator 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.

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 changes in the scheduling of the examination.

6.1.2 Faculty Regulations for Thesis Examinations

Thesis 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). Changes of more than two weeks will need prior approval by the Faculty 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,[3] (2) an oral candidacy examination has been successfully passed, and (3) a dissertation research proposal has been approved by the student's Supervisory Committee. 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.

For further information, review *Guidelines: Chairing Oral Thesis and Candidacy Examinations*, at http://www.grad.ucalgary.ca > Policies and Procedures > 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.[4] 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 Coordinator.

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.

[3] Exceptions apply to students in Clinical Psychology (CPSY) and Applied Psychology (APSY).

[4] Exceptions apply to students in Clinical Psychology (CPSY) and Applied Psychology (APSY).

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 Coordinator who shall ensure that no conflict of interest exists between the student or the Supervisor and the additional members of the examination committee. (See Graduate Studies Conflict of Interest Policy: http://www.grad.ucalgary.ca//policies/conflictofinterest . 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 Coordinator. 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 Coordinator, 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 Coordinator 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 Coordinator confirms that the candidate has completed course requirements.[5] 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 Coordinator), 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 retake 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 Coordinator. 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 Coordinator and the Supervisor. After consultation with the Supervisor, the Graduate Coordinator 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.

[5] Exceptions apply to students in Clinical Psychology (CPSY) and Applied Psychology (APSY).

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 Coordinator 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 Coordinator. 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. The composition of the committee must be approved by the Dean, upon the recommendation of the Graduate Coordinator. 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 Coordinator 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://www.grad.ucalgary.ca > Policies and Procedures > Examination.

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 Coordinator 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 Coordinator. 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 Coordinator 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 Coordinator 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[6] to proceed to oral examination, endorsed by the Graduate Coordinator, 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.

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 Coordinator and the Dean of Graduate Studies, or designate, must be posted at least two weeks before the date of the examination. The Graduate Coordinator 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.

[6] Exceptions apply to students in Clinical Psychology (CPSY) and Applied Psychology (APSY).

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 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 UPDATED (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 Coordinator 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 Coordinator. 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 Coordinator and the Supervisor. After consultation with the Supervisor, the Graduate Coordinator 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 Coordinator, 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 Coordinator. 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 Coordinator. 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 Coordinator and the Supervisor. After consultation with the Supervisor, the Graduate Coordinator 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 Coordinator, 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 Coordinator. 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 Coordinator, 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 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.

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 Coordinator 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 Coordinator 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.

GRADUATE STUDIES | UNIVERSITY OF CALGARY

HANDBOOK OF SUPERVISION AND EXAMINATION NEW! (May 26, 2009)

Part IV: Policy Governing the Relationship Between Supervisor and Student (Approved by Graduate Council May 7, 2009)

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/files/grad/ip_awareness_checklist.pdf) 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/files/grad/ip_awareness_checklist.pdf) 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 Coordinator to arrange for the necessary consultation and mediation, the Graduate Coordinator 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 Coordinator 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 dissertation 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 behavior) 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 document 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.

Fees and Expenses

Fees

All graduate students pay both general and tuition fees each year. The tuition fees listed below are effective
1 May 2009 to 30 April 2010, 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 our website at www.ucalgary.ca/registrar/node/301

Thesis-based students: All students in the first year of a thesis-based degree (Master's or doctoral) program are assessed program fees*. Program fees are pro-rated over four terms: one-third in Fall, one-third in Winter, one-sixth in Spring, and one-sixth in Summer.

Canadian citizens and permanent residents (all programs except the MBA program):	$ 5,359.50
MBA thesis students:	$ 10,983.60
International students (all programs except the MBA program):	$ 12,164.88
International MBA thesis students:	$ 24,235.20
Continuing fees for Canadian citizens and Permanent Residents per year, pro-rated over four terms are:	$ 1,559.28
Continuing fees for International students per year are:	$ 3,538.80

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 general fees and continuing fees.

*Note that a student in a thesis-based program may pay program fees for one, two or three years. Refer to the Faculty of Graduate Studies Calendar or contact your department/program for the manner in which your fees will be assessed in subsequent years.

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. At the time of annual registration, each student is assessed a registration deposit equivalent to the fees 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 and is non-refundable. However, the fee is credited to the first course the student takes in the registration year.

Canadian citizens and permanent residents:	
Graduate Half-Course Fee (except MBA)	$ 684.90
MBA Half-Course Fee	$ 1,247.88
Minimum Program Fee for Course-Based Programs (except MBA) Students in course- based programs who audit courses pay half of the above fees	$ 5,479.20
International Students:	
Graduate Half-Course Fee	$ 1,554.84
MBA Half- Courses	$ 2,760.30
Minimum Program Fee for Course-Based Programs (except MBA) Students in course-based programs who audit courses pay half of the above fees.	$ 12,438.72

General Fees

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

	Full-Time	Part-Time	
Registration	$10.00	$10.00	All students
Graduate Students' Association	$96.45	$80.38	All students
Group Insurance	$11.00		Full-time students only
Extended Health Insurance Dental Insurance	$240.00 $165.00		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 who are automatically enrolled unless proof of alternative coverage (i.e., Blue Cross, Clarica), with his/her name on it, is submitted to the GSA (MacEwan Student Centre Room 350) 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.
UPASS (Spring 2009 or Summer 2009 Initial and Anniversary Terms)	$240.00		Full-time students only.
UPASS (Fall 2009, Winter 2010, Spring 2010, and Summer 2010 Initial and Anniversary Terms)	$255.00		Full-time students only.
Athletics	$45.80	$45.80	
Campus Recreation	$100.12	$100.12	
Thesis Levy	$21.00		Assessed in first and second years of thesis-based programs only.
Graduate Bursary Donation	$10.00	$10.00	Optional*
TOTAL (Spring 2009 or Summer 2009 Initial and Anniversary Terms)	$1029.37	$246.30	
TOTAL (Fall 2009, Winter 2010, Spring 2010, and Summer 2010 Initial and Anniversary Terms)	$1044.37	$246.30	

*Must Opt-out in writing through the Faculty of Graduate Studies before the Fee Payment deadline of your Annual Registration.

Late Charges
Students who do not register by the fee payment deadline will be assessed a late registration fee of $60.
Students who make course changes (i.e., additions or substitutions) after the fee payment deadline will be assessed a fee of $60 for each Change of Registration form.

Students in course-based programs are assessed tuition fees by course, based on the level of the course.
Each year, at the time of the student's annual registration, each course-based student is assessed tuition fees equivalent to a graduate half-course, whether or not the student has registered in a course. This fee will be credited to the first half-course taken in the registration year.

The total of the tuition fees paid by a course-based student over the course of a graduate degree program cannot be less than the minimum program fee for course-based programs in effect during the student's final year. A student who has paid less than the minimum tuition fees for course-based programs over the course of his/her program will be assessed the difference between the program fee in effect in his/her final year and the total amount paid to date in tuition fees.

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.

A student who receives advanced credit for courses taken before formal entry to a graduate degree program will not have the fees paid for those courses credited toward the current graduate degree program. A student who receives transfer credit for courses taken at another university may not have the fees credited toward the current graduate degree program.

Students who audit courses pay half the current 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 + half the current differential fee.

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. Check with the graduate program for exceptions to the normal tuition policy.

Doctor of Education (distance delivery)

Please refer to the web for current fee information: http://www.educ.ucalgary.ca/gder/

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.

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. Fees paid for extra-to-program courses will not be credited toward payment of full course fees.

Fee credit will not be given for extra-to-program courses that are subsequently used for unclassified studies or in any degree, diploma or certificate program.
Registration in any course is subject to departmental approval.

Any appeals regarding fee assessment must be made to the Graduate Associate Registrar (Student Services) within six months of the fee assessment.

Fee Adjustments and Refunds

A student who withdraws from the Faculty of Graduate Studies and subsequently seeks admission into a different program at the University of Calgary will not receive credit for previously paid fees.

Students have until the fee payment deadline for the term to make course additions and deletions without penalty.

Students who make course changes after the fee payment deadline will be assessed a $60 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.
A course-based student is assessed a minimum tuition fee equivalent to a graduate half-course tuition fee at the time of his/her annual registration. If the student cancels program registration before the fee payment deadline for his/her annual registration term, the tuition fees will be refunded. If the student withdraws from program after the fee payment deadline, the minimum tuition fee will not be refunded whether or not the student has registered in a course for that term. A course-based student who withdraws from a course before the deadline for fee payment 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 a graduate program will have tuition fees pro-rated to the end of the term in which they withdraw. If the student cancels program registration before the fee payment deadline for his/her annual registration term, the tuition fees will be refunded.

General fees are not refunded following the fee payment deadline.

Payment and Collection of Fees

Students may pay their fees by cash, cheque, money order or debit card using the following methods:
Mail a cheque or money order to the Enrolment Services (117 MacKimmie Library Block, University of Calgary, 2500 University Drive N.W., Calgary, Alberta T2N 1N4)
Through Telephone/Internet Banking Services. The University of Calgary is listed with the Canadian Imperial Bank of Commerce, Bank of Montreal, Royal Bank, Scotiabank and TDCanada Trust
In person at the U of C Service Stop (Monday to Friday, 09:30-4:30; Thursday, 10:00-4:30)

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.

If fees are to be paid from government student loans, application must be made through the University of Calgary Student Awards and Financial Aid Office to ensure automatic deferral of payment of fees. If assistance is being provided from a source other than government loans, a letter from the source concerned must be presented to the U of C Service Stop prior to the prescribed fee deadline date.
Students receiving disbursement of their student loan in one installment will have both Fall and Winter Session fees deducted from the single installment plus any other outstanding debts owing to the University (i.e., room and board, student emergency loans, fines, etc.). Students receiving disbursement of their loan in two installments will have Fall Session fees deducted from the fist installment and Winter Session fees deducted from either or both of the installments.
If financial assistance is refused, the fees must be paid within ten days. The letter of refusal from Alberta Learning Student Finance must be produced to avoid the late payment penalty. It should be noted that students will not have their registration cancelled if financial assistance is refused and such students will be liable for tuition and general fees owing for the session.

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

Program and continuing fees are collected as follows:

4/12 in Fall	2/12 in Spring
4/12 in Winter	2/12 in Summer

Course-based students' fees must be paid in full by the deadline in the Academic Schedule for the annual registration semester and for each semester in which courses are being taken.

The last date for the payment for late registrants is 10 days after assessment.

A $60 penalty and an administration fee of $10 may be charged on any payments made or post-marked after the specified deadline. If the fees are not paid by the date specified in the Academic Schedule, registration may be subject to cancellation. Future registration will not be accepted until the account has been settled and the reinstatement fee has been paid. Arrangements can be made with the Fee Office to make fee payments by installments per term.

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 Student Awards and Financial Aid, or the Counselling and Student Development Centre.

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

Degree Regulations Summary

No more than one-half of a regular graduate student's required program of course work can be at the 500-level. Programs requiring a larger ratio of undergraduate courses must receive approval of the Dean of Graduate Studies at the time of admission. Some programs may not allow any courses at the undergraduate level. For further information, see individual program descriptions.

The various deadline dates pertaining to Oral Examinations are set out in the Academic Schedule and in the *Handbook of Supervision and Examination* included in this calendar and posted at http://www.grad.ucalgary.ca//policies/handbooks.

Oral candidacy examinations are mandatory in all doctoral programs.

All degree programs have a final oral examination with the exception of the course-based Master of Business Administration program, and, in some cases, the Master of Education program.

Degree	Thesis-based	Course-based	Full-time Requirement	Course Requirement (Full-course equivalents)	Maximum Years to Completion
PhD	✓		See Program Details	See Program Details	6
PhD/MBA	✓				
EdD	✓		Twelve Months	4	6
MA	✓	✓	See Program Details	See Program Details	Thesis-based: 4 Course-based: 6
MSc	✓	✓	See Program Details	See Program Details	Thesis-based: 4 Course-based: 6
MSc/MBA	✓				
LLB/MBA		✓	Two terms, normally consecutive	See Program Details	4
LLM	✓		Two consecutive terms	1.5	3
MBT		✓	No	4.5	6
MBT/MBA		✓	See Program Details	See Program Details	6
MBA	✓	✓	Thesis-based: 2 consecutive terms	Thesis-based: 4 Course-based: 7.5	Thesis-based: 5 Course-based: 6
MC		✓	No	6	6
MCE		✓	Year One and Year Two – Three-week Spring or Summer Institute on campus	6	6
MCM		✓	No	6	6
MCS		✓	No	6	6
MEd		✓	No	6	6
MEng	✓	✓	No	Thesis-based: 2–4 Course-based: 5-6	Thesis-based: 6 Course-based: 6
MFA (Art)	✓		Two consecutive years	3	4
MFA (Drama)	✓		No	4.5	5
MGIS		✓	No	5	6
MKin		✓	No	5	6
MMus	✓		No	2 – 3	5
MN	✓	✓	Thesis-based: 2 years Course-based: No	Thesis-based: 3.5 Course-based: 6	Thesis-based: 4 Course-based: 6
MSW	✓	✓	No	Thesis-based: 4.5 Course-based: 5	Thesis-based: 4 Course-based: 6
MSW/MBA		✓	See Program Details	See Program Details	7
MSS	✓	✓	See Program Details	Thesis-based: 3 Course-based: 6	Thesis-based: 4 Course-based: 6
MD/Master's	✓		See Program Details	See Program Details	5
MD/PhD	✓		See Program Details	See Program Details	8

Program Details

Combined Programs

A combined degree program enables highly motivated students to complete two complete degree programs simultaneously. A combined program may include a professional undergraduate degree, such as the Bachelor of Laws (LLB) or the Doctor of Medicine (MD), and a graduate degree, such as a Master of Business Administration (MBA) or Master of Science (MSc), or two graduate degrees, such as the Master of Social Work (MSW) and the Master of Business Administration (MBA).

Interested applicants must apply and be accepted to each individual program separately, then apply to the combined program. Acceptance into both individual programs does not automatically mean acceptance into the combined program. Students must graduate in both degrees simultaneously.

Leaders In Medicine

The *Leaders in Medicine* program at the University of Calgary offers students the 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 seven offered by the Faculty of Medicine (Biochemistry and Molecular Biology; Cardiovascular/Respiratory Sciences; Community Health Sciences; Gastrointestinal Sciences; 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 may also apply for the combined degree program during the first two years of either the MD or the graduate program. Expected completion time is four to five years for the MD/Masters programs and six to 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 G329
Telephone: (403) 210-9572 Fax: (403) 210-8109
E-mail: mdgrad@ucalgary.ca or visit the website http://www.ucalgary.ca/education/gse/jointMDPhD.htm

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.

Bachelor of Laws/Master of Business Administration (LLB/MBA)

The Bachelor of Laws/Master of Business Administration (LLB/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 Science/Master of Business Administration (MSc/MBA)

The combined MSc/MBA program offers students a course-based Master's degree that provides a business background with a science degree in which a project with commercial viability is pursued as a thesis project. The program is focused on the education of Life Sciences, Information and Communication Technology (ICT), Energy Sector, Nanotechnology, and other industry-oriented entrepreneurial students in the area of applied research and business development. The program is available to students in the faculties of Kinesiology, Medicine, Science, and the Schulich School of Engineering.

Doctor of Philosophy/Master of Business Administration (PhD/MBA)

The combined PhD/MBA program provides students with a focused, multidisciplinary program that has a solid foundation for their faculty discipline and provides them with the skills and knowledge to bridge the gap between scientific/engineering methods and procedures and the business application of that knowledge. The program is available to students in the faculties of Kinesiology, Medicine, Science, and the Schulich School of Engineering.

INTERDISCIPLINARITY AT UNIVERSITY OF CALGARY

Interdisciplinary Specialization

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, and the Environment (Engineering, Centre for Environmental Engineering Research and Education)
Environmental Engineering (Engineering, Centre for Environmental Engineering Research and Education)
Israel Studies (History, Political Science, English, Religious Studies and Centre for Military and Strategic Studies)
Reservoir Characterization (Chemical and Petroleum Engineering and Geology and Geophysics)
Performance Studies (Fine Arts, Humanities, Kinesiology)
Please see the listings in the Programs & Course Descriptions and the Interdisciplinary Specializations sections of this Calendar for more information on programs and specializations in the Faculty of Graduate Studies.

Courses of Instruction

This section contains the descriptions of courses offered at the University of Calgary. The courses are arranged in alphabetical order by course title and 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 session.

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: University of Calgary Undergraduate students are permitted to register in graduate level courses (600-level) only with permission of both their Faculty and the Department offering the course. Undergraduate students are not normally permitted to take courses numbered 700-level or above.

Medical Science 609 H(3-2T)
(Biochemistry 609)

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: Medical Science 537 (Biochemistry 537) or equivalent.

Note: Credit for both Medical Science 609.02 and 751.14 will not be allowed.

Course Numbers:

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

Hours of Instruction:

- 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 sessions.
- F(3-1S-3) — Full course; equivalent of 3 hours of lectures, 1 seminar hour, and 3 hours of lab each week for 2 sessions.
- Q(3-0) — Quarter-course; equivalent of 3 hours of lectures each week for 1 half session.
- H(3-3/2) — Half-course; equivalent of 3 hours of Lectures every week and 3 hours of lab every other week for 1 session.
- E(0-3) — Eighth-course; equivalent of 3 hours of lab each week for one quarter session.

The figures "S" or "T" attached to a number signify seminar or tutorial hours.

Cross-Listed Courses:
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.

Prerequisite:
Must be completed before registering in this class.

Corequisite:
Must be completed at the same time as this class.

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.

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.

PROGRAM ABBREVIATIONS (Undergraduate and Graduate)

Faculty of Communication and Culture

African Studies	AFST
Canadian Studies	CNST
Central and East European Studies	CEST
Communications Studies	COMS
Culture and Society	CUSP
Development Studies	DEST
East Asian Studies	EAST
Film	FILM
General Studies	GNST
Law and Society	LWSO
Museum and Heritage Studies	MHST
Northern Planning and Development Studies	NPDS
Science, Technology and Society	STAS
South Asian Studies	SAST
Women's Studies	WMST

Faculty of Education

Applied Psychology	APSY
Campus Alberta Applied Psychology	CAAP
Continuing Education	CTED
Education Teacher Preparation	EDTP
Educational Research	EDER

Faculty of Environmental Design

Environmental Design	EVDS
Environmental Design Architecture	EVDA
Environmental Design Planning	EVDP

Faculty of Fine Arts

Art	ART
Art History	ARHI
Dance	DNCE
Drama	DRAM
Fine Arts	FINA
Music Education	MUED
Music History and Literature	MUHL
Music Performance	MUPF
Music	MUSI
Music Theory and Composition	MUTC

Haskayne School of Business

Accounting	ACCT
Business and Environment	BSEN
Energy Management	ENMG
Entrepreneurship and Innovation	ENTI
Finance	FNCE
Human Resources and Organizational Dynamics	HROD
Management Information Systems	MGIS
Management Studies	MGST
Marketing	MKTG
Operations Management	OPMA
Petroleum Land Management	PLMA
Risk Management and Insurance	RMIN
Strategy and Global Management	SGMA
Tourism Management	TOUR

Faculty of Humanities

Chinese	CHIN
Comparative Literature	COLT
East Asian Language Studies	EALS
English	ENGL
French	FREN
German	GERM
Greek	GREK
Greek and Roman Studies	GRST
Hindi	HNDI
Humanities	HUMN
Italian	ITAL
Japanese	JPNS
Latin	LATI
Philosophy	PHIL
Religious Studies	RELS
Romance Studies	ROST
Russian	RUSS
Spanish	SPAN
Slavic	SLAV
Term Abroad Program	TAP

Faculty of Kinesiology

Athletic Therapy	ATTH
Dance Education	DCED
Kinesiology	KNES
Outdoor Pursuits	ODPU
Physical Education	PHED
Physical Education Activity Theory	PEAT

Faculty of Law

Law	LAW

Faculty of Medicine

Health and Society	HSOC
Biochemistry and Molecular Biology	MDBC
Biomedical Technology	MDBT
Community Health Sciences	MDCH
Cardiovascular/Respiratory Sciences	MDCV
Gastrointestinal Sciences	MDGI
Immunology	MDIM
Microbiology and Infectious Diseases	MDMI
Medical Science	MDSC
Medicine	MDCN
Neuroscience	MDNS

Faculty of Nursing

Nursing	NURS
Nursing Offsite	NUOS

Schulich School of Engineering

Biomedical Engineering	BMEN
Chemical Engineering	ENCH
Civil Engineering	ENCI
Computer Engineering	ENCM
Electrical Engineering	ENEL
Engineering, Energy and Environment	ENEE
Engineering	ENGG
Environmental Engineering	ENEN
Geomatics Engineering	ENGO
Manufacturing Engineering	ENMF
Mechanical Engineering	ENME
Petroleum Engineering	ENPE
Software Engineering for Engineers	ENSF

Faculty of Science

Chemistry	CHEM
Computer Science	CPSC
Nanoscience	NANS
Science	SCIE

Department of Biological Sciences

Biology	BIOL
Biological Sciences	BISI
Ecology	ECOL
Cellular, Molecular and Microbial Biology	CMMB
Marine Science	MRSC
Zoology	ZOOL

Department of Geoscience

Geology	GLGY
Geophysics	GOPH

Department of Mathematics and Statistics

Actuarial Science	ACSC
Applied Mathematics	AMAT
Mathematics	MATH
Pure Mathematics	PMAT
Statistics	STAT

Department of Physics and Astronomy

Astronomy	ASTR
Astrophysics	ASPH
Medical Physics	MDPH
Nanoscience	NANS
Physics	PHYS
Space Physics	SPPH

Faculty of Social Sciences

Anthropology	ANTH
Archaeology	ARKY
Clinical Psychology	CPSY
Economics	ECON
Geography	GEOG
History	HTST
International Relations	INTR
Israel Studies	ISST
Linguistics	LING
Native Languages	NTVE
Political Science	POLI
Psychology	PSYC
Social Sciences	SOSC
Sociology	SOCI
Strategic Studies	STST
Urban Studies	UBST

Faculty of Social Work

Social Work	SOWK

Faculty of Veterinary Medicine

Veterinary Medical Sciences	VMS
Veterinary Medicine	VETM

Collaborating Faculties

Architectural Studies (CC, EV)	ARST
Arts and Science Honours (HU, SC, SS)	ASHA
Biochemistry (MD, SC)	BCEM
Community Rehabilitation (ED, SW)	CORE
East Asia (CC, HU, SS)	ETAS
Earth Science (SC, SS)	EASC
Environmental Science (SC, SS)	ENSC
Indigenous Studies (CC, FA, HU, SS, SW)	INDG
Innovation (CC, EN, HA, HU, SC, SS)	INNO
Language (ED, HU, SS)	LANG
Latin American Studies (CC, HU, SS)	LAST
Software Engineering (EN, SC)	SENG
South Asian Studies (HU,SS)	SASO
Sustainable Energy Development (EN, EV, LA, HA)	SEDV
Transportation Studies (EN, SS)	TRAN

Interdisciplinary Specializations

Biological Anthropology	BANT
Clinical Research	CLIN
Energy and Environmental Systems	EESS
Interdisciplinary Graduate Program	IGP
Reservoir Characterization	RSCH

Other

Academic Writing	ACWR
Co-operative Education	COOP
English For Academic Purposes Program	EAPP
Internship	INTE
Performance Studies	PFST
University	UNIV

PROGRAMS & COURSE DESCRIPTIONS

ANTHROPOLOGY ANTH

Contact Info

Location: Social Sciences Building, Room 854
Faculty number: (403) 220-6517
Fax: (403) 284-5467
E-mail 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
Students in the Departments of Anthropology and Archaeology and the Faculty of Medicine may choose an interdisciplinary specialization in Biological Anthropology. For further information on the Biological Anthropology (Interdisciplinary) specialization, see the separate listing in this Calendar.

2. Admission Requirements

In addition to Faculty 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

Doctor of Philosophy

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

3. Application Deadline

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

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.

Graduate Courses

Anthropology 501 H(3-0)

Conference Course in Anthropology
Arranged for various topics of anthropology on the basis of special interest and need.
Prerequisite: Anthropology 203 or 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.
Prerequisites: 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)
(formerly Anthropology/Archaeology/Geography 609)

Human Ecological Systems
The development of human ecology, its current directions and application of analytical techniques as they apply to anthropology, archaeology and geography.
Prerequisite: Consent of the Department.
Note: 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.
Prerequisites: Anthropology 311 plus one of the following: Anthropology 413, 435 or 451.

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: 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.
Prerequisites: Anthropology 351 and consent of the Department.
Corequisite: Anthropology 553 or consent of the Department.
Note: Normally offered during Spring Session.
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.
Prerequisites: Anthropology 552 and consent of the Department.
Note: Normally offered during Spring Session.
MAY BE REPEATED FOR CREDIT

Anthropology 567 H(3-1T)
(Communications Studies 567)

Advanced Studies in Visual Culture
Advanced studies in visual communication with special attention to historical and theoretical aspects of visual practices. Students will explore diverse expressions of visuality and undertake applied visual research and production. Topics may include the social production of visual discourse, visual media and social change, visual anthropology, and strategies for visual research.
Prerequisite: Communications Studies 367 or Anthropology 411 or consent of the Faculty of Communication and Culture.

Anthropology 571 H(3-0)

Honours Seminar in Primatology
Current theoretical and methodological issues will be explored in a discussion based seminar format.
Prerequisite: For students enrolled in the BSc Honours program.

Anthropology 573 H(3-0)

Honours Seminar in Social and Cultural Anthropology
Current theoretical and methodological issues will be explored in a discussion based seminar format, with the possibility of development of a research project.
Prerequisite: For students enrolled in the BA Honours program.

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: 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: 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: 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: Consent of the Department.
Note: 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: 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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Anthropology 631 H(3-0)

Anthropological Theory
Prerequisite: 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: Consent of the Department.

Anthropology 641 H(3-0)

Graduate Seminar in Civil-Military Relations
Comparative analysis of relations between civil society and military institutions. While most theories of civil-military relations take the military and civilian sectors as a given, this seminar will adopt a critical approach to analyzing how civil and military institutions mutually constitute each other as distinct forms of society.
Prerequisite: 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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Anthropology 701 H(3-0)

Independent Studies
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

APPLIED PSYCHOLOGY APSY

Contact Info

Location: Education Tower, Room 302
Faculty number: (403) 220-3585
Fax: (403) 282-9244
E-mail address: apsygrad@ucalgary.ca
Web page URL: http://www.educ.ucalgary.ca/apsy/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)
Master of Science (MSc), thesis-based
Master of Education (MEd), course-based
Master of Counselling (MC), course-based

Programs of study:
School and Applied Child Psychology
Counselling Psychology
Inclusive/Special Education – Please contact the Division of Applied Psychology for further information.

2. Admission Requirements

In addition to Faculty requirements, Division requirements include:

Master of Education and Master of Science

Counselling Psychology

Normally, a minimum of three full-course equivalents in applied psychology and/or psychology. This must include:

- Two undergraduate statistics courses (Note: For those who completed a psychology degree at the University of Calgary, PSYC 312 acts as an equivalent.)
- APSY 419 (Communication Skills in Guidance and Counselling) or its equivalent
- A senior undergraduate psychology or applied psychology course in each of learning theory, developmental psychology, and personality theory
- A résumé and a concise rationale for the application (500 words or less)
- Two letters of reference.

Information on the criteria used for admission decisions can be obtained from the Division website in the document *Counselling Psychology Information Booklet* and from the Division office.

Note: Although the following is not an admission requirement into the Master's programs, the College of Alberta Psychologists (i.e., the governing body that licenses psychologists in Alberta) requires that individuals have completed a senior undergraduate or graduate half-course in *biological bases of behaviour* before licensure as a psychologist. Furthermore, for those planning to eventually seek admission into a CPA accredited doctoral program, several additional undergraduate or graduate level prerequisite courses need to be completed. Please see section on Doctor of Philosophy in Counselling Psychology for additional information.

School and Applied Child Psychology

The Master's programs in School and Applied Child Psychology have been developed in alignment with accreditation and training standards for programs of Psychology. They adhere to the scientist-practitioner model, which emphasizes the interaction of research, theory, and practice. The goal is to develop researchers and professionals who use research to critically inform practice and conduct applied and theoretical research relevant to the practice of School and Applied Child Psychology. Students are expected to gain broad knowledge in the areas

encompassed by school and applied child psychology and develop a firm foundation in the philosophy of science and scientific methodology. Students are taught to critically evaluate and apply research through their substantive courses.

The Master of Science is an on-campus, thesis-based program while the Master of Education is a course-based off-campus program. Detailed information on these programs can be obtained from the Division website.

In addition to Faculty requirements, Divisional entry requirements for these programs include:

- Honours degree in Psychology (or equivalent), with a grade point average of 3.0 (equivalent to a B or 70% in many universities) over the courses taken during the last two years of study
- A typed résumé and statement of research and professional interests including the specification of a prospective research supervisor from among current faculty
- Two letters of reference
- For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written test) or 237 (computer-based test).
- 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.

Inclusive/Special Education

These programs are currently under review. Please contact the Division for further information.

Master of Counselling

The *Master of Counselling Program* normally requires at least three half-courses in psychology or educational psychology (including one course each in human development and learning). In addition, applicants are required to have a half-course in counselling skills.
As part of the application process, students are required to submit a résumé and a concise rationale for the application. Related volunteer work or paid employment is an asset.

Students who plan to apply for registration as psychologists after completing the program should bear in mind that additional undergraduate and graduate courses in applied psychology and/or psychology may be required. Further information on registering requirements can be obtained from the College of Alberta Psychologists' website.

Doctor of Philosophy

Counselling Psychology

- A completed Master's degree in Counselling Psychology or equivalent from an approved university, with a minimum grade point average of 3.5 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.
- A résumé and a concise rationale (500 words or less) for the application
- Two senior undergraduate or one graduate half-course in a) biological bases of behaviour, (b) cognitive-affective bases of behaviour, (c) social bases of behaviour, and (d) individual behaviour, .
- One senior undergraduate or one graduate half course in the historical and scientific foundations of general psychology
- 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
- A typed résumé and a concise rationale (500 words or less) for the application
- Two letters of reference

In keeping with the seamless model for doctoral studies, potential doctoral students who have completed an undergraduate Honours degree in Psychology may be admitted initially to the Master of Science program in Counselling Psychology. Of these students, those demonstrating outstanding performance in the Master of Science program can apply for transfer to the Doctor of Philosophy program at the end of the first year. Information on the criteria used for admission decisions and on transfer from the Master of Science to the doctoral program can be obtained from the Division website in the document *Counselling Psychology Information Booklet* and from the Division office.

Note: The Division of Applied Psychology will be applying for accreditation of its doctoral program in Counselling Psychology by the Canadian Psychological Association (CPA) within the next few years.

School and Applied Child Psychology Specialization

In keeping with the seamless model of doctoral studies, Master of Science students who have a minimum grade point average of 3.5 in their first year of studies can apply to transfer to the doctoral program at the end of their first year. All of the requirements for transfer must be completed:

- successful completion of all first year graduate courses
- approval of a PhD Research Program Proposal by the student's PhD supervisory committee.
- Detailed information regarding transfer to the doctoral program is available from the Division.

A limited number of outstanding applicants holding equivalent Bachelor's and Master's degrees from elsewhere may be considered; however, if the course content of their Master's program is not equivalent to the Master of Science at the University of Calgary in School and Applied Child Psychology, students will be required to take additional courses within their doctoral program to ensure equivalent training. These additional courses (a maximum of two full courses) must be completed in the first year of study. Applicants must also have a research advisor selected from among professors in the Division of Applied Psychology upon entry to the program.

3. Application Deadline

On-line applications to the Master of Education, Master of Science, Master of Counselling, and Doctor of Philosophy programs may be accessed through the following link: https://www.gradapplication.ucalgary.ca/account/instructions.asp.

The deadline for the submission of complete applications is:
15 December 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 Faculty of Graduate Studies requirements, the Division requires:

Master of Science - Counselling Psychology

Students will be required to complete:

- eight full-course 600 level equivalents including 500 hours of practicum experience (equivalent to 1.5 full courses)
- a thesis (equivalent to one full course)
- a non-credit research seminar

Course content addresses theory, research, and practice in the domains identified by the CCA Standards for Accreditation of Counsellor Education Programs. Detailed information on core course requirements can be obtained from the Division website. First year students are assigned an interim advisor who will assist with course selection.

Master of Education – Counselling Psychology

Students will be required to complete a course-based program which includes:

- eight full-course 600 level equivalents including 500 hours of practicum experience (equivalent to 1.5 full courses)
- written and oral comprehensive examinations upon the completion of coursework.

Course content addresses theory, research, and practice in the domains identified by the CCA Standards for Accreditation of Counsellor Education Programs. Detailed information on core course requirements can be obtained from the Division website in the document Counselling Psychology Information Booklet and from the Division office. First year students are assigned an interim advisor who will assist with course selection.

Master of Science – School and Applied Child Psychology

Students will be required to complete:

a) 15 half-courses
b) a thesis (equivalent to three half-courses)
c) a 1,200 hour internship (equivalent to two half-courses).
d) A non-credit research seminar is also required.
e) Course content addresses theory, research, and practice in the domains identified by NASP Standards for Credentialing of School Psychologists.

Master of Education – School and Applied Child Psychology

The Master of Education will be offered through a distributed learning mode of delivery. Students will be required to complete a course-based program which includes:

a) 18 half-courses
b) A comprehensive examination
c) A 1,200 hour internship (equivalent to 2 half-courses).

Note: Detailed information on core course requirements for each specialization can be obtained from the Division website.

Master of Counselling

The Master of Counselling Program will be offered through a distributed learning mode of delivery. It consists of twelve half-courses plus the completion of a final project. Core courses, required by all students, are listed below. More complete course descriptions, along with learning objectives, and evaluation procedures, are provided on the Division of Applied Psychology website. http://educ.ucalgary.ca/apsy/mc-online

- Campus Alberta Applied Psychology 601: Theories of Counselling and Client Change
- Campus Alberta Applied Psychology 603: Professional Ethics
- Campus Alberta Applied Psychology 605: Developing A Working Alliance
- Campus Alberta Applied Psychology 607: Equity and Diversity Issues In Counselling
- Campus Alberta Applied Psychology 611: General Counselling Practicum
- Campus Alberta Applied Psychology 613: Assessment
- Campus Alberta Applied Psychology 615: Intervening to Facilitate Client Change
- Campus Alberta Applied Psychology 617: Methods of Inquiry
- Campus Alberta Applied Psychology 619: Specialized Practicum

Doctor of Philosophy – Counselling Psychology

Students who have completed the pre-requisites 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 required of students on the Master of Science program in Counselling Psychology, will be required to complete:

a) two doctoral-level full-course equivalents
b) a non-credit research seminar
c) a candidacy examination
d) a dissertation
e) a twelve-month full-time internship.

Students who are deficient in prerequisites will be required to take additional courses on 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.

Doctoral students transferring from the Master of Science program in Counselling Psychology will be required to complete all remaining courses on the Master of Science program in addition to:

a) two doctoral-level full-course equivalents
b) a senior undergraduate full course or a graduate half-course in the biological bases of behaviour (if not completed previously)
c) a senior undergraduate or graduate half-course in the historical and scientific foundations of psychology (if not completed previously)
d) a non-credit research seminar
e) a candidacy examination
f) a dissertation
g) a twelve-month full-time internship

Detailed information on core course requirements can be obtained from the Division website.
Note: First year students are assigned an interim advisor who will assist with course selection.

Doctor of Philosophy – School and Applied Child Psychology

Master of Science students admitted to the Doctoral program will be required to complete:

a) all remaining courses (except the thesis and internship) in the Master of Science program;
b) one doctoral-level full-course equivalent
c) twelve-month full-time internship
d) a candidacy examination
e) a dissertation

Students entering the program following completion of a Master's degree outside the program may be required to take additional Master's courses to ensure equivalency to the Master of Science program in School and Applied Child Psychology at the University of Calgary. A student may be deficient in no more than two full courses, which must be completed in the first year of Doctor of Philosophy studies.

6. Additional Requirements

Applied experience is an asset. Applicants to the Master of Counselling and Master of Education in School and Applied Child Psychology should have reasonable computer literacy because portions of the programs are delivered on-line.

7. Credit for Undergraduate Courses

The Division does not normally accept undergraduate courses for credit toward graduate degrees.

8. Time Limit

Counselling Psychology

The Master of Science requires a minimum of two consecutive four-month terms of full-time study and research. Students may complete the degree in a minimum of two years of full-time study. Maximum time allowed for completion of the Master of Science degree is four years.
The Master of Education can be completed in two years of full-time study but students may take up to six years to complete the degree on a part-time basis.

The Doctor of Philosophy degree may be completed in three years. Students transferring from the Master of Science into the doctoral program can anticipate five years of full-time study from their initial entry into the Master of Science program to completion of their doctoral program. Maximum completion time allowed for the Doctor of Philosophy degree is six years.

Normally, Master of Counselling students will complete their program in three years.

School and Applied Child Psychology

The Master of Science requires three years of full-time study to complete. Maximum completion time is four years. The Master of Education can also 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.

Students transferring from the Master of Science into the doctoral program can anticipate five years of full-time study from their initial entry into the Master of Science program to completion of their doctoral program. Maximum completion time is six years for the Doctor of Philosophy degree.

9. Supervisory Assignments

Counselling Psychology

An interim advisor is assigned to each first-year student. Students are responsible for initiating discussions with potential permanent supervisors and are expected to have finalized supervisory arrangements by their second annual registration.

School and Applied Child Psychology

A mentorship model, which emphasizes the development of knowledge and skills through professional relationships, is utilized. Students will be initially supported in the program by faculty members who share their research interest and agree to function as a program advisor. Students have the opportunity to become involved in their advisor's research through participating in research groups, graduate assistantships, or externally funded assistantships. It is anticipated that this involvement will lead to development of the dissertation research.

10. Required Examinations

Comprehensive examinations for the Master of Education program and candidacy examinations for the doctoral program both have written and oral components. Information on examinations is provided on the Division website.

11. Research Proposal Requirements

Information on research proposals is available through the interim advisor/supervisor. Ethics approval is needed for all research projects involving the use of human subjects before data collection begins. To initiate the ethics review, the researcher must submit a copy of the application (available on the Research Services website) to the Conjoint Faculties Research Ethics Board, c/o Associate Dean (Research), Faculty of Education.

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 Division by the preceding 1 February.

The Division also provides assistance for students through teaching assistantships, graduate research scholarships and other Divisional scholarships. Application forms and deadline information for these awards can be obtained from the Division.

14. Other Information

For further information or for copies of the Division brochure, write to the Division of Applied Psychology, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4 or e-mail apsygrad@ucalgary.ca.

Further information on the Master of Counselling may be obtained from the Division website http://educ.ucalgary.ca/apsy/mc-online

15. Faculty Members/Research Interests

Research interests of faculty members and adjunct faculty can be found at: http://www.educ.ucalgary.ca/research/academic/homepages.html and from the Division office.

Graduate Courses

Note: Graduate courses within the Division of Applied Psychology can be taken only with consent of the Division of Applied Psychology and in specific cases additional requirements may be necessary (see below).

Applied Psychology 603 H(3-0)

Ethics in Applied Psychology
Ethical and legal issues in Applied Psychology. Professional issues in practice settings.
Prerequisite: Consent of the Division.

Applied Psychology 605 H(3-2)

Research Design and Statistics in Applied Psychology
Research design and statistics, including methods for research in applied psychology and related laboratory instruction.

Applied Psychology 607 H(3-2)

Research in Applied Psychology - Multivariate Analysis
Research design and statistics in applied psychology, with special reference to large sample techniques.
Prerequisites: Applied Psychology 301 and 303 or equivalents.

Applied Psychology 611 H(3-2)

Qualitative Research Methodologies
Advanced study of qualitative research methods for use in applied psychology and education.
Prerequisites: Applied Psychology 301 and 303 or consent of the Division.

Applied Psychology 615 H(3-0)
(formerly Applied Psychology 693.24)

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.

Applied Psychology 617 H(3-3)

Psychological Assessment of Adults
The purpose of this course is to provide 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: Applied Psychology 615

Applied Psychology 619 H(3-0)

Counselling Girls and Women
Sex role development; stereotyping and social roles; counselling theories; counselling approaches.

Applied Psychology 621 H(2-2)

Creating a Working Alliance
Theory and practice in developing skills contributing to working alliance and problem clarification. Ethical, legal and professional issues are the context for the application of generic counselling skills in laboratory experiences.
Prerequisite: Applied Psychology 419 or consent of the Division.
Prerequisite or Corequisite: Applied Psychology 623.
Note: Not open to unclassified students.

Applied Psychology 623 H(3-0)

Theory in Counselling
History and systems involved in counselling psychology and client change.
Prerequisite: Consent of the Division.

Applied Psychology 625 H(3-0)

Cultural Influences on Professional Practice
An examination of cultural influences on theory and practice in applied psychology.
Prerequisite: Consent of the Division.

Applied Psychology 627 H(3-1)

Group Processes in Applied Psychology
Theory of group practice in applied psychology, with experiential laboratory.

Applied Psychology 629 H(3S-2)

Theory and Applications: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Psychology 631 H(3-0)

Theories of Career Development
Study of career development theory and related research; implications for the applied field.

Applied Psychology 633 H(2-2)

Career Counselling
Laboratory and field experiences in career counselling.
Prerequisite: Applied Psychology 631.

Applied Psychology 635 H(3-0)
(formerly Applied Psychology 693.54)

Advanced History, Theory, and Practice in Psychology
Course examines the history of psychological concepts in Western culture, major theoretical systems and research approaches, and the foundational assumptions of contemporary perspectives in psychology.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.
Note: Not open to students with credit in APSY 693.54.

Applied Psychology 637 H(3-0)

Relationship Counselling
Review of theory and systems in marriage and family counselling. Structured observation activities.
Prerequisite or Corequisite: Applied Psychology 640 or consent of the Division.

Applied Psychology 639 H(2-2)

Counselling Interventions
Theory and practice in planning and implementing client change interventions; the application of counselling interventions in laboratory experiences.
Prerequisites: Applied Psychology 621 and 623 or consent of the Division.
NOT INCLUDED IN GPA

Applied Psychology 640 F(2-7)

Practicum in Counselling Psychology
Supervised counselling experience and related seminars.
Prerequisites: Applied Psychology 621, 623, 625 and consent of the Division.
Prerequisites or Corequisites: Applied Psychology 639 and one of 601, 615, or 685, or equivalent.
Note: Not open to unclassified students.
NOT INCLUDED IN GPA

Applied Psychology 641 H(3-0)

Development, Learning and Cognition - Child and Adolescence
The interactions of development, learning and cognition in childhood and adolescence.

Applied Psychology 643 H(3-0)

Development, Learning and Cognition - Adult
The interactions of development, learning and cognition in childhood and adulthood.

Applied Psychology 650 H(3-0)
(formerly Applied Psychology 693.48)

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.
Note: Not open to students with credit in APSY 693.48.

Applied Psychology 651 H(3-0)
(formerly Applied Psychology 683)

Disorders of Learning and Behaviour
Focuses on childhood and adolescent disorders through an examination of theories, diagnostic and associated features and disorders, prevalence, developmental course, cultural and gender context, and familial patterns.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.
Note: Not open to students with credit in APSY 683.

Applied Psychology 652 H(3-0)

Academic and Language Assessment
Course provides a broad understanding of the standards that guide assessment practices through an examination of assessment of academic areas and language skills.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.
Note: Not open to students with credit in APSY 667.

Applied Psychology 654 H(3-0)

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.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.

Applied Psychology 656 F(1-14)

Practicum in Academic and Language Assessment and Intervention
This 200-hour practicum provides opportunities to develop competencies in academic and language assessment and interventions within an approved setting.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.
NOT INCLUDED IN GPA

Applied Psychology 657 H(3-0)

Cognitive and Neuropsychological Assessment
Focuses on the theory and practice of intellectual/cognitive, memory, and neuropsychological assessment primarily through the use of individually administered standardized tests.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.

Applied Psychology 658 H(3-0)

Interventions to Promote Cognitive, Academic, and Neuropsychological Well-Being
Focuses on evidence-based interventions aimed at promoting cognitive, academic, and neuropsychological development in children and youth.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.

Applied Psychology 660 H(3-0)

Social, Emotional, and Behavioural Assessment
Grounded in bioecological systems perspective and developmental and resiliency frameworks, course focuses on the comprehensive assessment of children and youth referred for social, emotional, and behavioural concerns.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.

Applied Psychology 661 H(3-0)

Psychological Foundations of Student Exceptionality
Major trends, developments, theoretical foundations, and current practices and challenges relative to the education of students with diverse learning needs.
Prerequisite: Open to students enrolled in APSY programs or permission of the Division.

Applied Psychology 667 H(3-3)

Assessment of Students with Exceptional Learning Needs
Theory and practice in school-based academic and social-emotional assessment techniques and strategies for use with students with diverse learning needs. Laboratory and field experiences.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.
Note: Not open to students with credit in APSY 652.

Applied Psychology 671 H(1-3)

Practicum in School-based Interventions for Children and Youth with Exceptional Learning Needs: I
Practicum in educational interventions for children and adolescents with special learning needs. Focus on general assessment, analysis, intervention, and strategies in applied settings.
Prerequisite: Applied Psychology 661 or equivalent.

Applied Psychology 673 H(3-3)

Practicum in School-based Interventions for Children and Youth with Exceptional Learning Needs: II
Advanced practicum in educational interventions for children and adolescents with special learning needs. Focus on specialized assessment, analysis, interventions, and strategies in applied settings.
Prerequisite: Applied Psychology 671 or equivalent.

Applied Psychology 674 H(3-0)

Interventions to Promote Socio-emotional and Behavioural Well-being
Courses focuses 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: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.

Applied Psychology 675 F(1-14)

Practicum in Cognitive and Neuropsychological Assessment and Intervention
This 200-hour practicum provides opportunities to develop competencies in cognitive and neuropsychological assessment and interventions within an approved setting.
Prerequisite: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.
NOT INCLUDED IN GPA

Applied Psychology 676 F(1-14)

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: Open to students enrolled in the School and Applied Child Psychology program or permission of the Division.
NOT INCLUDED IN GPA

Applied Psychology 677 H(3-0)

Play Therapy Theory and Process
The theoretical foundations and basic orientation necessary to understand and use play as therapy are outlined, along with the developmental underpinnings of play in children and the basic principles upon which child-centered play therapy is built.

Applied Psychology 679 H(3-0)

Fundamentals of Solution-Oriented Therapy
Provides a working knowledge of the theory and practice of solution-oriented therapy and related models.

Applied Psychology 684 H(3-0)

Advanced Seminar in the Domains of School Psychology Leadership and Function in the Schools
This course provides 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. Open only to students enrolled in the MEd program in School and Applied Child Psychology or with permission of the division.

Applied Psychology 691 Q(1.5S-0)

Graduate Seminar: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Psychology 692 F(3S-0)

Graduate Seminar: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Psychology 693 H(3S-0)

Graduate Seminar: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Psychology 694 F(1S-3)

Graduate Practicum: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Psychology 695 H(1S-3)

Graduate Practicum: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT
Notes:
1. 700-level courses are normally available only to students in the Applied Psychology doctoral program.
2. Students seeking an internship can do so by registering in a 700-level Special Topics course, in consultation with their supervisor.

Applied Psychology 698 F

Pre-Master's Internship in School and Applied Child Psychology
This 1,200 hour internship requires the integration and application of the full range of school psychology competencies and domains within an approved setting.
Prerequisite: Consent of Training Director. Open only to students enrolled in the MEd or MSc in School and Applied Child Psychology.
NOT INCLUDED IN GPA

Applied Psychology 701 H(3-0)

Advanced Research Design, Psychometrics and Statistics in Applied Psychology
Provides intensive exposure to sophisticated quantitative techniques relevant to research design, psychometrics, and statistics such as structural equation modelling (SEM), item-response theory (IRT), and hierarchical linear modelling (HLM).
Prerequisite: Applied Psychology 607 or equivalent.

Applied Psychology 703 H(3-0)

Advanced Seminar in Applied Psychology
Doctoral seminar in issues in applied psychology. Dissertation development.
NOT INCLUDED IN GPA

Applied Psychology 705 H(3-0)

Advanced Seminar in Special Education I
Advanced study of theoretical, empirical, and practical issues affecting individuals with exceptional learning needs.
Prerequisite: Applied Psychology 661 or equivalent.

Applied Psychology 709 H(3-0)

Advanced Seminar in Applied Learning and Developmental Psychology I
Advanced study of theory and practice in human development and learning.

Applied Psychology 731 H(3-0)

Advanced Clinical Supervision in Applied Psychology
This course provides students with formal training in clinical supervision with the intent of raising an awareness of supervision models, as well as a conceptual framework and vocabulary for thinking through their supervision practice.
Prerequisite: Open only to doctoral students in School and Applied Child Psychology and Counselling Psychology or permission of the Division.

Applied Psychology 732 H(3-0)

Advanced Seminar in School and Applied Child Psychology
Seminar series that links theory and research with practice in the school psychology domains of professional competence.
Prerequisite: Open only to doctoral students in School and Applied Child Psychology.

Applied Psychology 741 H(3-2)

Advanced Professional Skills and Issues
This course focuses on providing knowledge and developing skills in the areas of consultation, supervision, and program development and evaluation across the lifespan.

Applied Psychology 742 F(2-7)

Advanced Practicum in Counselling
Advanced practicum in counselling psychology, and related seminars.
NOT INCLUDED IN GPA

Applied Psychology 788 F

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.
Note: Open only to students enrolled in the PhD program in Counselling Psychology.
NOT INCLUDED IN GPA

Applied Psychology 792 F(3-0)

Advanced Seminar: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Psychology 793 H(3S-0)

Graduate Seminar: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Psychology 794 F(1S-3)

Advanced Practicum: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Psychology 795 H(1S-3)

Advanced Practicum: Selected Topics
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Psychology 798 F

Pre-Doctoral Internship in School and Applied Child Psychology
Supervised 1,600 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: Consent of the Training Director. Open only to doctoral students in School and Applied Child Psychology.
NOT INCLUDED IN GPA

In addition to the numbered and titled courses shown above, the Division offers a selection of advance level graduate courses specifically designed to meet the needs of individuals or small groups of students at the advanced doctoral level. The courses listed in the calendar as May Be Repeated for Credit may be decimalized to create these specialized offerings. Such arrangements are, however, contingent upon the availability of staff resources.

Master of Counselling

Graduate Courses

Note: Students not in the Master of Counselling program may take these courses only with consent of the Division of Applied Psychology and in specific cases additional requirements may be necessary (see below).

Campus Alberta Applied Psychology 601 H(3-0)

Theories of Counselling and Client Change
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.

Campus Alberta Applied Psychology 603 H(3-0)

Professional Ethics
Addresses personal and professional ethical issues in counselling. The perspectives of different professional disciplines will be used to highlight commonalities and differences. Students will reflect critically on both personal and collective worldviews and values as well as explore the impact of those perspectives on counselling processes and contexts.

Campus Alberta Applied Psychology 605 H(2-2)

Developing a Working Alliance
Focuses on the understanding and acquisition of skills that are essential for the development of working alliances in counselling contexts. Introduces a theoretical framework for the application of counselling skills in addition to providing the opportunity for skill practice.
Prerequisite or Corequisite: Campus Alberta Applied Psychology 601.

Campus Alberta Applied Psychology 607 H(3-0)

Equity and Diversity Issues in Counselling
Focuses on increasing personal awareness, identification of conceptual frameworks, and development of in-depth knowledge of equity and diversity issues in counselling. Students will be expected to examine their own attitudes, behaviours, perceptions and biases.

Campus Alberta Applied Psychology 611 H(2-7)

General Counselling Practicum
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.
Prerequisites: Campus Alberta Applied Psychology 601, 603, 605, 607, 613 and 615 and consent of the Campus Alberta Program.
NOT INCLUDED IN GPA

Campus Alberta Applied Psychology 613 H(2-2)

Assessment
Combines a theoretical and practical focus to develop a framework from which to approach the assessment of client change in a variety of contexts.
Prerequisites: Campus Alberta Applied Psychology 601 and 605.

Campus Alberta Applied Psychology 615 H(2-2)

Intervening to Facilitate 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.
Prerequisites: Campus Alberta Applied Psychology 601 and 605.

Campus Alberta Applied Psychology 617 H(3-2)

Methods of Inquiry
Helps students critically analyze other research efforts and in the process learn how to think through their own research questions in a critically evaluative manner.

Campus Alberta Applied Psychology 619 H(2-7)

Specialized Practicum
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.
Prerequisites: Campus Alberta Applied Psychology 611, 613 and 615.
NOT INCLUDED IN GPA

Campus Alberta Applied Psychology 621 H(3-0)

Foundations of Career Development
Focuses on major theories and models of career development and related research. Emphasis will be placed on the integration of theory with career counselling practice.
Prerequisites: Campus Alberta Applied Psychology 601.

Campus Alberta Applied Psychology 623 H(3-0)

Processes and Resources for Facilitating Career-Life Transitions
Provides knowledge of common issues associated with career-life transitions as they pertain to models of career counselling. Students also acquire knowledge about various types of career development resources and gain critical skills for selecting and using resources to facilitate career-life transitions.

Prerequisites: Campus Alberta Applied Psychology 605 and 621.

Campus Alberta Applied Psychology 625 H(3-0)

Systemic Community Change: A Comprehensive Approach to Human Service Delivery
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.

Campus Alberta Applied Psychology 627 H(3-0)

Career Development in 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.
Prerequisites: Campus Alberta Applied Psychology 601, 603, 605 and 607.

Campus Alberta Applied Psychology 629 H(3-0)

Multicultural Issues in Career Development
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.
Prerequisites: Campus Alberta Applied Psychology 607 and 621.

Campus Alberta Applied Psychology 631 H(3-0)

Learning Processes
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.

Campus Alberta Applied Psychology 633 H(3-0)

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.

Campus Alberta Applied Psychology 635 H(3-0)

Health Psychology
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.
Prerequisites: Campus Alberta Applied Psychology 601, 607, and 617.

Campus Alberta Applied Psychology 637 H(3-0)

Group Process
Provides a conceptual understanding of group process, applied to a wide range of contexts and clientele. Incorporates various theories of group counselling and group process to develop an overall conceptual framework. Delivery consists of two integrated components: (a) an on-line component focusing on group theories and conceptual aspects of working in group contexts and (b) a face-to-face component delivered during a summer institute.
Prerequisites: Campus Alberta Applied Psychology 601, 603, 605, and 607.

Campus Alberta Applied Psychology 639 H(3-0)

Introductory Data Analysis
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.

Campus Alberta Applied Psychology 641 H(3-0)

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.

Campus Alberta Applied Psychology 661 H(3-0)

History of Art Therapy
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.
Prerequisites: Campus Alberta Applied Psychology 611, 613, and 615.

Campus Alberta Applied Psychology 681 H(3-0)

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.
Prerequisites: Campus Alberta Applied Psychology 601, 603, 605, and 607.

Campus Alberta Applied Psychology 691 Q(15S-0)

Graduate Seminar: Special Topics
Prerequisite: Consent of the Campus Alberta Program.
MAY BE REPEATED FOR CREDIT

Campus Alberta Applied Psychology 693 H(3-0)

Graduate Seminar: Selected Topics
Prerequisite: Consent of the Campus Alberta Program.
MAY BE REPEATED FOR CREDIT

Campus Alberta Applied Psychology 695 H(1-4)

Graduate Practicum: Selected Topics
Prerequisite: Consent of the Campus Alberta Program.
MAY BE REPEATED FOR CREDIT

ARCHAEOLOGY ARKY

Contact Info

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1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)
Master of Arts (MA), thesis-based
Students in the Departments of Archaeology and Anthropology and the Faculty of Medicine may choose an interdisciplinary specialization in Biological Anthropology. For further information on the Biological Anthropology (Interdisciplinary) specialization, see the separate listing in this Calendar.

2. Admission Requirements

In addition to Faculty of Graduate Studies 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 3.3 grade point average in the last two years of program or over the last ten full course equivalents

3. Application Deadline

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

4. Advanced Credit

The Department does not normally give advanced credit.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies requirements, the Department requires:

Master of Arts

a) Normally, three full-course equivalents including Archaeology 601 and one of the following, as determined by the student's evaluation committee: Archaeology 615 or Archaeology 617 or a course in human osteology
b) A season of fieldwork or the equivalent

Doctor of Philosophy

a) Normally, four full-course equivalents in Archaeology
b) For those without a Master of Arts degree, normally five 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. Unless previously satisfied, ARKY 601 and two of the following: ARKY 615 or ARKY 617 or

a course in human osteology will be required as determined by the student's evaluation committee.

c) Normally, the writing of one research paper of publishable quality, as judged by the supervisory committee
d) A research proposal approved by a committee consisting minimally of three members of his or her supervisory committee, and by the Graduate Coordinator. This must be submitted within twenty months of entering the program.
e) A reading ability in a foreign language acceptable to the Department. The student's supervisory committee will decide the manner of demonstrating this ability.
f) Normally, proficiency in statistics, acceptable to the Department. The student's supervisory committee will decide the manner of demonstrating this ability.

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

g) 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.

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 Coordinator 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 15th.

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/home/people.
Note: Individual specializations are also listed in the Department's Graduate Brochure, published annually, and available upon request from the Department.

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.

Archaeology 501 H(3-0)

Practical Problems in Archaeological Interpretation
Exercises in the analysis and interpretation of a variety of archaeological data sets.
Prerequisite: 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: 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: 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.
Prerequisites: Pure Mathematics 30; Archaeology 201 and 306.
Note: Normally offered during the Spring and/or Summer Sessions.

Archaeology 507 H(3-0)
(formerly Archaeology 533.13)

Issues in Hominoid Behaviour
Critical evaluation of the behavioural patterns shared by hominoids from the perspectives of primatology, paleonanthropology, and Paleolithic archaeology.
Prerequisites: Archaeology 201 or 203 or 205; Anthropology 201 or consent of the Department.

Archaeology 511 H(3-0)

Mesoamerican Writing Systems
Writing systems of Mesoamerica, their origins and development, including the Mesoamerican calendar and astronomical knowledge.
Prerequisites: Archaeology 341 and 343 or consent of the Department.

Archaeology 517 H(3-0)

Archaeometry
Analytical methods for reconstructing various aspects of life in the past based on analysis and interpretation of the material record. The structures of materials at the microscopic and macroscopic levels; raw materials and production technologies; provenance; dating; prospection; dietry reconstruction; sampling and measurement. Archaeological case studies are used throughout.
Prerequisite: Pure Mathematics 30; consent of the Department.

Archaeology 523 H(3-0)
(Anthropology 523) (Geography 523)
(formerly Archaeology/Anthropology/Geography 609)

Human Ecological Systems
The development of human ecology, its current directions and application of analytical techniques as they apply to anthropology, archaeology and geography.
Prerequisite: Pure Mathematics 30; consent of the Department.
Note: 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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Archaeology 533 H(3-0)

Special Topics in Archaeology
This course is offered periodically to meet special needs of students or visiting faculty members.
Prerequisite: 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.
Prerequisites: Any two of Archaeology 341, 343, 345 or 347.

Archaeology 553 H(3-0)
(History 553)

Circum-Caribbean Archaeology and History
The prehistory and history of the indigenous peoples of the Caribbean from the first peopling of the islands to the early contact period.
Prerequisite: Consent of the Department.
Note: 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: Archaeology 203 or consent of the Department.
Note: Not open to students with credit in Archaeology 613.
Note: Until July 21, preference in enrollment 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: Pure Mathematics 30; 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: 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: 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: Pure Mathematics 30; Archaeology 203 or consent of the Department. Archaeology 555 is recommended.
Note: Until July 21, preference in enrollment 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: 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: 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: 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: 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(3-0)

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: 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: 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: Archaeology 417 or equivalent.

Archaeology 607 H(0-6)

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: 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: 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 analyzing human remains from archaeological contexts with emphasis on identification and description. Lecture, lab and weekly seminar directed to Archaeology graduate students who have not had a previous course in human osteology.
Prerequisite: Consent of the Department.
Note: Not open to students with credit in Archaeology 555 or 603.07.

Archaeology 615 H(3-0)

Topics in Archaeological Theory and Method
The history of archaeological theory and contemporary theoretical and methodological approaches used in archaeological research.
Prerequisite: Consent of the Department.

Archaeology 617 H(3-0)

Theory and its Application in Biological Anthropology
Basic issues in the study of human adaptation with a focus on principles of evolutionary biology as they apply to modern studies. Throughout, a bio-cultural approach will be emphasized.
Prerequisite: 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: Archaeology 555 or consent of the Department.

Archaeology 621 H(3S-0)

Problems in Ethnoarchaeology
Seminar on selected topics relating to ethnoarchaeology.
Prerequisite: Consent of the Department.

Archaeology 623 H(3S-0)

Reconstructing Plains Culture
Archaeological and ethnographic Plains culture and the methodological and theoretical issues involved in the use of achaeological reconstructions of the past. Normally focus will be on the northern Plains.
Prerequisite: 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 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: 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: 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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

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.

ART

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Location: Craigie Hall D 100
Faculty number: (403) 220-5384
Fax: (403) 282-6925
E-mail address: julia.ross@ucalgary.ca
Web page URL:
http://www.finearts.ucalgary.ca/art.shtml

1. Degrees and Specializations Offered
Master of Fine Arts (MFA)
Specializations: sculpture, printmaking, photography, painting, drawing, inter-media, media art and technology, interdisciplinary work

Applicants interested in a doctoral degree in Art on a special case basis should contact the Department.

2. Admission Requirements
In addition to Faculty 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 35 mm slide format or CD/DVD
c) A written statement of intent

3. Application Deadline
The deadline for the submission of complete applications is 15 January 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 three 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 Art 605. One half-course equivalent 600-level graduate seminar 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 three 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 1 January of the first academic year of registration. The approval of a permanent supervisor, by the Coordinator, 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.
Questions on the research proposal will not be included in the oral candidacy examination of special case doctoral degree students.

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 Faculty of Fine Arts by January 15.

14. Other Information
The Department has extensive facilities for multi-media, mixed media and inter-media projects.

15. Faculty Members/Research Interests
Faculty members and their research interests can be found at http://www.finearts.ucalgary.ca/art.shtml

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: 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: 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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Art 631 H(2T-10)

Advanced Electronic Media
Individual study in electronically generated art forms, including digital media.
631.01. Advanced Electronic Media I
631.02. Advanced Electronic Media II
Prerequisite: Consent of the Department.

Art 635 H(2T-10)

Advanced Photography
Individual study in photography.
635.01. Advanced Photography I
635.02. Advanced Photography II
Prerequisite: Consent of the Department.

Art 641 H(2T-10)

Advanced Drawing
Individual study in drawing.
641.01. Advanced Drawing I

641.02. Advanced Drawing II
Prerequisite: Consent of the Department.

Art 651 H(2T-10)

Advanced Painting
Individual study in painting.
651.01. Advanced Painting I
651.02. Advanced Painting II
Prerequisite: Consent of the Department.

Art 661 H(2T-10)

Advanced Studio Practice
Individual study that is not limited to a single medium.
661.01. Advanced Studio Practice I
661.02. Advanced Studio Practice II
Prerequisite: Consent of the Department.

Art 671 H(2T-10)

Advanced Printmaking
Individual study in printmaking.
671.01. Advanced Printmaking I
671.02. Advanced Printmaking II
Prerequisite: Consent of the Department.

Art 681 H(2T-10)

Advanced Sculpture
Individual study in sculpture.
681.01 Advanced Sculpture I
681.02 Advanced Sculpture II
Prerequisite: Consent of the Department.

Art 691 H(1-3)

Practicum in Post-Secondary Art Instruction
Supervised practical application of techniques of planning and teaching art in a post-secondary curriculum.
Prerequisite: Consent of the Department.
Note: This course consists of three hours of supervised practicum per week and one hour of seminar every two weeks.
Note: Not open to students in their first term of program.
MAY BE REPEATED FOR CREDIT

Art 699 H(3S-3T)

Graduate Seminar
A seminar in art criticism and theory.
Prerequisite: 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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Graduate Courses

Art History 613 H(3-0)

Independent Study in Art History
Prerequisite: 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: 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: Consent of the Department.

BIOCHEMISTRY AND MOLECULAR BIOLOGY MDBC

Contact Info

Location: Health Sciences Centre, Room G329
Faculty number: (403) 220-8306
Fax: (403) 210-8109
E-mail 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
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. All students will have the specialization "Biochemistry and Molecular Biology."

All Master's Thesis and Doctoral students are considered full-time. In exceptional circumstances part-time status may be considered and must be approved.

Combined MD/Master's and MD/PhD programs are offered under the title "Leaders in Medicine."

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, the Department requires:
a) A minimum admission grade point average of 3.2 on a four point scale
b) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (written), 250 (computer-based) or 100 (internet-based) or an IELTS score of 7.50
c) International applicants are required to submit scores from the Graduate Record Examination (GRE).A competitive GRE score has usually been in the 90th percentile.

3. Application Deadline

Deadlines for submission of complete applications for students with international transcripts:
15 May for September admission
15 September for January admission
15 January for May admission
Deadlines for submission of complete applications for students with Canadian or U.S. transcripts:
15 June for September admission
15 October for January admission
15 March for May 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

Advanced credit requests must be made by the applicant as part of the admission process. Any credit to be given for courses completed will be included in the departmental letter recommending the student's admission to the Faculty of Graduate Studies.

5. Program/Course Requirements

In addition to Faculty requirements, an interim supervisory committee will determine the courses required for each student, based on the student's previous academic background and proposed area of research. In general, Master's students will be required to take at least two graduate level half-courses and doctoral students will be required to take at least three graduate level half-courses.

6. Additional Requirements

Each student is required to participate regularly in journal club and work-in-progress seminar programs administered by the 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. Consult the program website for details.

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

Maximum completion time is four years for the Master of Science degree and six years for the Doctor of Philosophy degree.
Leaders in Medicine – Maximum completion time is six years for the MD/Master's program, and eight years for the MD/PhD program.

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 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

The doctoral candidacy examination has both a written and an oral component and is designed to test general and specific knowledge about various aspects of biochemistry and molecular biology. Four examination questions will be given to the student four weeks before the oral examination. The student will prepare a written paper for two of the examination questions and submit the two papers to all examiners one week before the oral examination. The supervisor is a non-voting observer at the doctoral candidacy examination.

Doctoral students are required to present a public

thesis seminar immediately before the thesis defence.

11. Research Proposal Requirements
Each student must prepare a research proposal within twelve months of initial registration (sixteen months for rotation students). The research proposal will be presented and defended before the supervisory committee.

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 [$20,000 for MSc students and $22,000 for doctoral students (fourth year post-candidacy PhD students will receive $23,000/yr).] 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. Students applying for University scholarships must submit their applications to the Department by 1 February.

14. Course Information
All Biochemistry and Molecular Biology graduate students are required to take either the Biochemistry and Molecular Biology core course MDSC 721; or Advanced Genetics, MDSC 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
BCEM 731 Protein and Metabolic Engineering
MDSC 603 Biology of Laboratory Animals (BIOL 603)
MDSC 604 Integrative Human Physiology
MDSC 605 Information Storage and Processing in Biological Systems (CPSC 605)
MDSC 609.02 Genes and Development
MDSC 613.05 Regulation of Gene Expression in Bacteria
MDSC 619.01 Cellular and Molecular Neuroscience
MDSC 619.03 Developmental Neuroscience
MDSC 621.01 Basic Principles of Pharmacology
MDSC 631 Muscle Physiology
MDSC 639.01 Principles of Immunology
MDSC 639.02 Cellular and Molecular Immunology
MDSC 641.01 Advanced Genetics I
MDSC 641.04 Genomics
MDSC 643 Biostatistics I and II
MDSC 671 Techniques in Medical Science
MDSC 675 Bioinformatics Resources for the Biologist
MDSC 683.01 Cancer Pathology, Epidemiology and Therapy
MDSC 683.02 Molecular Mechanisms of Cancer
MDSC 683.04 Cell Biology of Cancer
MDSC 717 Functional Genomics Technologies
MDSC 721 Biochemistry and Molecular Biology
MDSC 751.02 Cellular and Molecular Pathogenic Mechanisms of Diabetes
MDSC 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
Research interests of the Groups can be found on the department website at
http://www.ucalgary.ca/bmb/facultyresearch.html

BIOLOGICAL SCIENCES BISI

Contact Info
Location: Biological Sciences Building, Room 186
Faculty number: (403) 220-6623
Fax: (403) 289-9311
E-mail 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
Concentrations of Study include:
Biomolecules, Cells and Microbes
Ecology and Evolutionary Biology
Organismal Biology

2. Admission Requirements
In addition to Faculty requirements, the Department requires:
(a) A minimum grade point average of 3.20 on a four point scale over 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), 237 (computer-based test) or 92 (internet-based test) or an IELTS score of 7.5
(c) A concise statement outlining the applicant's research interests and reasons for wishing to attend the University of Calgary

3. Application Deadline
Deadlines for submission of complete applications for students with international transcripts:
1 May for September admission
1 September for January admission
1 January for May admission

Deadlines for submission of complete applications for students with Canadian or US transcripts:
1 June for September admission
1 October for January admission
1 March for May admission

4. Advanced Credit
Not applicable.

5. Program/Course Requirements
In addition to Faculty of Graduate Studies 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 to a doctoral 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 Coordinator. 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 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 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. The supervisor, in consultation with the student, selects an Advisory Committee consisting of the supervisor and at least two other faculty members whose research area 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 three substantive essays in answer to questions, which focus on the student's field of specialization, submitted by their candidacy committee. One week after the submission of the 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 for transfer of program 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 by 18 January.

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.

Biochemistry (BCEM)

Undergraduate Courses

See also the separate listing of graduate level Chemistry courses.

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.
Prerequisites: 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: 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.
Prerequisites: One of Biochemistry 341 or 393, and one of Biochemistry 471 or Chemistry 371.

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: Biochemistry 393 or 443.
Note: Prior or concurrent completion of Biochemistry 431 and 471 is strongly recommended.

Biochemistry 561 H(2-3T)
(formerly Biotechnology 561)

Applied Biochemistry and Biotechnology
An introduction to the language, materials, methods, concepts and commercial applications of biotechnology with emphasis on methodology: biocatalysts, bioreactor designs and operation, scale-up, instrumentation, product recovery, animal and plant cell culture, process economics.
Prerequisite: Biochemistry 393.
Note: Prior completion of Cellular, Molecular and Microbial Biology 411 or Biochemistry 401 is strongly recommended.

Biochemistry 575 H(3-2T-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: Biochemistry 393 or 443

Biochemistry 577 H(3-4/2)

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.
Prerequisites: One of Biochemistry 341 or 393 and one of Biochemistry 471 or Chemistry 371.

Graduate Courses

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 programs.

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
Contemporary methods of recombinant DNA technology will be combined with modern methods and strategies for expressing, secreting, purifying and characterizing proteins. This will include biophysical techniques, structural analysis and covalent modifications. Various modern 'omics' research approaches will also be discussed.

Biology (BIOL)

†Limited amounts of non-scheduled class time involvement will be required for these courses.

Undergraduate Courses

Biology 501 H(3-0)
(Medical Science 501)

Principles and Mechanism of Pharmacology
Basic principles of pharmacology, with specific emphasis on receptor signaling mechanisms.
Prerequisites: 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: Biology 501 (Medical Science 501) or consent of the Department.

Biology 505 H(3-0)

Medicinal Plant Biochemistry
This course 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 of this course 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.
Prerequisites: Biology 331 and Biochemistry 393
Note: Credit for Biology 505 and Botany 503 will not be allowed.
Note: Enrolment in this course may be limited. See explanation in Program section of Calendar.

Biology 515 (Medical Science 515) H(3-0)

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.
Prerequisites: Biochemistry 443 and Biology 331.

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: Consent of the Department.

Biology 551 H(3-0)

Systems Biology
An overview of theoretical concepts and high-throughput technologies in systems biology. Functional genomics, genetic circuits, gene-regulatory networks, and systems dynamics as applied to the control of development..
Prerequisite: Biology 331, Biochemistry 393, and Math 249 or 251 or 281.
Note: Prior completion of Computer Science 217 or 231; and Math 211 or 213 is strongly recommended.

Biology 553 H(3-0)

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: Biochemistry 341 or 393; and Biochemistry 471 or Chemistry 371.
Note: Prior completion of Biochemistry 555 is strongly recommended.

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: Consent of the Department.

Graduate Courses

Enrolment in any Graduate Course requires consent of the Department. (Only where appropriate to a student's program may graduate credit be received for courses numbered 500-599.) 600-level courses are available, with permission, to undergraduate students in the final year of programs.

Biology 601 H(2S-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 Biomolecules, Cells and Microbes I
601.02. Biomolecules, Cells and Microbes II
601.03. Organismal Biology I
601.04 Organismal Biology II
601.05 Ecology and Evolutionary Biology I
601.06 Ecology and Evolutionary Biology II
NOT INCLUDED IN GPA

Biology 603 H(3-1)
(Medical Science 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(3-3)

Special Problems in Biology
Lectures, 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 nonlinear 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: Familiarity with statistical inference, regression, and ANOVA-based experimental design (equivalent of Ecology 425) is required.
Note: Offered in odd-even dated academic years.

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 in biology.
Note: Offered in 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 in 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 in odd-even dated academic years.

Biology 703 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

Botany (BOTA)

Undergraduate Courses

Botany 501 H(3-0)

Plant Molecular Biology and Biotechnology
Organization of the plant genome. Plant gene structure. Comparisons between plant and animal genomes. The chloroplast genome and its expression. Coordination of chloroplast-nuclear gene expression. Regulation of plant gene expression by light, temperature and chemical stimuli. Molecular basis of plant hormone action. Tissue and organ specific gene expression. Plant transposable elements. Plant viruses. Plant genetic engineering. Gene transfer in plants. Plant DNA vectors. Plant genetic transformation and its uses in plant physiology, biochemistry and applied biotechnology.
Prerequisites: One of Biochemistry 341 or 393; Biology 233 and 331.

Botany 507 H(3-3)

Special Problems in Botany
Lectures, seminars, term papers and training in theoretical and/or laboratory methods.
Prerequisites: Successful 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 enroll 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

Botany 528 F(0-6)

Independent Studies in Botany
Original and independent thought, practical research and the completion of written and oral reports.
Prerequisites: 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

Botany 530 F(0-8)

Honours Research Project in Botany
Research project under the direction of one or more faculty members in the Department of Biological Sciences. Formal written and oral reports must be presented on completion of this course. Open only to Honours Botany students or Honours Biological Sciences students.
Prerequisites: Completion of at least 15 full-course equivalents and consent of the department.
Note: After consultation with a department faculty member who will supervise the chosen problem, a permission form obtained from the department office or website must be completed before a student can register.

Botany 543 H(3-3)

Plant Developmental Biology
Physiology, biochemistry, molecular and cellular aspects of plant growth and development. Emphasis on the coordinated 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.
Prerequisites: Biology 331 and Botany 303 or 403 or 503.
Note: Offered in odd-even dated academic years.
Note: Enrolment in this course may be limited. See explanation in Program section of Calendar.

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.

Botany 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 this course.
MAY BE REPEATED FOR CREDIT

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 in even-odd dated academic years.

Botany 745 H(0-6)

Botanical 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 in odd-even dated academic years.

Cellular, Molecular and Microbial Biology (CMMB)

Undergraduate Courses

†Limited amounts of non-scheduled class time involvement will be required for these courses.

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 coordinated regulation of gene expression during development.
Prerequisites: Biochemistry 401 or 443, Cellular, Molecular and Microbial Biology 403.

Cellular, Molecular and Microbial Biology 507 H(3-3)

Special Problems in Cellular, Molecular and Microbial Biology
Lectures, seminars, term papers and training in theoretical and/or laboratory methods.
Prerequisites: 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 enroll in their 3rd or 4th year. After consultation with a department 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

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: 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 the cytoskeleton, subcellular organization and dynamics, RNA and protein trafficking, and other aspects of eukaryotic cell biology.
Prerequisites: Biology 311, 331 and one of Biochemistry 401 or 443.

Cellular, Molecular and Microbial Biology 523 H(3-0)

DNA, Genomes and RNA Function
An examination and comparison of the roles of DNA and RNA in the cell. Includes chromatin structure, transcriptional regulation, mechanisms of post-transcriptional regulation at the RNA level, and the diverse roles played by RNA, ranging from information molecules to structural scaffolds to ribozymes.
Prerequisite: Cellular, Molecular and Microbial Biology 411.

Cellular, Molecular and Microbial Biology 527 H(3-3)
(formerly Cellular, Molecular and Microbial Biology 427)

Immunology
Comprehensive overview of the immune responses: antibody-antigen interaction, antibody structure, genetics and synthesis, cellular immunology, MHC, phagocytosis, tolerance, autoimmunity, hypersensitivity, tissue rejection, tumour immunology and vaccine production. Responses to viral, bacterial, fungal and parasite infections. Methods for the study of immunology.
Prerequisites: Biochemistry 401 or 443, Biology 311, 331, Cellular, Molecular and Microbial Biology 343.
Note: Enrolment in this course may be limited. See explanation in the Program section of this Calendar.

Cellular, Molecular and Microbial Biology 528 F(0-6)

Independent Studies in Cellular, Molecular and Microbial Biology
Original and independent thought, practical research and the completion of written and oral reports.
Prerequisites: Completion of at least 15 full-course equivalents and consent of the department.
Note: After consultation with a department faculty member who will supervise the chosen problem, a permission form obtained from the department office or website must be completed before a student can register.
MAY BE REPEATED FOR CREDIT

Cellular, Molecular and Microbial Biology 530 F(0-8)

Honours Research Project in Cellular, Molecular and Microbial Biology
Research project under the direction of one or more faculty members in the Department of Biological Sciences. Formal written and oral reports must be presented on completion of this course. Open only to Honours Cellular, Molecular and Microbial Biology students or Honours Biological Sciences students.
Prerequisites: Cellular, Molecular and Microbial Biology 451, completion of at least 15 full-course equivalents and consent of the Department.
Note: Students are required to register in CMMB 507.95 in the Winter term during which they are registered in CMMB 530. Failure to register as such will result in their removal from CMMB 530. After consultation with a department faculty member who will supervise the chosen problem, a permission form obtained from the department office or website must be completed before a student can register.

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 remodeling and stem cells.
Prerequisites: Biology 331, and one of Biochemistry 443 or 431 or 401
Note: Not open to students with credit in Cellular, Molecular and Microbial Biology 507.90.
Note: Prior completion of Cellular, Molecular and Microbial Biology 403 is highly recommended and Cellular, Molecular and Microbial Biology 451 or 527 are advantageous.

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 emphasised. Special topics will include plant-microbe and animal-microbe symbiosis, extreme environments and biotechnological applications of environmental microbiology.
Prerequisite: Cellular, Molecular and Microbial Biology 343 or consent of the Department.

Cellular, Molecular and Microbial Biology 549 H(3-0)

Microbial Genetics
The structure and function of microbial genes and genomes will be analyzed with state-of-the-art bioinformatics programs. Advances in understanding of mechanisms of genetic exchange in bacteria and bacteriophages, including conjugation, transduction, transformation and lysogeny will be presented together with selected topics in microbial genetics.
Prerequisite: Cellular, Molecular and Microbial Biology 411.

Cellular, Molecular and Microbial Biology 561 H(3-0)
(Medical Science 561)

Cancer Biology
Advances in methodology and in theoretical concepts have permitted continuing breakthroughs in our understanding of the organismal, cellular and molecular biology of cancer cells, and in the development of novel strategies for cancer prevention, diagnosis and treatment. These advances will be presented in a comprehensive overview of cancer including issues of demographics and incidence, causation and detection, origins and progression and therapeutic approaches. Emphasis will be placed on the cell and molecular biology of cancer and on the interaction of the cancer cell with the host organism.
Prerequisites: Biology 331, Cellular, Molecular and Microbial Biology 411 and one of Biochemistry 401 or 443.

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.

Cellular, Molecular and Microbial Biology 637 H(3-3)

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.
MAY BE REPEATED FOR CREDIT

Ecology (ECOL)

†Limited amounts of non-scheduled class time involvement will be required for these courses.

Undergraduate Courses

Ecology 501 H(0-3)

Ecological and Evolutionary Applications
A class project course in which students apply their understanding of ecological and evolutionary concepts and their analytical skills to investigate selected problems in detail. Project topics vary from year to year and will include fundamental and applied problems. Formal written and oral reports will be presented as a necessary component of the course.
Prerequisite: Ecology 417, 425, 429 and completion of at least 12.5 FCE in the Ecology program.
Note: Prior or concurrent completion of Biology 401, Ecology 419 and 439 are strongly recommended. Ecology 501 is intended to draw on experience gained throughout the Ecology program, and should be taken by students in the final year of the program.

Ecology 507 H(3-3)

Special Problems in Ecology
Lectures, seminars, term papers and training in theoretical and/or laboratory methods.
Prerequisites: 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 enroll 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.
Prerequisites: Biology 313, and one of Ecology 417 or Zoology 477.02.
Note: Offered in even-odd dated academic years.

Ecology 528 F(0-6)

Independent Studies in Ecology
Original and independent thought, practical research and the completion of written and oral reports.
Prerequisites: 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 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.
Prerequisites: 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. 600-level courses are available with permission to undergraduate students in the final year of 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 in 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

Zoology (ZOOL)

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.
†Limited amounts of non-scheduled class time involvement will be required for these courses.

Zoology 507 H(3-3)

Special Problems in Zoology
Lectures, seminars, term papers and training in theoretical and/or laboratory methods.
Prerequisites: 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 enroll 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

Zoology 528 F(0-6)

Independent Studies in Zoology
Original and independent thought, practical research and the completion of written and oral reports.
Prerequisites: Biology 315, 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

Zoology 530 F(0-8)

Honours Research Project in Zoology
Research project under the direction of one or more faculty members in the Department of Biological Sciences. Formal written and oral reports must be presented on completion of this course. Open only to Honours Zoology students or Honours Biological Sciences students.
Prerequisites: Biology 315, completion of at least 15 full-course equivalents and consent of the department.
Note: After consultation with a department faculty member who will supervise the chosen problem, a permission form obtained from the department office or website must be completed before a student can register.

Zoology 531 H(3-3)

Histology
Light and electron microscopic morphology of the basic tissues (epithelia, connective tissues, muscles and nerves) in the vertebrates; structural and functional associations of the basic tissues in the primary organs of the body.
Prerequisites: Biology 331 and one of Zoology 377 or 471.
Note: Offered in even-odd dated academic years.

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.
Prerequisites: Biology 313 and one of Ecology 429, Zoology 375, 377 or 477.
Note: Credit for both Marine Science 546 and Zoology 567 will not be allowed.
Note: Offered in even-odd dated academic years.
Note: Enrollment in this course may be limited. See explanation in the Program section of this Calendar.

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: Zoology 377.
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 in odd-even dated academic years. Zoology 571.02 is offered in even-odd dated academic years.

Zoology 573 H(2-1T-3)

Advanced Embryology
Analysis of mammalian embryology including gametogenesis, fertilization, cleavage, gastrulation, and early organogenesis. Consideration of normal developmental patterns and abnormal events resulting in congenital malformations.
Prerequisite: Zoology 471.
Note: Credit for both Zoology 573 and Medical Science 607.02 will not be allowed.
Note: Offered in odd-even dated academic years.

Zoology 575 H(3-0)

Advanced Topics in Animal Biology
Prerequisite: Biology 313.
MAY BE REPEATED FOR CREDIT

†Zoology 577 H(3-3)

Mammalogy
A detailed examination of the evolution, morphology, physiology, ecology and behaviour of mammals.
Prerequisites: Biology 313 and Zoology 411.01 or consent of the department..
Note: Offered in even-odd dated academic years.
Note: Enrollment in this course may be limited. See explanation in the Program section of this Calendar.

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.
Prerequisites: Zoology 477.01 and Biology 313.
Note: Offered in 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: Zoology 461.

Zoology 597 H(3-1S)

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: Zoology 463.

BIOMEDICAL ENGINEERING BMEN

Contact Info

Location: ENA 125
Faculty number: (403) 220-4818
Fax: (403) 210 8447
E-mail address: bmegrad@ucalgary.ca
Web page URL:
http://www.schulich.ucalgary.ca/Biomedical

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)
Master of Science (MSc)
Master of Engineering (MEng), thesis-based

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. Students in the MSc and PhD degree programs are normally considered full-time. The MEng (thesis-based) will focus on Engineering Healthcare Systems Management, and is intended to be taken full time, although part-time schemes are available. Aspects of the Biomedical Engineering Graduate program are offered in collaboration with the University of Alberta.

2. Admission Requirements

For admission to the MSc and PhD Programs, students must apply to the department of the intended supervisor and complete a supplementary application to the Biomedical Engineering Graduate Program. For admission to the MEng (thesis-based) Program, students must apply to the Department of Civil Engineering and complete a supplementary application to the Biomedical Engineering Graduate Program. Students will be admitted to the Faculty of Graduate Studies on the recommendation of the department and an Admissions Committee for the Biomedical Engineering program. All students must meet the admission requirements of both the Faculty of Graduate Studies and the respective department (the "home department"), but students will immediately transfer to the Biomedical Engineering Graduate Program.

3. Application Deadline

See the listing for department(s) of intended supervisor. Students in thesis programs may be admitted for September, January, May, or July.

4. Advanced Credit

According to home departmental regulations and with the approval of the Biomedical Engineering Graduate Program.

5. Program/Course Requirements

MSc/PhD
All MSc/PhD students are required to take the two Core Courses (BMEN 601 and BMEN 603) plus a BME program seminar course (either BMEN 605 or BMEN 607) and attend the appropriate number of home department seminars. Other courses may be chosen from the listing of Additional Courses or approved courses from other departments. Courses offered via video link from the University of Alberta that are part of the BME program will also be acceptable, subject to 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/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.
For a Master of Science degree, all students are required to take a minimum of four courses as approved by the Biomedical Engineering Graduate Program.

For a Doctor of Philosophy, two further elective courses are required beyond the Master of Science requirements.

Master of Engineering (thesis-based)
For a Master of Engineering (thesis-based), 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 the two Biomedical Engineering Core Courses (BMEN 601 and BMEN 603) plus ENCI 691 and MDSC 677. The remaining four courses may be chosen from a listing of Additional Courses as approved by the Biomedical Engineering Graduate Program for Master of Engineering (thesis based) students (see website for most recent information: http://www.schulich.ucalgary.ca/Biomedical).

In addition to the course requirements, all Master of Engineering (thesis-based) students are required to complete a project-based research project and to submit a written thesis in compliance with the regulations of the Faculty of Graduate Studies.

Core Courses
1. Biomedical Engineering 601 - Fundamentals of Biomedical Engineering
2. Biomedical Engineering 603 - Frontiers of Biomedical Engineering

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 in Theme 1: 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
6. Medical Science 689.99 –Medical Imaging Project

Additional Courses in Theme 2: Cell and Tissue Engineering
1. Chemical Engineering 659 – Advanced Cell and Tissue Engineering

Additional Courses in Theme 3: Biomechanics
1. Biomedical Engineering 619.02 – Special Topics in Biological Tissue System Mechanics
2. Civil Engineering 651 - Finite Element Modeling
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 4: Bioelectrical Engineering
1. Electrical Engineering 623/519.11 - Biomedical Instrumentation
2. Electrical Engineering 663 - Numerical Electromagnetic Field Computation
3. Electrical Engineering 631 - System Identification and Parameter Estimation
4 Electrical Engineering 665 - Bioelectromagnetism

Additional Biomedical Engineering related courses may be listed under individual departmental listings. 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 on the list require the 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 program as approved by the supervisory committee, and the Biomedical Engineering Graduate Program.

8. Time Limit

According to Faculty of Graduate Studies regulations

9. Supervisory Assignments

A supervisory committee, approved by the Biomedical Engineering graduate coordinator, will be established by the supervisor immediately upon the MSc/PhD student's entry to the program. Master of Engineering (thesis based) students will choose a supervisor in consultation with the Biomedical Engineering Graduate Program.

UPDATED (Sept. 16, 2009)
The 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 by with the Biomedical Engineering Graduate Program coordinator. 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. Membership on candidacy and examination committees requires the approval of the Biomedical Engineering Graduate Program.

10. Required Examinations

The research proposal will be required before the oral candidacy exam can be completed. The oral candidacy examination may include questions related to the research proposal.

Final thesis oral examinations are open.

11. Research Proposal Requirements

MSc/PhD students must present a written research proposal to the supervisory committee no later than twelve months after initial registration. The proposal, with an approval form signed by all members of the supervisory committee, must be sent to the Biomedical Engineering Graduate Program to be placed in the student's file.

12. Special Registration Information

According to home departmental regulations.

13. Financial Assistance

See individual home departmental listings.

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.

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.schulich.ucalgary.ca/Biomedical

Graduate Courses

Biomedical Engineering 601 H(3-0)

Fundamentals of Biomedical Engineering
An introduction to biology, biochemistry, anatomy, physiology, engineering fundamentals, and biostatistics for biomedical engineers. Detailed discussion on current biomedical engineering topics, including current local and international research and industry, with an emphasis on local strengths.

Biomedical Engineering 603 H(3-0)

Frontiers of Biomedical Engineering
An introduction to research in biomedical engineering, experimental design, preparation and review of research proposals, technical (oral and written) communication to diverse audiences.

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 619 H(3-1)

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

BIOMEDICAL TECHNOLOGY MDBT

Contact Info

Location: Health Sciences Centre, Room G321
Faculty number: (403) 210-9572
Fax: (403) 210-8109
E-mail 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 involves several areas of Medical Science: genetics, biochemistry, cell biology, physiology, immunology, microbiology, and pharmacology.
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

In addition to the Faculty of Graduate Studies requirements, the program requires:

a) Normally, a four year Bachelor of Science degree in biological sciences, or its equivalent

b) A minimum admission grade point average of 3.20 on a four-point scale over the last two full years or equivalent
c) For students required to provide proof of proficiency in English, a TOEFL score of 600 (written), 250 (computer-based) or 100 (internet-based)
d) A current resume and a personal statement (approx. 300 words) 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:

30 April for applicants with Canadian or US transcripts

31 March for applicants with international transcripts

4. Advanced Credit
The applicant must make advanced credit requests as part of the admission process. In consultation with the graduate program coordinator, advanced credit may be requested in accordance with Faculty of Graduate Studies regulations.

5. Program/Course Requirements
The program consists of a minimum of nine half-courses, normally carried out from June to August. Students will be required to complete a twelve-week student practicum and successful completion of the final program course Medical Science 670. Information on the practicum can be found at http://www.biotech.ucalgary.ca/.

6. Additional Requirements
Suggested prerequisites: Genetics (BIOL 311 or equivalent), Cell Biology (BIOL 331 or equivalent, Biochemistry or macro molecules (BCEM 393 or equivalent).

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 coordinator will serve as interim supervisor for all newly admitted students. Students must have a supervisor within two months. The selection of the supervisor must be by mutual agreement between the student and the faculty member concerned and approved by the MBT Graduate Coordinator.

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
Course information can be found at http://wcm2.ucalgary.ca/biotech/faculty.

Contact the Graduate Science Education Office for more information.

CARDIOVASCULAR/RESPIRATORY SCIENCES MDCV

Contact Info
Location: Health Sciences Centre, Room G329
Faculty number: (403) 210-3937
Fax: (403) 210-8109
E-mail address: cvrgrad@ucalgary.ca
Web page URL:
http://www.ucalgary.ca/UofC/faculties/med/education/gse/Cardiovascular/

1. Degrees and Specializations Offered
Doctor of Philosophy (PhD)
Master of Science (MSc), thesis-based

Faculty members within the Department hold academic appointments in Biochemistry and Molecular Biology, Biology, Medicine, Medical Physiology and Biophysics, or Pharmacology & Therapeutics. Faculty members are affiliated with the Cardiovascular, Smooth Muscle and Respiratory Research Groups.

A joint MD/Master's and MD/PhD program is also offered under the title "Leaders in Medicine."

The Universities of Calgary and Alberta offer a joint Biomedical Engineering Program. Further information can be obtained from the separate listing in this Calendar.

Students in the MSc and PhD degree programs are normally considered full-time.

2. Admission Requirements
In addition to Faculty requirements, the Department requires:
a) A minimum grade point average of 3.20 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), 250 (computer-based test) or 100 (internet-based test)
c) Submission of Graduate Record Examinations (GRE) is encouraged, particularly for international applicants.

3. Application Deadline
Deadlines for submission of complete applications for students with international transcripts:
1 April for September admission
1 August for January admission
1 Dec for May admission

Deadlines for submission of complete applications for students with Canadian and US transcripts:
1 June for September admission
1 October for January admission
1 March 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.

4. Advanced Credit
Advanced credit for previous course work is usually not given.

5. Program/Course Requirements
In addition to Faculty requirements, the Department 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. The amount of course work is determined by the student's supervisory committee. However, it also must meet the departmental minimum requirements.
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 Ph.D. 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 respective research group (Cardiovascular, Respiratory, or Smooth Muscle) 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 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. The amount of course work is determined by the student's supervisory committee; however, it also must meet the departmental minimum requirements.

6. Additional Requirements
Attendance at a Research Integrity Day workshop is required for all graduate students. Consult the program website for details at http://www.ucalgary.ca/UofC/faculties/med/education/gse/Cardiovascular/

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 Coordinator may credit be received for courses numbered 500–599.

8. Time Limit
Expected completion time is four years for the Doctor of Philosophy program. Maximum completion time is four years for the Master of Science program and six years for the Doctor of Philosophy program.
Expected completion time is four to five years for the MD/Master's program and six to seven years for the MD/PhD program. Maximum completion time is six years for the MD/Master's program and eight years for the MD/PhD program.

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 Coordinator. The supervisor will be a member of the Cardiovascular, Respiratory or Smooth Muscle Research Groups. 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 Coordinator.

Master of Science students in the Leaders in Medicine Program must have supervisory committees constituted according to the regulations of the graduate 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), Associate Dean (Undergraduate Medical Education), and the Associate Dean (Research) of the Faculty of Medicine.

10. Required Examinations
The rules for candidacy exams follow those outlined by the regulations of the Faculty of Graduate Studies but include modifications specific to MDCV. The major points are:
(i) Doctoral students who enter the program with an MSc degree must attempt this examination NO LATER THAN 28 months after initial registration.
(ii) Students who enter the Doctoral program with a BSc degree, or who transfer from MSc program to PhD program without obtaining their MSc degree must attempt this examination NO LATER THAN 36 months after initial registration, irrespective of any previous completed graduate degrees.

The doctoral candidacy examination consists of a comprehensive written examination that must be completed in three weeks, and an oral examination that follows one week later. The oral examination should focus on the background knowledge of students in their discipline, as well as their preparedness to do research of high quality in their particular fields of study. A program-approved research proposal must be a precursor to any candidacy exam. The oral examination will not include questions on the candidate's research proposal. The supervisor and co-supervisor are non-voting observers at the doctoral oral candidacy examination.

Final Thesis Oral Examinations consist of a public presentation followed by an open examination on the same day.

11. Research Proposal Requirements
A written research proposal must be prepared by every graduate student and presented to the supervisory committee within twelve months of initial registration.

12. Special Registration Information
None.

13. Financial Assistance
All students who are accepted into the Cardiovascular/Respiratory Science Graduate Program will receive a minimal stipend as reflected by current CIHR/AHFMR awards. Students are encouraged to apply to external agencies for financial support and studentship awards. University of Calgary Scholarships are also available (see Awards and Financial Assistance section of this Calendar).

Students applying for University scholarships must submit their applications to the Department by 1 February.

14. Other Information
Courses in the Department of Cardiovascular / Respiratory Sciences are offered under the auspices of the Department of Medical Science. For information on course requirements please visit the graduate program's webpage at http://www.ucalgary.ca/UofC/faculties/med/education/gse/Cardiovascular/
Detailed course descriptions are available at http://www.ucalgary.ca/pubs/calendar/ and timetabling information can be found through myuofc.ca.

15. Faculty Members/Research Interests
Faculty members and their research interests may be found at http://www.ucalgary.ca/UofC/faculties/med/education/gse/Cardiovascular/

CHEMISTRY CHEM

Contact Info
Location: Science A Building, Room 109
Faculty number: (403) 220-6252
Fax: (403) 284-1372
E-mail 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.

Specializations: 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.

2. Admission Requirements
In addition to Faculty of Graduate Studies admission requirements, the Department requires:

Master of Science
For applicants required to prove proficiency in English, a TOEFL score of 580 (written test), 237 (computer-based test) or 92 (internet-based test)

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 3.7 or better on a four point scale
c) For applicants required to prove proficiency in English, a TOEFL score of 580 (written test), 237 (computer-based test) or 92 (internet-based test)

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 3.3 or better on a four point scale
c) For applicants required to prove proficiency in English, a TOEFL score of 580 (written test), 237 (computer-based test) or 92 (internet-based test)

3. Application Deadline
Deadlines for submission of complete applications:
15 April for September admission
15 August for January admission
10 December 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.

5. Program/Course Requirements
In addition to Faculty of Graduate Studies requirements, the Department requires:

Master of Science
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 and the graduate coordinator.

Students who transfer to the doctoral program will be given credit for courses taken in the MSc program.

6. Additional Requirements
Each student must participate in the Department's CHEM 601 and CHEM 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 credit be given for courses numbered 500-599.

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 coordinator) upon first registration in a program and must choose a permanent supervisor before the fifth month in program.

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.*
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 (TA), Faculty of Graduate Studies Support (FGSS), and Trust funding. TA and FGSS are 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
The faculty members in the Department and their specific research interests can be found at http://www.chem.ucalgary.ca.

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.

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 spectroscopy. Laboratory: Analysis of inorganic and organic samples using spectroscopic, electrochemical, and chromatographic instrumental methods.
Prerequisites: Chemistry 311 and 315.

Chemistry 531 H(3-1T)

Advanced Inorganic Chemistry I
Coordination 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.
Prerequisites: Chemistry 333 and 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.
Prerequisites: Chemistry 333 and 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.
Prerequisites: Chemistry 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: 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: Chemistry 453.

Chemistry 555 H(1-8)
(formerly Chemistry 455)

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: Chemistry 453.
Note: Open to students in Chemistry programs and to others by consent of the Department.

Chemistry 557 H(3-1T)

Natural Product Chemistry
The organic chemistry of important classes of natural products such as polyketides, terpenoids, alkaloids, and antibiotics; illustrating the biosynthetic processes involved in their production, and selected chemical transformations, and syntheses.
Prerequisite: Chemistry 453.

Chemistry 559 H(3-1T)

Organic Spectroscopy
The instrumentation, theory and practical aspects of spectroscopy (e.g. UV/vis, MS, IR, ^{1}H and ^{13}C NMR including 2D-techniques). The emphasis will be on the application for structural elucidation through a problem solving approach.
Prerequisite: Chemistry 351; Chemistry 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.
Prerequisites: Chemistry 371, 373 and consent of the Department.

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.
Prerequisites: Chemistry 371, 373 and consent of the Department.

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.
Prerequisites: 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.
Prerequisites: 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: 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."

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 organic molecular structure. Techniques include Nuclear Magnetic Resonance Spectroscopy (NMR), Infrared and Raman Spectroscopy, Ultraviolet and Visible Spectroscopy; (absorption, fluorescence, chiroptic), Mass Spectrometry, and an outline of the single-crystal X-ray diffraction method. Separation techniques will be covered, particularly those combining separations and spectroscopic analysis.

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 outside a student's thesis area under the direction of a staff member and approved by the student's supervisor (or in the case of PhD students the supervisory committee) and Department Head. A report must be submitted on completion of the course.
MAY BE REPEATED FOR CREDIT

COMMUNICATIONS STUDIES COMS

Contact Info

Location: Social Sciences Building, Room 222
Faculty number: (403) 220-6357
Fax: (403) 210-8164
E-mail address: gradprog@ucalgary.ca
Web page URL:
http://www.comcul.ucalgary.ca/gradprograms

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)
Master of Arts (MA), thesis-based
Master of Communications Studies (MCS), course-based

The Doctor of Philosophy program offers a specialization in the Social Context of Information and Communications Technology.

2. Admission Requirements

Students applying for admission to the Master's program require an undergraduate degree in communications or the equivalent, although students with Bachelor's degrees in other areas will be considered. The doctoral program requires a Master's degree in communications or the equivalent. Prerequisites for admission to the program which are additional to Faculty of Graduate Studies requirements are:

Master of Arts (thesis-based)

a) A written statement of intent (250-500 words)
b) Two samples of written work
c) A detailed curriculum vitae

Master of Communications Studies (course-based)

a) A written statement of intent (250-500 words)
b) Two samples of written or professional work
c) A minimum of three years work experience in a communications-related field
d) A detailed curriculum vitae

Doctor of Philosophy

a) A statement of research intent (500-1000 words)
b) Three samples of written work
c) A detailed curriculum vitae

3. Application Deadline

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

4. Advanced Credit

MCS applicants must request advanced credit at the time of admission for graduate level courses up to a maximum of one half-course equivalent. 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. Approval of the Director is required. Advanced credit is not available to MA applicants.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements, the Graduate Program in Communications Studies requires the following:

Master of Arts

a) Three full-course equivalents including core courses Communications Studies 601, Communications Studies 613, and Communications Studies 615.
b) One-half of the above course requirements may be chosen from courses in appropriate research-related areas. One half-course equivalent elective may be selected from other graduate programs;

one half-course equivalent elective may be Communications Studies 711 - Directed Studies.

Master of Communications Studies

a) Five full-course equivalents including core courses Communications Studies 601, Communications Studies 605 and Communications Studies 615. These courses are chosen between the program's core and elective courses. One half-course equivalent elective may be selected from other graduate programs; one half-course equivalent elective may be Communications Studies 711 - Directed Studies.
b) Communications Studies 790 - Master's Project; included as part of the five full course equivalent requirement.

Doctor of Philosophy

a) Six full-course equivalents at the 600 or 700 level in Communications Studies beyond the Bachelor's degree, three at the Master's level, and three at the doctoral level.
b) Three full-course equivalents at the 600 or 700 level in Communications Studies beyond the Master's degree.
c) For students in the Social Context of Information and Communications Technology specialization, at least four half-courses in this area.

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 for the Master of Arts degree, two years of full-time study or three years of part-time study for 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

Master of Arts

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 COMS 790 project year, the project supervisor may or may not be the permanent supervisor of record.

Doctor of Philosophy

By April 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 the 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. After completing the course work, within a period of ten calendar days, each student will take a three-hour written examination in each of the three fields of study. The student's supervisory committee sets the examination questions. The oral candidacy examination is taken no later than 20 calendar days after the last written examination.

Final thesis oral examinations are open.

11. Research Proposal Requirements

Students whose research involves human subjects must receive approval from the Faculty of Communications and Culture Ethics Review Committee and the University of Calgary Conjoint 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 coordinator 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. Students applying for scholarships must submit their applications to the Graduate Programs Office by 1 February.

14. Other Information

Inquiries concerning specific questions about the program and degree requirements should be directed to: Faculty 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://www.comcul.ucalgary.ca/facultyresearch.

Note: Courses that are considered electives will be offered on the basis of student needs and contingent upon the availability of staff resources.

Graduate Courses

Communications Studies 601 H(3S-0)

Interdisciplinary Approaches to Communications Studies
A foundation seminar that provides an introduction to the field of communication theories and approaches.
Prerequisite: Consent of the Program Director.

Communications Studies 603 H(3S-0)

Critical Perspectives on Television and Film
A seminar that explores theories and perspectives with regard to television and film.
Prerequisite: Consent of the Program Director.

Communications Studies 605 H(3S-0)

Organizational Communication
An examination of the application of theory and methodology of administrative communication processes in complex organizations.
Prerequisite: Consent of the Program Director.

Communications Studies 609 H(3S-0)

Communication Law
An examination of the operation of Canadian law as it relates to the areas of telecommunications, broadcasting and other media.
Prerequisite: Consent of the Program Director.

Communications Studies 613 H(3S-0)

Communication Theory
An examination of the major perspectives in communication theory through a historical analysis of classic works and an overview of contemporary approaches and applications.
Prerequisite: Consent of the Program Director.

Communications Studies 615 H(3S-0)

Communication Research Methods
Designed to provide a fundamental understanding of empirical research in communication. Focus will be on published, data-based research.
Prerequisite: Consent of the Program Director.

Communications Studies 619 H(3S-0)

Communication and Cultural Industries: Policy and Development
An analysis of the governmental and social contexts which inform the current development of telecommunications, communications, cultural industries and new media in Canada.
Prerequisite: Consent of the Program Director.

Communications Studies 623 H(3S-0)

Social and Economic Impacts of Communication and Information Technologies
An examination of the social context of information and communication technologies with regard to patterns of knowledge, power and social relationships.
Prerequisite: Consent of the Program Director.

Communications Studies 625 H(3-0)

Interpersonal and Small Group Communication
An examination of the theory and research concerning communication processes in face-to-face and small group interaction. Provides opportunities to develop effective practical skills.
Prerequisite: Consent of the Program Director.

Communications Studies 627 H(3S-0)

Mass Media and Democracy in North America
A discussion of how politicians use the media to campaign for office and retain power. Also considers the effects of communication technologies on the nature of democratic politics.
Prerequisite: Consent of the Program Director.

Communications Studies 629 H(3S-0)

Communication Management
An examination of communication management in business organizations. Looks at topics such as marketing, public relations and advertising in the context of rapidly changing business environments.
Prerequisite: Consent of the Program Director.

Communications Studies 641 H(3S-0)

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: Consent of the Program Director.

Communications Studies 711 H(3S-0)

Directed Studies
A research project under the direction of a faculty member.
Prerequisite: Consent of the Program Director.
MAY BE REPEATED FOR CREDIT

Communications Studies 717 H(3S-0)

Selected Topics in Communication
A variety of communication topics based on faculty expertise.
Prerequisite: Consent of the Program Director.
MAY BE REPEATED FOR CREDIT

Communications Studies 790 F(0-6)

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: Consent of the Program Director.

COMMUNITY HEALTH SCIENCES MDCH

Contact Info

Location: Heritage Medical Research Building
Faculty number: (403) 220-4288/ 210-6689
Fax: (403) 210-8109
E-mail 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 Community 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.

Students wishing to charter as Counseling Psychologists should apply to the Division of Applied Psychology.

2. Admission Requirements

a) MCM
- Currently enrolled in the Royal College Residency Training Program in Community Medicine at University of Calgary
- Hold an MD or equivalent degree
- Meet the admission requirements of the Department of Community Health Sciences

b) MDCS
- Minimum admission grade point average of 3.0 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

3. Application Deadline

a) MCM -15 January for September admission
b) MDCS - 15 August for January admission

4. Advanced Credit

a) MCM - Applicable graduate courses may be considered.
b) MDCS -.A maximum of four half graduate 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.

5. Program/Course Requirements

a) MCM - A minimum of twelve half-course equivalents, in combination with the Community 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 at the end of this Community Health Sciences Calendar entry.

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.
b) MDCS - Expected completion time is 3 years (maximum 6 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 MDSC 649.01: Practicum in Community 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)
Within the thesis-based programs, the student must select a specialization in Biostatistics, Epidemiology, Healthcare Epidemiology, Clinical Epidemiology, Health Services Research, Population/Public Health or Community Rehabilitation and Disability Studies.
c) Combined MD/Master's and MD/PhD programs are offered under the title "Leaders in Medicine"

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) A BSc, BA, BCR, MD or equivalent degree for admission to the Master of Science program
b) A Master's degree or equivalent for admission to the Doctor of Philosophy program
c) A minimum admission grade point average of 3.20 on a four point scale over the last two full years or equivalent
d) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (written test), 250 (computer-based test) or 100 (internet-based test)
e) A statement outlining the applicant's interest and reasons for choosing the program

f) A letter from a faculty member of our Department indicating interest in supervising the applicant
g) Work and/or research experience in the health system, community rehabilitation and/or disability studies is highly recommended.

3. Application Deadline
The deadline for the submission of complete applications is 15 January for September admission. Students applying to the MD/Master's 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, Open Studies Students are not eligible to enroll in the three core courses, Essentials of Biostatistics (MDSC 643.01), Fundamentals of Epidemiology (MDSC 647.01) and Health Research Methods (MDSC 659.02). 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
In addition to Faculty requirements, the Department requires that all students complete two Block Week courses: "Introduction to Community Health Sciences" and "Determinants of Health."

Master of Science
A minimum of six half-course equivalents (three core courses and three electives) for all specializations. The CRDS specialization requires a minimum of six CORE half courses.
See departmental website for specific course requirements for each MSc specialization.

Doctor of Philosophy
A minimum of four half-course equivalents, in addition to the three core courses if not completed previously. The CRDS specialization requires a minimum of four CORE half courses.
See departmental website for specific course requirements for each PhD specialization.

Brief course descriptions follow this section. Courses in CRDS specialization are only offered in block weeks. More detailed course schedules and outlines are found on the departmental website at: http://www.ucalgary.ca/communityhealthsciences/

6. Additional Requirements
In addition to the Faculty requirements, the Department requires that all students attend the two research seminars offered weekly and bi-weekly during the academic year. Some students (including CRDS) may be exempt from this requirement. Attendance at Research Integrity Day is required once during a student's program.

7. Credit for Undergraduate Courses
The Department does not normally give credit for undergraduate courses.

8. Time Limit
Expected completion time is two to three years for the MSc program (maximum four years) and 4-5 years for the PhD program (maximum six years).

Leaders in Medicine
Expected completion time is four to five years for the MD/Master's program (maximum six years) and six to seven years for the MD/PhD program (maximum eight years).

9. Supervisory Assignments
Applicants must secure a potential supervisor prior to applying for admission. During the second academic term of the first year of the program, each student must confirm a permanent Supervisor. The student and Supervisor complete and submit an *Appointment of Supervisor* form.

For thesis-based Master's students, the Supervisory Committee is usually named at the same time as the confirmation of the Supervisor. For doctoral students, the Supervisory Committee must be appointed within three months of the confirmation of the Supervisor. The Supervisor, in consultation with the student and the Graduate Program Coordinator, recommends the Supervisory Committee.

Students in the Leaders in Medicine Program must also have a Supervisory Committee constituted according to the above regulations. Both Master of Science and doctoral 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
Doctoral candidacy examinations consist of a written component followed by an oral examination. The student has three weeks to prepare written solutions to three questions. The student and his/her Supervisory Committee establish a concept map outlining the student's study area and an accompanying reading list to prepare for the exam. The Supervisory Committee develops three exam questions that meet the competency requirements as outlined by the department.

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.

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 most 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 Open Scholarship Competition is 15 January.

14. Other Information
Medical Science (MDSC) and Community Rehabilitation (CORE) Courses in Community Health Sciences are listed following this section.

15. Faculty Members/Research Interests
Current faculty and their areas of research are on the departmental website at:
http://www.ucalgary.ca/communityhealthsciences/

Community Rehabilitation Courses (CORE)

Community Rehabilitation 603 H(2-3)

603.01 Foundations of Rehabilitation
603.02 Advanced Seminar – Assessment & Intervention for Families with Children with Special Needs
603.03 Advanced Seminar-Career Development & Adult Onset Disabilities
603.04 Community Rehabilitation & the Aging Process
603.08 Law in Community Rehabilitation
603.10 Social Construction & Inter-disciplinarity
603.11 Inter-professional Ethics

Community Rehabilitation 624 F(2-3)

624.16 Locating the Professional in Inquiry-Based Practice

Community Rehabilitation 641 H(3-0)

641 International Disability Research & Policy

Community Rehabilitation 676 F(2-3)

676 Consultation in Human Services & Systems

Community Rehabilitation 691 H(2-3)

Specialization Topics
691.04 Adapting Curriculum & Instruction from K - 12
691.32 Challenging Behaviours in the Classroom: Inclusive Education
691.33 Collaboration, Ethics, Management: Inclusive Education
691.36 Pro-Seminar in Disability, Community & Rehabilitation
691.39 Mental Health & Addictions
691.42 Health Research, Emerging Technologies & Marginalized Groups
691.44 Bioethics & People with Disabilities
691.45 Advocacy, Leadership & Innovation
691.49 Autism & Social Policy

Medical Science Courses (MDSC)

Medical Science 643 H(3-2)

Biostatistics
Focuses on the key methods necessary to understand and critically interpret results from common biostatistical analyses, as well as gaining hands-on experience analyzing data using statistical software. Medical Science 643.01 introduces the fundamental concepts of summarizing data and statistical inference, including graphical displays, hypothesis testing, p-values, confidence intervals, and sample size determination. Medical Science 643.02 extends the fundamental concepts to modeling health outcomes using modern regression analysis techniques. Logistic and linear regressions, and their extensions, are covered in detail. Medical

Science 643.03 broadens the techniques to include generalized linear models (GLM), generalized additive models (GAM), Poisson regression, generalized estimating equations (GEE), and proportional hazards regression. In all three courses, students gain hands-on experience analyzing data using statistical software.
643.01 Biostatistics I: Essentials of Biostatistics
643.02 Biostatistics II: Models for Health Outcomes.
643.03. Biostatistics III: Models for Repeated Measures Studies and Time-to-Event Studies
Prerequisites: Medical Science 643.01 requires no formal prerequisites but good quantitative and mathematical skills are an asset. Medical Science 643.02 requires either 643.01 or a graduate-level introductory course in (bio)statistics. Medical Science 643.03 requires Medical Science 643.02.
Note: Admission to a graduate program in Community Health Sciences is normally required for enrolment in the Medical Sciences 643 courses; these courses are not available to Open Studies students.

Medical Science 644 H(3-0)

Community Health Sciences Overview
These courses provide an overview of key foundation areas of research in Community Health Sciences.
644.01. Introduction to Community Health Sciences
644.02. Determinants of Health I
Prerequisite: Consent of the Instructor.
Note: Admission to a graduate program in Community Health Sciences (or Community Medicine Residency Training Program) is required for enrolment in Medical Science 644 courses.

Medical Science 645 H(3-0)

Health Care
The components of the health care system; the structure and function of the Canadian health care system and issues in the organization of health care delivery; environmental and psycho-sociocultural factors in health, illness and health care; specific problems and issues in health care. Health services research is a multidisciplinary field of scientific investigation, both basic and applied, that studies how social factors, financing systems, organizational structures and process, health technologies and personal behaviours affect access to health care, the quality and cost of health care, and ultimately our health and well-being
645.01. Systems of Health and the Health Care System
645.06 Health Protection
645.10. Leadership in Health Care Organizations
645.15. Health Policy: Policy Issues in the Canadian Health Care System
645.17. Introduction to the Legal and Ethical Framework of Health Care in Canada
645.18 Foundations of Health Services Research
Prerequisite: Consent of the Faculty.
Note: Medical Science 645.03: one or more field trips may be required outside regular class time.

Medical Science 646 H(3S-0)

Seminars in Occupational Health and Medicine
Current issues in occupational health and medicine; topics to be based on a pre-course survey.
Prerequisite: Consent of the Instructor.
NOT INCLUDED IN GPA

Medical Science 647 H(3-2)

Epidemiology
Epidemiology is the study of the distribution of diseases in populations and of factors that influence the occurrence of disease. Courses focus on principles and methods of descriptive, analytic and experimental epidemiology, as well as epidemiological methods specific to certain health conditions and the preventive strategies available for various health conditions.
647.01. Fundamentals of Epidemiology
647.05. Epidemiology of Aging.
647.07. Research in Infection Control and Hospital Epidemiology Research in Healthcare Epidemiology and Infection Control
647.09. Epidemiology of Chronic Diseases
647.10. Surveillance 1: Data Handling for Infection Control
647.11. Surveillance 2: Principles of Surveillance
647.12. Introduction to Population Health Surveillance
647.15 Clinical Epidemiology
Prerequisites: Medical Science 643.01 or consent of the Faculty.
Note: Admission to a graduate program in Community Health Sciences is normally required for enrolment in Medical Science 647.01; it is not available to Open Studies students.

Medical Science 649 H(1-3)

Practicum in Community Health Sciences
Clinical or laboratory-based practicum for students enrolled in certain programs of the Department of Community Health Sciences.
649.01. Practicum in Community Medicine
649.02. Practicum in Hospital Epidemiology
Prerequisite: Consent of the Faculty.
NOT INCLUDED IN GPA

Medical Science 651 H(3-0)

Population/Public Health
The courses within the Population/Public Health family are intended to provide graduates the opportunity to gain the competencies required to become researchers, planners, and practitioners in fields that require a depth of understanding of the determinants of health, the values and philosophies of population and public health, behaviour change theory, and the role of the ecosystem in promoting and protecting the health of the public.
651.01. Health Promotion Planning
651.02. Health Promotion for Women
651.03. Community Interventions: Theory, Research and Practice
651.04. Fundamentals of Population/Public Health
Prerequisite: Consent of the Instructor.

Medical Science 657 H(3-0)

Telehealth and E-health
These online courses explore many aspects of e-health, beginning with an initial focus on telehealth. They reflect a range of practice-based activities and research areas in e-health including business plan development, implementation and evaluation of clinical and learning applications.
657.02. e-Health Sustainability: From Business Case to Policy Development
657.03. Evaluation of e-Health Initiatives
Prerequisite: Consent of the Faculty.
Note: These are online courses.

Medical Science 659 H(3-2)

Methods in Health Research
An introduction to research design, sampling, measurement, data collection and data analysis applied to health research including evaluation research.
659.02. Health Research Methods
659.03. Health Program Planning and Evaluation
659.04. Introduction to Clinical Trials
659.05. Qualitative Health Research
659.06. Decision Analysis in Health Economic Evaluation
659.07. Administrative Data Analysis Methodology
Prerequisite: Medical Science 643.01 or consent of the Faculty.
Note: Admission to a graduate program in Community Health Sciences is normally required for enrolment in Medical Science 659.02; it is not available to Open Studies students.
Note: MDSC 659.08 is typically completed prior to MDSC 659.06.

Medical Science 660 F(3-1.5)

On-line Basic Infection Control
Provides novice Infection Control Professionals (ICPs) with the basic knowledge, tools and strategies needed to do Infection Control in a broad 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: Consent of Instructor.

Medical Science 661 H(3-0)

Science Value and Philosophy
Philosophical issues which fall into two categories: the Nature of Scientific Inquiry and Science and Moral Value.
Prerequisite: Consent of the Instructor.

Medical Science 679 H(3-0)
(Economics 679)

Health Economics I
Applies basic concepts from economics to the 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 in interventions.
Prerequisite: Consent of the Faculty.

Medical Science 705 H(3-0)

Advanced Methods in Health Research
Advanced health research designs (both quantitative and qualitative) and measurement techniques.
Prerequisite: Medical Science 659.02.

Medical Science 709 H(3-2)

Advanced Epidemiology
Topics to include causal inference, epidemiologic measures, induction latent period, internal and external validity, control of confounding variables and interaction between study factors.
Prerequisite: Medical Science 647.01.

Medical Science 711 H(3S-0)

Systematic Reviews and Meta-Analysis
Exposes students to all steps involved in the conduct of a systematic review and meta-analysis.
Prerequisite: Medical Science 643.01, 643.02, 647.01 and 659.02, or consent of Instructor.

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: Consent of faculty member who will supervise the chosen study.
MAY BE REPEATED FOR CREDIT

COMPUTER SCIENCE CPSC

Contact Info

Location: Information and Communications Technology Building, Room 602
Faculty number: (403) 220-6015
Fax: (403) 284-4707
E-mail 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

The Master of Science degree with a specialization in Software Engineering is offered jointly through the Department of Computer Science and the Department of Electrical and Computer Engineering. Software Engineering is a formal specialization.

Students may register in the MSc and PhD programs as part-time students only with permission from the department.

2. Admission Requirements

In addition to Faculty admission requirements, the department requires:

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 3.3 in the last 2 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 3.3 in the last 2 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:
a. Theory of Computation
b. Software Engineering
c. Systems (Operating Systems, Compilers, Distributed Systems, Networking)
d. Application (Artificial Intelligence, Graphics, Databases, etc.)

The cumulative GPA for these courses must be at least 3.3.

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), 250 (computer-based test) or 100 (internet-based test), or an IELTS score of 7.5 or above.
c) For students applying with degrees from outside Canada, GRE scores are generally expected and will be considered.

Master of Science in Software Engineering

Students applying for entry to the Master of Science in Software Engineering will be assessed on qualification as in (a) above, but with a GPA of 3.0 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 Master of Science degree from a recognized institution with a minimum GPA of 3.3. 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 3.7 and demonstrated research ability.

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 programs must be chosen in consultation with the supervisor and approved by the Computer Science Graduate Affairs Committee. In addition to the Faculty requirements, the Department requires:

Master of Science (thesis-based)

a) Course Requirements: Computer Science 699, plus
b) 4 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 with Software Engineering Specialization (thesis-based)

a) Course Requirements: Computer Science 699, plus
b) 4 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. In addition to the above courses, Computer Science 699 or equivalent experience is required and does not count toward the minimum 8 half-courses above.
b) Breadth Requirements: Students must have achieved at least a grade of B in two graduate courses in each of three categories.

These three categories are to be selected from the following four categories:
A. Applications: Includes Graphics, Human-Computer Interaction, Artificial Intelligence, Computer Vision, and Scientific Computing
B. Systems: Includes Databases, Compilers, Networks, Operating Systems, and Software Engineering
C. Theory: Includes Algorithms, Computational Complexity, Quantum Computation, Numerical Analysis, Cryptography, Category Theory, Programming Languages Theory
D. External to Computer Science: If this category is used, the two courses must be presented with a justification as to why they are another area, and must be approved by the student's supervisor and the graduate committee.

An alternative breadth/depth program that satisfies the supervisor, the supervisory committee, and the graduate committee may be proposed in special cases. In case of conflict, an appeal committee will be struck by the Head of the Department.

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 three years, and four 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 Director. Doctoral students select their supervisory committee members in consultation with their permanent supervisors.

10. Required Examinations
There is a written departmental component and an oral candidacy examination in the doctoral program. The departmental written examination is taken by the candidate after course work is completed and before the Faculty oral candidacy examination. The departmental written exam must be approved by the Graduate Director, and consists of a take-home examination (normally 3-5 days) in the candidate's broader area of specialization as defined by the research proposal (see section 11). The scope of the written and oral candidacy exam is defined by a reading list, prepared by the student's supervisor in collaboration with the supervisory committee, and given to the student at least two months before the departmental written examination. The candidate's completed written exam, together with research proposal, must be submitted to the examination committee at least 10 working days prior to the Faculty oral exam.

Final thesis oral examinations are open.

11. Research Proposal Requirements
Research proposal requirements are determined by the supervisor at the Master's level.

At the Doctoral level, a research proposal, approved by the student's supervisory committee, must be submitted to the Graduate 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, 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/

Registration in all graduate courses requires the approval of the Department of Computer Science.

Computer Science (CPSC)

Graduate Courses

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 coordination concepts, forming and maintaining organizations, and competitive agent environments. Example systems; the implementation of a multi-agent system will be performed as the assignment.
Note: Credit for both Computer Science 609 and Software Engineering 697 will not be allowed for programs offered by the Department of Computer Science.
Note: Lectures may run concurrently with Computer Science 567.

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.
Note: Lectures may run concurrently with the first semester of Computer Science 510.

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: Lectures may run concurrently with Computer Science 511.
Note: Computer Science 413 or equivalent is recommended as preparation for this course.

Computer Science 613 H(3-0)

Program Specification, Proof and Transformation
Program proving techniques; approaches to partial and total correctness. Operational abstraction and data abstraction. Mechanical transformation of programs. Machine assisted proof.
Note: Computer Science 417 or 521 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 417, 513, 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.
Note: Lectures may run concurrently with Computer Science 519.

Computer Science 627 H(3-1T/2)

Computer Viruses and Malware
Study of computer viruses, worms, Trojan horses, and other forms of malicious software. Countermeasures to malicious software. Legal andethical issues, and some general computer and network security issues.
Prerequisites: Computer Science 313 and 457 or equivalents and consent of the Department.
Note: Lectures may run concurrently with Computer Science 527.

Computer Science 628 H(3-1T/2)

Spam and Spyware
Study of spam and other forms of unsolicited bulk electronic communication, and spyware. Legal and ethical issues, and tie-ins to other fields like business and economics. Spam and spyware countermeasures, and related security problems.
Prerequisites: Computer Science 313 and 457 or equivalents and consent of the Department.
Note: Lectures may run concurrently with Computer Science 528.

Computer Science 629 H(3-0)
(Pure Mathematics 629)
(formerly Computer Science 601.09)

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-Hellman key exchange, El Gamal encryption, and digital signatures, as well as the associated computational problems on which their security is based.
Prerequisites: Pure Mathematics 315 or consent of the Department.

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.
Note: Lectures may run concurrently with Computer Science 535.

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 653 H(3-0)

Computational Geometry
Geometric searching, hull proximity and intersection data structures and algorithms and their complexity.
Note: Computer Science 415 or 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 553 or equivalent is recommended as preparation for computer science students taking this course.

Computer Science 661 H(3-0)

Algorithms for Distributed Computation
Basic problems in distributed systems such as symmetry breaking, consensus, resource allocation, and synchronization. The impact of system characteristics, such as models of communication, timing and failure, and of solution requirements, such as correctness and complexity criteria and algorithmic constraints, on the computability and complexity of these problems. Techniques for solving problems under different models will be emphasized.
Note: Lectures may run concurrently with Computer Science 561.
Note: Computer Science 413 or equivalent is recommended as preparation for this course.

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: Lectures may run concurrently with Computer Science 518.
Note: Computer Science 413, 491 and Pure Mathematics 431, or equivalents, are recommended as preparation for this course.

Computer Science 669 H(3-0)
(Pure Mathematics 669)

Cryptography
An introduction to the fundamentals of cryptographic systems, with emphasis on attaining well-defined notions of security. Public-key cryptosystems; examples, semantic security. One-way and trapdoor functions; hard-core predicates of functions; applications to the design of cryptosystems.
Prerequisite: Consent of the Department.
Note: Computer Science 413 and Mathematics 321, or equivalents, are recommended as preparation for this course.

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 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.
Note: Lectures may run concurrently with Computer Science 587.

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.
Note: Lectures may run concurrently with Computer Science 589.

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.
Note: Lectures may run concurrently with Computer Science 591.

Computer Science 695 H(3-0)

Geometric Algorithms in Geographical Information Systems and Applied Sciences
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. Basic techniques such as incremental, divide and conquer, sweep-plane, and dimension reduction. Algorithms for surface simplification, culling, quality measurement and error reduction. Applications in computer modelling, graphics, motion planning, visualization, and other areas.

Computer Science 697 H(3-0)
(formerly Computer Science 601.20)

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 modeling, signature authentication, and biometric pattern recognition. Multi-modal biometrics and biometric security.

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.
Note: This course meets for one and one-half hours per week during the Fall and Winter Sessions.
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: 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: 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.

Software Engineering (SENG)

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 613 Q(3-1)

Requirements Engineering II
Applications of requirements engineering to the management of the lifecycle of software development from requirements elicitation through analysis, design, coding, testing, enhancement and reuse.
Prerequisite: Software Engineering 611.

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.
Note: Credit for both Software Engineering 625 and 627 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, Reliability, and Testing of Software Systems
Principles of software dependability techniques, and techniques to improve, to predict, and to test software reliability.
Note: Credit for both Software Engineering 637 and either Software Engineering 631 or 635 will not be allowed.
Note: Engineering 319, Software Engineering 511, and Software Engineering 421, or their equivalents, are recommended as preparation for this course.

Software Engineering 641 H(3-1)
(formerly Computer Science 601.33)

Modifiability of Large-Scale Software
Phenomena and approaches involved in the evolution and reuse of large-scale software, including design for modifiability and tool support. Strengths and weaknesses of industrially-current techniques as well as recent research results.
Prerequisite: Consent of the Department.
Note: Software Engineering 401 or equivalent is recommended as preparation for this course.
Note: Lectures may run concurrently with Software Engineering 531.

Software Engineering 651 H(3S-0)

Half-Course Project
A project in either software development or software best practice and experience.
Note: 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.
Note: 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.
Note: 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.
Note: 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.
Note: Credit for both Software Engineering 697 and Computer Science 609 will not be allowed for programs offered by the Department of Computer Science.

CONTINUING EDUCATION CTED

Contact Info
Location: Education Tower, Room 940
Faculty number: (403) 220-5675
Toll free in Canada: (877) 623-0292
Fax: (403) 282-3005
E-mail address: gder@ucalgary.ca
Web page URL: http://www.educ.ucalgary.ca/gder

1. Degrees and Specializations Offered
Applications for this program are not being accepted for 2009-2010. Interested prospective students are encouraged to review the "Workplace and Adult Learning" specialization in the Master of Education program in the Graduate Division of Educational Research.

The Faculty of Education offers graduate work leading to the Master of Continuing Education (MCE), with a choice of two specializations: Workplace Learning, or Leadership and Development.

2. Program/Course Requirements
Twelve half-courses will be required. Five of these will be program core courses, three will be specialization core courses, two will constitute the final project, and two will be approved electives.
Program Core Courses
Continuing Education 601 – Adults as Learners
Continuing Education 603 – Facilitating Individual Learning in the Workplace
Continuing Education 605 – Facilitating Development Projects
Continuing Education 607 – Theory of Groups
Continuing Education 609 – Research Methods
Specialization Core Courses for Workplace Learning
Continuing Education 613 – Learning, the Workplace and Society
Continuing Education 617 – Program Planning and Evaluation
Continuing Education 619 – Organizational Change and Learning
Specialization Core Courses for Leadership and Development
Continuing Education 621 – Leadership in Organizations
Continuing Education 623 – Foundations of Human Resource Management
Continuing Education 625 – Leadership Development
Examples of Elective Courses
Continuing Education 641 – Facilitating On-Line Learning
Continuing Education 643 – Career Development in Organizational Settings
Continuing Education 645 – Multicultural Issues in Adult Education
Continuing Education 647 – Evaluation in Organizations
Continuing Education 649 – Management Learning
Continuing Education 653 – Strategic Human Resource Management
Continuing Education 657 – Independent Study
Master's Project
Continuing Education 693/695/ – Project I, II
Doctoral
Continuing Education 702 – Doctoral Seminar on Workplace Learning

3. Additional Requirements
The Master's Project constitutes an integration of research, theory and practice. The student's supervisor must approve a project proposal in advance. Normally, this project will be designed to improve workplace learning or leadership. The final written project report will include the purpose of the project, the means by which research, theory and practice were integrated, the sequential project study/action methods, presentation of results, analysis and discussions, and implications and recommendations for workplace learning or leadership.

4. Credit for Undergraduate Courses
Not applicable.

5. Time Limit
Typical completion time is three years, with a minimum of two years and a maximum completion time of six years.

6. Supervisory Assignments
Students are assigned an interim advisor when entering the program and must have an approved supervisor immediately following their second Spring or Summer Institute.

7. Required Examinations
The project and course work will be the subject of the final oral comprehensive examination.

8. Research Proposal Requirements
Not applicable.

9. Special Registration Information
None.

10. 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 application by 1 February.

11. Other Information
A program fee of $ 3,748 will be charged for each of Years 1 and 2. Each subsequent year the program fee will be $1,249. These program fees are in addition to the normal tuition fees charged for each course taken.

To participate in the program, it is necessary to have access to a computer running Windows or a Macintosh Plus (or higher), in addition to a modem (14,400 bps or higher).

12. Faculty Members/Research Interests
Faculty members and their research interests can be found at http://www.educ.ucalgary.ca

Graduate Courses

Continuing Education 693 H(3-0)

Master's Project I
The project could involve an in-depth scholarly study, using secondary sources, of a chosen area of workplace learning. Alternatively, it could involve case study analysis of a specific workplace issue or problem. The project will enable the adult learner to develop and demonstrate competence in conducting an investigation at an organizational level. This phase of the master's project typically involves the preparation and approval of a research proposal and an ethics application, if the research involves human subjects.
Prerequisite: Consent of the Faculty.
Note: Open only to students in the MCE degree program.
Note: This course will involve the student, in consultation with his/her supervisor, selecting a research issue, problem or question to be examined, writing a project proposal outlining the guidelines for conducting the research and, if involving human subjects, obtaining approval from the Research Ethics Board.
NOT INCLUDED IN GPA

Continuing Education 695 H(3-0)

Master's Project II
This phase involves the written portion of the master's project.
Prerequisite: Continuing Education 693.
Note: Open only to students in the MCE degree program.
NOT INCLUDED IN GPA

CULTURE AND SOCIETY CUSP

Contact Info
Location: Social Sciences Building, Room 222
Faculty number: (403) 220-6357
Fax: (403) 210-8164
E-mail address: gradprog@ucalgary.ca
Web page URL:
http://www.comcul.ucalgary.ca/gradprograms

1. Degrees and Specializations Offered
Doctor of Philosophy (PhD)
Master of Arts (MA), thesis-based

2. Admission Requirements
In addition to Faculty of Graduate Studies requirements, the Graduate Program in Culture and Society requires:

Master of Arts
a) A written statement of intent (250-500 words)
b) A current curriculum vitae
c) Two samples of applicant's written work
d) A completed baccalaureate degree

Doctor of Philosophy
a) A statement of research intent (500-1000 words)
b) A current curriculum vitae
c) Three samples of applicant's written work
d) Completed baccalaureate and Master's degrees

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

4. Advanced Credit
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 is not available to MA applicants.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements, the Graduate Program in Culture and Society requires:

Note: Courses for both the MA and PhD degrees may be selected from graduate-level courses in Communications Studies or Culture and Society. One half-course equivalent elective may be selected from other graduate programs; one half-course equivalent elective may be Culture and Society 711: Directed Studies.

Master of Arts

Six graduate half-course equivalents including core courses Culture and Society 601, Culture and Society 613, and Culture and Society 615

Doctor of Philosophy

Six graduate half-courses.

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 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

Master of Arts

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.

Doctor of Philosophy

By April 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 the 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. Each student will take a three-hour written examination in each of the three fields of study. This examination will take place over a period of ten calendar days. The student's supervisory committee sets the examination questions. The oral candidacy examination is taken no later than 20 calendar days after the last written examination.

Final thesis oral examinations are open.

11. Research Proposal Requirements

Students whose research involves human subjects must receive approval from the Faculty of Communications and Culture Ethics Review Committee and the University of Calgary Conjoint Research Ethics Board before beginning data collection.

Master of Arts

Thesis supervisor 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 coordinator 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. Students applying for scholarships must submit their applications to the Faculty of Communication and Culture Graduate Programs Office by February 1.

14. Other Information

Inquiries concerning specific questions about the program and degree requirements should be directed to: Faculty 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://www.comcul.ucalgary.ca/facultyresearch

Note: Courses that are considered electives will be offered on the basis of student needs and contingent upon the availability of staff resources.

Graduate Courses

Culture and Society 601 H(3S-0)

Interdisciplinary Approaches to Culture and Society
An introduction to ways of studying culture and society from a variety of perspectives, including approaches rooted in traditional disciplines and those that have arisen in a more interdisciplinary climate such as cultural studies and critical discourse analysis. Specific problems in culture and society will provide the basis for course work.

Culture and Society 613 H(3S-0)

Cultural Theory
An examination of a wide range of critical social theories, including feminist theory, critical race theory and postcolonial theory will provide students with the analytical sophistication and critical thinking skills necessary to unpack complex cultural and social dynamics and to develop innovative a approaches to vexing issues. Students will study a particular problem in culture from one specific point of view appropriate to their intended concentration, including aspects of law, cultural identity, personal identity, gender identity, and literary/artistic culture.

Culture and Society 615 H(3S-0)

Research Methods
Designed to provide a fundamental understanding of research methods appropriate to the study of culture and society.

Culture and Society 711 H(3S-0)

Directed Studies
A research project under the direction of a Faculty member.
Prerequisite: Consent of the Program Director.
Note: May be repeated for credit once.
MAY BE REPEATED FOR CREDIT

Culture and Society 717 H(3S-0)

Selected Topics in Culture and Society
A variety of topics based on faculty expertise.
Prerequisite: Consent of the Program Director.
MAY BE REPEATED FOR CREDIT

DRAMA DRAM

Contact Info

Location: Craigie Hall D 209
Department number: (403) 220- 5422
Fax: (403) 284-0713
E-mail address: dramgs@ucalgary.ca
Web page URL:
http://www.finearts.ucalgary.ca/drama/

1. Degrees and Specializations Offered

Master of Fine Arts (MFA) (thesis-based)
Specializations: Directing, Design/Technical, Playwriting, Theatre Studies

Students will generally be accepted and registered on a full-time basis. Part-time registration will be considered on an individual basis.

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, the Department 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 the Department. When the applicant intends to study in the Design/Technical area, a portfolio of drawings and design work is required. Applicants to the Playwriting area must submit a portfolio of original creative writing. Applicants to the Theatre Studies area must submit samples of their written work.

3. Application Deadline

The deadline for the submission of complete applications is 15 January 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 Coordinator and all admission materials submitted to the Department by 15 October 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 Faculty of Graduate Studies requirements, the Department 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 areas are described below:

a) Directing candidates must enrol in Drama 610, Drama 647 and Drama 649 in the first year.
b) Design/Technical candidates must enrol in at least four of the decimalized series that includes Drama 623, Drama 625, Drama 627 and Drama 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 Department of Drama office.
c) Playwriting candidates must enrol in Drama 671 and Drama 673 in the first year. Drama 647 and Drama 649 are also required courses.
d) Theatre Studies candidates must enrol in Drama 647 and Drama 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

The Department of 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 five 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 this Calendar. Students applying for scholarships must submit their applications to the Department by 1 February .

14. Other Information

None.

15. Faculty Members/Research Interests

The interests and research specialties of the staff can be found at
http://www.finearts.ucalgary.ca/drama/people

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.

Drama 517 H2S-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: Consent of the Department.

Drama 519 H(2S-2)

Advanced Design for Theatre II
Continuation of Drama 517.
Prerequisites: Drama 517 and consent of the Department.

Drama 531 H(2S-2)

Scene Painting I
Theory and technique of scene painting for a variety of theatre genres.
Prerequisite: Consent of the Department.

Drama 533 H(2S-2)

Scene Painting II
Continuation of theory and technique of scene painting for a variety of theatre genres.
Prerequisites: Drama 531 and consent of the Department.

Drama 540 F(4S-0)

Seminar in Drama III
Critical study at an advanced level of the dramatic metaphor as presented in the Department's season of plays; intensive focus on the historical period and theatrical genre of one or two of the season's plays especially.
Prerequisite: Drama 440 or consent of the Department.

Drama 560 F(2S-2)

Performance Creation III
Independent research, creation and facilitation of original solo or group performances.
Prerequisite: Drama 460 or consent of the Department.

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: Drama 460 or consent of the Department.

Drama 571 H(2S-0)

Directed Studies I
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Drama 572 F(2S-0)

Directed Studies II
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Drama 590 F(1S-10)

Professional Theatre Internship
Internship experience in acting; directing; design; dramaturgy; theatre, stage or production management with a local professional theatre organization.
Prerequisites: Fourth-year standing and consent of the Department.

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	

ECONOMICS ECON

Contact Info

Location: Social Sciences Building, Room 454
Faculty number: (403) 220-6064
Fax: (403) 282-5262
E-mail address: dalip@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

The Department is not currently accepting applications for the Master of Economics program, and potential applicants are encouraged to investigate the course-based Master of Arts program.

The Department offers a formal specialization in Health Economics. Other specializations are arranged informally, determined by the research interests of the student.

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 Faculty requirements, the Department requires:

Master of Arts

A minimum of four full-year 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.

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.

3. Application Deadline

Deadline for 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 a required level for admission.

5. Program/Course Requirements

In addition to Faculty requirements, the Department requires:

Master of Arts (thesis-based)

a) For students holding an Honours Economics degree with credits in Economics 395, Economics 387, Economics 389, Economics 495, Economics 497, Economics 557 and Economics 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, Economics 657, and Economics 659 unless one or more of them is explicitly exempted by the requirements for a specialization.

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 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 Economics 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 one-semester courses. Required courses include two courses each in econometrics, ECON 615 and ECON 715, microeconomic theory, ECON 657 and ECON 757, and macroeconomic theory, ECON 659 and ECON 759. In addition, students must take six one-semester courses in "field" areas. Students are also recommended to take a non-credit one-week course in the Fall semester block week (the week prior to the start of classes) of the first year in Mathematical Economics (ECON 600). 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

Normally 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, three years for the Master of Economics, 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 Master of Economics, and 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, Macroeconomic Theory, and Econometrics. 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 are required to pass a written comprehensive field examination in two fields of study. The written comprehensive field examinations shall each be three hours long. These examinations shall normally be scheduled in June of the second year. Students who fail one or more of the written comprehensive field examinations shall be given a second opportunity in August to pass those examinations they failed. Students who do not pass their written comprehensive field examinations by the second sitting shall be required to withdraw from the program.

The oral candidacy exam will include examination on general research knowledge, information from the written examinations and the 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 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 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 semester of the third year, a student must pass their comprehensive field examination and their oral candidacy examination by the beginning of Winter semester courses in their third year.

14. Other Information

None

15. Faculty Members/Research Interests

The active research interests of the current faculty can be found at http://econ.ucalgary.ca/people

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.

Economics 527 H(3-0)

World Oil Economics
Analysis of the world oil industry in the post war period.
Prerequisites: Economics 301 or 309; and 303 or 313; or consent of the Department.

Economics 529 H(3-0)

Microeconomics with Applications
Intermediate microeconomic theory and welfare economics with special emphasis on applications. Topics include: demand theory and measurement; production and cost theory and measurement; market structure and pricing behaviour; pricing practices; regulation; antitrust law; and capital budgeting. Normally restricted to Master of Economics students.
Prerequisite: Consent of the Department. It is recommended that Economics 521 be taken prior to or concurrently with Economics 529.
Note: Credit for both Economics 529 and either 309 or 357 will not be allowed.

Economics 537 H(3-0)

Economic Growth
This is an advanced course in Macroeconomics which explores why some countries are rich and others are poor.
Prerequisite: Economics 359 or consent of the Department.
Prerequisite or Corequisite: Economics 357.

Economics 541 H(3-0)

Monetary Theory
A survey of recent work in monetary theory with primary emphasis on financial issues.
Prerequisites: Economics 341 and 357 and 359; or consent of the Department.
Prerequisite or Corequisite: Economics 315 or 395.

Economics 557 H(3-0)

Topics in Economic Theory I
Topics in microeconomic theory such as welfare economics and general equilibrium theory.
Prerequisites: Economics 357 and 389; or consent of the Department.

Economics 559 H(3-0)

Topics in Economic Theory II
Topics in macroeconomic theory such as consumption and growth.
Prerequisites: Economics 315 or 359; and 359 and 389; or consent of the Department.

Economics 571 H(3-0)

Competition Policy
The law and economics of competition policy. An examination of the economics, jurisprudence and history of competition policy towards mergers, price fixing, vertical restraints, and monopolization, primarily in Canada and the United States.
Prerequisite: Economics 471.

Economics 599 H(3-0)

Selected Topics in Economics III
A decimalized course in which topics will vary from year to year. Consult the timetable or the Department for the topics available in a given year.
Prerequisites: Economics 357 and 359; or consent of the Department.
MAY BE REPEATED FOR CREDIT

Graduate Courses

Students are required to have departmental consent before registering in any of the following courses:

Economics 605 H(3-0)

Advanced Computational Optimization and Economic Applications I

Economics 607 H(3-0)

Advanced Computational Optimization and Economic Applications II
Prerequisite: Economics 605.

Economics 611 H(3-0)

Independent Study
MAY BE REPEATED FOR CREDIT

Economics 615 H(3-0)

Advanced Econometrics I

Economics 617 H(3-0)

Advanced Econometrics II
Prerequisite: Economics 615 or consent of the Department

Economics 619 H(3-0)

Economics of International Commercial Policy

Economics 621 H(3-0)

International Trade

Economics 625 H(3-0)

The Economics of the Petroleum Industry

Economics 627 H(3-0)

Energy in the Production Sector of the Economy

Economics 633 H(3-0)

Labour Markets

Economics 635 H(3-0)

Regulatory Economics

Economics 641 H(3-0)

Monetary and Financial Economics

Economics 643 H(3-0)

Institutions and Growth

Economics 645 H(3-0)

Topics on Institutions and Economic Performance

Economics 651 H(3-0)
(formerly Economics 611.13)

Redistribution and Social Insurance

Economics 653 H(3-0)

Public Revenue Analysis

Economics 655 H(3-0)

Cost/Benefit Analysis

Economics 657 H(3-0)

Microeconomic Theory

Economics 659 H(3-0)

Macroeconomic Theory

Economics 661 H(3-0)

Behavioural Economics

Economics 663 H(3-0)

Experimental Economics

Economics 667 H(3-0)

Seminar in Industrial Organization

Economics 675 H(3-0)

Advanced Topics in Natural Resource Economics

Economics 677 H(3-0)

Seminar in Economics of the Environment

Economics 679	H(3-0) (Medical Science 679)

Health Economics I
Applies basic concepts from economics to the 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 in interventions.
Prerequisite: Consent of the Department.

Economics 681	H(3-0)

Health Economics II

Economics 691	H(3-0)

Research Methods I

Economics 693	H(3-0)

Research Methods II

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

Economics 757	H(3-0)

Advanced Microeconomic Theory

Economics 759	H(3-0)

Advanced Macroeconomic Theory
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.

EDUCATION GDER

Contact Info

Location: Education Tower, Room 940
Faculty number: (403) 220-5675
Toll free in Canada (877) 623-0292
Fax: (403) 282-3005
E-mail address: gder@ucalgary.ca
Web page URL: http://www.educ.ucalgary.ca/gder

This portion of the calendar provides information about graduate programs offered by the Graduate Division of Educational Research (GDER). Programs offered by the Division of Applied Psychology (APSY) appear elsewhere in this Calendar.

1. Degrees and Specializations Offered

The Graduate Division of Educational Research offers Doctor of Philosophy (PhD), Doctor of Education (EdD), Master of Arts (MA), Master of Science (MSc), and Master of Education (MEd) degrees in ten 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 practising 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.

Curriculum, Teaching and Learning

The specialization offers the opportunity to develop and integrate understandings, within a general curriculum framework, in a variety of fields of study, for example: Curriculum Studies, Gifted education, French education, Language and Literacy education, Mathematics, Science and Environmental education. This includes the study of subject matter, courses, programs, purposes and practices used to teach and learn in formal and informal educational settings. This specialization supports a broad range of quantitative and qualitative research methods and inquiry. (PhD, EdD, MSc, MA, MEd)

Educational Contexts

This interdisciplinary approach to education includes philosophy; sociology; comparative, global and cultural education; gender studies; and history. Educational Contexts serves students specializing in these areas while also complementing the programs of students in all the specializations of GDER. Such interdisciplinary inquiry asks, for example: How do culture, spirituality, social class, gender, and ethnicity influence the perceptions, policies and practices of education as a process and as an institution? How do the language we use and the mental models we construct in order to interpret our world influence the way we make decisions and work with others? How do our histories and philosophies affect how we deal with the world and understand our own selves? Master's and doctoral projects in the Educational Contexts specialization are based on sound research methodology from the chosen field, and are often interdisciplinary in nature. (PhD, EdD, MA, MEd)

Educational Leadership

This specialization draws upon the social sciences and humanities to prepare researchers and practitioners for the analysis and resolution of issues and problems related to educational policy and the direction and management of schools, school systems, other institutions, and governmental bodies concerned with public and private education. This specialization prepares graduates for administrative and research-related careers with an understanding of organizational change in the field of educational leadership. (PhD, EdD, MA, MEd)

Educational Technology

This specialization is addressed to two audiences:

a) Teachers who are interested in the application of technology in the classroom or who are interested in technology leadership positions;
b) Those who are interested in instructional development in settings outside elementary/secondary schools, e.g., instructional developers in colleges, institutes of technology and universities, military/industrial trainers, health educators, and private training consultants.

Students in this specialization have the opportunity to investigate a broad spectrum of instructional design and development techniques as they apply to newer technologies and to explore new directions in instructional design and development as they emerge in the literature. (PhD, EdD, MSc, MA, MEd)

UPDATED (Oct. 27, 2009)

Higher Education Leadership

This specialization offers learners insight into local, national and international scholarly communities and graduates will understand issues in higher education leadership and administration, analyze ethical and legal issues in leadership and administration, appreciate links between theory and practice, and gain career-enhancing executive preparation. (PhD, EdD, MA, MEd)

Interpretive Studies in Education

Within the Interpretive Studies in Education specialization, education may be understood broadly as a highly complex, contested and living human enterprise. Graduate level research in this specialization involves examining how aspects of education are symbolically and existentially experienced in the world. This entails attending to the different meanings of teaching as practice and learning as experience, and to how and under what conditions—historical, cultural, linguistic, social and political—those meanings have come to be. Graduate work in Interpretive Studies in Education involves engaging in interpretive forms of inquiry, such as hermeneutics, phenomenology, feminist theory, critical theory, narrative theory, post-structuralism, historical inquiry, semiotics and cultural studies, so as to achieve a deeper, more critical understanding of teaching, learning and educational work more generally. (PhD, EdD, MSc, MA, MEd)

Learning and Teaching Languages is a multi-faculty initiative that includes the Faculties of Education, Humanities and Social Sciences, in an integrated approach to graduate education. It provides opportunities to engage in basic and applied research, to gain professional recognition, and/or an understanding of language and literary studies in English and other languages.

In GDER two specialization areas fall under this initiative:

Second Language Teaching (SLT)

This specialization offers students the opportunity to develop and broaden their pedagogical and research skills in learning and teaching a second or additional language by enabling them to

a) pursue the study of topics relevant and, in some cases necessary, to teach in the contemporary educational climate, with courses in second language teaching and learning, multilingual and bilingual education, cultural diversity and technology.

b) seek a new career direction, such as administrators in educational settings that involves second language studies.

c) French teaching/Enseignement du français, allows students to acquire the same knowledge with the focus on French. (PhD, EdD, MA, MEd).

Teaching English as a Second Language (TESL)
This specialization aims to address practical, professional and theoretical interests in the area of Teaching English as a Second Language. This area will be of interest to:

a) University graduates intent on establishing new career directions in both local and international contexts.
b) Individuals seeking to upgrade their educational qualifications for professional recognition.
c) Individuals interested in conducting research under the guidance of a faculty member in this specialization (PhD, EdD, MA, MEd).

Workplace and Adult Learning
There are two routes in the Workplace and Adult Learning specialization:
a) The course-based Master's program (MEd) is an online program designed to provide practitioners with the knowledge and skills to take a leadership role in working with adults in a variety of contexts.
b) Thesis-based degrees (MA, EdD, PhD) in this specialization are commonly interdisciplinary in focus, e.g., adult learning theory, marketing higher education, learning in the workplace. The MA and PhD degrees are normally pursued on campus. The EdD degree is available on campus and online.

GDER Programs Online
The Graduate Division of Educational Research offers online graduate programs via the web and other multi-media components to local, regional, national, and international communities. Programs normally lead to the Master of Education (MEd) in Curriculum, Teaching and Learning; Educational Contexts; Educational Leadership; Educational Technology; Gifted Education; Higher Education Leadership; Second Language Teaching; Teaching English as a Second Language; and Workplace and Adult Learning. The thesis-based Doctor of Education (EdD) in the specializations of Educational Leadership (K-12); Educational Technology; Higher Education Leadership; and Workplace and Adult Learning; 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: GDER at gder@ucalgary.ca or (403) 220-5675 or toll free in Canada (877) 623-0292.

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements, the Graduate Division of Educational Research requires:

Doctor of Philosophy (PhD)
A thesis-based Master's degree in an appropriate field. Outstanding applicants holding Master's degrees without thesis may be considered.
A minimum grade point average of 3.50 on a four-point scale in a Master's degree program
A written statement indicating the applicant's reasons for wishing to pursue a graduate program in the Graduate Division of Educational Research
Where appropriate, candidates will be expected to have, or to obtain, relevant practical experience in their area of specialization
For applicants required to prove proficiency in English, a TOEFL score of 580 (written test), 237 (computer-based test) or 93 (internet-based test)

Doctor of Education (EdD)

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 in the Graduate Division of Educational Research
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), 237 (computer-based test) or 93 (internet-based test)

Admission Portfolio for Doctoral Applicants
Applicants to the Doctor of Philosophy and Doctor of Education programs 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 Portfolios must include a Table of Contents and an Executive Summary that outlines the contents of the Portfolio.
The Doctoral Admission Portfolio may contain the following:
- Thesis (if applicable)
- Reports
- Research grants or scholarships
- Articles
- Curriculum documents
- Non-print materials, e.g., multimedia
- Relevant prior learning (see below)
- Personal statement documenting research skills and interests (for PhD applicants)
- Personal statement documenting research and professional skills and interests (for EdD applicants)

Relevant Prior Learning Considerations
- Personal continuing education/training
- Results in these continuing education efforts
- Experience in a field related to the aspired degree
- Management of people, resources, finances, situations
- Increasing or varying responsible positions in organizations related to the aspired degree
- Work-related products, e.g. reports, programs of learning or training, handbooks, videos, manuals, workshops, seminars
- Evidence of personal growth in knowledge, understanding, management skills, and intellectual resources
- Evidence of innovation
- Evidence of leadership, co-ordination

Master's Programs
General
a) A written statement indicating the applicant's reasons for wishing to pursue a graduate program in the Graduate Division of Educational Research
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)

Curriculum, Teaching and Learning Specialization
a) Normally, an acceptable teaching certificate and teaching experience

Second Language Teaching Specialization
Teaching English as a Second Language Specialization

a. A minimum of two years teaching experience for the TESL specialization
b. Relevant instructional experience for the SLT specialization
c. A written statement and professional profile of past education and work experience
d. An introductory level of linguistics knowledge and/or second language theory
e. Knowledge of an additional language, preferred.

3. Application Deadline

MEd – Online
Curriculum, Teaching and Learning; Educational Contexts; Educational Leadership; Educational Technology; Gifted Education; Higher Education Leadership; Second Language Teaching; Teaching English as a Second Language; Workplace and Adult Learning
1 February for July or September admission
15 August for January admission

EdD – Online
Educational Leadership; Educational Technology; Higher Education Leadership; Workplace and Adult Learning
1 February for July admission
15 August for January admission

MEd – On-Campus
Curriculum, Teaching and Learning; Educational Contexts; Educational Leadership; Educational Technology; Gifted Education; Interpretive Studies in Education; Second Language Teaching; Teaching English as a Second Language
1 February for July or September admission
15 August for January admission

Thesis-Based On-Campus Degrees
PhD, EdD, MSc, MA
1 February for July or 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

For the most current program information, visit our website.

In addition to the requirements of the Faculty of Graduate Studies, the Faculty of Education requires:

Doctor of Philosophy, Doctor of Education
These degree programs may be completed on a full-time or part-time basis.
a) A minimum of one and one-half full-course equivalents, including Educational Research 700 (a full course) the first year of program. The remaining required half-course is normally a course in research methods suited to the student's area of research;

b) Additional graduate courses or seminars as determined by the supervisor in consultation with the student. The number of courses required for program completion must be approved by the Associate Dean of the Division and be finalized no later than the beginning of the second year of program.

Master of Arts, Master of Science

These degree programs may be completed on a full-time or part-time basis.

a) One full-course equivalent in research methods
b) One full-course equivalent in the student's area of specialization
c) Additional graduate courses or seminars as determined by the supervisor in consultation with the student. The number of courses required for program completion must be approved by the Associate Dean of the Division and be finalized no later than the beginning of the second year of program.

Master of Education

This degree may be done on a full-time or part-time basis on campus, or online.

a) A minimum of six full courses
b) One full-course equivalent in research methods
c) Two full-course equivalents in the student's area of specialization
d) Additional graduate courses or seminars as determined by the supervisor in consultation with the student and approved by the Associate Dean of the Division

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

The Division 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, three years in course-based programs and four years in doctoral programs. Maximum completion time is four years for thesis-based Master's programs, and six years for course-based Master's programs and doctoral programs.

9. Supervisory Assignments

A supervisor is normally appointed at the time of admission.

10. Required Examinations

Written Candidacy Process:

A written paper will be prepared by the student to demonstrate her/his knowledge of the Field of Study and preparedness to conduct research in this field. The paper will be a response to one written question normally selected by the student from two or three questions prepared by the supervisor with the assistance of the supervisory committee members. The questions are to take into consideration a list of readings agreed to by the supervisory committee and the student as defining the student's Field of Study. These questions must be approved by the GDER Associate Dean or designate before being presented to the student.

On the date assigned to begin the Written Paper, the student may pick up the questions from the Graduate Secretary. The student then has twenty-eight days to prepare, independently, the paper. The paper normally will be twenty-five to forty double-spaced pages in length, exclusive of references and should use the standard format normally used within a given Area of Specialization. The student will provide a copy of the question and the paper to each member of the examining committee at least two weeks in advance of the Oral Examination.

Final thesis oral examinations are open.

11. Research Proposal Requirements

Questions on research proposals are not examined during the oral candidacy examination. Doctoral thesis proposals must be approved before 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. Students applying for scholarships must submit their applications to the Division by 1 February.

14. Other Information

For information about Graduate Certificates, Graduate Diplomas, and Continuing Professional Development opportunities on-campus and online, please visit our website.

15. Faculty Members/Research Interests

Current faculty members and their areas of interest can be found at http://www.educ.ucalgary.ca

Educational Research (EDER)

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
Consult current timetable for offerings.
MAY BE REPEATED FOR CREDIT

Educational Research 606 F(3-0)

Special Topics in Professional Development
Consult current timetable for offerings.
MAY BE REPEATED FOR CREDIT

Educational Research 607 H(3-0)

Special Topics in Professional Development
Consult current timetable for offerings.
MAY BE REPEATED FOR CREDIT

Educational Research 609 H(3-0)

Research Methods
Various approaches to research in education.
MAY BE REPEATED FOR CREDIT
NOT INCLUDED IN GPA

Educational Research 611 H(3-0)

Communication in Educational Administration
To explore dominant areas of interpersonal communication which constantly challenge educational leaders.

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
Consult current timetable 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 627 H(3-0)

Program Evaluation
Systematically examines the evaluation enterprise including concepts, procedures and uses of evaluation.

Educational Research 629 H(3-0)

Special Topics in Assessment/Evaluation
Consult current timetable 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 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
MAY BE REPEATED FOR CREDIT

Educational Research 651 H(3-0)

Philosophy of Education
Philosophical topics in the context of education.
Consult current timetable for offerings.
MAY BE REPEATED FOR CREDIT

Educational Research 653 H(3-0)

Sociology of Education
Sociological topics in the context of education. Consult current timetable for offerings.
MAY BE REPEATED FOR CREDIT

Educational Research 655 H(3-0)

Comparative Education
Topics in comparative education. Consult current timetable 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 current timetable for offerings.
MAY BE REPEATED FOR CREDIT

Educational Research 659 H(3-0)

History of Education
Historical topics in the context of education. Consult current timetable 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 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.
Note: Not open to students with credit in Educational Research 665, 669.27 or 699.42.

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 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 690 F(3-0)

Professional Project
Seminar course to facilitate the preparation and evaluation of an independent culminating project.

Educational Research 691 H(3-0)

Critical Issues in Education
Culminating course focusing on the integration and application of major themes covered in student's program.

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 695 H(3-0)

Inquiry into Culture, History, Language and Cognition
Examination of the foundations of interpretive studies.
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.
Prerequisite: Consent of the Division.
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.
Prerequisite: Consent of the Division.
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.
Prerequisite: Consent of the Division.
Note: Normally restricted to Doctoral students.

Educational Research 719 H(3-0)

Advanced Special Topics in Educational Leadership
Prerequisite: Consent of the Division.
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.
Prerequisite: Consent of the Division
Note: Normally restricted to doctoral students.
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.
Prerequisite: Consent of the Division.
Note: Normally restricted to Doctoral students.

Educational Research 761 H(3-0)

Research Seminar on Second Language Education
Multidimensional perspectives on theory building about second language learning and teaching, including factors such as language, schooling, curriculum, culture, community and society.
Prerequisite: Consent of the Division.
Note: Normally restricted to Doctoral students.

Educational Research 771 H(3-0)

Doctoral Seminar in Educational Technology
Advanced doctoral seminar focused on defining issues and current research in educational technology.
Prerequisite: Consent of the Division.

Educational Research 779 H(3.0)

Advanced Educational Technology
Advanced concepts in educational technology.
Prerequisite: Consent of the Division
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.
Prerequisite: Consent of the Division.
Note: Normally restricted to Doctoral students.

Educational Research 783 H(3-0)

Conceptualizing Instructional Research
Critical examination of various theoretical frameworks and representative studies in the literature of research on instruction.
Prerequisite: Consent of the Division.
Note: Normally restricted to Doctoral students.

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.
Prerequisite: Consent of the Division.
Note: Normally restricted to Doctoral students.

Educational Research 789 H(3-0)

Advanced Curriculum Study
Research and issues in the study of a variety of topics and areas concerning the school curriculum.
Prerequisite: Consent of the Division.
Note: Normally restricted to Doctoral students.
MAY BE REPEATED FOR CREDIT

Educational Research 797 Q(1.5-0)

Advanced Special Topics
Prerequisite: Consent of the Division.
Note: Normally restricted to Doctoral students.
MAY BE REPEATED FOR CREDIT

Educational Research 798 F(3-0)

Advanced Special Topics
Prerequisite: Consent of the Division.
Note: Normally restricted to Doctoral students.
MAY BE REPEATED FOR CREDIT

ENGINEERING PROGRAMS

Contact Info

Location: ENC202
Faculty number: (403) 220-5738
Fax: (403) 284-3697
E-mail address: schulich@ucalgary.ca
Web page URL: http://wcm2.ucalgary.ca/schulich/

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)
Master of Science (MSc)
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.

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 2.7) 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.

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 coordinator. 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. Fee credit will not be given for courses accepted for advanced credit. Please note that minimum program fees are in effect.

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 coordinator, 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 coordinator.

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 coordinator, from outside the student's department. 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 2-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 coordinator. 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.

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 coordinator, from outside the department. 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 2-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 1 February .

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 ENGG 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 Info

Location: Schulich School of Engineering, Room B202
Phone number: (403) 220-4802
Fax number: (403) 284-4852
E-mail address: chemandpetenggrad@ucalgary.ca
Web page URL:
http://www.eng.ucalgary.ca/Chemical/

1. Degrees and Specializations Offered

Degrees:
Doctor of Philosophy (PhD)
Master of Science (MSc), thesis-based
Master of Engineering (MEng), thesis-based and course-based

The Department offers specializations in Chemical Engineering, Petroleum Engineering, Environmental Engineering and Biomedical Engineering. The Master of Engineering degree is also offered with specialization in Petroleum Reservoir Engineering, Petroleum Exploration Engineering and Reservoir Characterization (Interdisciplinary). For further information on the Reservoir Characterization (Interdisciplinary) and Energy and Environment (Interdisciplinary) specializations, see the separate listings in this Calendar.

The Universities of Calgary and Alberta offer a joint Biomedical Engineering Program. Further information can be obtained from the separate listing in this Calendar.

For registration status of thesis-based graduate students, see "Engineering Programs".

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 Reservoir 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

- A Master's degree in Chemical, Oil and Gas, or Petroleum Engineering

Applicants to a Master's program who hold a Bachelor's degree with Distinction may be considered for later transfer to the doctoral program.

3. Application Deadline

Deadlines for submission of complete applications for students with international transcripts:
15 March for September admission
15 July for January admission
15 November for May admission

Deadlines for submission of complete applications for students with Canadian and US transcripts:
15 July for September admission
15 November for January admission
15 March for May admission

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 (ENCH 701)
Advanced Mathematical Methods in Engineering (ENCH 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 Chemical Engineering specialization: ENCH 613, 623, 625, 631 and 633; and for the Petroleum Engineering specialization: (ENCH 621, 629, 647, 657 and 677).

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 must also present one research seminar in ENCH 601. For more details, students must refer to the guidelines for the Research Seminar course. Requirements for other specializations are listed under the corresponding sections.

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.

Questions on the research proposal will not be included in the oral candidacy examination, but will include questions on background knowledge needed to carry out the proposed research.

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.

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, and Energy & Environment 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.

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: Chemical Engineering 607.

Chemical Engineering 611 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 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(3-3/2)

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(3-3/2)

Modelling and Identification Advanced Control
Modelling and identification for the advanced control of chemical and process engineering systems. Theory and linear time series methods for system identification. Time-Domain and frequency-domain methods for analyzing dynamic data. Decisions concerning causal relationships between process signals. Closed-loop identification. Multivariate regression methods for the design of steady-state soft sensors.

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: Consent of the Department Head or Associate Head Graduate Studies.
Note: 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 or Corequisite: Petroleum Engineering 523 or equivalent.

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.

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. Transport across boundaries. Moving-boundary problems involving phase change.

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: Petroleum Engineering 525 or equivalent.

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: Chemical Engineering 427 or equivalent.

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: Engineering 407 or equivalent.
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. Impact of air pollution and greenhouse gases on health and climate change. Energy and air pollution. Fundamentals of fossil fuel combustion and related air pollution. Pre-combustion air pollution control strategies: fossil fuel cleaning/refinery, renewable energy (wind, solar, biomass, etc.), and alternative energy sources (hydrogen, etc). In-combustion air pollution control. Post-combustion air pollution control. Industrial air pollution control. Control of particulate matter. Control of VOCs, SOx, and NOx. Adsorption and absorption of air pollutants. GHG emission control. Indoor air quality engineering. Recent advances on related topics.
Note: 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.

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.
Note: Credit for both Chemical Engineering 651 and Chemical Engineering 619.51 will not be allowed.

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: Petroleum Engineering 523 or equivalent.

Chemical Engineering 657 H(3-0)

Advanced Reservoir Engineering
Formulation and solution of reservoir-engineering problemsincluding 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: Petroleum Engineering 523 or equivalent.
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: Consent of the Instructor.

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: Petroleum Engineering 523 or equivalent 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: Petroleum Engineering 523 or equivalent.

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.
Note: Credit for both Chemical Engineering 687 and Chemical Engineering 619.87 will not be allowed.

Chemical Engineering 698 F(3-0)
(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.
Prerequisites: Chemical Engineering 621, Geology 697, 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: Consent of the Department Head or Associate Head Graduate Studies.
Note: Credit for both Chemical Engineering 699 and 620 will not be allowed.
Note: May be repeated once for credit.
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).
Note: Intended for MSc/PhD students. MEng students may be able to register with Instructor's Permission. Credit for more than one of Chemical Engineering 701, Environmental Engineering 621, Chemical Engineering 619.45 and 619.82 will not be allowed.

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.
Note: Intended for MSc/PhD students. MEng students may be able to register with Instructor's Permission. Credit for both Chemical Engineering 703 and Chemical Engineering 619.83 will not be allowed.

ENGINEERING, CIVIL ENCI

Contact Info

Location: Schulich School of Engineering, Room F262
Faculty number: (403) 220-5821
Fax: (403) 282-7026
E-mail 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

Areas of Study:
Civil Engineering
Biomedical Engineering
Energy and Environment (Interdisciplinary)
Specializations include Avalanche Mechanics; Biomechanics; Bituminous Materials; Environmental Engineering; Geotechnical Engineering; Materials Engineering; Project Management; Structures & Solid Mechanics; Transportation Engineering; Water Resources

2. Admission Requirements

Master's Programs

See "Engineering Programs."

Doctor of Philosophy

See "Engineering Programs."

Project Management Specialization

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
1 May for September admission
1 September for January admission
1 January for May admission
International Admissions
1 April for September admission
1 August for January admission
1 December 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 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

6. Additional Requirements

All full-time Master of Science and doctoral students, except for those registered in ENEN 601or BMEN 605 or BMEN 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 ENCI 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 Program."

11. Research Proposal Requirements

Not applicable

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 1 February.

14. Faculty Members/Research Interests

Information about faculty members and their research interests may be found at http://www.eng.ucalgary.ca/Civil/Civil_grad_studies.htm.

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.

Civil Engineering 513 H(3-3/2)

Concrete Materials for Sustainable Construction
Production and use of concrete for sustainability. Fundamental and engineering properties of cements, aggregates, supplementary cementing materials, chemical admixtures, concrete and other ingredients used to improve the performance and sustainability of concrete structures. Methods to reduce energy consumption and environmental impact associated with materials production and construction are emphasized.
Prerequisite: Civil Engineering 413.

Civil Engineering 523 H(3-1T-2/2)

Soil Mechanics and Foundation Engineering
Earth embankments; sub-surface investigations; compaction; seepage analysis and slope stability; lateral earth pressures and retaining structures; shallow and deep foundations in sands and clays; bearing capacity and settlement of structures; selected laboratory, design exercises, solution to slope stability and other problems using computer programs.
Prerequisite: Civil Engineering 423.

Civil Engineering 525 H(3-1)

Applied Geotechnical Engineering
Selected topics from: soil improvement; foundations in permafrost; machine foundation analysis and soil dynamics; tunneling; geotechnical aspects of mining engineering; deep foundations; retaining structures; computer applications.
Prerequisites: Civil Engineering 423 and 523.

Civil Engineering 533 H(3-1)

Engineering Hydrology
Introduction to engineering hydrology; Meteorological factors in hydrology, radiation, temperature, humidity, wind; Physical hydrology, measurement and estimates of precipitation, evaporation and transpiration, groundwater flow, rainfall-runoff relation; hydrometry, stream flow measurement, stage-discharge relations; gauging stations; Linear theory of hydrological systems, hydrograph analysis, groundwater recession, unit hydrograph; Hydrology of floods, reservoir and river flood routing; Statistical hydrology, probability distributions, frequency analysis; Hydrological design, design storms, design flows.
Prerequisite: Mechanical Engineering 341.

Civil Engineering 535 H(3-1)

Open Channel Hydraulics
Review of basic concepts of fluid flow, types of flow, states of flow, equations of motion; Energy principle in open-channel flow, transition problem, specific energy, non-rectangular channel sections; Momentum equation in open-channel flow, hydraulic jump, specific force; Critical flow, critical flow applications, flow measurement; Uniform flow, formulae, Manning's n, uniform flow computations for prismatic and compound irregular cross-sections;

Design of channels for uniform flow, nonerodible channels, erodible channels; Gradually varied steady flow, classification and computation of flow profiles, the discharge problem, computer applications; Flow around bridge piers and flow through culverts; Storm sewer design; Unsteady flow, equations of motion, numerical solutions, kinematic wave approximation, the method of characteristics.
Prerequisite: Mechanical Engineering 341.

Civil Engineering 545 H(3-1)

Theory of Structures I
Structural analysis' role in design: idealized models. Review of analysis of statically determinate structures. Static indeterminacy; kinematic indeterminacy; principle of superposition; general methods for the analysis of statically indeterminate structures: the force (flexibility) method and the displacement (stiffness) method. Flexibility and stiffness matrices. Effects of moving loads. Strain energy and virtual work; calculation of displacements by virtual work. Use of computers for the analysis of plane frames and grids. Plastic analysis of continuous beams and frames. Visualization of deflection, bending moment and shearing force diagrams; comparison with diagrams generated by computers.
Prerequisite: Civil Engineering 461.

Civil Engineering 547 H(3-1)

Theory of Structures II
Energy theorems: application to transformation of forces, displacements, and stiffness and flexibility matrices. Application of the force method: column analogy. Application of the displacement method: moment distribution, Muller-Breslau principle; influence lines for beams and frames, arches, grids and trusses. Effects of axial forces on flexural stiffness of members. Plastic analysis of plates: yield line theory. Applications using available computer programs. Topics selected annually from the analysis of funicular systems, introduction to structural reliability analysis, analysis of shear wall systems, introduction to finite element analysis, and methods of fatigue and cumulative damage analysis.
Prerequisite: Civil Engineering 545.

Civil Engineering 553 H(3-1)

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, shear load distribution, shear walls, code provisions, building envelope, detailing, geometric walls, prestressed masonry.
Prerequisite: Civil Engineering 451.

Civil Engineering 555 H(3-1)

Structural Concrete Design
Structural systems for buildings. Analysis and design of continuous beams and one-way slabs using moment coefficients as well as analysis and design by computer. Shear and torsion (general method). Bond and development. Serviceability. Two-way slabs and flat plates by direct design method, punching shear. Long columns. Walls: laterally loaded walls, bearing walls, shear walls. Footings: wall footings, isolated footings. Prestressed concrete: introduction, elastic analysis, deflections, flexural and shear strength. Use of computer programs where applicable.
Prerequisite: Civil Engineering 451.
Corequisite: Civil Engineering 545.

Civil Engineering 557 H(3-1)

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. Use of available computer programs to assist in analysis and design of steel structures.
Prerequisites: Civil Engineering 451 and 545.

Civil Engineering 565 H(3-1)
(formerly Civil Engineering 465)

Engineering and Construction Management
Introduction to engineering and construction management; planning, scheduling, estimating, cost control; project organization, human resource management; specifications; construction processes; manpower requirements; disputes and their resolution, social, economic and environmental impacts; regulatory requirements; project completion and commissioning.
Prerequisite: Civil Engineering 471.

Civil Engineering 569 H(3-1)

Design 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; mathematical analysis of mode of operation, route alignment, access, station & stop location, transfer protocols, time table, vehicle & fleet size, reliability; concepts of utility and value of time; detailed functional design & optimization of a bus route, rail line; introduction to design of bus and rail networks; and application of ITS concepts to public transport.
Prerequisite: Civil Engineering 473.

Civil Engineering 570 F(0-4)

Group Design Project
A team design project applying engineering and project management principles to prepare a multidisciplinary design and bid document for a civil engineering project. Students are expected to consult with local industry and professors in the Department. Teams will prepare a final report and will present this report to a committee, comprising of representatives from the Department and industry. Proposals should document and discuss the project development, design and execution plan with an emphasis on the technical, human resources and business aspects of the project. Initial engineering design for all Civil Engineering design aspects including: Environmental, Geotechnical, Hydraulics, Materials, Structural and Transportation. Preparation of design documents and specifications and presentation of competitive bids.
Prerequisites: Civil Engineering 413, 423, 451, 461, 473, 481 or Department approval. Departmental approval will only be granted in exceptional cases if students are missing no more than two of the courses listed.

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.
Prerequisites: Civil Engineering 473 and one of Biomedical Engineering 319 or Engineering 319.

Civil Engineering 573 H(3-1)

Highway Engineering
Introduction to highway planning and engineering; human factors; road vehicle performance characteristics; highway capacity and level of service; highway classification; design consistency; alignment elements, cross section elements, intersections, interchanges, traffic barriers; road safety audits. Planning and design of bicycle facilities. Environmental impact of highways. Explicit evaluation of safety in road design.

Civil Engineering 575 H(3-1)

Traffic Engineering and Operations
Introduction to traffic engineering, traffic stream components, traffic stream characteristics, traffic studies, data collection, speed, travel time and delay studies, speed limits and advisory speeds, accident studies, parking studies, traffic barriers, traffic noise, capacity and level of service, warrants for traffic control devices, principles of intersection signalization, actuated and pretimed signals, signal control systems, progression, traffic systems management, local area traffic management studies, intelligent transportation systems, road safety audits.
Prerequisite: Biomedical Engineering 319 or Engineering 319 or equivalent.

Civil Engineering 577 H(3-1)

Modelling of Transportation Systems
Approaches to mathematical and computer-based modelling for transportation planning; trip generation models, trip distribution models, mode split processes, assignment models; direct demand models; discrete-choice behavioural models; simplified transportation demand models; use of models in design and evaluation.
Prerequisite: Civil Engineering 473.

Civil Engineering 579 H(3-1)

Asphalt Pavement Design and Management
Planning, designing, constructing and maintaining asphalt pavement: physical parameters, economic considerations and governing specifications; optimum design based on: design loads, subgrade soil mechanics and aggregates; asphalt mix selection and preparation; construction methods; pavement failure mechanisms; prediction of long-term performance based on field and laboratory tests; performance criteria and the implementation of rehabilitation and recycling programs.
Prerequisites: Civil Engineering 423, Geology 471.

Civil Engineering 581 H(3-1)

Water and Wastewater Engineering
Water and wastewater quantities and quality, water distribution and wastewater collection systems, hydraulic considerations, flow through pipes and networks, 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, design considerations, sludge processing and disposal.
Prerequisites: Civil Engineering 481 and Mechanical Engineering 341.

Civil Engineering 587 H(3-1)

Site Assessment and Remediation
Environmental impact assessments, environmental audit protocols and plans, pre-assessment planning and preliminary assessment of contaminated sites, site investigation, field techniques and program implementation, remedial planning and design, cost and time analysis, physical, chemical and biological remediation techniques, land treatment, soil vapour extraction and solidification.
Prerequisite: Civil Engineering 481.

Civil Engineering 589 H(3-1)

Air and Water Pollution
Sources of air and water pollution, acute and chronic health effects of pollution, environmental quality standards and compliance criteria, monitoring environmental quality, sampling techniques, fate and transport of pollutants in environmental media, particulates and gaseous pollutants in air medium, dissolved and suspended solids in water medium, air and water quality modelling, introduction to software.
Prerequisite: Civil Engineering 481.

Civil Engineering 591 H(3-1)

Solid and Hazardous Waste Engineering
Integrated waste management, solid and hazardous waste characterization and classification, reduce, reuse, recycle, resource recovery and utilization, composting, thermal techniques of waste treatment, fundamentals of waste degradation and disposal, geo-environmental aspects of landfill design, leachate and gas management at landfills.
Prerequisite: Civil Engineering 481.

Civil Engineering 595 H(3-1)

Special Topics
Current topics in Civil Engineering.
Prerequisite: 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.

Civil Engineering 599 H(0-5)

Civil Engineering Project II
Individual project intended for students who have completed a suitable Civil Engineering Individual Project and wish to continue the assigned research project by completing a more extensive investigation. A comprehensive written report is required which is defended and presented orally in a Department seminar.
Prerequisites: Civil Engineering 597 and formal approval from the project supervisor and course coordinator(s).

Graduate Courses

Registration in all courses requires the approval of the Department of Civil 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 nonlinear 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. Nonlinear analysis: effect of axial forces combined with large displacements, geometric stiffness matrix, Newton-Raphson techniques, examples of geometric nonlinearity, nonlinear buckling, cable networks including membrane elements, analysis of structures made of nonlinear 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; nonlinear 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 fieldapplications.

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: 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.
Note: 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 nonlinear 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.
Prerequisites: Civil Engineering 691, 697 and consent of the Program Director.

Civil Engineering 691 H(3-0)
(Business and Environment 691)

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: 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: 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; labor relations; claims; contractor(s) responsibility in project commissioning start-up and operations.
Prerequisite: 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 labor relations.
Prerequisite: 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 nondisclosure; 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: Consent of the Program Director.
Note: This course may not be taken for credit towards the LLB or LLM degrees.

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 coordination 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: 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: Civil Engineering 707 or consent of the Department.

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: 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: 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: Civil Engineering 533 or equivalent.

Civil Engineering 741 H(3-0)
(Environmental Engineering 663)

Biological Processes for Wastewater Treatment
Specialized biological wastewater treatment processes for removal of impurities not effectively removed by conventional secondary wastewater treatment systems, such as nutrients (e.g. nitrogen and phosphorus), residual organics, residual solids, bacteria and viruses. Wetlands. Activated sludge modelling. Biological nutrient removal. Sludge management. Disinfection.
Note: Credit for both Civil Engineering 741 and Environmental Engineering 663 will not be allowed.

Civil Engineering 743 H(3-0)
(Environmental Engineering 625)

Computational Methods for Environmental Engineering
Taylor series, numerical integration. Linear and nonlinear 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 Dynamics and 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.

ENGINEERING, ELECTRICAL AND COMPUTER ENEL

Contact Info

Location: ICT Building, Room 402
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1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)
Master of Science (MSc)
Master of Engineering (MEng), thesis and course-based

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.

The Department also offers specializations in Telecommunications, VLSI and Microelectronics, Image Processing, Computer Engineering, Power Electronics, Control Systems, Power Systems, Energy and Environment, and Biomedical Engineering.

The Universities of Calgary and Alberta offer a joint Biomedical Engineering Program. Further information can be obtained from the separate listing in this Calendar.

All programs are available to both full-time and part-time students. For details, see the Schulich School of Engineering.

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:
1 March for September admission
30 June 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 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 electrical engineering
b) Students are encouraged to include Electrical Engineering 698 - Graduate Project in their programs. Normally ENEL 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.
c) A comprehensive report on a topic agreed upon with the supervisor and a final oral examination (a written examination is not required)

Master of Engineering (thesis-based)

Normally, five to eight graduate half-courses

Master of Science

Normally, five 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) 2.5 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, seven to ten graduate half-courses (at least seven in electrical engineering) 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 electrical engineering
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 ENEL 605/607 at the beginning of their graduate studies program. That is, students starting in the Fall will take ENEL 605 in the Fall, and ENEL 607 in the Winter. Similarly, students starting in the Winter semester will start with ENEL 607 and follow with ENEL 605 in the Fall.
b) Students in the PhD program who completed the course in the MSc program will not be required to take the ENEL 605/607 for the second time.

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 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 15 January.

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

The active research interests of individual faculty members can be found at http://www.enel.ucalgary.ca.

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. Registration in all courses requires the approval of the Department of Electrical and Computer Engineering.

Electrical Engineering 519 H(3-2)

Special Topics in Electrical Engineering
Current topics in electrical engineering.
Prerequisite: 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: Electrical Engineering 327.

Electrical Engineering 527 H(3-2)

Design and Implementation of FPGA-Based DSP Systems
The design and implementation of digital systems for digital signal processing applications. Introduction to Hardware Design Languages. VHDL. Introduction to digital filter design and computational units for digital arithmetic. Interface standards. Interfacing to peripheral devices. Printed circuit board design and implementation. Design for testability.
Prerequisites: Electrical Engineering 453 and 471.

Electrical Engineering 529 H(3-1T-1)

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.
Prerequisites: Electrical Engineering 471 and one of Biomedical Engineering 319 or 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: Electrical Engineering 441.

Electrical Engineering 559 H(3-2)

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.
Prerequisites: Electrical Engineering 465 and 471.

Electrical Engineering 563 H(3-1T-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: Electrical Engineering 327.

Electrical Engineering 565 H(3-1T-3/2)

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: Electrical Engineering 465.

Electrical Engineering 567 H(3-1T-3/2)

CMOS VLSI Engineering
Introduction to CMOS very large-scale integrated (VLSI) circuit design. Review of MOS transistor theory and operation. Introduction to CMOS circuits. CMOS processing technology and design rules. Circuit characterization and performance estimation. CMOS circuit and logic design. VLSI design methods and tools. Basic concepts of design for testability. CMOS subsystem and system design.
Prerequisite: Electrical Engineering 465 or Computer Engineering 467.

Electrical Engineering 569 H(3-1T-3/2)

Electronics for Instrumentation
Error analysis. Component specification. Power supplies. Switched power supplies. Operational amplifier non-idealities. Noise in devices. Instrumentation and isolation amplifiers. Logarithmic principles. Multipliers, dividers. RMS to DC conversion. Voltage-to-frequency conversion. Bridge circuits.
Prerequisite: Electrical Engineering 465.

Electrical Engineering 571 H(3-1T-3/2)

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: Electrical Engineering 471 and Biomedical Engineering 319 or 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: Biomedical Engineering 319 or 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; network analysis;; advanced topics.
Prerequisite: Electrical Engineering 475.

Electrical Engineering 577 H(3-1T-1)

Transmission Media
Transmission lines: characterization, analog and digital transmission. Terrestrial radio: very high frequency and ultra high frequency, propagation and noise. Microwave propagation. Satellite communication. System designs; modulation requirements and error control.
Prerequisites: Electrical Engineering 471 and 475.

Electrical Engineering 579 H(3-1T-3/2)

Optical Fibre Communications
Electromagnetic wave progagation and Maxwell's equations. Modal analysis of the dielectric slab waveguide together with the step-index and graded-index cylindrical optical fibre. Dispersion and attenuation. Fibre design considerations and a review of fibre chemistry and production techniques. Measurement of fibre parameters. Optical transmitters, photodetectors and receivers, modulation, multiplexing, splices and connectors. Multiterminal analog and digital network analysis and design. Optical fibre local area networks. Optical switching and integrated optics.
Prerequisites: Electrical Engineering 463 and 475.

Electrical Engineering 581 H(3-1T-3/2)

Renewable Energy and Solid State Lighting for Human Development
Introduction to solid state lighting (SSL) and renewable energy (RE) systems. Topics include: history of lighting, illumination standards, incandescent bulbs, fluorescent tubes, White LEDs their properties and measurement; photovoltaic, wind power, hydro power, human and animal power, thermoelectric, biomass energy, biodiesel, fuel cells and SSL system design. SSL project planning and financing, environmental and social impact assessments, carbon credits and SSL system metrics for the developing world.
Prerequisite: Electrical Engineering 489 or permission of the instructor.
Note: Credit for both Electrical Engineering 581 and Electrical Engineering 519.39 will not be allowed.

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:: Electrical Engineering 107

Electrical Engineering 585 H(3-2)

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: Electrical Engineering 465.

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: Electrical Engineering 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: 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 Project
This project involves individual work on an assigned Computer, Electrical or Software Engineering topic under the supervision of a faculty member. The topic would normally involve a literature review, theoretical and experimental or computer work. A final report is required which is defended and presented orally.
Prerequisites: Formal approvals from the project supervisor and course coordinator(s).

Electrical Engineering 593 H(3-1T-2/2)

Digital Filters
Discrete-time systems. The Z transform and its properties. Sampling and aliasing. Input-output and state-variable representations. Recursive and nonrecursive discrete-time filter structures. Time-domain and frequency-domain analysis. Classification and design of filter transfer functions. Bilinear transform. Implementations in software and hardware. Nonideal performance, finite precision arithmetic, limit cycles, noise, dynamic range, scaling. Applications in engineering, chosen from telecommunications, audio hi-fi, television, graphics, multimedia.
Prerequisite: Electrical Engineering 327.

Electrical Engineering 597 H(3-1T-3/2)

Power Systems Management and Electricity Markets
Power system operation and economic load dispatch, concept of marginal cost, Kuhn-Tucker's conditions of optimum, unit commitment, hydro-thermal coordination, power flow analysis, optimal power flow, probabilistic production simulation, power pools and electricity markets, market design, auction models, power system reliability, primary & secondary frequency control and AGC, steady-state and transient stability, power sector financing & investment planning.
Prerequisite: Electrical Engineering 487 or Electrical Engineering 587.

Electrical Engineering 599 H(2-4)

Individual Computer, Electrical, and Software Engineering 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 investigation. A comprehensive written report is required which is defended and presented orally in a department seminar.
Prerequisite: Electrical Engineering 591 and formal approval from the project supervisor and course coordinator(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 performance. 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)

Nonlinear Control
Nonlinear systems; phase portraits, equilibrium points, and existence of solutions. Lyapunov stability definitions and theorems. Nonlinear control design; feedback linearization, sliding modes, adaptive control, backstepping, and approximate-adaptive control. Frequency domain stability analysis using describing functions.

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 Instrumentation
Introduction to biomedical instrumentation. The four elements of an electronic monitoring system. Errors and error handling. Instrument modelling. Sensors: Basic concepts. Conversion of different processes into voltages or currents. Introduction to biomedical amplifiers. Ideal op amp. The concept of patient protection. Differential and instrumentation amplifiers. Non-idealities in biomedical amplifiers. Noise and noise sources. Error analysis. Offsets and offset compensation. Power supplies for instrumentation circuits. Frequency characteristics of biomedical amplifiers. Frequency conditioning circuits. Active filters. Isolation amplifiers and details on patient protection. Analog-to-Digital conversion. Basic principles and conversion errors. Nyquist theorem of discretization and antialiasing requirements. Multichannel data acquisition. Real-time requirements. Real-time digital conditioning of monitored biomedical signals. The concept of closed-loop real-time control of biomedical systems.

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 nonlinear and/or time-varying systems.
Prerequisite: Electrical Engineering 649.

Electrical Engineering 633 H(3-1)

Wireless Networks
Overview of the components and architectural alternatives for wireless networks. Review of existing and proposed wireless network standards (e.g. Advanced Mobile Phone System - AMPS, Digital AMPS, Interim Standard 95 - IS95, Global System for Mobile Communications - GSM, Code division Multiple Access 2000 - CDMA 2000, Universal Mobile Telecommunications System - UMTS, etc.). Discussion of wireless network 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 in the context of voice, data and video services, making use of mathematical and simulation techniques. Outline of current and future research challenges in wireless networks.

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 nonlinearities and design methodologies.

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(3-1)

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(3-1)
(formerly Electrical Engineering 619.23)

Theory & 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
Discrete-time signals and systems, discrete-time Fourier transform and Fourier series, discrete-time random signals, linear time-invariant systems. Sampling of continuous-time signals, decimation and interpolation. Fundamentals of multirate systems, special filters and filter banks. The z-transform, transform analysis of linear time-invariant systems. Structures for discrete-time systems, FIR and IIR structures, finite-precision arithmetic effects. Filter design techniques. The discrete Fourier transform. Discrete Hilbert transforms.

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: At least one of Electrical Engineering 675, Electrical Engineering 649, Electircal Engineering 625 or permission from 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; nonideal 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). Topicscover 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 nonlinear control applications.
Prerequisite: 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: Electrical Engineering 571 or equivalent.

Electrical Engineering 675 H(3-1)

Digital Communications
Physical layer design of digital communications systems. Linear modulation techniques are using signal space concepts. Demodulator and detector design, optimal detection rules for recovering digital information from a noisy signal. Pulse shaping using the Nyquist criterion and practical pulse shaping filters, linear equalizer design for dispersive channels, optimal detection of sequences with memory, Viterbi algorithm, error correction using channel codes.
Prerequisite: Electrical Engineering 649 or permission of the instructor.

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: 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, delinterlacing, 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.
Prerequisites: 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 applications; Topics in algorithm/architecture design under timing and throughput constraints.
Prerequisite: At least one undergraduate level course in Microelectronics or VLS.I

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 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 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: 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. 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 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.

Software Engineering (SENG)

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 613 Q(3-1)

Requirements Engineering II
Applications of requirements engineering to the management of the lifecycle of software development from requirements elicitation through analysis, design, coding, testing, enhancement and reuse.
Prerequisite: Software Engineering 611.

Software Engineering 615 H(3-2)
(formerly Computer Science 601.93)

Agile Software Engineering
Investigation and application of agile software development practices.
Prerequisite: Consent of the Department.
Note: Students are expected to have some background in software development as preparation for this course.
Note: Lectures may run concurrently with Software Engineering 515.

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.
Note: Credit for both Software Engineering 625 and 627 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, Reliability, and Testing of Software Systems
Principles of software dependability techniques, and techniques to improve, to predict, and to test software reliability.
Note: Credit for both Software Engineering 637 and either Software Engineering 631 or 635 will not be allowed.
Note: Engineering 319, Software Engineering 511, and Software Engineering 421, or their equivalents, are recommended as preparation for this course.

Software Engineering 641 H(3-1)
(formerly Computer Science 601.33)

Modifiability of Large-Scale Software
Phenomena and approaches involved in the evolution and reuse of large-scale software, including design for modifiability and tool support. Strengths and weaknesses of industrially-current techniques as well as recent research results.
Prerequisite: Consent of the Department.
Note: Software Engineering 401 or equivalent is recommended as preparation for this course.
Note: Lectures may run concurrently with Software Engineering 531.

Software Engineering 651 H(3S-0)

Half-Course Project
A project in either software development or software best practice and experience.
Note: 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.
Note: 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.
Note: 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.
Note: 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.
Note: Credit for both Software Engineering 697 and Computer Science 609 will not be allowed for programs offered by the Department of Computer Science.

ENGINEERING, GEOMATICS ENGO

Contact Info

Location: Schulich School of Engineering, Room E228
Faculty number: (403) 220-4979
Fax: (403) 284-1980
E-mail address: lamarkla@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
Areas: Positioning, navigation and wireless location; Earth observation; Digital imaging systems (Biomedical Engineering); and GIS and land tenure
See "Engineering Programs" for further degree specializations.

2. Admission Requirements

See "Engineering Programs."

3. Application Deadline

Deadlines for submission of complete applications:
Canadian and Permanent Resident Admissions
1 September for September admission
1 January for January admission
1 May for May admission
1 July for July admission

International Admissions
31 March for September admission
31 July for January admission
30 November for May admission
30 January for July admission

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:

Students in all thesis programs must complete a Technical Report Writing course. In consultation with the Supervisor and the Graduate Coordinator, this

requirement can be waived for students with prior experience and skills in technical report writing.

Master of Engineering (course-based)

See "Engineering Programs."

Master of Engineering (thesis-based)

a) A minimum of five half-courses, of which at least three must be graduate courses
b) After satisfactory progress in the student's own research work, enrollment in the ENGO 605 Research Seminar course
c) A thesis related to original engineering analysis or design

Master of Science

a) A minimum of five half-courses, of which at least three must be graduate courses
b) After satisfactory progress in the student's own research work, enrollment in the ENGO 605 Research Seminar course
c) Attend 6 seminars [ENGO 605, 607, and/or 609] in total – a maximum of 4 of these in the student's area of specialization and the remaining in other areas. 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, enrollment in the ENGO 607 and 609 Research Seminar courses, normally not to be taken in the same term
c) Attend 6 seminars [ENGO 605, 607, and/or 609] in total – a maximum of 4 of these in the student's area of specialization and the remaining in other areas. 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

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

See "Engineering Programs."

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 one day's duration. 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. Questions on the research proposal will not be included in the oral candidacy examination.

Doctoral Final Oral Examination

See "Engineering Programs."

11. Research Proposal Requirements

Master of Engineering (thesis-based)

A preliminary thesis proposal, consisting of five to eight pages, 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 unless self-funded or with financial support provided by an interested supervisor. 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 4-5 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/

Undergraduate Courses

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.
Prerequisites or Corequisites: Communications Studies 363 and Geomatics Engineering 501.

Geomatics Engineering 501 H(152 hours)

Field Surveys

Field exercises include: instrument familiarization, highway design and construction survey, boundary survey problems, astronomic azimuth, precise engineering survey, geodetic control survey, satellite surveys. Emphasis is placed on practical and professional experience and students participate in organizational, planning, scheduling, and logistical aspects of field operations. In addition to group field reports on each exercise, each student is required to prepare a complete report on one selected major exercise. In addition there will be a two day series of seminars and case studies on the practice and profession of Land Surveying.
Prerequisites: All third year courses or consent of the Department Head.
Note: A two-week field camp will be held at the Kananaskis Centre for Environmental Research Field Station prior to the start of the Fall Session 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.
Prerequisites: Geomatics Engineering 421, 431, and 435.

Geomatics Engineering 545 H(2-2)

Hydrography
Elements of oceanography, tides and water levels. Fundamentals of RF and acoustic propagation. Marine positioning: shore-based and satellite-based radionavigation systems, positioning accuracies. Underwater acoustic positioning. Sounding methods: shipborne single beam and multibeam echo-sounding, sonars, related corrections. Practical examples: data acquisition and processing.
Prerequisites: Geomatics Engineering 361 and 465.

Geomatics Engineering 551 H(2-2)

Special Topics in Geospatial Information Systems
Special topics in the research, development and applications of geospatial information systems. Internet and Web GIS, Mobile/Wireless GIS and Location Based Services (LBS), 3D GIS, GIS Interoperability, Ontology, Spatial Data Infrastructures, Geo-Sensor Networks and Spatial Sensor Web, Social Networks, and Collaborative GIS. GIS Applications in Energy and Environment related topics will be introduced in group projects.
Prerequisite: 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 and restoration, image segmentation, and introduction to image compression.
Prerequisites: Electrical Engineering 327 and Geomatics Engineering 435.

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: 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 coordinates and coordinate 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.
Prerequisites: Geomatics Engineering 343, 361 and 419.
Corequisite: 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.
Prerequisites: 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: Geomatics Engineering 455.
Corequisite: 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: Geomatics Engineering 455.
Corequisite: Geomatics Engineering 579.

Geomatics Engineering 583 H(2-2)
(Environmental Engineering 635)

Environmental Modelling
Nature and purpose of environmental modeling; 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: Fourth year standing.

Geomatics Engineering 585 H(2-2)

Wireless Location
Fundamentals of radio-frequency propagation, principles of radio-frequency positioning observations times and angles and their associated error sources. Introduction to self-contained inertial sensors including odometers, gyro, accelerometers, and augmentation of RF methods with self-contained sensors and other data sources. Current systems: E-OTD, assisted GPS, pseudolites, location with wireless computer networks, ultra-wideband. Applications: outdoor and indoor personal location, asset tracking.
Prerequisites: Electrical Engineering 327, Geomatics Engineering 465.

Graduate Courses

The following Graduate Courses are normally offered in the Department. Additional courses are also offered by visiting international lecturers. Please refer to the Department web site (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.
Note: Not open to students with credit in Geomatics Engineering 611 or 617.

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 coordinate 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, anddefraction 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 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 649 H(3-1)

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.

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: Geocomputation, Complexity theory, Computational intelligence, Cellular automata modelling, Multi-agent system modelling, Artificial neural network, Scale, Data mining and knowledge discovery, Post-normal science.

Geomatics Engineering 661 H(3-0)

Advanced Spatial Information Systems
Principles of advanced spatial information systems. Topological modelling and spatial data representations. Automated data sources and integration of remote sensing. Data quality and uncertainty. Advanced spatial data handling methods and algorithms. Spatial database management including relational databases, object-relational databases and object-oriented databases. Data warehousing and data mining. Open GIS and distributed GIS issues. Spatial data standards and meta data management.

Geomatics Engineering 663 H(3-0)

Satellite Altimetry and Applications
Overview of satellite altimetry missions, achievements and potentials. Altimeter measurement analysis technology and specifications. Orbit determination with ground tracking and perturbation analysis. Altimetry profile data processing, regularization and gridding. Sea surface topography, ocean and coastal geoid modelling. Inversion for gravity and mass anomalies. Ocean and related monitoring applications. Geodetic, global change and geophysical exploration applications. Current research activities.

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 671 H(3-1)

Adaptive Signal Processing
Fundamentals: performance objectives, optimal filtering and estimation, the Wiener solution, orthogonality principle. Adaptation alogorithms: MSE performance surface, gradient search methods, the Widro-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.

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 modeling, generalized linear mixed models, estimation and modeling of nonstationary covariances, and spatio-temporal processes.

Geomatics Engineering 678 H(3-0)

Dynamic Satellite Geodesy
Covers advanced aspects of satellite motion and orbit design. Orbit perturbations from gravitational and drag forces will be treated in analytical and numerical ways. The emphasis will be on current research and current satellites, in particular the gravity mapping missions CHAMP, GRACE and GOCE. Further topics: satellite altimetry, GNSS orbit characteristics, formation flying.

Geomatics Engineering 681 H(3-0)
(Geophysics 681)

Advanced Global Geophysics and Geodynamics
Elasticity, figure of the Earth, Earth structure and seismology, gravity and its temporal variations, isostasy, tides, Earth rotation and orientation, time, plate flexure, glacial rebound, continental drift, geodetic observation methods for geodynamics.

Geomatics Engineering 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

ENGINEERING, MECHANICAL AND MANUFACTURING ENME

Contact Info

Location: Mechanical Engineering Building, Room 507
Faculty number: (403) 220-4154
Fax: (403) 282-8406
E-mail address: grad@enme.ucalgary.ca
Web page URL:
http://www.eng.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

Areas: applied mechanics, automation, control, robotics and nano MEMS, biomechanics, design, manufacturing systems, materials and manufacturing processes, thermo-fluids, energy systems and environment.

In addition, the Department offers a Master of Engineering program (course-based or thesis-based) with specialization in Energy and Environment.

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements and the Schulich School of Engineering's minimum requirements, the Department's 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

Doctor of Philosophy

MSc degree, or transfer from MSc program with a BSc degree grade point average of 3.60 or higher on a four-point scale. Transfer from MSc to PhD program is allowed only after the successful completion of all courses required for the MSc degree with a grade point average of 3.50 or higher on a four-point scale.

3. Application Deadline

Deadlines for submission of complete applications:
15 April for September admission
15 August for January admission
15 December for May admission

4. Advanced Credit

See "Engineering Programs".

5. Program/Course Requirements

In addition to Faculty 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 research seminar when registered in ENME/ENMF 613

Master of Engineering (course-based), Specialization in Environmental Engineering

Ten to twelve half-courses approved for each student by the Department Head or designate

Master of Engineering (thesis-based), Specialization in Environmental Engineering

(a) Five to eight half-courses approved for each student by the Department Head or designate
(b) Presentation of one research 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 research 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 research 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 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

Active research programs and research interests of current faculty can be found at
http://www.eng.ucalgary.ca/enme/research

Manufacturing Engineering (ENMA)

Manufacturing Engineering 601 H(3-0)

Artificial Intelligence Applications in Manufacturing
Artificial intelligence; expert systems, system components and architecture, knowledge representation, search techniques, uncertainty; AI planning, problem representation, solution methods; programming languages and expert system shells for developing expert systems; introduction of neural networks, basic neuron model, multilayer perception, self organizing networks, adaptive resonance memory. Applications to design, manufacturing planning and robotics.

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 611 H(3-0)

Multi-Agent Systems
Historical background; types and definitions of agents; knowledge representation and reasoning; agent theories, architectures and languages; possible world model and alternatives; symbolic, reactive and hybrid architectures; agent communication; coordination, cooperation, negotiation and planning; agent frameworks; example multi-agent systems are considered throughout the course.

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 617 H(3-0)

Real-time Distributed Control Systems
Shop floor control systems. Programmable logic controller (PLC) concepts, languages and models (e.g., IEC 61131-3). Real-time distributed control models (e.g., IEC 61499, RT-UML). Intelligent control: real-time distributed control system design; safety-critical system issues; reconfiguration issues.

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, cooperating manipulators, redundancy in force sensing and sensor fusion.

Manufacturing Engineering 623 H(3-0)

CAD/CAM/CAE
Components of CAD/CAM/CAE systems. Geometric modeling. Development of customized CAD systems. Complex shape modeling. 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(0-3S)

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

Mechanical Engineering (ENME)

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
The main topics covered are commonly used techniques for the measurement of temperature, pressure, velocity, mass-flow, concentration in binary and other mixtures, heat transfer rate and heat flux, calorific value of fuels, viscosity, thermal conductivity and diffusion coefficients. In addition, attention is given to flow visualization techniques and to the recording and handling of experimentally obtained data by various means including automatic recorders, high-speed photography and analog-to-digital data converters.

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 625 H(3-0)

Unsteady Gas Dynamics
Origins of unsteady flow; one-dimensional unsteady flow in pipes and ducts; simplified method of analysis, method of characteristics; boundary conditions for method characteristics analyses; graphical and numerical procedures for solving the characteristics equations; application of solution techniques for practical problems; pressure exchangers and other devices utilizing unsteady flow.

Mechanical Engineering 629 H(3-0)

Fuel Science and Technology
Review origins of fuels, reservoir technology and geology. Past, present and future energy supply and demand. Classification of fuels. Physical and chemical properties. Fuel handling and fire hazards. Requirements of conventional and non-conventional power and heating plants. Ecological and efficiency considerations. Some non-conventional fuels.

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 and Cogeneration Systems
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.

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. Nonlinear 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 645 H(3-0)

Robotics and Vision Systems
An introduction to robotics. Kinematics, statics, dynamics, and control of robot arms. Digital image processing and robot vision. Robot programming and applications. Project: design of mechanisms or software related to these topics.

Mechanical Engineering 647 H(3-0)

Combustion in Gas Turbines
Basic design features of combustion chambers, their types and requirements for aero and industrial applications; combustion fundamentals relevant to gas turbines; aerodynamics; fuel types and fuel injection systems; ignition, flame stabilization, heat transfer, combustion efficiency and how they affect performance and emissions.

Mechanical Engineering 653 H(3-0)

Continuum Mechanics in Engineering
Review of generalized tensors in index and diadic notation; kinematics of nonlinear deformation; deformation and strain tensors and their invariants; equations of motion; various stress and pseudostress tensors; basic laws on continuum mechanics; constitutive theory; application of principles to deal materials, including solids and fluids.

Mechanical Engineering 655 H(3-0)

Analysis of Shells and Plates
General linear and nonlinear equations of the theories of thin shells. Approximate, membrane, and shallow shell theories. Plates as special cases of the shell. Finite elements for plates and shells. Stability and optimum design of plates and shells. Stress concentrations and local loads. Large deflections and limit loads. Applications to the design of pipelines, large containers, pressure vessels, and other mechanical structures.

Mechanical Engineering 661 H(3-0)

Corrosion Science
Electrochemical thermodynamics. Kinetics of electrode processes. Experimental polarization curves. Instrumentation and experimental procedures. Passivity. Galvanic, pitting, crevice and intergranular corrosion. Corrosion-deformation interactions. Atmospheric corrosion. Oxidation and high temperature corrosion. Protection techniques. Materials selection and design.

Mechanical Engineering 663 H(3-0)
(Medical Science 663) (Kinesiology 663)

Advanced Biomechanics
Theoretical and applied aspects of biomechanics in the acquisition and performance of sport skills.
Prerequisite: 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) (Kinesiology 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: Consent of the Faculty.

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 701 H(3-0)

Advanced Mechanical Vibrations
Free and forced vibrations of discrete and continuous linear systems: oscillators, rods, beams, membranes and plates; analytical and numerical methods. Nonlinear vibrations of simple systems: classification and nonlinearities, phase diagrams, methods of analysis. Random vibrations of discrete systems: introduction to random processes, linear and non-linear response to random forces, methods of analysis.
Prerequisite: Mechanical Engineering 599, or equivalent.

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

ENGLISH ENGL

Contact Info

Location: Social Sciences Building, Room 1112
Faculty number: (403) 220-5484
Fax: (403) 289-1123
E-mail 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), course-based and thesis-based
Areas: British, American, Canadian and International literatures in English
A Creative Writing option is available in the Master of Arts (thesis-based) and Doctor of Philosophy programs.

2. Admission Requirements

In addition to Faculty requirements, the Department requires:

Master of Arts (course-based and thesis-based)

a) A University of Calgary Honours degree or its equivalent in English (10 full courses in English)
b) A Statement of Intent
c) A 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), 250 (computer-based test) or 100 (internet-based test)

Doctor of Philosophy

a) A Master of Arts Degree in English or its equivalent
b) A Statement of Intent
c) A 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), 250 (computer-based test) or 100 (internet-based test)

3. Application Deadline

The deadline for the submission of complete applications is January 10 for September admission.

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 Faculty requirements, the Department normally requires:

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 reading knowledge of a language other than English

Master of Arts (course-based)

a) Four full-course equivalents in English at the 600 or 700 level beyond the Honours BA or equivalent
b) English 696 or its equivalent
c) A reading knowledge of a language other than English

Note: Only the course-based Master of Arts program is open to part-time students.

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 reading knowledge of a language other than English
d) A Minor Field Examination
e) A Major Field Examination

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 two years for the Master of Arts (thesis-based), and four years for the Master of Arts (course-based) and Doctor of Philosophy degrees. Maximum completion time is four years for the Master of Arts (thesis-based) and six years for the Master of Arts (course-based) and Doctor of Philosophy degrees.

9. Supervisory Assignments

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.

Master of Arts (thesis-based)

By 1 March 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.

Master of Arts (course-based)

By 1 March of the first year of study, each student must submit the name of the proposed supervisor to the Graduate Executive Committee for approval (15 August for part-time students).

Doctor of Philosophy

By 1 April of the first year, each student must submit the name of the proposed supervisor and the proposed areas of the major and minor field examinations to the Graduate Executive Committee for approval. By 30 September 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

Students are required to complete a Minor Field Examination and then a Major Field Examination that forms the basis of the candidacy oral examination.

The written Major Field Examination is based on one of the Department's Field Reading Lists. 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). The Major Field Examination forms the basis of, and 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 M.A. 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.

At the end of the Candidacy Oral Examination, the examiners judge the student's performance, including written and oral components, Pass or Fail.

Consult the Department website for details.
Final thesis oral examinations are open.

11. Research Proposal Requirements

Master of Arts (thesis-based)

By 1 May, no later than eight months after initial registration, each student must submit a thesis proposal on the form *Registration of MA Thesis Topic* to the Graduate Executive Committee. Further details are available from the department.

Doctor of Philosophy

By 30 September 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. Other new students should consult the course instructors 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 15 December.

14. Other Information
None

15. Faculty Members/Research Interests
Detailed information about faculty members and their research interests may be found at http://www.english.ucalgary.ca/faculty/index.htm.

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 696 F(1-0)
Studies in Bibliography, Research Methods, and Palaeography
Required of all graduate students who have not had an equivalent course.
NOT INCLUDED IN GPA

English 698 F(2-1T-1)
Studies in Creative Writing
Note: This course is double-numbered with English 598 (which will have separate and less strenuous student expectations). Though 598 and 698 may not both be counted for graduate credit, a student may take 598 as an undergraduate student and 698 as a graduate student in English.
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
Required of all doctoral students.
MAY BE REPEATED FOR CREDIT
NOT INCLUDED IN GPA

English 703 H(1-0)
Minor Field
Required of all doctoral students.
MAY BE REPEATED FOR CREDIT
NOT INCLUDED IN GPA

ENVIRONMENTAL DESIGN EVDS

Contact Info
Location: Professional Faculties - 2182
Faculty number: (403) 220-6601
Fax: (403) 284-4399
E-mail address: evdsinfo@ucalgary.ca; and evdsphd@ucalgary.ca
Web page URL: http://www.ucalgary.ca/evds/

1. Degrees and Specializations Offered
Doctor of Philosophy (PhD)
Master of Environmental Design (MEDes), thesis-based
Master of Architecture (MArch), course-based

2. Admission Requirements
In addition to Faculty of Graduate Studies requirements, the Faculty of Environmental Design requires:

Doctor of Philosophy

a) For applicants required to prove proficiency in English, a TOEFL score of 600 (written test), 250 (computer-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); or 100 (internet-based test); or an IELTS score of 7.5
b) An admission grade point average (GPA) above 3.50 on a 4-point scale
c) A statement of interest that describes the nature of the thesis research the applicant expects to undertake. This is not a detailed thesis proposal, but 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.
d) A qualified supervisor from the Faculty of Environmental Design will be identified once admission is recommended by an admissions committee and the student has been admitted by the Faculty of Graduate Studies.

Master of Environmental Design

In addition to Faculty of Graduate Studies requirements, the Faculty of Environmental Design requires:

As an interdisciplinary degree, applications are encouraged from a variety of academic l backgrounds (including first professional degrees in planning and design) or a combination of undergraduate degree and work-related experience.

Applicants for the Master of Environmental Design must provide:

a) a clear, well written, statement of intent which describes how the applicant's specific educational background and professional or personal experience relates to Environmental Design as a field of study and the applicants' future 'vision' for pursuing a graduate degree in Environmental Design (related to personal and professional goals and intentions)
b) a clear, well written and substantive statement of thesis research interests which informs the Admissions Committee of the applicant's supervisory needs;
c) 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;
AND provides examples or illustrates the applicant's design work, graphics, visual communication, creative thinking, community action, or creative ideas as related to the applicant's statement of intent. If any of the work involves collaboration with others, please clearly identify what aspects of the work are from others. This portfolio should be submitted in digital form (pdf files) on a CD/DVD or in format easily downloaded to a CD or DVD

Master of Architecture

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 10 pre-requisite half course requirements in 4 areas: Design, Technology, Communications, and History/Theory (equivalent to the courses taken in the minor in Architectural Studies).

Applicants may be admitted to the M.Arch 'Foundation' or qualifying year in order to complete these prerequisite requirements. 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) Applicants must provide evidence of original and/or creative work in any field or medium and demonstrate in writing the relevance of the skills shown by this work to the study of Architecture. This work should be presented in a compact form (box, envelope or binder in A4 metric [8.5" x 11"] or 297 mm by 297 mm [11" x11"] format). If any of the work involves collaboration with others, please clearly identify what aspects of the work are from others.

3. Application Deadline

Doctor of Philosophy

Deadlines for the submission of complete applications for students with international transcripts:
1 March for September admission
1 June for January admission

Deadlines for the submission of complete applications for students with Canadian or US transcripts:
1 April for September admission
1 September for January admission

Master of Environmental Design & Master of Architecture

Applications are accepted from 1 December through 1 February for September admission. There is no January admission. Please note that new admissions to both Masters Degree Programs may be limited in number on an annual basis.

4. Advanced Credit

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.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements, the Faculty of Environmental Design requires:

Doctor of Philosophy

a) Students complete Environmental Design 711[EVDS711] (half-course), Environmental Design 702[EVDS702] (full course) and at least one other half-course (normally an additional three half-courses) recommended by the student's interim advisor. The PhD Coordinator must approve these courses. Students admitted for 1 September 2009 must take and complete Environmental Design 702[EVDS702] and Environmental Design 711[EVDS 711] in their first term. (Environmental Design graduates who have completed EVDS 702 will not be required to repeat that course).
b) Additional course work when recommended by the student's interim advisor or supervisor
Fieldwork and research done off-campus may be counted towards fulfillment of the full-time study and research requirement.

Master of Environmental Design

An individual student Program of Study (POS) will be submitted by all students for approval by the MEDes Graduate Coordinator. The POS must include the following academic requirements:

a) Required Courses:
EVDS 651.10 (HCE): Design Thinking Studio
EVDS 683.61 (HCE): Interdisciplinary Seminar
EVDS 751.10(HCE): Thesis Research and Design Studio
b) Interdisciplinary Project: this requirement can be met through elective courses, such as thematic electives or studio, international project or studio courses or, participation in a research project through the EVDS Research Centre.
c) International Experience: this requirement can be met through elective courses, international term abroad or international project or studio courses; or, a research project though the EVDS Research Centre. This requirement can also be met by submission of documentation of previous international work or academic experience to the MEDes Graduate Coordinator.
d) A minimum of two half-course electives, one of which must be a thematic area elective.
e) A research thesis based on an approved thesis proposal and signed by the Thesis Supervisor.. The approved student thesis proposal must form part of the POS for Unconditional POS approval.
f) Satisfactory annual Faculty of Graduate Studies student progress reports.

Master of Architecture

The MArch is a first professional degree in Architecture accredited by the Canadian Architectural Certification Board. The MArch is a two year course-based degree with an additional Foundation year for those applicants without a design-related four year undergraduate degree. A student Program of Study (POS) will be submitted by all students registered in the two year MArch for approval by the MArch Graduate Coordinator. The POS must include the following academic requirements

a) First and Second Year required courses:
b) Environmental Design 675[EVDS 675] is required for MArch students in the Barcelona Term Abroad program. Environmental Design 671[EVDS671] is required for March students not participating in the Barcelona Term Abroad.
c) MArch students are required to take the Somerville Design Charrette (quarter-course) and either the Gillmor Theory Seminar (quarter-course) or the Taylor Practice Seminar (quarter-course) which are offered as one week block courses at least once (may be repeated for elective credit).
d) Two half-course (or equivalent) electives are required.
e) Satisfactory annual Faculty of Graduate Studies student progress reports.

Courses in the two year MArch program:
EVDA 682.02 (full course)
EVDA 619 (half course)
EVDA 663 (half course)
EVDA 621 (half course)
EVDB 697.xx (quarter course)
EVDA 682.04 (full course)
EVDA 611 (half course)
EVDA 613 (half course)
EVDA 615 (quarter course)
EVDA 617 (quarter course)
EVDA 661 (half course)
EVDB 697.xx (quarter course)
EVDA 782.xx (full course)
EVDA 782.xx (full course)
EVDA 703.xx (half course)
Barcelona Term Abroad Courses:
EVDA 782.xx (full course)
EVDS 643 (quarter course)
EVDS 675 (half course)
EVDS 783.xx (half course)
EVDS 697.xx (quarter course)
Courses in the M.Arch Foundation year:
EVDS 583.61 (half course)
EVDS 551.10 (half course)
EVDA 511 (half course)
EVDA 523.01 (half course)
EVDA 541 (half course)
EVDA 582 (full course)
EVDS 523 (half course)
EVDA 523.02 (half course)
EVDA 543 (half course)

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Doctor of Philosophy

Not given.

Master of Environmental Design

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

Master of Architecture

With the exception of Foundation year courses, only where appropriate to a student's Program of Study may graduate credit be received for courses numbered 500-599, which are considered undergraduate courses.

8. Time Limit

All PhD requirements must be completed within six registration years.

All MEDes and MArch requirements must be completed 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 Coordinator, will recommend a program of courses that must be approved by the PhD Coordinator.

During the first year of studies, the student, with the advice of the interim advisor and the PhD Coordinator, will prepare a thesis proposal and propose a supervisor and the other members of a supervisory committee for approval by the PhD Coordinator.

Master of Environmental Design

Upon admission, each MEDes student will be assigned an interim Thesis Advisor appropriate to their admissions statement of intent and thesis research area who may assist with POS development and thesis proposal development. Within twelve months of first registration a Thesis Supervisor will be approved specific to the student's approved thesis proposal.

Master of Architecture

Upon admission each MArch student will be assigned a Program Advisor to assist with POS development. As part of the MArch research studios in second year, research project advisor will be assigned to students on an individual interest basis.

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. Within one month of completing the written candidacy, the student will take an oral examination.

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 Architecture

Comprehensive exit requirement is a research studio project presented in a review format.

11. Research Proposal Requirements

Doctor of Philosophy

Approval of the thesis proposal by the supervisory committee and the PhD Coordinator is required as noted in the "Supervisory Assignments" above. Thesis Proposals should clearly describe the project in terms of Title, Objectives, Background, Methodology and Results and must include an explicit interventionist or problem-solving component.

Master of Environmental Design

Thesis proposals will be presented and reviewed upon completion of first year thesis research design studio. Final thesis proposals will be individually approved by an approved Supervisory committee.

Master of Architecture

Design research studio proposals will be approved by Research Studio Project Advisors.

12. Special Registration Information

None.

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 webstite and the Awards Data Base on the Faculty of Graduate Studies website.

14. Other Information

None.

15. Faculty Members/Research Interests

Current information about faculty members and research interests can be found at http://www.ucalgary.ca/evds/people/faculty/index.htm

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 2008-2009 academic year.

Students are advised that some of the courses listed below may not be offered in 2008-2009 if special circumstances require that they be dropped. Students should consult with their Faculty advisor before registering for any course.

Core Courses in Environmental Design are:

Environmental Design 604. Conceptual Bases of Environmental Design

Environmental Design 609. Environmental Design Practice

Environmental Design 702. Advanced Environmental Design Practice

Environmental Design 711. Theoretical Basis for Interdisciplinary Intervention and Design.

See the online Graduate Calendar for a listing of new Graduate level courses in Environmental Design.

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.

Environmental Design 533 H(3-0)

Introduction to Industrial Design

Historic and conceptual frameworks of industrial design; principles of ergonomics, materials and industrial production technologies; industrial design as technique and creative process; professional perspectives. Lectures and field work. Environmental Design 533 is a prerequisite or corequisite to Industrial Design studio courses.

Environmental Design 583 H(1.5-1.5T)

Special Topics in Environmental Design

Topics in architecture, environmental science, industrial design and planning.

MAY BE REPEATED FOR CREDIT

Environmental Design 597 Q(1.5-1.5T)

Special Topics in Environmental Design

Topics in architecture, environmental science, industrial design and planning.

MAY BE REPEATED FOR CREDIT

Graduate Courses

Environmental Design 604 H(4.5-0)

Conceptual Bases of Environmental Design

Conceptual frameworks for design intervention in the environment based on perspectives from the humanities, natural and social sciences of human relation to natural, social and built environments; theories and models of investigation and intervention; discussion of professional responsibilities and environmental design issues. Required course for all Environmental Design degree program students. Design Camp, for first year students, is part of the Environmental Design 604 core course.

Environmental Design 606 F(6-1)

Introduction to Environmental Science

Study of the nature, philosophy and research of environmental science professional practice. Examines project definition, research design, scoping, business management, and regulatory and policy issues in environmental science. There is an interdisciplinary problem solving studio component. Research design and proposal writing are developed.

Prerequisite: Normally open only to students in Environmental Design degree programs and required of MEDes Environmental Science students.

Note: Not open to students with credit in Environmental Design 603 or 683.13.

Note: Full course offered in single session.

Environmental Design 607 H(3-0)
(formerly Environmental Design 683.50)

Sustainable Development

Examines both the theoretical principles and practical applications of sustainable development, and provides a framework for understanding the past, present, and future sustainability issues and the challenges to making development truly sustainable.

Environmental Design 609 H(0-8)

Environmental Design Practice

Introduction to environmental design encompassing perspectives of architecture, industrial design, urban and regional planning and environmental science; communication and interdisciplinary approaches; environmental design as technique and creative process. Lectures, field and studio work.

Prerequisite: Open only to students in Environmental Design degree programs.

Note: Required of all MEDes and MArch degree program students.

Note: Graded on CR/C/F basis only.

Environmental Design 615 Q(1-3)

Introduction to Computer Visualization in Urban Design

Introduction to computer visualization techniques with emphasis on CAD studio project.

Environmental Design 617 H(3-0)

Statistical and Empirical Methods in Industrial Design

A broad interdisciplinary view of methods used to collect and interpret information necessary in the design and development of products. Areas dealt with include but are not limited to user needs and preferences, manufacturing processes and market investigations.

Environmental Design 619 H(3-1)

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 621 H(3-1)

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 623 H(3-0)

Sustainability in the Built Environment

The principle of sustainability recognizes people as temporary stewards of their environments, working toward a respect for natural systems and a higher quality of life. Examination of the built environment and the tools to achieve a stable and balanced and a regenerative ecosystem in a process of responsible consumption, wherein waste is minimized and the built environment interacts with natural environments and cycles. Healthful interior environments, resource efficiency, ecologically benign materials, renewable energies and social justice issues are examined.

Environmental Design 625 H(3-0)

Environmental Design of Wetlands and Inundated Areas

Wetland ecology, hydrology and biogeochemical processes will be applied to management issues and design opportunities afforded by wetlands and inundated landscapes. Relationships between land use and water quality lead to consideration of the effects of point source and non-point source pollutants on natural wetlands and receiving water bodies. The effectiveness and limitations of water treatment applications of designed wetlands. Local constructed wetland projects will be used to demonstrate design concepts, regulatory issues and site-specific opportunities. Lectures, student-led seminars and interactive class design study are included.

Note: Offered in odd-even dated academic years.

Environmental Design 627 Q(1.5-1.5)

Computer Literacy in Environmental Design

Basic computer literacy for Environmental Design students. Introduction to selected software packages of professional relevance to environmental designers.

Note: Graded on CR/C/F basis only.

Environmental Design 629 H(3-0)

Community Development

Basic principles and practice of community development. A comprehensive approach to the field and discussion of a wide range of community development perspectives. Topics include community economic development, housing, tourism and cultural development.

Environmental Design 631 H(3-0)

Cities, International Development and Planning

Examines strategies for urban development within the context of a globalized economy. Competition for investment, global interdependence, technological change, growing income polarization, and environmental degradation are creating new challenges in the urbanizing world. Planning concepts and policies will be examined in different economic, institutional and cultural settings with an emphasis on economic, social and physical aspects of change. Selected best practices in North America, Western and Eastern Europe will illustrate different approaches to development and sustainability.

Note: Not open to students with credit in Environmental Design 683.91 or 723.

Environmental Design 633 H(3S-0)

Environmental Reserves

Study of National Parks and equivalent reserves throughout the world, with emphasis on those occurring in North America; an examination of the purposes and functions of such areas in historical, cultural, ecological, legal, and future perspectives; analysis of selected planning and use situations and their related institutional structures.

Note: Offered in even-odd dated academic years.

Environmental Design 635 H(3-1.5)

Computer Applications for Industrial Design

Introduction to computer applications in Industrial Design, including computer-aided design (CAD), computer graphics, analytical and micro-computer applications. Conceptual and mathematical bases for two- and three-dimensional computer modelling. Hands-on experience with a range of CAD systems and other computer applications. Discussion of the role of computer systems in design processes.

Prerequisite: Pure Mathematics 30 or equivalent.

Environmental Design 637 H(3-0)
(formerly Environmental Design 683.99 or 683.35)

Housing and Neighbourhood Change

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 communities.

Note: Not open to students with credit in Environmental Design 683.35 or 683.99.

Note: Offered in even-odd dated academic years.

Environmental Design 639 H(3-1)

Planning Theory

An introduction to planning 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. An integrative normative procedural approach to planning is presented, one which is appropriate for a pluralistic liberal democratic society.

Environmental Design 641 H(3-3)

Applications of Plant Ecology to Environmental Management

Examines the principles of vegetation analysis, with an orientation towards natural resource assessment and environmental management. Included will be a consideration of sampling designs and field techniques, data handling, botanical diversity measures, the applied use of parametric and nonparametric statistical techniques, multivariate plant community classification and ordination techniques, and selected formal vegetation classification systems. An overview will be given of selected ecological land classification systems and evaluation methods. A compulsory weekend field trip will be part of the course.

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: Open only to students in Environmental Design degree programs.

Note: Not open to students with credit in Environmental Design 683.40

Environmental Design 647 H(3-0)

Historic Preservation: Principles and Practice

Introduction to the concepts, approaches and practice of historic preservation from both an urban planning as well as an architectural perspective. Building conservation, historic districts, historic site development, ecomuseums, commercial area and neighbourhood revitalization are analysed for both public as well as private sector concerns. North American and European case studies are utilized.

Note: Offered in odd-even dated academic years.

Environmental Design 649 H(3-0)

Impact Assessment

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. Federal and various Provincial impact assessment policies and procedures will be considered.

Environmental Design 652 F(0-16)

Basic Industrial Design Studio

Basic skills in form-giving for mass produced objects. Principles of two- and three-dimensional composition, space and form; the design process. The application of basic design principles to simple problems in industrial design.

Prerequisite: Open to students in Environmental Design programs.

Prerequisite or Corequisite: Environmental Design 533.

Note: Full course offered in single session only.

Note: Available to students from other faculties with program permission.

MAY BE REPEATED FOR CREDIT

Environmental Design 653 H(3-0)

Multimedia for Environmental Design

Laboratory course allowing students the opportunity to develop an understanding of computer multimedia techniques used to create interactive presentations, educational CD-ROM titles and web documents. The elements covered by the course are: visual (still, video and animation techniques), sound (quality and integration), and the use of web-design software.

Environmental Design 655 H(3-0)

City and Neighbourhood Planning

Examines significant contemporary issues facing planning practitioners in city-wide and neighbourhood contexts. Topics can include downtown planning, transportation planning, urban sprawl and open space planning, etc. Normally a client-based project in an established neighbourhood provides students with an opportunity to employ public participation and problem-solving techniques.

Note: Not open to students with credit in Environmental Design 683.04 or 683.12.

Environmental Design 657 H(3-0)

Landscape Reclamation

Introduction to reclamation planning and practice covering such topics as reclamation goal setting, impact prediction, mitigation, materials handling, landscape reconstruction, revegetation, erosion control and industrial decommissioning. The course will focus on large scale developments such as strip mining, industrial plants and linear disturbances. The course is comprised of lectures, a project and student seminars.

Environmental Design 659 H(96 hours)

The Ecology of the Canadian West Coast - A Field Course

A two-week field course conducted in late Spring to acquaint students with the ecosystems of the Canadian West Coast from the marine intertidal zone through mesothermal forest ecosystems to alpine tundra ecosystems. The use of plant ecology to help delineate functional, manageable ecosystem units is emphasized using the taxonomy, autoecology and synecology of some 450 plant species. Selected land use and management problems are observed and discussed. A minimum enrolmentlment for the course is required.

NOT INCLUDED IN GPA

Environmental Design 661 H(3-0)

Ecosystem Management and Planning

Natural resource managers and planners are realizing (and operationalizing) the need for concordance between the dynamic process-and-pattern view of nature and the complex social milieu that forms the context for resource planning and management. The emerging field of ecosystem management is the embodiment of the professional response to this need. Examines the interdisciplinary approach of ecosystem management as the intersection between conservation biology, social science of natural resource management and organizational theory. Case studies and readings will be chosen to highlight current ecosystem management ideas and practice.

Environmental Design 663 H(3-0)

Introduction to Policy Analysis

Introduces students to the major issues and policy responses to economic, social and environmental problems in Canadian communities. Provides an overall understanding of the political, societal, financial and institutional constraints that affect the processes of policy formation and implementation. Assists in the development of practical skills in the analysis, planning, monitoring and evaluation of public policies.

Environmental Design 665 H(3-0)

Drawing Skills and Studio Techniques for Designers.

Introductory manual drawing studio for students of industrial design directed to developing skill in conceiving, developing and communicating ideas through various drawing styles, techniques and media.

Environmental Design 667 H(3-0)

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 a sensitivity to the application appropriate for specific GIS problems.

Environmental Design 669 H(3-0)
(formerly Environmental Design 683.97)

Introduction to Heritage Conservation

Introduces students to the theory and practice of heritage conservation through lectures, guest speakers, case studies, and tours of local historic sites. Topics can include heritage conservation principles; a history of the preservation movement; methods of identifying and evaluating heritage structures; conservation approaches and techniques; and heritage area planning and interpretation.

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 673 H(3-0)

Wildlife Management Planning

Reviews the history of wildlife management and the principles of effective planning, including scoping issues, dealing with constraints, goal setting, effective public involvement, conflict resolution, development and evaluation of alternatives, and applying science to evaluate management actions. The course begins with a series of introductory lectures on the fundamentals of wildlife management, history of wildlife management and policy, the need for science in management, and the changing context of public involvement in resource management. Lectures by professional practitioners provide insights into the practical world of resource management and planning. Assignments allow students to assess a wildlife issue, critically review selected wildlife management plans, and to write and present a strategic management plan.

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: Open only to students in Environmental Design degree programs.

Corequisite: Environmental Design 702 (Barcelona only).

Note: Not open to students with credit in Environmental Design 683.72.

Environmental Design 679 H(3-0)

Computer Modelling of the Environment

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 a sensitivity to the application appropriate to communicating three dimensional urban and natural form using computer generated images.

Environmental Design 681 H(3-0)

Environmental Ethics Seminar

Intended to provide the student with a thorough grounding in the theory and practice of environmental ethics. Particularly directed to students in Environmental Design and concerns itself primarily with philosophical and ethical issues facing environmental scientists, planners and designers. Includes such topics as animal rights, deep ecology, eco-feminism, environmental pragmatism and sustainable development.

Environmental Design 683 H(1.5-1.5T)

Advanced Special Topics in Environmental Design

Topics in 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 685 H(3-0)

Industrial Design Clinic

The evaluation of new products and services with emphasis on the Industrial Design content. The goal of the evaluation exercise is to provide the client with advice.

Note: Offered in odd-even dated academic years.

Environmental Design 687 H(3-0)

Ergonomics for Environmental Design

Consideration of human physical, physiological, perceptual, and behavioural characteristics in the design of an object or environment for safe and effective use. Methods of obtaining human factors information, applying this information in a design process, and evaluating designs against human factors constraints and user performance criteria. Sources of information and factors affecting the validity of information. The scope of human factors, ergonomics, anthropometry, and related disciplines. Independent research in applications of individual interest.

Note: Offered in odd-even dated academic years.

Environmental Design 689 H(3-0)

Industrial Design Technology

Application of contemporary and developing technologies to industrial design. Content covers manufacturing processes and materials, with particular emphasis on metals and plastics. The course includes lectures, design exercises, seminar discussions, case studies and field trips.

Note: Offered in even-odd dated academic years.

Environmental Design 691 H(3-0)

History of Industrial Design

Review of the social, cultural and technical environment of Industrial Design; major personalities, design movements and achievements in the design of products since 1900; current and emerging trends.

Note: Offered in odd-even dated academic years.

Environmental Design 693 H(3-0)

People and Products

Seminar course exploring the interactions between people and products on their many levels and in their multifaceted complexity. Product perception, attitudes, meaning, semiotics, and psycho-social processes. Awareness of frameworks and concepts for understanding the interaction between people and products from industrial design, psychology, sociology, anthropology, ethology, and other disciplines. Application of such frameworks, concepts, and methods to the design process.

Note: Offered in even-odd dated academic years.

Environmental Design 697 Q(1.5-1.5T)

Advanced Special Topics in Environmental Design

Topics in 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 702 F(0-16)

Advanced Environmental Design Practice

Interdisciplinary training in environmental design practice at an advanced level, centred on case studies, information probing and analysis; culminates in a policy planning, design or management assignment and an environmental design presentation on a real world problem.

Prerequisite: Environmental Design 609 or 711 or permission of instructor.

Corequisite: Environmental Design 675 (Barcelona only).

Note: Offered in a single session.

Note: Graded on CR/C/F basis only.

Environmental Design 703 Q(0-3)

Directed Study in Environmental Design

Research, readings or a studio project in architecture, environmental science, industrial design or planning.

Prerequisite: Open only to Environmental Design students with consent of the Associate Dean (Academic).

MAY BE REPEATED FOR CREDIT

Environmental Design 707 H(0-8)

Ecological Management in Land Use Planning

A studio course in which a real land use problem with a major ecological management component is taken on by the class as a consulting team. Problem definition, proposal preparation and the complete study from regional biophysical and land use inventory through client presentations of interim and final results are completed within the term. The final report must include development recommendations and environmental management guidelines. Projects are drawn mainly from the resource development industry, although other potential clients are considered.

Environmental Design 709 H(3-0)

Product and Technology Assessment

Theoretical, legal, and practical aspects of assessing products and technologies for their environmental impacts (socio-economic, health, safety, and biophysical). Philosophy and theory of PATA, life cycle assessment, life cycle costing, risk assessment and management, green product endorsement and labelling, and purchasing guidelines are explored through lectures, seminar, and projects.

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 and is a prerequisite to Environmental Design 702.

Environmental Design 725 H(3-0)

Topics in Wildlife Management and Resource Development

The practice of wildlife management combines the science of ecology with an understanding of human social and economic needs. It acknowledges that the root of environmental problems lies in the economy and human culture. Through a series of assigned readings, seminars and discussions, the course will examine current issues and methods in wildlife management practice, conservation biology, wildlife population management, community-based wildlife management, and environmental impact assessment.

Environmental Design 731 H(3-0)

Cultural Tourism

Designed to provide students with an introduction to the wide range of existing cultural tourism possibilities, while emphasizing the management design and planning dimensions of historic resources (historic sites, buildings, festivals, events and regional heritage initiatives). Case study approach whenever appropriate.

Note: Offered in even-odd dated academic years.

Environmental Design 744 F(0-16)

Studio in Urban Design

These urban design studios explore contemporary problems in urban development and design, and emphasize a concern for place over an extended period of time, human behaviour - built form relationships and environment conservation goals. The approach aims to produce urban design that is locale-specific and yet responsive to changes in the ways we live.

Note: Full course offered in single session only.

MAY BE REPEATED FOR CREDIT

Environmental Design 747 H(36 hours in Fall or Winter Session)

Management in Environmental Science

Introduces students to Environmental Management Systems and a set of 22 environmental management tools, which can be used by corporations and institutions to reduce their adverse impacts on the environment and to conserve resources. Lectures and seminars will review current practice, theory and provide specific examples. Ways and means of controlling activities of institutions and corporations that affect the environment, rather than on managing the environment.

Environmental Design 749 H(3-1)

Water Management

A broad perspective on water management issues through lectures, seminars, case studies and extensive readings. Water quality, quantity, technology, aesthetics, recreation and in stream uses, biophysical and cultural characteristics of watersheds, watershed rehabilitation and restoration, with an emphasis on Canada and Western Canada in particular. A review of legislation and policy at municipal, provincial, federal and international levels.

Environmental Design 762 F(0-16)

Advanced Studio in Environmental Design

Topics vary from year to year, depending on such factors as current issues and contemporary problems. A number of studio topics may be offered to accommodate a variety of interests.

Note: Full course offered in single session only.

MAY BE REPEATED FOR CREDIT

Environmental Design 783 H(0-3)

Directed Study in Environmental Design

Research, readings or a studio project in architecture, environmental science, industrial design or planning.

Prerequisite: Open only to Environmental Design degree students with consent of the Associate Dean (Academic).

MAY BE REPEATED FOR CREDIT

Environmental Design 792 F(0-16)

Studio in Industrial Design

Professional experience in design principles and/or analytical methods, interdisciplinary approaches and specific skills. Topics vary from year to year, depending on such factors as current issues and contemporary problems. A variety of studios may be offered to accommodate the varied level of student development

Prerequisite or Corequisite: Environmental Design 533.

Note: Full course offered in single session only.

MAY BE REPEATED FOR CREDIT

Environmental Design 793 H(0-8)

Workshop in Industrial 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. Field work and term projects.

793.01. Workshop Skills for Architecture

793.02. Workshop Skills for Industrial Design

793.03. Workshop Skills for Environmental Design.

NOT INCLUDED IN GPA

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. Preceptorships are not normally approved until a Program of Study is at least conditionally approved.

MAY BE REPEATED FOR CREDIT

Environmental Design Architecture (EVDA)

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.

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.

Note: Credit for both Environmental Design Architecture 511 and Architectural Studies 449 will not be allowed.

Environmental Design Architecture 521 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. The course runs in conjunction with Environmental Design Architecture 581.

Note: Credit for both Environmental Design Architecture 521 and Architectural Studies 455 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 Western Tradition 1400 to Present

Note: Credit for both Environmental Design Architecture 523 and Architectural Studies 457 will not be allowed.

Environmental Design Architecture 541 H(100 hours)

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.

Note: Credit for both Environmental Design Architecture 541 and Architectural Studies 451 will not be allowed.

Environmental Design Architecture 543 H(100 hours)

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.

Note: Credit for both Environmental Design Architecture 543 and Architectural Studies 453 will not be allowed.

Environmental Design Architecture 561 H(3-0)

Architectural Professional Practice I

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 581 H(0-8)

Introductory Studio in Architecture

An introduction to architectural design. Through exercises in the manipulation and composition of space and form students will develop the foundation of basic design skills necessary to pursue more advanced architectural design studios.

Note: Credit for both Environmental Design Architecture 581 and Architectural Studies 443 will not be allowed.

Environmental Design Architecture 582 F(0-16)

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.

Note: Credit for both Environmental Design Architecture 582 and Architectural Studies 444 will not be allowed.

Note: Full course offered in single session only.

Graduate Courses

Environmental Design Architecture 611 H(3-1)

Building Science and Technology II

Theory and principles of structural, foundation and building service systems. Application of building science principles to building structure and enclosure, examination of the types and manufacture of building elements and the application of building components to specific problems in architecture.

Environmental Design Architecture 613 H(3-0)

Structures for Architects I

Advanced structural systems for buildings including: structural connections and composite structures; system characteristics and architectural intent; and case studies in contemporary building structures.

Environmental Design Architecture 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.

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

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 621 H(3-0)

Formal Strategies in Architecture

The relationship between architectural intention and a syntactic knowledge of architecture. Precedents used as vehicles of investigation to clarify the ways meaning is 'contained' in form. The formal strategies utilized by the architect in the generation of architectural meaning through built form.

Environmental Design Architecture 655 H(3-0)

Computer-Aided Architectural Design

Three- and two-dimensional representation of designs. Issues in computer-aided architectural design such as consequences for conceptualization, experiential qualities of design with machines, new approaches to generation of designs, re-use of information, possibilities of new information technologies, and personal productivity.

Environmental Design Architecture 663 H(3-0)

Architectural Professional Practice II

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 682 F(0-16)

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.

Note: Full course offered in single session only.

Note: Normally open only to students in Faculty of Environmental Design programs.

MAY BE REPEATED FOR CREDIT

Environmental Design Architecture 782 F(0-16)

Senior Studio in Architecture

A research oriented design studio in which students collaborate with faculty inprojects exploring contemporary themes in architecture. Topics vary from year to year and are defined by the current research interests of Faculty. Enrolment may be limited.

Note: Full course offered in single session only.

MAY BE REPEATED FOR CREDIT

Environmental Design Planning (EVDP)

Graduate Courses

Environmental Design Planning 601 Q(3-0)

Legal Planning Frameworks

Familiarizes students with the legal basis of planning, from the Constitution and property law to environmental and administrative law. Also considered are the Municipal Government Act and various legal planning tools such as Municipal Development Plans, Land Use By-Laws, Business Revitalization Zones, etc. Addresses the municipal development process related to land use redesignations, development permits, subdivision and appeals.

Environmental Design Planning 603 Q(3-0)

Spatial Analysis for Urban Planning

GIS and quantitative analysis techniques for evaluating demographic, distribution of jobs, housing, and other economic trends that establish the basis for discussion of appropriate planning policies. Develops an understanding of the historical growth patterns for the City of Calgary.

Environmental Design Planning 605 H(3-0)

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 607 Q(3-0)

Economic and Fiscal Impact Analysis

Skill in quantitative analysis is developed in estimating the local impact of project development in terms of economic (income, expenditure, employment), demographic (population, households, housing units), and fiscal (revenue, expenditure, taxation) impacts.

Environmental Design Planning 609 Q(3-0)

Physical Planning

Execution of a major physical planning and design project. Skills development in drawing and in utilizing graphic conventions to describe and interpret built environment.

Environmental Design Planning 611 Q(3-0)

The Urban Development Framework

Critical examination of Canadian political, economic and legal institutions as the context of urban development. Exploration of administrative and regulatory alternatives. Financial analysis of private sector urban development.

Environmental Design Planning 613 Q(3-0)

Public Involvement

Provides students with an understanding of the principles and practice of public participation and community development. Various participation methods/approaches are analyzed in terms of their characteristics, advantages and limitations. How to develop and implement a public involvement plan also discussed.

Environmental Design Planning 615 Q(3-0)

Social Planning

Acquaints students with approaches to community building and social servicing in the context of economic and physical development that marginalizes social concerns. Introduces the empowerment model of planning, participatory problem-solving, social impact assessment and participatory action research in the context of neighborhood planning. Coursework explores social planning theories, theories of difference and diversity, and policy approaches for a range of social issues.

Environmental Design Planning 617 Q(3-0)

Environmental Planning

Focuses on the professional practice of environmental planning at the municipal and regional level. Basic terrestrial and aquatic ecological and environmental processes operating in regional ecosystem and landscapes will be presented in the context of municipal environmental policy, land use planning and development, performance zoning and standards and urban infrastructure development. Case examples and projects will be used to illustrate both current best practice, current practice and research issues in environmental planning within municipal and multi-jurisdictional frameworks.

Environmental Design Planning 639 H(3S-0)

Master's Degree Project in Planning: The Process

A seminar course to initiate the process of developing and designing the student's Master's Degree Project in Planning. At the completion of the course, the student is expected to have an approvable MDP proposal and a research plan.

Note: Graded on CR/C/F basis only.

Note: Passing grades on any assignment or on the course does not necessarily imply that the Faculty must accept or approve the student's proposal.

Environmental Design Planning 641 H(3S-0)

Master's Degree Project Research in Planning

A seminar course to facilitate the timely preparation of the Master's Degree Project in Planning, including its preparation, writing and defense.

Prerequisite: Unconditionally approved Program of Study and successful completion of Environmental Design Planning 639.

Note: Passing grades on any assignment or on the course does not necessarily imply that the MDP Supervisory or Examining Committee must accept or similarly evaluate work submitted to it as part of the MDP.

Environmental Design Planning 711 Q(0-4T)

Advanced Practicum in Professional Planning Practice

Approved senior student work experience in professional planning practice. Offered in cooperation with practising professionals and the Alberta Association of the Canadian Institute of Planners.

Prerequisite: Conditionally approved Program of Study.

Note: Graded on CR/C/F basis only.

MAY BE REPEATED FOR CREDIT

Environmental Design Planning 713 H(0-4T)

Advanced Practicum in Professional Planning Practice

Approved senior student work experience in professional planning practice. Offered in cooperation with practising professionals and the Alberta Association of the Canadian Institute of Planners.

Prerequisite: Conditionally approved Program of Study.

Note: Graded on CR/C/F basis only.

MAY BE REPEATED FOR CREDIT

FRENCH, ITALIAN AND SPANISH FISL

Contact Info

Location: Craigie Hall, Room D318
Faculty number: (403) 220-4001
Fax: (403) 284-3634
E-mail 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, in French and Spanish.

Full-time and part-time studies are possible.

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, Comparative Literature, Literary Theory, Second Language Learning and Teaching (including computer-assisted language learning)

The Department also participates actively in interdisciplinary degree programs, such as Canadian Comparative Literature (with English) and Film.

2. Admission Requirements

Doctor of Philosophy (PhD)

Applicants wishing to undertake a doctoral program on a special case basis should contact the Department.

Master of Arts

In addition to Faculty 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

3. Application Deadline

Deadlines for the submission of complete applications: 25 January for September admission (when accompanied by an Open Scholarship application http://grad.ucalgary.ca//funding/onlineapp
1 March for September admission (with no scholarship application)

Applications received later than the deadline will be considered 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

Master of Arts

Note: Normally no more than one half-course of Directed Reading may be taken for credit.
In addition to Faculty 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.

6. Additional Requirements

Master of Arts

a) All students must attend an orientation session.
b) Both options have a *knowledge areas requirement* that must be satisfied before or after admission. Upon admission students will be advised of any specific course or other work needed to fulfill this requirement.
c) 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.
d) 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. Information on the presentations and a one page critical summary for each one must be submitted with the Annual Progress Report.

7. Credit for Undergraduate Courses

Master of Arts

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

Master of Arts

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

Master of Arts

Newly admitted students begin their programs under the supervision of the departmental Graduate Coordinator. Students are expected to choose a permanent supervisor by the end of the second regular academic session after first registration (30 April for September registrants and 15 December for January registrants). Selection of a supervisor should be by mutual agreement between the student and the staff member concerned, approved by the Graduate Coordinator.

10. Required Examinations

Master of Arts

Oral 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.

Special Case Doctor of Philosophy (PhD)
Candidacy Examination
Questions on the research proposal will not be included in the oral candidacy examination of special case doctoral degree students.

Final oral thesis examinations are open.

11. Research Proposal Requirements

Master of Arts

Thesis students are required to submit a written thesis proposal fourteen months after initial registration (31 October for September registrants and 21 February for January registrants.) This proposal should be approximately 1000 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

Master of Arts

Funding is available to qualified thesis-based students in the form of research and/or teaching assistantships. Students can expect to receive funding for a maximum of 20 months. Students applying for scholarships for the following academic year must submit their applications to the Department by 25 January. All students are strongly encouraged to seek external financial assistance throughout their program. For information on awards, see the Awards and Financial Assistance section of this Calendar.

14. Other Information

Master of Arts - Doctor of Philosophy
Prospective students are encouraged to consult either the Head of the Department or the Graduate Coordinator. Detailed information on our programs is also available at http://fis.ucalgary.ca

15. Faculty Members/Research Interests

Information about faculty members and their research interests may be found at http://fis.ucalgary.ca/

French (FREN)

Undergraduate Courses

Only in exceptional circumstances and where appropriate to a student's M.A. program may graduate credit be received for courses numbered 500-599.
Dans certaines circonstances exceptionnelles, les cours de niveau 500 pourront être crédités dans le cadre du programme de maîtrise.

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 à l'autre.
Préalables: Trois demi-cours de français de niveau 400, ou autorisation du Département.
Remarque: Ce cours est obligatoire pour les étudiants inscrits au programme du baccalauréat spécialisé ("Honours") de français.
MAY BE REPEATED FOR CREDIT

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 au sens large. Le format et le contenu peuvent varier d'une année à l'autre.
Préalables: 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 à la langue, aux littératures ou aux diverses cultures de la francophonie. Le format et le contenu peuvent varier d'une année à l'autre.
Préalables: Trois demi-cours de français de niveau 400 ou autorisation du Département.
MAY BE REPEATED FOR CREDIT

French 557 H(3-0)

Littérature et culture françaises du 17e siècle
Étude de textes choisis du "Grand siècle". Le format et le contenu peuvent varier d'une année à l'autre.
Préalables: Trois demi-cours de français de niveau 400 ou autorisation du Département.
MAY BE REPEATED FOR CREDIT

French 559 H(3-0)

Littérature et culture françaises du 18e siècle
Étude de textes choisis du Siècle des Lumières en France. Le format et le contenu peuvent varier d'une année à l'autre.
Préalables: Trois demi-cours de français de niveau 400 ou autorisation du Département.
MAY BE REPEATED FOR CREDIT

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.
Préalables:Trois demi-cours de français de niveau 400, ou autorisation du Département.
MAY BE REPEATED FOR CREDIT

Graduate Courses

Details of the specific topics to be taught in all 600-level courses in French will be announced in the Departmental Graduate Program Web page and, when possible, in the Master Timetable.
All the following graduate courses may be repeated for credit:

Dans des cas considérés comme exceptionnels, le Département accordera des crédits au niveau du 2e cycle pour des cours de niveau 500. L'autorisation du Département sera alors indispensable.
The Department will give graduate credit at the MA level for 500 level courses in cases it deems exceptional. This option is subject to the approval of the Department.

French 605 H(3-0)

Problématiques littéraires et culturelles
MAY BE REPEATED FOR CREDIT

French 611 H(3-0)

Langue française
MAY BE REPEATED FOR CREDIT

French 615 H(3-0)

Images, textes, performance
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 641 H(3-0)

Littérature et culture avant 1800
MAY BE REPEATED FOR CREDIT

French 645 H(3-0)

La Modernité
MAY BE REPEATED FOR CREDIT

French 655 H(3-0)

Francophonies
MAY BE REPEATED FOR CREDIT

French 665 H(3-0)

Études postcoloniales
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 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

French 699 H(3-0)

Thèmes spéciaux
MAY BE REPEATED FOR CREDIT

Spanish (SPAN)

Undergraduate Courses

Only in exceptional circumstances and where appropriate to a student's M.A. 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.
Prerequisites: 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 literatures in its cultural and historical contxt. 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.
Prerequisites: Spanish 405, 407, 421 and 423 or consent of the Department

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.
Prerequisites: 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.
Prerequisites: Spanish 405, 407, 421 and 423 or consent of the Department.

Spanish 565 H(3-0)

Medieval and Golden Age Literature
Representative works of literature in the Spanish language from the 10th to the 17th centuries. Format and content of course may vary from year to year.
Prerequisites: Spanish 405, 407, 421 and 423 or consent of the Department.

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.
Prerequisites: 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.
Prerequisites: 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.
Prerequisites: 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.
Prerequisites: 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 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.
Prerequisites: Spanish 405, 407, 421 and 423 or consent of the Department.
MAY BE REPEATED FOR CREDIT

Graduate Courses

Details of the specific topics to be taught in all 600-level courses in Spanish will be announced in the Departmental Graduate Program Web page and, when possible, in the Master Timetable.

All the following graduate courses may be repeated for credit.

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	

GASTROINTESTINAL SCIENCES MDGI

Contact Info

Location: Health Sciences Centre, Room G329
Faculty number: (403) 220-8306
Fax: (403) 210-8109
E-mail 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
Specializations: Physiology, Biochemistry, Molecular Biology, Pharmacology, Immunology, Immunopharmacology, Nutrition, Parasitology, Pathology, Epidemiology

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 program.

A joint MD/MSc and MD/PhD program is also offered under the title "Leaders in Medicine."

2. Admission Requirements

In addition to Faculty requirements, the Department requires:
(a) A minimum grade point average of 3.20 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), 250 (computer-based test) or 100 (internet-based test)

3. Application Deadline

Students may be admitted for September, January, or May. Contact the department for general application guidelines.

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

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 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 two half-course equivalents for those entering with an Master's degree in a related subject and a minimum of three half-course equivalents for those entering with a Bachelor of Science or equivalent. Normally, one of these courses is MDSC 637.01. Exceptions, however, can be approved by the coordinator on the recommendation of the supervisor or the graduate education committee.
b) A supervisory committee
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 Coordinator.
e) For doctoral students, a comprehensive written examination completed no more than one month before the oral candidacy examination
f) Regular attendance at the G.I. Sciences seminar program

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

No credit given.

8. Time Limit

Expected completion time is two years for the Master's program and four years for the doctoral program. Maximum completion time is four years for the Master's program and six years for the doctoral program.

Expected completion time is four to five years for the MD/MSc program and six to seven years for the MD/PhD program. Maximum completion time is six years for the MD/MSc program and eight years for the MD/PhD program.

9. Supervisory Assignments

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. Master's students in the Leaders in Medicine Program must have a supervisory committee constituted according to the regulations of the graduate program. Both Master's and doctoral students will also be evaluated and advised by a Joint Liaison Committee composed of the Associate Dean (Graduate Science Education), Associate Dean (Undergraduate Medical Education), and the Associate Dean (Research) of the Faculty of Medicine.

10. Required Examinations

Doctoral students must pass a doctoral candidacy examination after completing all other requirements and within 28 months of entry into the program. The doctoral candidacy examination consists of a comprehensive written examination that must be completed in three weeks, and an oral examination that follows one week later. The object is to quantify the skills of the student to assimilate and discuss the literature in several areas related to gastrointestinal sciences. Students will be asked to select two questions out of four to answer. Questions on the research proposal will not be included in the oral candidacy examination. The supervisor is a non-voting observer at the doctoral oral candidacy examination.
Final thesis oral examinations consist of a public presentation followed by a closed examination.

11. Research Proposal Requirements

This is usually a document outlining the objectives, rationale, background and methods to be used.

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 1 February.

14. Other Information

Please visit the Department of Gastrointestinal Sciences Website at http://www.ucalgary.ca/gisgp for additional information.

15. Faculty Members/Research Interests

Current faculty research interests can be found at http://www.ucalgary.ca/girg/membership

GEOGRAPHY GEOG

Contact Info

Location: Earth Sciences Building, Room 356
Department number: (403) 220-5584
Fax: (403) 282-6561
E-mail 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 Faculty 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

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

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
15 January for September admission
15 August for January admission

For MGIS applicants
30 April
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 Faculty requirements, the Department requires the following:

Master of Geographic Information Systems

Ten half-courses, eight at the 600 level or higher, must be completed while in the program. 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 Modeling
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

Requirements for the MA and MSc degrees:

a) Four half-course equivalents in a two-year period, including History and Philosophy of Physical or Human Geography, at least one of the core Geography Graduate Seminars, and at least one Methods course.
b) An approved thesis proposal completed within the first year of the program.

Doctor of Philosophy

Requirements for the PhD degree:

a) Two half-course equivalents during the first two years in program, including at least one of the core Geography Graduate Seminars.
b) An approved thesis proposal completed within the first 18 months of the program.
c) 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/index.cfm?page=content&style=subsection&this=2.

Full time status is expected. In some situations thesis programs may be completed on a part-time basis with approval from the Graduate Coordinator.

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 Coordinator.

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 an interim advisor assigned—by mutual agreement—within the first term in program. For thesis students, the interim advisor may be appointed as supervisor upon successful defence of the thesis proposal, when an *Appointment of Supervisor Form* must be filed with the Faculty of Graduate Studies. For PhD students, a supervisory committee should be appointed within the first 16 months of the program. For MGIS students, a supervisor must be appointed by the second term of the program.

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://www.geog.ucalgary.ca/index.cfm?page=people&style=1&mode=1

Graduate Courses

Geography 603 H(3-3)
(formerly Geography 699.33)

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: Consent of the Department.

Geography 605 H(3-3)
(formerly Geography 699.39)

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: Consent of the Department.

Geography 607 H(3-3)
(formerly Geography 699.47)

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: Consent of the Department.

Geography 619 H(3-2)

Spatial Ecology
Applies the principles of landscape ecology and conservation biology to the study of spatial effects on individual species and on the structure, dynamics, diversity and stability of multi-species communities. The use of GIS and remote sensing technologies is a central theme. Topics include habitat fragmentation, metapopulation analysis and viability, wildlife habitat modelling (static and dynamic), management of endangered species, and spatial decision support. Other aspects of this course include the importance and use of indicator, umbrella, keystone and flagship species in conservation.
Prerequisite: Consent of the Department.
Note: Not open to students with credit in Geography 695.11.

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: Consent of the Department.

Geography 635 H(3-3)
(formerly Geography 699.35)

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: Consent of the Department.

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: 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: Consent of the Department.

Geography 649 H(3-3)

Enterprise GIS and Database Management Systems
Advanced topics in GIS and database systems, including integration of enterprise database systems with a GIS, data modelling, database management, distributed GIS via the world wide web, and web-based GIS.
Prerequisite: Geography 647 or consent of the Department.

Geography 667 H(3-3)

Advanced GIS Programming with ArcObjects
Advanced programming techniques in ArcGIS using the ArcObjects framework. Topics include customizing the user interface, COM and interface-based programming techniques, and creating macros to perform advanced tasks in ArcGIS. A significant portion of evaluation will be based on an independent term project. Completion of a pre-study package is required.
Prerequisite: 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.
Prerequisites: Geography 633, 639 and 647; or 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: Geography 681 or consent of the Department.

Geography 685 H(3S-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: Consent of the Department.

Geography 687 H(3S-3)

Advanced Glacial Geomorphic Systems
Contemporary topics in glacial geomorphology and sedimentology. Course consists of lecture, seminar and field trip components.
Prerequisite: Consent of the Department.
Note: Co-scheduled with Geog 507.

Geography 689 H(3S-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: Consent of the Department.
Note: Co-scheduled with Geog 509.

Geography 691 H(3S-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: Consent of the Department.
Note: Co-scheduled with Geography 411.

Geography 695 H(3-3)

Seminar in Geographic Research Methods
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Geography 697 H(3-0)

Seminar in the Philosophy and Nature of Human Geography
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Geography 699 H(3-0)

Seminar in the Philosophy and Nature of Physical Geography
Prerequisite: 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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Geography 797 H(3-0)

Selected Topics in Human Geography
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Geography 799 H(3-0)

Selected Topics in Physical Geography
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

GEOSCIENCE GLGP

Contact Info

Location: Earth Sciences Building, Room 118
Department number: (403) 220-3254
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E-mail address: geosciencegrad@ucalgary.ca
Web page URL: http://www.ucalgary.ca/geoscience

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.

The Master of Science degree is also offered with specialization in Reservoir Characterization (Interdisciplinary). For further information on this specialization, see the separate listing in this Calendar.

2. Admission Requirements

In addition to Faculty of Graduate Studies 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), 237 (computer-based test) or 92 (internet-based test), or an IELTS score of 7.5

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) or 237 (computer-based test) or 92 (internet-based test), or an IELTS score of 7.5

3. Application Deadline

Deadlines for complete applications:
1 February for September admission
January admission is considered on a case-by-case basis and applications must be received by 1 September.

4. Advanced Credit

Students must apply for advanced credit at the time of admission. Some graduate level courses taken as an unclassified student or as a student transferring from another university may be counted for credit, subject to departmental approval.

Credit for relevant courses taken during the Master of Science program may result in the reduction of the required four-course minimum for doctoral students. Credit may be granted for a maximum of three half-courses for students with Master of Science degrees from the Department of Geoscience at the University of Calgary, and two for students with Master of Science degrees from elsewhere. This will be determined by the Interim Advisor/Supervisor and the Graduate Coordinator or Department Head.

5. Program/Course Requirements

In addition to the Faculty 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 GLGY 701 or GOPH 701 research project)
b) Completion of a Research Project (GLGY 701 or GOPH 701). The student is required to present and defend the project in a one-hour defense once the written research report is in near-final form. The supervisor and two other members of the department assess the project. If a company is involved the company 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 Glgy 703 and Glgy 701. Courses are selected in consultation with the supervisor and with the approval of the graduate coordinator.
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, Geophysics 551, Geophysics 557, Geophysics 647, Geophysics 657, Geophysics 659.
b) At least four other GOPH courses at the 600-level or higher, of which no more than three can be at the 500 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 Goph 703 and Goph 701. Courses are selected in consultation with the supervisor and with the approval of the graduate coordinator.
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 coordinator approval, some credit may be granted for courses taken during a Master's program, to reduce the course requirement
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 company 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 Coordinator. The interim supervisor is chosen from the research field the student has specified. Usually the interim supervisor becomes the permanent supervisor, but the Graduate Coordinator 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

Final thesis oral examinations are open with a public presentation on the same day.

Questions on the research proposal may be included in the oral candidacy examination. Students should contact their department for further details.

11. Research Proposal Requirements

Master of Science thesis-based students must file a thesis proposal by 15 March of the second session of study for September registrants and 1 July 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.

Ph.D. thesis students will submit a more substantial thesis proprosal 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 submit their applications to the Department by 1 February.
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 web site.

15. Faculty Members/Research Interests

The current faculty research interests can be found at http://www.ucalgary.ca/geoscience/faculty

Geology (GLGY)

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.

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, theory and application of aqueous thermochemical models.
Prerequisite: Geology 323 or 329 or 429.
Note: A weekend field excursion will be run in September.

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.
Prerequisites: Geology 403 or 503, Geology 401 or 501 or 601.

Geology 527 H(3-1T-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: Geology 433 or 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.
Note: 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.
Prerequisites: Geology 341, 323 or 329 or 429, 433 or 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.
Prerequisites: Geology 323 or 329 or 429, 433 or 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 537 H(160 hours)

Field Methods III
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 Session or following the Winter Session.
Prerequisites: Geology 435 or 439, 433 or 443, 461. A minimum grade of B is required in Geology 435 or 439.
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 to pay a surcharge to cover the costs of equipment and other resources.

Geology 541 H(3-1T-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.
Prerequisites: Geology 341 and completion of at least 15 full-course equivalents.
Note: Credit for both Geology 541 and 641 will not be allowed.
Note: There is a weekend field excursion during the session.

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.
Prerequisites: Geology 433 or 443.

Geology 555 H(3-3)

Global Geology
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: Geology 443 or Geophysics 457.

Geology 561 H(3-3)

Sequence Stratigraphy
Integrated approach to the study of genetic stratigraphic sequences and their bounding surfaces, linked to facies analysis of clastic and carbonate successions.Principles of sequence stratigraphy and applications to petroleum reservoirs.
Prerequisites: Geology 435 or 439 or 441, 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: Geology 443 and 461; or Geophysics 457.

Geology 571 H(3-1T-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.
Prerequisites: Geology 341 and Geophysics 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 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: Geology 391 or 491.
Note: 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
Prerequisites: Geology 449 or Geophysics 449, Geology 461 or Geophysics 457.
Note: Credit for both Geology 589 and 689 will not be allowed.

Geology 593 Q(3-3)

Selected Topics in Petroleum Geology II
593.02. Stratigraphy and Sedimentation of Clastic Rocks
593.03. Stratigraphy and Sedimentation of Carbonate Rocks
593.05. Ichnology
593.06. Professional Practice for Geoscientists.
Prerequisites: Geology 449 or Geophysics 449, Geology 461 or Geophysics 457.
Note: 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
595.03. Reservoir Evaluation and Hydrocarbon Play Assessment
595.05. Basin Analysis
Prerequisites: Geology 449 or Geophysics 449, Geology 461 or Geophysics 457.
Note: students who have taken Geology 561 should take Geology 694.01, not 595.01.
Note: Credit for both Geology 595 and 694 will not be allowed.

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.
Prerequisites: Geology 449 or Geophysics 449, Geology 461 or Geophysics 457.
Note: 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.
Prerequisites: Mathematics 253 or 263 or 283 or Applied Mathematics 219; Mathematics 221 or 211; completion of at least 15 full-course equivalents or consent of the Department.
Note: 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: 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(3-3)

Advanced Physical Hydrogeology
An advanced treatment of topics covered in Geology 401.
Prerequisite: Consent of the Department.
Note: Credit for both Geology 601 and either 401 or 501 will not be allowed.

Geology 603 H(3-3)

Advanced Aqueous Geochemistry
Advanced discussion of theoretical and applied aspects of aqueous geochemistry of natural waters. Topics include: methods for collection and preservation of water samples in the field, laboratory analysis of waters, theory and application of aqueous geochemical models to complex formation, solubility, stability of low temperature mineral assemblages, oxidation and reduction processes in natural environments and reaction path modelling. Applications of stable isotopes to low temperature geochemical processes may also be covered.
Prerequisite: Geology 403 or 503, or Geophysics 457.

Geology 605 UPDATED (Sep. 16, 2009) H(3-1T)

Groundwater Flow and Transport Modeling
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 modeling project.
Prerequisites: Geology 401 or 601 or consent of the Department.

Geology 607 H(3-3)

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.
Prerequisites: Mathematics 253 or 263 or 283 or Applied Mathematics 219, Geography 415, Geology 401; or consent of the Department.

Geology 609 UPDATED (Sep. 16, 2009) H(3-3)

Advanced Contaminant Hydrogeology
An advanced treatment of topics covered in Geology 505.
Prerequisites: Consent of the Department.
Note: Credit for both Geology 505 and Geology 609 will not be allowed.

Geology 611 H(3-1)

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.
Prerequisites: Mathematics 253 or 263 or 283 or Applied Mathematics 219, 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: Chemical Engineering 331 or Geology 401 or 429 or 423.
Note: Credit for both Geology 613 and either 699.20 or Petroleum Engineering 513 will not be allowed.

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: 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: Geology 433 or 443 or equivalent or consent of the Department.

Geology 639 H(160 hours)

Field Laboratory in Groundwater Hydrogeology
The course entails a week at a hydrogeology field site on the Fraser River delta, 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 about three weeks following Winter Session Final Examinations.
Prerequisites: Geology 401 or 601 and consent of the Department.
Note: Credit for both Geology 441 and 639 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: Consent of the Department.
Note: Credit for both Geology 541 and 641 will not be allowed.
Note: There is a weekend field excursion during the term.

Geology 649 H(3-3) (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: Consent of the Department.

Geology 663 H(2-1) (Physics 663)

Applications of Stable Isotopes
Applications in archaeology, biology, chemistry, engineering, geography, geology, medicine, meteorology, paleontology, physics and space sciences. Topics include hydrology, paleoclimates, ore deposits, geothermometry, fossil fuels exploration and recovery, pollutant tracing, food webs forensic investigations.
Prerequisite: 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: 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: Petroleum Engineering 513 or Geology 613 or consent of the Department.
Note: 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: 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: Consent of the department.
Note: Credit for both Geology 585 and 685 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: Consent of the Department.
Note: Credit for both Geology 589 and 689will not be allowed.

Geology 693 Q(3-3)

Advanced Petroleum Geology II
693.02. Stratigraphy and Sedimentation of Clastic Rocks
693.03. Stratigraphy and Sedimentation of Carbonate Rocks
693.05. Ichnology
693.06 Professional Practice for Geoscientists
Prerequisite: Consent of the Department.
Note: Credit for both Geology 593 and 693 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: Consent of the Department.
Note: Credit for both Geology 595 and 694 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: Consent of the Department.
Note: Credit for both Geology 596 and 696 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.
Prerequisites: Mathematics 253 or 263 or 283 or Applied Mathematics 219; Mathematics 221 or 211; or consent of the Department.
Note: Completion of Mathematics 331 and/or Statistics 357 or 327 is recommended prior to taking this course.
Note: Credit for both Geology 597 and 697 will not be allowed.

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: Chemical Engineering 621, Geology 697, Human Resources and Organizational Dynamics 789 or equivalent.
Note: This course is intended for graduate students in the Master of Science in Reservoir Characterization program.

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 research 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
Note: Open only to graduate students in the Department of Geoscience.

Geology 707 H(3-3)

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 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(3-3)

Analytical Methods in Petrology
Topics may include scanning electron microscope, electron probe, x-ray diffraction and x-ray fluorescence.

Geophysics (GOPH)

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.

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.
Prerequisites: Geophysics 355, 359, Mathematics 331, 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 Session. Data collected will be processed during Fall Session tutorials.
Prerequisites: 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 to pay a surcharge 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.
Prerequisites: Geophysics 355, Physics 321, 323, Applied Mathematics 415, and Mathematics 331.

Geophysics 557 H(3-3)

Geophysical Data Processing
Geophysical signal analysis, digital processing methods applied to seismic and other geophysical data.
Prerequisites: Applied Mathematics 415, Geophysics 355.

Geophysics 559 H(3-3)

Geophysical Interpretation
Analysis and integration of geophysical and geological data. Qualitative and quantitative interpretation. Industrial case studies.
Prerequisite: Geophysics 355, Geophysics 457 or Geology 461 or 597.

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 also available to fourth-year undergraduate 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: Geophysics 551 or consent of the Department.

Geophysics 649 H(3-3)
(Geology 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: Consent of the Department.

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.
UPDATED (Sept. 16, 2009)

Geophysics 657 H(3-3)

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 Modeling, 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: Geophysics 551 or 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: 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.
Prerequisites: 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.
Prerequisites: 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(3-3)

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 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 research 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
Note: Open only to graduate students in the Department of Geoscience.

GERMANIC, SLAVIC AND EAST ASIAN STUDIES GSEA

Contact Info

Location: Craigie Hall, C Block, Room 205
Faculty number: (403) 220-5293
Fax: (403) 284-3810
E-mail address: gsea@ucalgary.ca
Web page URL: http://gsea.ucalgary.ca/

1. Degrees and Specializations Offered

Master of Arts degree (thesis-based) in German

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; Linguistics; Philosophy; French, Italian and Spanish). Applicants interested in an interdisciplinary doctoral program with a German Studies component on a special case basis should contact the Department.

The Department does not formally offer a part-time option – all students will be considered full-time.

2. Admission Requirements
In addition to the Faculty of Graduate Studies requirements, the Germanic, Slavic and East Asian Department 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

3. Application Deadline
Deadlines for the submission of complete applications:
1 February for September admission
1 September for January admission (discuss January admission with Department)
Late applications 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. 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. Maximum completion time is four years.

9. Supervisory Assignments
The Graduate Program Coordinator 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.

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 1 February.

14. Other Information
None.

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

Graduate Courses

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 AND ROMAN STUDIES GRST

Contact Info
Location: Social Sciences Building, Room 506
Faculty number: (403) 220-5537
Fax: (403) 220-9581
Contact List:
See http://grst.ucalgary.ca/contact
Web page URL: http://www.fp.ucalgary.ca/grst/
http://grst.ucalgary.ca/graduate-program

1. Degrees and Specializations Offered
Master of Arts (MA) degree, thesis or course-based (full or part time)
PhD on a special-case basis
Specializations are established on an individual basis through discussion between candidate and supervisor, and are approved by the Program Coordinator.

Applicants wishing to undertake a doctoral program dealing with the literature or history of classical antiquity should contact the Department.

2. Admission Requirements
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. All research areas require proficiency in reading Latin and/or Greek. Competence in reading French, German or Italian must be acquired either before or during the program. For PhD, an MA is required.

3. Application Deadline
Deadlines for submission of complete applications:
1 February for September admission (when accompanied by a graduate scholarship application)
1 April for September admission (with no scholarship application)
1 September for January admission

4. Advanced Credit
Contact department for information.

5. Program/Course Requirements
In addition to Faculty requirements, the Department requires:

Master of Arts (thesis-based, full or part-time)
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 (GRST 607), normally taken in Fall and Winter terms of the first and second year
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, full or part-time)
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 (GRST 607), normally taken in Fall and Winter terms of the first and second year
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
Contact the department for detailed information.

6. Additional Requirements
The department may require up to two half-courses of additional directed studies in order to ensure sufficient preparation in relevant areas for the MA. 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 information on the PhD program, contact the department.

9. Supervisory Assignments
The Graduate Program Coordinator 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 Coordinator for approval. For information on the PhD contact department.

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. Application forms are included in the admission application package and linked to the online admission application.
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: Graduate Program Coordinator, Department of Greek and Roman Studies, University of Calgary, 2500 University Drive NW, Calgary, Alberta, Canada T2N 1N4 (See http://grst.ucalgary.ca/contact).

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/people

Greek (GREK)

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.

Greek 525 H(3S-0)
Topics in Greek Literature and Language
Prerequisite: Greek 401 or 413.
MAY BE REPEATED FOR CREDIT

Greek 551 H(0-2T)
Directed Studies in Greek Literature and Language
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Graduate Course

Greek 601 H(3S-0)
Graduate Seminar
MAY BE REPEATED FOR CREDIT

Greek and Roman Studies (GRST)

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.

Greek and Roman Studies 525 H(3S-0)
Research Seminar
Research topics in Greek and Roman history, literature, art, and archaeology. Seminar discussions will require a high level of student participation.
MAY BE REPEATED FOR CREDIT

Greek and Roman Studies 551 H(0-2T)
Directed Research
Qualified students will undertake supervised research projects individually or in small groups.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

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(2S-0)
Research and Professional Training

Greek and Roman Studies 607 Q(0-1T)
Directed Studies
MAY BE REPEATED FOR CREDIT
NOT INCLUDED IN GPA

Latin (LATI)

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.

Latin 525 H(3S-0)
Topics in Latin Literature and Language
Prerequisite: Latin 401 or 413.
MAY BE REPEATED FOR CREDIT

Graduate Course

Latin 601 H(3S-0)
Graduate Seminar
MAY BE REPEATED FOR CREDIT

HASKAYNE SCHOOL OF BUSINESS: MANAGEMENT MGMT

Contact Info
Location:
MBA Program: Scurfield Hall, Room 350
PhD Program: Scurfield Hall, Room 332
Phone:
MBA Program: (403) 220-3808
PhD Program: (403) 220-3803
Fax: (403) 282-0095
E-mail 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

Joint programs, offered with other Faculties:
Bachelor of Laws/Master of Business Administration (LLB/MBA)
Master of Social Work/Master of Business Administration (MSW/MBA)
Master of Biotechnology/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. This program is intended for those with a strong undergraduate background and several years of relevant work experience. Students must complete the CMA pre-requisites and the CMA national entrance exam before being admitted to the MBA-CMA program. Students can complete the requirements for the Haskayne MBA and the CMA designation in three years of part-time study. For information and application materials for this program, please visit http://www.cma-alberta.com.

MBA-CGA Program

This is a combined initiative between the Haskayne School of Business and the Certified General Accountants of Alberta. Students accepted to the MBA program may complete several requirements of the CGA designation as part of their MBA program. For information check with the Haskayne MBA office or with http://www.cga-alberta.org.

Master of Business Administration (course-based) UPDATED (Dec. 14, 2009)

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 (LLB/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.

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.

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 personal statement outlining the applicant's career goals and how the MBA program would help achieve those goals
c) 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
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. Where GMAT is unavailable, the program will accept equivalent results on the Graduate Record Exam (GRE). 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) For course-based programs only, the equivalent of at least 3 years of appropriate work experience
f) For applicants to the thesis-based program, normally a Bachelor of Commerce with a minimum grade point average of 3.3 on a four point scale
g) For applicants to the Executive MBA program, the equivalent of at least seven years of work experience, a number of years of which must have carried management or professional responsibility
h) An applicant to a combined MBA program (LLB/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.

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.*

** Consult the Haskayne School of Business about the Graduate Management Admission Test.*

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 3.5 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) A score of at least 600 on the Graduate Management Admission Test (GMAT) with high scores on both verbal and quantitative subcomponents; or equivalent results on the Graduate Record Exam (GRE). It is recommended that students should place above the 85th percentile on overall test scores. Most PhD applicants in the recent past have obtained above 650 on the GMAT, with many successful applicants having earned scores of 700 and above

c) For those 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

d) A personal statement outlining objectives, intent and commitment to a research program

e) 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://www.haskayne.ucalgary.ca/programs/graduate/phd for more information. Approved changes to the program standards and requirements will be posted on the website.

3. Application Deadline

Deadlines for the submission of complete applications to the Haskayne School of Business:

	Deadline	Decision made by*
Decision Round 1	15 Nov	15 Jan
Decision Round 2	15 Jan	1 March
Decision Round 3	1 March	1 May
Decision Round 4**	1 May	15 June

**Applications that are not accepted for admission or rejected may be held over for consideration in following decision rounds.*

*** Not open to international applicants.*

PhD and MBA (thesis-based) programs

15 January 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

Haskayne MBA

UPDATED (Dec. 14, 2009)

The MBA degree normally consists of twenty half-courses (nineteen half-courses and two quarter courses effective July 1, 2010). Students may be granted exemption from first-year 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.

First Year Courses

UPDATED (Dec. 14, 2009)

ACCT 601 Financial Accounting
ACCT 603 Management Accounting
FNCE 601 Managerial Finance
HROD 601 Managing Human Resources
MGIS 601 Management Information Systems
MGST 611 Managerial Economics
MGST 613 Managerial Decision Modelling
MKTG 601 Marketing Management
OPMA 601 Operations Management
SGMA 601 Strategic Management
MGST 789.01 MBA Skills (effective July 1, 2010)

Second Year Courses
UPDATED (Dec. 14, 2009)

The MBA degree requires the following integrative courses:
MGST 715 Strategic Business Analysis
BSEN 777 Global Environment of Business
MGST 789.02 Leadership Capstone (effective July 1, 2010)

Areas of Specialization
UPDATED (Dec. 14, 2009)

Students must complete eight elective half-courses (seven effective July 1, 2010) beyond the first year 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 LLB/MBA
A student admitted to the combined LLB/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 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.

Combined MD/MBA
A student admitted to the MD/MBA program 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).

Executive MBA
UPDATED (Dec. 14, 2009)

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. Only in rare cases will it be possible for students to do the latter. 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 21-month time frame.

MBA (thesis-based)
In addition to the requirements of the Faculty of Graduate Studies, the Haskayne School of Business requires:

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 (MGST 773, Multivariate Analysis in Management) and one Strategy and Global Management course BSEN 777, SGMA 701, or SGMA 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 MGST 781, MGST 783, MGST 791, MGST 792, and MGST 793. Students who have not completed a research-based Master's degree should take MGST 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

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 15 January.
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 by sending a non-refundable $500 deposit to the Haskayne School of Business. The $500 will be credited toward fees upon registration.

15. Faculty /Research Interests

The active research interests of the faculty can be found at
http://www.haskayne.ucalgary.ca/faculty/dir/faculty/

Accounting (ACCT)

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: 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: Accounting 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: 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. Topics covered include cost classifications and methods of cost establishment; cost data appropriate for decision models, standards and controls.
Prerequisite: 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: Accounting 601.

Accounting 723 H(3-0)

Advanced Taxation
The focus of this course is 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: 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: Accounting 643.

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: 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, parternships, and not-for-profit organizations.
Prerequisite: 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: 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: Accounting 661

Accounting 789 H(3S-0)

Seminar in Accounting
Development of and solutions to current issues and problems in accounting.
Prerequisite: Accounting 603 or consent of the business school.
MAY BE REPEATED FOR CREDIT

Accounting 797 H(3S-0)

Advanced Seminar in Accounting
Advanced accounting research topics.
Prerequisite: 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

Business and Environment (BSEN)

Business and Environment 691 H(3-0)
(Civil Engineering 691)

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: Consent of Program Director.

Business and Environment 719 H(3-0)

Project External Issues
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: Business and Environment 691.

Business and Environment 749 H(3-0)

Rediscovering Leadership: The Haskayne Wilderness Retreat
One-week wilderness intensive combines experiential outdoor activities and personal growth challenges with cross-cultural teachings and ceremonies to deliver core leadership skills for social responsibility and sustainable development.

Business and Environment 751 H(3-0)
(formerly Strategy and General Management 789.12)

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)
(formerly Strategy and General Management 797.04)

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 to produce 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 Canadian Business
Economic, political, social and legal factors affecting management decisions. Topics include Canada in the world economy, business and government relations, business ethics, legal environment for business. Develops knowledge and ability to analyze and deal with complexities of the business environment.
Corequisite: Strategy and Global Management 701 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 law which are particularly relevant to someone developing their business: contracts, patents and copyrights, product liability, incorporation, etc.
Prerequisites: 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: Consent of the Haskayne School of Business.
MAY BE REPEATED FOR CREDIT

Entrepreneurship and Innovation (ENTI)

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.
Note: Credit for both Entrepreneurship and Innovation 785 and Management Studies 797.81 will not be allowed.

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: Marketing 601 or consent of the Haskayne School of Business.

Entrepreneurship and Innovation 791 H(3-0)
(formerly Entrepreneurship and Innovation 797.01)

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. Innovation concepts such as 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.

Entrepreneurship and Innovation 797 H(3S-0)

Advanced Seminar in Venture Development
797.02. Strategic Legal Planning for New Ventures
Prerequisite: 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

Finance (FNCE)

Finance 601 H(3-1)

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: Management Studies 609 or 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: 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: Finance 601.

Finance 753 H(3-1)

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: Finance 601.

Finance 755 H(3-1)

Capital Budgeting
Capital investment policies, real options, required rate of return calculation, tax factors, risk analysis, buy versus lease, abandonment considerations.
Prerequisite: 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: Finance 601.

Finance 759 H(3-1)

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: Finance 601.

Finance 763 H(3-0)

Corporate Risk Management
Comprehensive introduction to theory and practice of the management of operational and hazard risks based on contemporary financial theories, including risk identification, loss estimation, risk control, risk financing with insurance and other techniques, captive insurance, crisis management, reinvestment decisions, and enterprise risk management.
Prerequisite: 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: Finance 751 or consent of the Haskayne School of Business.

Finance 785 H(3-0)

New Venture Finance
Problems of valuing and financing new ventures. Emphasis on financial theory, best practices and modeling of new ventures. Case studies and opportunities to develop detailed financial plan for live new venture.
Prerequisite: Finance 601 or consent of the Haskayne School of Business.

Finance 789 H(3S-1)

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: Finance 601.

Finance 797 H(3S-0)

Advanced Seminar in Finance
Prerequisite: 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

Human Resources and Organizational Dynamics (HROD)

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: 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(3-1)

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 analyzed and developed through small group exercises.
Prerequisite: Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 723 H(3-1)

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: 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: 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: 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: 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: 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: 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: Human Resources and Organizational Dynamics 601.

Human Resources and Organizational Dynamics 797 H(3S-0)

Advanced Seminar in Human Resources and Organizational Dynamics
Prerequisite: 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

Management Information Systems (MGIS)

Management Information Systems 601 H(3-1)

Management Information Systems
The fundamental role of information systems (IS) and Information Technologies in leading and managing effective organizations. Strategic, tactical and operational aspects of IS are covered, focusing on their impact on managerial decision processes across a range of business contexts. Topics highlight the development, control, impact and evaluation of IS activities from the individual to the societal level of analysis.

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: 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: 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: 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: Management Information Systems 601.

Management Information Systems 797 H(3S-0)

Advanced Seminar in Management Information Systems
Prerequisite: 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 (MGMT)

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 701 H(3-0)

Research Methods in Management
Research design and techniques in management that will prepare students to conduct their research projects.

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: Strategy and Global Management 601.
Note: Credit for both Management Studies 715 and Management Studies 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: 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. Management of these activities must reflect the major structural changes taking place in the world. Increasing growth in international trade heightens the level of international purchasing and logistics activities, demanding that the future manager exploit global sourcing and production opportunities and configure a supply chain management system that provides excellent, cost-effective service on a world-wide basis. Both theoretical and practical approaches are applied to the wide array of topics in global manufacturing, sourcing and distribution.
Prerequisite: 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.
Prerequisites: Accounting 603 and Finance 601.

Management Studies 761 H(3-3T)
(formerly Finance 789.02)

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: Finance 601 or equivalent.
Note: May not be used as part of a student's major in Finance.

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 convariance, 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: 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: 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: Consent of the Haskayne School of Business.

NEW! (Dec. 14, 2009)
Management Studies 789 Q(3-0)
(effective July 1, 2010 and pending PCC approval)

Seminar in Management Studies
Intensive study and discussion of current literature and research with respect to selected topics in Management Studies.
Prerequisite: 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: 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(1-2)

Research Development
Development of research skills through participation in a well defined project under the direct supervision of an experienced researcher.
Prerequisite: 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: 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: Consent of the Haskayne School of Business.
MAY BE REPEATED FOR CREDIT

Management Studies 799 H(3-0)

Topics in Management Studies
MAY BE REPEATED FOR CREDIT

Marketing (MKTG)

Marketing 601 H(3-0)

Marketing Management
An introductory course on marketing management with an emphasis on 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: 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: 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: 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: 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: Marketing 601.

Marketing 785 H(3-0)

New Venture Marketing
The development of new products with emphasis both upon product design and market feasibility.
Prerequisite: 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: Marketing 601 or consent of the Haskayne School of Business.
MAY BE REPEATED FOR CREDIT

Marketing 793 H(3-0)

Strategic Market Planning
Strategic market planning in a corporate context. Developing marketing plans and understanding implementation. Examining the market management process.
Prerequisite: 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: Marketing 601.

Marketing 797 H(3S-0)

Advanced Seminar in Marketing
Prerequisite: 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

Operations Management (OPMA)

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 inventory and quality control to long-term strategic decisions like capacity and location planning. Topics covered in the course may include operations strategy, product/service design and inventory and supply chain management.

Operations Management 719 H(3-0)

Project Procurement and Logistics
Procurement planning activities; commercial practice; tendering; bid evaluation; negotiation and award; contract administration; logistics management; transportation; warehousing and inventory management; modularization; regulatory requirements; customs; claims.
Prerequisite: Strategy and Global Management 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.
Prerequisites: 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.
Prerequisites: Operations Management 601 and Management Studies 613.

Operations Management 797 H(3S-0)

Advanced Seminar in Operations Management
Prerequisite: Consent of the Haskayne School of Business.
MAY BE REPEATED FOR CREDIT

PhD Course

Operations Management 799 H(3S-0)

Doctoral Seminars in Operations Management
799.02. Tactical Research Issues
799.03. Operational Research Issues

Strategy and Global Management (SGMA)

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.
Note: 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: 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, major technological drivers, organization and top management leadership.
Corequisite: Strategy and Global Management 701.

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: Strategy and Global Management 701 or consent of the Haskayne School of Business.

Strategy and Global Management 797 H(3S-0)

Advanced Seminar in Strategy and Global Management
Prerequisite: 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

Tourism and Hospitality Management (TOUR)

Tourism Management 741 H(3-0)
(formerly Tourism and Hospitality Management 741)

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: Consent of the Haskayne School of Business.

Tourism Management 745 H(3-0)
(formerly Tourism and Hospitality Management 745)

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: Consent of the Haskayne School of Business.

PhD Course

Tourism Management 799 H(3S-0)
(formerly Tourism and Hospitality Management 799)

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

HISTORY HIST

Contact Info

Location: Social Sciences Building, Room 656
Faculty Number: (403) 220-3839
Fax: (403) 289-8566
E-mail 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
Candidates should apply to the program of their choice, indicating the area of specialization (see section 5 below).

2. Admission Requirements

In addition to the requirements of the Faculty, 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 FCE 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 post-graduate degree in history

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

3. Application Deadline

Deadlines for the submission of complete applications:
15 January for September admission and funding
15 April 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 Faculty 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. Masters students will complete their coursework through regularly offered History seminars.

Areas of specialization are: Canada, Europe, Latin America, United States, Britain, Imperial India, 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.

Students in the Departments of History, Political Science, Religious Studies and the Centre for Military and Strategic Studies may choose an interdisciplinary specialization in Israel Studies. For further information on the Israel Studies (Interdisciplinary) specialization, see the separate listing in this Calendar.

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.

The Graduate Studies Committee may vote to allow students to enrol in History 691 directed reading courses after reviewing a written request from the student's supervisor.
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, 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 History 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 700-level, including courses in the major, minor and cognate fields. The course work will help the student to prepare a major field, a minor field and a cognate/thematic field. The fields 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 each field as well as their particular area of research.

The minor field will be selected from an area of

history outside of the major field. The cognate/thematic field will consist of either a non-history discipline or a thematic history field such as the ones listed below. The reading list for the minor and cognate/thematic fields will each be roughly half the size of the major field reading list. The reading list for a thematic history field will span three geographical areas. The availability of cognate/thematic fields will depend on faculty members' expertise. Each of a student's three fields must be taught by a different faculty member or as defined by the committee.

Major fields: Canada; Europe (Medieval/Early Modern); Europe (Early Modern/Modern); Britain; Latin America; United States; World; Military/Diplomatic; History of Science.

Minor Fields (to be chosen from outside of Major Field): *Canada*: Beginnings to 1896; 1841 to the Present; Europe: Medieval, 500-1500; Early Modern, 1350-1789; Modern, 1750 to the Present; *Britain*: Early Modern, 1450-1832; Modern, 1688 to the Present; Imperial; *Latin America*: Colonial, 1482-1810; National, 1810 to the Present; United States: Beginnings to 1877; 1865 to the Present; World: China, 960 to the Present; India, 1700 to the Present; *Military/Diplomatic*: Military Diplomatic; History of Science: Scientific Revolution; Social Sciences, 1700 to the Present; Science and Religion, 1200-1759; or a field designed by the student and supervisor in conjunction with the supervisory committee and approved by the Graduate Studies Committee.

Cognate/Thematic Fields: The department prefers that students prepare a cognate field in a non-history discipline but, with the approval of the supervisory committee and the Graduate Studies Committee, students may prepare a thematic field in history appropriate to their work, such as Borderlands, Gender and Sexuality, Legal and Constitutional, Popular Culture, Intellectual, Environmental, Religious, or Atlantic.

c) A thesis normally of 400 pages, including notes, charts and tables, but excluding bibliography and appendices
d) A reading knowledge of one language other than English.
e) A written and oral candidacy examination in major, minor, and cognate fields. The History Department urges candidates to take candidacy examinations within 20 months of first registration. Examinations must be completed within 28 months of first registration.

The doctoral program consists of two terms of coursework relevant to the major, minor, and cognate fields. The second term comprises reading courses in each of the three candidacy fields. 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.

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 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. Each doctoral student takes one three-hour written candidacy examination within a period of ten calendar days in each of the three fields of study. 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 field. The oral candidacy examination is taken no later than twenty calendar days after the last written examination. The department strongly urges candidates to complete their candidacy examinations within 20 months of their first date of registration; candidacy examinations must be taken within 28 months of first registration.

Final thesis oral examinations are open.

11. Research Proposal Requirements

In consultation with the supervisory committee, each doctoral student is required to submit a brief thesis proposal which will be discussed and if necessary revised at a meeting of the supervisory committee no later than four weeks before the candidacy exam. The thesis proposal may serve as an additional basis for questioning during the candidacy exam.

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 Coordinator 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 15 January.

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 http://hist.ucalgary.ca/faculty

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.

History 501 H(3S-0)

Topics in the History of British Imperialism
A thematic and comparative approach to British Imperialism in Africa and South Asia. Topics can include: race, sex and class and the fashioning of imperial cultures, methods of coercion and resistance in imperial territories, medicine and imperialism, and law and imperialism.

History 502 H(3S-0)

Empire and Settlement in the British Atlantic World, 1550-1700
An investigation of the ways the British discovered, established sovereignty over, settled, and used portions of the Atlantic world, circa 1550-1700. Topics include comparative analysis of British and European justifications for claiming new found lands, settlement and migration patterns, and impact upon native peoples and the landscape.

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: One of East Asian Studies 317, East Asia 300, History 209, 301, 315, 317, 405, 407.01, 407.02, 407.03, or consent of the Department.
MAY BE REPEATED FOR CREDIT

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: History 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.
Prerequisites: History 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: 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: One of History 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: History 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
Enlightenment ideas and institutions, including the challenge to religious orthodoxy, the salons and early feminism, the new "universal" laws of the human sciences, and ideas of progress and the origins and course of the Revolution; the liberal and democratic revolutions; Terror and Virtue; failure of the Republic; the imperial saga in France and Europe.
511.01. The Age of Enlightenment
511.02. Revolution and Napoleon

History 513 H(3S-0)

Topics in Modern Russian and Soviet History
Topics may include: the establishment and dismantling of the imperial service state; the social, cultural, and economic transformation of late imperial Russia; women and gender; the experience of empire; the origins and fate of the Bolshevik Revolution; Stalinism; the Cold War.

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: History 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.

History 519 H(3S-0)

Canada from Laurier to Pearson
Political developments in Canada from 1896-1968, with emphasis on the national scene.
Prerequisite: History 337 or 351 or consent of the Department.

History 520 H(3-0)

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.

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.

History 523 H(3S-0)

Topics in Alberta History
Selected topics in Alberta history with emphasis upon the use of local archival sources.
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.
MAY BE REPEATED FOR CREDIT

History 526 H(3S-0)
(Strategic Studies 609)

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.
Prerequisites: History 349 or History 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: 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.
MAY BE REPEATED FOR CREDIT

History 531 H(3-0)

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.

History 533 H(3S-0)

Gender, Race, Class and Women 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.

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: History 359 or 361 or consent of the Department.
MAY BE REPEATED FOR CREDIT

History 537 H(3S-0)

Great Awakenings: Revival Religion in U.S. History, 1720-1900
The origins and development of evangelical Christianity and its relationship to the American Revolution, industrialization, the Civil War, and social reform movements.

History 541 H(3-0)

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: At least one of the following courses: History 371, 373, 477.01 or 477.02.
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: One of History 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: One of History 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 Canada in the 20th and 21st 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: Political Science 321, or History 343, or consent of the Department.

History 553 H(3-0)
(Archaeology 553)

Circum-Caribbean Archaeology and History
The prehistory and history of the indigenous peoples of the Caribbean from the first peopling of the islands to the early contact period.
Prerequisite: Consent of the Department.
Note: Not open to students with credit in Archaeology 531.61.

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.

History 567 H(3-0)(Political Science 567)

United States Constitutional History
History of constitutionalism in the U.S. from colonial times to the present. The process of constitutional development through judicial interpretation of the basic law.

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.

History 571 H(3S-0)

Religion in History
A thematic approach to religious beliefs, rituals, and behaviour in Europe and North America from the medieval era to the present.

History 583 H(3-0)
(Political Science 583)

The United States and the World since 1890
A historical and analytical examination of the development of modern United States foreign policy from the late nineteenth century to the present. Topics include the institutional structure of foreign policy decision-making, including the role of the President, Congress, State Department, Pentagon, and public opinion, and the relationship between domestic politics and foreign policy. Historical dimensions include the turn to imperialism, World War I, the coming of World War II, the Cold War, Korea, Vietnam, Latin American relations, strategic arms limitations talks, and detente.
Prerequisites: Third or fourth year standing and one of History 361, Political Science 381 or consent of the Department.

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: 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.
MAY BE REPEATED FOR CREDIT

History 597 H(3-0)

Honours Directed Reading
Directed readings for Honours students in their third or fourth year.
Note: Not open to students with credit in History 596.
Note: May be repeated for credit with consent of the Department.
MAY BE REPEATED FOR CREDIT

History 598 F(3-0)

Honours Special Subject
The Honours Essay for Honours students in their fourth year.

Graduate Courses

Only a limited number of these 600-level courses will be offered in any one year. Students may obtain further information from the Department.

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)

Research and Methods Seminar

History 655 H(3-0)

Classics of Strategy
Strategic thought from Sun Tzu to Clausewitz, Mahan to Corbett. Analyzes the writings of classic strategic thinkers, and then by way of case studies examines their theories as they pertain to military and political planners from the Peloponnesian War to the present.

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

History 797 H(3S-0)

Advanced Seminar in Historical Research

IMMUNOLOGY MDIM

Contact Info

Location: Health Sciences Centre, Room G329
Faculty number: (403) 210-3937
Fax: (403) 210-8109
E-mail 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

Area of Study: Immunology

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.

A joint MD/Master's and MD/PhD program is also offered under the title "Leaders in Medicine."

The Universities of Calgary and Alberta offer a joint Biomedical Engineering Program. Further information can be obtained from the separate listing in this Calendar.

Students in the MSc and PhD degree programs are normally considered full-time.

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, this program requires:

(a) A baccalaureate degree or its equivalent from a recognized institution with a minimum grade point average of 3.2 (on a 4-point system; approximately equivalent to a B+) on the work of the last two undergraduate years.

(b) Proficiency in the English language. The Test of English as a Foreign Language (TOEFL) is required from applicants whose native language or language of instruction in the institution from which they obtained their degree was not English. Minimum acceptable score is 600.

(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 (CMMB 527 or equivalent). It will be possible for a student to take MDSC 639.01 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.

3. Application Deadline

Deadlines for submission of complete applications for students with international transcripts:
1 April for September admission
1 August for January admission
1 December for May admission

Deadlines for submission of complete applications for students with Canadian and US transcripts:
1 June for September admission
1 October for January admission
1 March 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.

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 Faculty 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. MDSC 639.02 or MDSC 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.
Contributions to journals, relevant journal clubs and/or seminars are desirable.

7. Credit for Undergraduate Courses

No credit will 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. Maximum completion time is 4 years for an MSc and 6 years for a PhD.

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 $18,750 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

Students in the PhD program must complete a candidacy examination, which consists of a written examination and a subsequent oral examination. Candidates will have three weeks in which to provide written answers to two out of four questions set by the candidacy committee. At least one question answered must be in the format of a grant proposal. The oral examination will take place one week after submission of the written answers and should focus on the background knowledge of students in their discipline, as well as their preparedness to do research of high quality in their particular fields of study. A program-approved research proposal must be a precursor to any candidacy exam. However, the oral examination will not include questions on the candidate's research proposal. The candidate's supervisor will act as a non-voting observer at the candidacy examination.

Students who enter directly into a doctoral program after completion of an MSc in Immunology must attempt their candidacy examination within 28 months of initial registration in the program. Students who have transferred into a doctoral program from an MSc program must attempt the candidacy examination within 36 months of initial registration in the program.

All MSc and PhD students in the Immunology Specialization must complete a final thesis oral examination. Final thesis oral examinations consist of a public presentation followed by the examination.

Thesis Oral Examinations are open.

11. Research Proposal Requirements

MSc and PhD students must present a written research proposal to their supervisory committees no later than 12 months after initial registration in the program. The research proposal must be presented and defended before the supervisory committee.

12. Special Registration Information

A request for transfer of program from the MSc program to the doctoral program may be made no later than 24 months after initial registration in the program. Students who request for transfer will be required to give a 45 minute seminar to the Immunology Research Group followed by a one hour oral examination based on the research proposal by the supervisory committee and one member of the IGEC. Approval of transfer will be determined by the examining committee. Written feedback on the performance will be provided to the student jointly by the supervisor and the IGEC member. The student will be required to submit a revised research proposal and complete the course requirements of the doctoral program. He/she must meet the 36-month deadline for the candidacy examination.

13. Financial Assistance

Applicants must identify a source of funding to be admitted into the Immunology Specialization. Graduate students are generally funded by their supervisor's operating grants, internal awards, and/or external awards. Possible sources of financial support are outlined in the Awards Guide of the Red Brochure of the Medical Sciences Graduate Education Program and are listed on the Faculty of Graduate Studies website: http://www.grad.ucalgary.ca/funding. These include Graduate Assistantships (Teaching), Faculty of Graduate Studies Scholarships, Dean's Excellence Awards, Dean's Entrance Awards, and the Faculty of Graduate Studies Open Scholarship Competition. Students applying to the Open Scholarship Competition must submit an application to the Faculty of Medicine. Funding for students in the Immunology Graduate Program is also available through the Canadian Institutes of Health Research (CIHR) Training Program in Immunology, Immunopathogenesis, and Inflammation.

14. Other Information

The Immunology Graduate Program offers the following four courses:

MDSC 639.01: Principles of Immunology
MDSC 639.02: Cellular and Molecular Immunology
MDSC 639.03: Topics in Immunology
MDSC 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 myuofc.ca.

15. Faculty Members/Research Interests

The research interests of current IRG faculty members can be found at:
http://www.ucalgary.ca/irg/faculty

INTERDISCIPLINARY GRADUATE PROGRAM IGP

Contact Info

Location: Professional Faculties Building, Room 3168
Faculty number: (403) 220-7209
Fax: (403) 210-8872
E-mail address: pfisk@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
All degrees are research and thesis-based and can be completed on a full-time or part-time basis.

Previously known as the Resources and the Environment Program, the Interdisciplinary Graduate Program can trace its founding back to 1968. The present name recognizes the breadth of the areas of interdisciplinary research undertaken in the program, which have always included studies of human and cultural resources and environments. The program emphasizes interdisciplinary research in areas not offered by other departmental and faculty programs. Over the years it has provided an intellectually enriching vehicle for many students and faculty members to pursue their research interests where these cross the limits of other program structures.

The Interdisciplinary Graduate Program is largely an administrative unit. It employs no academic faculty members, offers no courses and is, by mandate, both interdisciplinary and non-competitive with existing graduate programs. Its academic strength comes from the fact that all qualified academics across the university, regardless of departmental affiliation, may be thesis supervisors and students may take courses in any department. Thus while it has no faculty members by appointment, it has potentially the largest contingent of academic expertise of any academic unit on campus. The program is particularly well suited to self-motivated learners and mature, independent researchers who have a strong sense of the academic path they wish to pursue.

Students may approach potential supervisors directly or, in the case of applicants from off-campus, the Director will attempt to identify appropriate supervisors once the applicant has submitted a research proposal. Research proposals must be received in a timely fashion, well in advance of the applicable application deadline.

2. Admission Requirements

In addition to Faculty requirements, the Program requires:
UPDATED (Dec. 14, 2009)
For applicants required to prove proficiency in English a TOEFL score of 600 (written test) or 250 (computer-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); or 100 (internet-based test); or an IELTS score of 7.5.

Master of Arts and Master of Science

a) A thesis proposal (approximately 3,500 words plus preliminary bibliography).
b) A statement explaining the interdisciplinary nature of the program of study. This shall include the three academic areas being combined for interdisciplinary study and the list of proposed courses. It shall show the relationship among the proposed courses, supervisory committee members, and areas of study (matrix format is recommended).
c) A recommendation for a supervisory committee of three people from different academic areas relevant to the research work (see section 9).

Doctor of Philosophy

UPDATED (Dec. 14, 2009)

a) Normally, a grade point average of 3.50 or higher on a four point scale over a Master's program
b) A thesis proposal (approximately 3,500 words plus preliminary bibliography).
c) A statement explaining the interdisciplinary nature of the program of study. This shall include the three academic areas being combined for interdisciplinary study and the list of proposed courses. It shall show the relationship among the proposed courses, supervisory committee members, and areas of study (matrix format is recommended).
d) A recommendation for a supervisory committee of four people from at least three different academic areas relevant to the research work (see section 9).
e) A four-year funding proposal.

3. Application Deadline

UPDATED (Dec. 14, 2009)

Deadlines for submission of complete applications for Canadians and Permanent Residents:
1 February for September admission
1 August for January admission

Deadlines for the submission of complete applications for students that require a study permit to enter the program:
1 February for September admission
1 April 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. Advanced credit requests may not exceed one-third of the course load identified at the Admission Seminar.

5. Program Course Requirements

In addition to Faculty requirements, the Program normally requires:

Master of Arts and Master of Science

a) A minimum of four graded half-courses, as determined by the supervisory committee.
b) It is expected that at least half of the courses in a student's program will be at the graduate level.

Doctor of Philosophy

a) A minimum of three graded graduate-level half-courses, as determined by the supervisory committee.
b) Specializations are determined by the supervisory committee in consultation with the Director.

Fieldwork and research done off-campus may be counted toward fulfillment of the full-time study and research requirement.

6. Additional Requirements

After an applicant's file is complete (including thesis proposal and proposed supervisory committee), the file is reviewed by the Director. If approved by the Director, an admissions seminar is held. The student, the proposed supervisory committee members, and the Director are present at the admissions seminar. If the recommendation of the admissions committee is favourable, the Director will forward the file to Graduate Studies with a recommendation for admission and approval of the supervisory committee.

In the event that an applicant cannot attend the admission seminar, special arrangements for applicant participation will be made.
Applicants are admitted to undertake the program approved by the admissions committee and the Faculty of Graduate Studies must approve any changes to that program.

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

Students must identify a supervisor and supervisory committee in conjunction with completion of the thesis proposal. Supervisory committees for Master's students normally consist of three people (supervisor plus two additional members). Supervisory committees for doctoral students normally consist of four members (supervisor plus three additional members). At least three different academic areas should be represented on the supervisory committee. Identification of the proposed Supervisory Committee must also include confirmation of the supervisory committee members' willingness to assume this role after review of the research proposal.

10. Required Examinations

Doctoral candidacy examinations have a written and an oral component. The written candidacy examination normally consists of a set of three questions established by the supervisory committee. The student has three weeks to complete the written candidacy papers. The student will defend the written candidacy papers during an oral candidacy examination within one month of their submission. Although the written paper forms the basis of the oral candidacy examination, questions may extend beyond the written papers to areas as outlined in the notice of candidacy examination.

Final thesis oral examinations will be open.

11. Research Proposal Requirements

A fully developed thesis proposal is required for admission. However, the thesis proposal may be modified in consultation with the supervisory committee.

12. Special Registration Information

IGP students register using the Student Centre accessible through the Portal at https://my.ucalgary.ca; however, course registration must be completed manually by completion of the Faculty of Graduate Studies *Change of Registration* form.

13. Financial Assistance

Limited financial assistance may be available to qualified full-time 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 by 15 January.

14. Other Information

Enquiries concerning the program should be addressed to the Program Administrator, Interdisciplinary Graduate Program, University of Calgary, Professional Faculties Building, Room 3168, Calgary, Alberta T2N 1N4.

KINESIOLOGY KNES

Contact Info

Location: Kinesiology B, Room 146
Faculty number: (403) 220-5183
Fax: (403) 220-0105
E-mail address: knesgrad@ucalgary.ca
Web page URL: http://wcm2.ucalgary.ca/knes/grad

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)
Master of Science (MSc), thesis-based
Master of Kinesiology (MKin), course-based

The Master of Science degree is a full-time degree that may be taken in a variety of specializations according to faculty research interests. The Master of Kinesiology is offered as a course-based program. The Doctor of Philosophy degree is offered as a full-time degree that may be taken in a variety of specializations according to faculty members' research interests.

The Universities of Calgary and Alberta offer a joint Biomedical Engineering Program. Further information can be obtained at the website http://www.schulich.ucalgary.ca/Biomedical/.

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, the Faculty of Kinesiology requires:

Master of Science

a) Consent for supervision from an approved Faculty member in Kinesiology
b) An appropriate academic background for the area of specialization

Master of Kinesiology

UPDATED (Nov. 4, 2009) (Jan. 6, 2010)

a) An appropriate undergraduate degree with course work in Anatomy, Exercise Physiology, Biomechanics, Sports Psychology, Statistics. For application for the 2010 / 2011 academic year, an appropriate undergraduate degree with coursework in Anatomy, Exercise Physiology, Biomechanics, Sports Psychology and Statistics.
b) A demonstrated ability to be self-motivated and capable of independent study as shown in undergraduate studies, volunteer work and/or full-time work

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 grade point average of 3.2 or higher on a four-point scale over the last two years of study
d) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 580 (written) or 237 (computer-based)

A student may request a transfer from the Master of Science program to the doctoral program, upon the recommendation of the supervisory committee

3. Application Deadline

The deadline for the submission of complete applications is 31 March for September 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:

Master of Kinesiology

a) Two full courses, six half-courses and two quarter courses:

Core Courses (Required of all students): Kinesiology 606, Kinesiology 615, Kinesiology 617, Kinesiology 637, Kinesiology 673, Kinesiology 690, Kinesiology 715, Kinesiology 773, Kinesiology 775 and Kinesiology 785

b) A final oral presentation is considered the capstone event. This will be undertaken in conjunction with KNES 715.

Master of Science

a) One-half course in statistics at the graduate level
b) One-half course in research design at the graduate level
c) A maximum of three additional half-courses, determined by the supervisor according to the student's background and research focus. When appropriate, students may enrol in courses offered by faculties other than Kinesiology

Doctor of Philosophy

A minimum of three graduate-level half-courses, approved by the supervisory committee

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

Expected completion time is two years for the Master of Science program and 16 months for the Master of Kinesiology program. Maximum completion time is four years for the Master of Science and six years for the Master of Kinesiology. Expected completion time is four years for the Doctor of Philosophy; maximum completion time is six years.

9. Supervisory Assignments

The relationship between the supervisor and the student is the basis of the Master of Science and Doctor of Philosophy programs in Kinesiology. Rather than having a specified program and extensive rules and regulations determining the learning experience, the supervisor and student are expected to determine the scope and quality of the student's program. The Faculty offers a broad spectrum of research areas within the field of Kinesiology.

Master of Science and doctoral students must have identified a supervisor at the time of admission. For the Master of Science program, the student and supervisor together select a supervisory committee consisting of the supervisor plus two other faculty members within three months following the initial registration. The composition of the supervisory committee must be approved by the Associate Dean (Graduate) of the Faculty of Kinesiology.

The doctoral supervisory committee is selected according to Faculty of Graduate Studies procedures. The student meets with the supervisory committee within the first three months in program, then a minimum of once a year thereafter. The supervisory committee must be approved by the Associate Dean (Graduate) of the Faculty of Kinesiology.

10. Required Examinations

Doctoral candidacy examinations have a written and an oral component. The student and supervisor select one of the following:

a) The written component will be a closed book, six-

hour examination in two three-hour blocks, administered by the supervisor. The examination is based on questions from the candidacy examination committee. The student will answer four out of five questions. The written answers are circulated to the candidacy examination committee immediately thereafter. The oral candidacy examination, based on the written examination, general knowledge and the thesis proposal, will take place seven days later, or

b) Five questions from the candidacy examination committee will be given to the student four weeks before the oral 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 examination. Each paper should be a maximum of twenty double-spaced pages. The oral candidacy examination, based on the written examination, general knowledge and the thesis proposal, will take place seven days later.

Both the written and the oral components of the candidacy examination must be found acceptable in order to receive a passing grade.

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 Health Research Ethics Board before beginning data collection. Research with animals must receive approval from a University Animal Care Committee.

Each Master of Science student presents a thesis proposal to a thesis proposal committee before collecting data. Each doctoral student must prepare a research proposal, before sitting the candidacy exam: this is no later than twenty-four months after beginning the program.
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 Associate Dean (Graduate) of the Faculty of Kinesiology.

12. Special Registration Information

None.

13. Financial Assistance

For Doctoral students, evidence of external financial support for their program must be provided before admission. It is expected that students will be funded through competitive scholarships or studentships or supported by their supervisors' research funds.

Financial assistance in the form of Faculty of Graduate Studies Scholarships and Graduate Assistantships (Teaching) may be available to qualified students. For information on awards, please contact the Graduate Program in the Faculty of Kinesiology. Students are encouraged to seek external financial assistance for their programs because the Faculty of Kinesiology cannot guarantee financial assistance.

14. Other Information

Initial enquiries should be directed to the Graduate Program, Faculty of Kinesiology.

15. Faculty Members/Research Interests

Current faculty and their areas of research interest can be found at
http://wcm2.ucalgary.ca/knes/facultycontact

Dance (DNCE) Course Offerings

Graduate Courses

Dance 603 H(3-0)
(formerly Dance Education 603)

Special Topics
Selected topics in dance education and related subjects.
Prerequisite: Consent of the Program of Dance
MAY BE REPEATED FOR CREDIT

Dance 681 H(2-S2)

Special Topics in Dance
Prerequisite: Consent of the Program of Dance
MAY BE REPEATED FOR CREDIT

Kinesiology (KNES) Course Offerings

Graduate Courses

Kinesiology 601 H(3S-0)

Graduate Seminar
Seminar discussion and critique on current research in human physical activity and related subjects.
Prerequisite: Consent of the Faculty.

Kinesiology 603 H(3-0)

Special Topics
Intensive study of selected topics in human physical activity and related subjects.
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Kinesiology 605 H(4T-8)

Practicum
Prerequisite: Consent of the Faculty.
Note: Open to Exercise and Functional Fitness students only. If this choice is made, the student must select another approved graduate level half-course option.
MAY BE REPEATED FOR CREDIT
NOT INCLUDED IN GPA

Kinesiology 606 F(2T-3)

Practical Skills for Applied Exercise Physiology
Practice with measurement tools involved in assessing various types of fitness and lifestyle factors that potentially influence risk for chronic disease.
Prerequisite: Consent of the Faculty.

Kinesiology 607 H(0-3T)

Project
Students will identify, address, and resolve problems relating to their specialty. The project will be completed under the direction of a supervisor. A final report in a format appropriate to the nature of the project will be required.
Prerequisite: Consent of the Faculty.

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: Consent of the Faculty.
Note: 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, interpretation of data, scientific writing, and critical appraisal of the literature relevant to kinesiology.
Prerequisite: One graduate course in Biostatistics or Statistics (including Kinesiology 609, Medical Science 643.01, Psychology 614, or equivalent) and consent of the Faculty.

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: Consent of the Faculty.

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: Consent of the Faculty.

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: Consent of the Faculty.

Kinesiology 643 H(3S-0)

Selected Topics in Sport and Fitness Management
An examination of the managerial role in selected sport and fitness situations.
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Kinesiology 651 H(3S-0)

Cognitive Science: Vision and Motor Behaviour
An exploration of research in cognitive science, vision, and eye movement as these areas relate to motor learning and performance with particular attention to the development of motor expertise, in both normal and atypical populations.
Prerequisite: Kinesiology 251 and 253 or 250 or equivalent.

Kinesiology 653 H(3-0)

Special Topics in Neuromotor Psychology
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Kinesiology 655 H(2-2)

Kinanthropometry
The quantitative study of size, shape, proportion, composition, and maturation of the human body in relation to gross motor function in sport, physical activity, and the work place.
Prerequisite: Kinesiology 355 or consent of the Faculty.

Kinesiology 661 H(3-0)

Special Topics in Biomechanics
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Kinesiology 663 H(3-0)
(Mechanical Engineering 663) (Medical Science 663)

Advanced Biomechanics
Theoretical and applied aspects of biomechanics in the acquisition and performance of sport skills.
Prerequisite: Consent of the Faculty.

Kinesiology 669 H(3-0)

Special Topics in Sport Medicine
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

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: Kinesiology 473 or consent of the Faculty.

Kinesiology 675 H(3-0)

Special Topics in Exercise Physiology
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Kinesiology 690 F(1T-8)

Practicum
The practicum will normally be an appropriate experience in an applied physiology environment.
Prerequisite: Consent of the Faculty.
NOT INCLUDED IN GPA

Kinesiology 695 H(3-0)

Special Topics in Sport and Exercise Psychology
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Kinesiology 697 H(3S-0)

Health and Exercise Psychology
An examination of applied psychological theories, research, and practices in promoting exercise adherence and in the development of optimal health through physical fitness.
Prerequisite: Consent of the Faculty.

Kinesiology 699 H(3S-0)

Applied Sport Psychology I
The examination and practice of mental training theory and skills in maximizing athletic performance.
Prerequisite: Consent of the Faculty.

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: Consent of the Faculty.

Kinesiology 751 H(3T-0)

Directed Study in Neuro-Motor Psychology
Individual study in a tutorial setting. An individual course is set for each student based on a mutually agreed upon topic. Students are required to read extensively in a specialist area of their choice.
Prerequisite: Kinesiology 651.

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: Kinesiology 673 and consent of the Faculty.

Kinesiology 775 H(3-3)

Clinical Exercise Physiology
Exercise for clinical populations: exercise assessment and prescription for disease modification.
Prerequisite: Kinesiology 773 and consent of the Faculty.

Kinesiology 777 H(3-0)

Physiology of Skeletal Muscle
An in-depth study of the structural and contractile properties of skeletal muscle.
Note: Credit for both Kinesiology 777 and 675.85 will not be allowed.

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: Kinesiology 773 and consent of the Faculty.

Kinesiology 799 H(3S-0)

Applied Sport Psychology II
An examination of further selected topics in applying psychological technique to athletic performance.
Prerequisite: Kinesiology 699.

LAW LAW

Contact Info

Location: Murray Fraser Hall
Faculty number: (403) 220-8154
Fax: (403) 210-9662
E-mail address: law@ucalgary.ca
Web page URL: http://www.law.ucalgary.ca

1. Degrees and Specializations Offered

The Faculty of Law offers thesis-based and course-based Master of Laws (LLM) programs exclusively in the Faculty's areas of specialization: natural resources, energy and environmental law. Subject to government approval, the Faculty will also offer a Post Graduate Certificate in Natural Resources, Energy and Environmental Law. For more information on the Post Graduate Certificate, please see the Faculty of Law Calendar or website.

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:

a) A first academic degree in law
b) For applicants required to provide proof of proficiency in English, a minimum TOEFL Internet (ibT) score of 100, of which the reading, listening and writing component must total 75; or a minimum TOEFL score of 600 (paper-based) or 250 (computer-based) and a TWE score of 5.5; or the minimum IELTS overall band of 7.0, with a reading and writing band minimum of 7.0; or successful completion of a University of Calgary Faculty of Law Post Graduate Certificate.
c) Applicants to the thesis-based LLM program must submit a brief statement of their proposed thesis and indicate their proposed supervisor. Forms and details are available from the Faculty.

3. Application Deadline

a) Thesis-based LLM applications are accepted for September admission only. The deadline for submission of completed applications is 15 December.
b) Course-based LLM and Post Graduate Certificate applications are accepted for September or January admission. The deadline for completed applications for September admission is 15 December and the deadline for completed applications for January admission is 15 July.
c) 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 normally 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 Graduate 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 & Methodology
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 Coordinator
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 Coordinator.
e) Two terms in residence, normally consecutive and normally from September to April. Students need 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 & Methodology
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 Coordinator. At least two of the five additional courses must be at the 600-level and at least two of them must have research paper evaluations. One of the additional courses may be Law 705, the Graduate Seminar in Legal Theory.
c) 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 Coordinator and evaluated on a Pass/Fail basis.

Post Graduate 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 and including at least two at the 600- level. All courses require the approval of the Graduate Coordinator. This program is still pending approval.

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 Graduate Certificate program must be completed within three calendar years of initial registration.

9. Supervisory Assignments

Contact the Faculty of Law Graduate Coordinator 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 Graduate 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

Graduate Courses

Law 601 H(2-0)(2 credits)

Advanced Criminal Law
In depth examination of selected areas of criminal law with an emphasis on substantive issues. Topics may include: double jeopardy, police entrapment, conspiracy, corporate crime, theft and related offences, impaired driving and breathalyzer offences, plea negotiations, ethical aspects of practicing criminal law, mistake of law as a defence, juveniles and the criminal process. Reference is made to special evidential and procedural problems associated with the chosen topics.
Prerequisite: Law 511 or consent of the Faculty.

Law 603 H(2-0)(2 credits)

Advanced Labour Law
Examines the process of resolving disputes arising out of the interpretation and application of collective agreements by way of grievance and arbitration procedures. Topics include pre-arbitration procedures, arbitrability, the arbitration tribunal and hearing, arbitral remedies, and the enforcement and judicial review of arbitration awards. Selected issues in grievance determination will be studied such as discipline, discharge, seniority, promotion, work assignment, contracting out, technology change and management rights.
Prerequisite: Law 517 or consent of the Faculty.

Law 605 H(2-0)(2 credits)

Advanced Oil and Gas Law
Selected problems in oil and gas law including special industry contractual problems (farm out, joint operating and royalty agreements), and legislative and regulatory issues. In dealing with the latter, emphasis is laid upon the law and practice of the Alberta Department of Energy and Natural Resources, the Federal Department of Energy, Mines and Resources, the E.R.C.B., the Public Utilities Board and the N.E.B.
Prerequisite: Law 523 or consent of the Faculty.

Law 607 Q(1-0)(1 credit)

Advanced Legal Research
Advanced legal research including recent developments in technological and electronic legal research. The emphasis is on advanced legal research skills required for successful legal practice.

Law 609 H(3-0)(3 credits)

Canadian Legal History
Selected topics in the history of the development of law and legal institutions in Canada, with particular reference to the Northwest Territories and the early legal history of Alberta. Topics are chosen to reflect the interests of the students, and course work includes research in the original court records.

Law 613 H(3-0)(3 credits)

Conflict of Laws
An examination of the doctrines and rules governing the disposition of legal disputes which cut across provincial or national boundaries. Topics covered 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 areas of private law - torts, contracts, property, succession and family law.

Law 619 H(2-0)(2 credits)

Estate Planning
The elements of estate planning including: the use of trusts; the transfer of interests in businesses; planning for spouses, farmers, and disabled people. The impact of the Income Tax Act on estate planning will be considered.
Prerequisite: Law 527 or consent of the Faculty.

Law 629 H(2-0)(2 credits)

Trial Evidence and Procedure
An examination of the particular problems and requirements of litigation with the focus on the trial and criminal law evidence; topics will include relevance; character evidence; self-serving evidence; the trial structure; witnesses and experts; examination-in-chief and cross-examination; documentary evidence; views; verdicts and judgements; costs and appeals.

Law 633 H(2-0)(2 credits)

Advanced Contracts and Torts
An examination of the appropriate province of the law of contract and the law of tort, with special emphasis upon the historical development of contractual and tortious liability; the availability of contractual and tortious claims arising out of pre-contractual negotiations; the possibility of concurrent or alternative liability in contract and tort arising out of the performance of a contract; the advantages or disadvantages, and the effects, of claiming in contract or tort; and the encroachment of tort upon contract's preserve.

Law 635 H(3-0)(3 credits)

Aboriginal Law
A survey of issues in aboriginal law; topics include: law of aboriginal societies and recognition of aboriginal custom; self-determination and other applicable principles of international law; self-government; common law recognition of aboriginal title; treaties; the fiduciary duty of the Crown; constitutional entrenchment of aboriginal and treaty rights; application of provincial law: Indian Act, land surrenders and exemptions from seizure and taxation; aboriginal justice systems.

Law 637 H(2-0)(2 credits)

Energy Law
Selected legal issues related to the energy industry, including the stages of research and exploration, development and production, transportation, marketing and consumption. Emphasis is on the relevant fiscal systems and regulatory processes, particularly in the national and international context.

Law 639 H(2-0)(2 credits)

Trial Advocacy
Simulated trial practice using various substantive law fields; discoveries and pre-trial settlement negotiations; supervised preparation of all trial documentation; filing requirements for trial; concludes with full trial moot.
Note: This course is graded CR, D or F.

Law 643 H(3-0)(3 credits)

Trusts
The concept of the trust and its development in Equity; its relationship to other legal concepts; various types of trusts; constituting, administering and terminating the trust; trustee duties and powers; variation of trusts; breach of trust and the doctrine of tracing; with some attention to the modern uses of the trust and its statutory modifications.

Law 649 H(2-0)(2 credits)

Law and Contemporary Problems
The impact of a variety of contemporary issues upon the law and legal institutions; law reform and the development of new legal structures to accommodate change in society.
MAY BE REPEATED FOR CREDIT

Law 651 H(0-2)(2 credits)

Directed Research I
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 a Faculty member to supervise the particular projects.
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Law 653 H(0-3)(3 credits)

Directed Research II
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 a Faculty member to supervise the particular projects.
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Law 655 H(2-0)(2 credits)

The Legal Profession and Ethics
The Canadian legal profession from sociological and legal perspectives, focusing on the roles lawyers play in our legal system. Conflicts between and among those roles, and conflicts between 'official ethics' and broader ethical values are explored.

Law 657 H(2-0)(2 credits)

Law and Medicine
The focus is on legal aspects of frontier developments in medical practice including professional confidentiality, birth technology, prolongation of life, human experimentation, mental illness, determination of competency and fitness to stand trial, transplantation, genetics, rights of the unborn child and sterilization. The seminar format will involve a number of practitioners from both Law and Medicine.

Law 659 H(3-0)(3 credits)

Corporate Finance and Securities
The financing of business entities, and their reorganization; particular emphasis on securities regulation.
Prerequisites: Law 509 and 535 or consent of the Faculty.

Law 661 H(2-0)(2 credits)

Advanced Business Transactions
Selected topics relating to mergers and acquisitions, including the structure and regulation of take-over bids and plan of arrangement transactions.

Law 663 H(2-0)(2 credits)

Dispute Resolution
Various dispute resolution processes and the role of lawyers. The focus is on mediation and arbitration, but hybrid processes (mediation/arbitration and mini-trials both private and judicial), pre-trial conferences, and the design of dispute resolution systems (preventative lawyering) are included. The seminar addresses 'how' and also 'what' is being done in dispute resolution. Political, social, and cultural dimensions of dispute resolution, and particularly mediation, will be introduced. Role playing and simulations will be used.
Prerequisite: Law 501 or consent of the Faculty.

Law 665 H(2-0)(2 credits)

International Trade Law
The public law framework for international trade. Emphasis will be placed on the FTA, NAFTA, and GATT. Topics to be covered include basic principles of international trade law, anti-dumping and countervail actions, and dispute resolution.

Law 667 H(2-0)(2 credits)

Advanced Constitutional Law
Selected topics in constitutional law. Course content will vary, but will cover fundamental principles represented by sections 1, 7, 15, 24, and 52 of the Constitution Act, 1982.

Law 669 H(2-0)(2 credits)

Mooting and Clinical Studies
Preparation for and participation in approved external competitive moots including the Gale Cup Moot and the Alberta Challenge Moot or participation in an approved clinical experience in an area not otherwise the subject of a clinical course.
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Law 671 H(2-0)(2 credits)

Advanced Environmental Law
Selected topics in Environmental Law. Topics to be covered may include the law and practice of environmental impact assessment; the law of protected areas and protected species; sustainable development; biodiversity; global warming; command and control regulations vs. market based emissions control measures.
Prerequisite: Law 531.

Law 673 H(3-0)(3 credits)

Jessup Moot
Preparation for and participation in the Philip C. Jessup International Law Moot Court Competition.
Prerequisite: Consent of the Faculty.

Law 675 H(2-0)(2 credits)

Western Canada Trial Competition
Preparation for and participation in the Western Canada Trial Competition.
Prerequisite: Consent of the Faculty.

Law 679 H(2-0)(2 credits)

Feminist Legal Theory
A critical inquiry into the nature and function of law from a variety of different perspectives within feminist legal theory; the role of rights and of legal discourse, and the possibilities and limitations of law as a strategy for social transformation.

Law 681 H(3-0)(3 credits)

Current Legal Problems
The impact of a variety of contemporary issues upon the law and legal institutions; law reform and the development of new legal structures to accommodate change in society.
MAY BE REPEATED FOR CREDIT

Law 683 H(2-0)(2 credits)

Advanced Family Law
Selected topic in Family Law such as division of pensions, international family law and the law relating to children (including regulatory aspects e.g. Child Welfare). Current developments in law reform and social policy change will be addressed. Short placements may be offered.
Prerequisite: Law 515 or consent of the Faculty.

Law 685 H(2-0)(2 credits)

Business Clinical Seminar
A clinical seminar in the practice of business law. Supervised clinical experience will be gained through appropriate placements.
Prerequisite: Law 509 or consent of the Faculty.
Note: This course is graded CR, D or F.

Law 687 H(2-0)(2 credits)

Criminal Justice Clinical Seminar
A clinical seminar considering the law and practice of the criminal justice system, involving simulated exercises and/or placements.
Prerequisites: Law 511 and 639 or consent of the Faculty.
Note: This course is graded CR, D or F.

Law 689 H(2-0)(2 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.
Prerequisite: Law 515 or consent of the Faculty.
Note: This course is graded CR, D or F.

Law 691 H(2-0)(2 credits)

Natural Resources Clinical Seminar
A clinical seminar involving placements in any one of the following practice areas: energy law, resources law, water law, and environmental law.
Prerequisites: One of Law 523 or 531; plus one of Law 605, 637, 671 or 649.01; or consent of the Faculty.
Note: This course is graded CR, D or F.

Law 703 H(3-0)(3 credits)

Graduate Seminar in Legal Research & 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.

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.

Law 707 H(2-0)(2 credits)

Selected Problems in Natural Resources, Energy and Environmental Law
Selected legal issues in the renewable and non-renewable energy and natural resources sectors and in environmental law.
Note: This course is only open to graduate students.
MAY BE REPEATED FOR CREDIT

Law 709 H(3-0)(3 credits)

Selected Problems in Natural Resources, Energy and Environmental Law
Selected legal issues in the renewable and non-renewable energy and natural resources sectors and in environmental law.
Note: This course is only open to graduate students.
MAY BE REPEATED FOR CREDIT

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Contact Info

Location: Social Sciences Building, Room 820
Faculty number: (403) 220-5469
Fax: (403) 282-3880
E-mail address: toth@ucalgary.ca
Web page URL: http://ling.ucalgary.ca/

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 Faculty 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 TOEFL score of 560 (written test), 220 (computer-based test), 83 (internet-based test) OR a minimum score of 550 (written test) or 213 (computer-based test), 80 (internet-based test) AND a minimum score of 5.0 on the Test of Written English (TWE)

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 TOEFL score of 560 (written test), 220 (computer-based test) OR a minimum score of 550 (written test) or 213 (computer-based test) AND a minimum score of 5.0 on the Test of Written English (TWE)

3. Application Deadline

Students applying for university scholarships must submit their applications to the department by 1 February. All applications submitted by the university scholarship deadline will also receive full consideration for department scholarships and assistantships. We accept applications throughout the year. However, only applications received by 1 July will normally be considered for September admission, and financial support may be limited for applications received after 1 February. 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 Faculty 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, Linguistics 613 and Linguistics 697
c) Linguistics 600
d) A demonstrated knowledge of a language other than English. This requirement can be met in the following ways:
   - having received credit for one full course equivalent in a language other than English at the undergraduate level
   - *Note: This may include field methods courses and/or courses on the structure of the language offered in the Department of Linguistics.*
   - demonstrating a native or near native ability in a language other than English
   - demonstrating a strong reading knowledge of a language other than English

Doctor of Philosophy

a) Completion of four half-course equivalents in Linguistics beyond the MA, including Linguistics 711 and Linguistics 713. 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) Either a knowledge of two languages other than English, or one language other than English and one research tool. This requirement can be met by fulfilling two of the following three possibilities, subject to approval by the supervisor:
   i. A reading knowledge of a commonly used world language. Acceptable languages for the reading language requirement are those in which a significant body of writing pertaining to theoretical linguistics exists. Such languages include, but are not limited to French, German, Russian, Chinese, and Japanese. This requirement can be met in the following ways: *

   - successful completion of at least one full-course equivalent at the senior level in the language;

- satisfactory performance in an examination given within this Department or evidence of past schooling in which this was the language of instruction

ii. A working knowledge of a second language. Acceptable languages for the working knowledge requirement include all non-Indo-European languages and all lesser studied Indo-European languages. This requirement can be met in the following ways: *

- successful completion of a graduate level course on the structure of the language;
- successful completion of at least one full-course equivalent at the senior level in the language;
- a demonstrated ability to conduct field work with bilingual speakers of the language;
- satisfactory performance in an examination given within this Department;
- evidence of past schooling in which a less commonly used language was the language of instruction.

iii. A working knowledge of statistics and experimental design. This requirement can be met by passing one graduate-level half-course pre-approved by the department (for example, Psychology 615 or 617).*

*****_It is the responsibility of the student to supply evidence that course work in a language and/or in statistics and experimental design at another university meets these requirements._

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

At both the Master's and the doctoral level, with the approval of the Graduate Coordinator and the Department Head, a student may take a maximum of two undergraduate half-course equivalents for credit. 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 an interim advisor (in most cases the Departmental Graduate Coordinator) when first registering in the program. Students must choose a thesis supervisor by the end of the second term of study (usually April). Selection of a supervisor should be by mutual agreement between the student and the faculty member concerned, in consultation with the Graduate Coordinator. It is normal practice for the student to approach an appropriate faculty member about thesis or program supervision, rather than vice versa. In cases where the student is unsure of how to select a supervisor, the help of the Graduate Coordinator, the Department Head, or another professor should be sought.

Doctor of Philosophy

Selection of a supervisor should be by mutual agreement between the student and the faculty member concerned, in consultation with the Graduate Coordinator.

Students are strongly advised to finalize their choice by the end of the second term of study, and must do so no later than the second annual registration. It is normal practice for the student to approach an appropriate faculty member about dissertation or program supervision, rather than vice versa. In cases where the student is unsure of how to select a supervisor, the help of the Graduate Coordinator, the Department Head, or another professor should be sought.

The supervisory committee should be constituted in consultation with the student and will normally consist of the supervisor and two members recommended by the Department Head, and approved by the Dean of Graduate Studies. 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 submitted to the Dean of Graduate Studies 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. The written candidacy examinations consist of two original research papers in different areas of linguistics that must be submitted no later than twenty-seven months after the first registration. Normally, one paper will be in the area of either syntax or phonology and a second in an area in which at least one faculty member in the department has expertise. An oral candidacy examination based on these papers and general knowledge of the relevant areas of research will take place no later than twenty-eight months after the first registration. Questions on the research proposal will not be included in the oral candidacy examination.

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-eight 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 1 February.

Students whose applications are complete by 1 February 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 in the Department's *Graduate Handbook* and 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 Department of Linguistics, SS 820; 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://ling.ucalgary.ca/graduate

Undergraduate Courses

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

Graduate Courses

Admission to all 600-level courses is with the consent of the Department in addition to any other prerequisites that may be stated.

Linguistics 600 Q(2-0)

Introduction to Graduate Studies in Linguistics
An introduction to areas of faculty research and theoretical orientations, as well as to research and professional skills.
NOT INCLUDED IN GPA

Linguistics 605 H(3-0)

Field Methods
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Linguistics 611 H(3-0)

Advanced Syntactic Analysis I
Prerequisite: Linguistics 511 or consent of the Department.

Linguistics 613 H(3-0)

Advanced Phonological Analysis I
Prerequisite: Linguistics 403.

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: 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: 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: 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 697 H(3-0)

Thesis Research Development

Linguistics 699 H(3S-0)

Conference and Reading Course
MAY BE REPEATED FOR CREDIT

Linguistics 711 H(3-0)

Advanced Syntactic Analysis II

Linguistics 713 H(3-0)

Advanced Phonological Analysis II

MANAGEMENT PROGRAMS – See listing under Haskayne School of Business.

MATHEMATICS AND STATISTICS MTST

Contact Info

Location: Math Sciences Building, Room 462
Faculty number: (403) 220-6299
Fax: (403) 282-5150
E-mail 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
Divisions: Applied Mathematics, Pure Mathematics and Statistics

2. Admission Requirements

In addition to Faculty requirements, the Department requires:

Master of Science

a) Normally, an Honours Bachelor's degree, or its equivalent, in the subject of the division for which application is made
b) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (written test), 250 (computer-based test) or 100 (internet-based test); or minimum IELTS score of 7

Doctor of Philosophy

a) A Master's degree or equivalent in the subject of the division to which application is made
b) For applicants required to provide proof of proficiency in English, a minimum TOEFL score of 600 (written test) or 250 (computer-based test) or 100 (internet-based test); or minimum IELTS score of 7
c) Excellent students, admitted to the Master's program, may be admitted after the first year to the PhD program with three completed half-courses with a 3.7 GPA and Divisional Graduate Committee approval. Such transfers are to be initiated by supervisors and are to include information about research ability.

3. Application Deadline

The deadline for submission of complete applications is 15 January 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 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 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 AMAT 605, AMAT 617, PMAT 607, PMAT 613 in their program; and, in each of the first two years of their program, the seminar course AMAT 621.
b) Pure Mathematics students must include two of AMAT 605, AMAT 617, PMAT 607, PMAT 613 in their program; and, in each of the first two years of their program, the seminar course PMAT 621.
c) Statistics students must include any three of STAT 701, STAT 703, STAT 721, STAT 723 in their program; and, in each of the first two years of their program, the seminar course STAT 621.

Master of Science (course-based)

This degree can be completed on a full-time or part-time basis. In addition to the Faculty of Graduate Studies requirement that full-time students must be registered in six or more half-courses per annual registration, the normal course load for a full-time course-based Master of Science student is three half-courses per term.

a) Applied Mathematics students take ten half-course equivalents which must include two of AMAT 605, AMAT 617, PMAT 607, PMAT 613; and, in each of the first two years of their program, the seminar course AMAT 621.
b) Pure Mathematics students take ten half course equivalents which must include two of AMAT 605, AMAT 617, PMAT 607, PMAT 613; and, in each of the first two years of their program, the seminar course PMAT 621.
c) Statistics students take eight half course equivalents which must include any three of STAT 701, STAT 703, STAT 721, STAT 723; and, in each of the first two years of their program, the seminar course STAT 621.

All students complete a project resulting in a written report, followed up by an oral examination on the 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 AMAT 605, AMAT 617, PMAT 607, PMAT 613; and, in each of the first three years of their program, the seminar course AMAT 621.
b) Pure Mathematics students must include eight half-course equivalents in their total graduate program (MSc and PhD); including the equivalent of two of AMAT 605, AMAT 617, PMAT 607, PMAT 613; and, in each of the first three years of their program, the seminar course PMAT 621.
c) Statistics students must include eight half-course equivalents in their total graduate program (MSc and PhD); including the equivalent of STAT 701, STAT 703, STAT 721, and STAT 723; and, in each of the first three years of their program, the seminar course STAT 621.

6. Additional Requirements

All MSc graduate students are required to register in one of the Seminar courses AMAT 621, PMAT 621, or STAT 621 in each of the first two years of their programs.

All PhD students are required to register in one of the Seminar courses AMAT 621, PMAT 621, or STAT 621 in each of the first three years 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 Director of Graduate Studies, Department of Mathematics and Statistics assigns supervisors based upon the graduate student's proposed program.

10. Required Examinations

Course-based Master's students must pass an oral examination on the written report and within three months of the completion of all course-based requirements.

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 student and 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

Details for financial assistance can be obtained from the Department website:
http://math.ucalgary.ca/student-finances.

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 15 January.

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

Applied Mathematics (AMAT)

Undergraduate Courses

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

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: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Mathematics 503 H(3-1T)

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: 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.
Prerequisites: Pure Mathematics 445 or 545; and one of Applied Mathematics 311 or 307; or consent of the Division.

Applied Mathematics 507 H(3-0)

Introduction to Relativity Theory
Mathematical theories of space and time. Special Relativity. Electro-dynamics. General Relativity.
Prerequisites: Applied Mathematics 505 or consent of the Division.

Applied Mathematics 509 H(3-0)

Analytical Dynamics
Symplectic geometry, Hamilton's equation, Hamilton-Jacobi theory, constraints and reduction.
Prerequisites: Applied Mathematics 505 or consent of the Division.

Applied Mathematics 581 H(3-0)

Advanced Futures and Options
Stochastic calculus and the dynamics of asset prices, martingale theory and risk-neutral valuation, interest rate models, energy and commodity markets, value-at-risk and risk management.
Prerequisites: Applied Mathematics 483 and Statistics 407.

Graduate Courses

In addition to the prerequisites listed below, consent of the Applied Mathematics Division 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: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Applied Mathematics 605 H(3-0)

Differential Equations III
Linear systems, classification. Nonlinear systems: Existence and uniqueness. Flow and one parameter groups of transformations. Stability theory. Hyperbolicity, Unstable/Stable/Center manifold theorems. Poincare-Bendixson.
Prerequisites: 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: Consent of the Division.

Applied Mathematics 617 H(3-0)
(formerly Pure Mathematics 617)

Analysis IV
Analysis in abstract spaces. Function spaces.
Prerequisite: Pure Mathematics 545.

Applied Mathematics 621 Q(2S-0)

Research Seminar
Reports on studies of the literature or of current research.
Note: All graduate students in Mathematics and Statistics are required to participate in one of Applied Mathematics 621, Pure Mathematics 621, Statistics 621 each semester.
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: Familiarity with complex variables, linear algebra and differential equations.

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.
Prerequisites: Applied Mathematics 441 or Mathematics 411; 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.
Prerequisites: Applied Mathematics 491; and 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.
Prerequisites: Applied Mathematics 311 and 491.

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.

Pure Mathematics (PMAT)

Undergraduate Courses

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

Pure Mathematics 501 H(3-0)

Integration Theory
Abstract measure theory, basic integration theorems, Fubini's theorem, Radon-Nikodym theorem, further topics.
Prerequisite: Pure Mathematics 545 or consent of the Division.
Note: Credit for both Pure Mathematics 501 and 601 will not be allowed.

Pure Mathematics 503 H(3-0)

Topics in Pure Mathematics
This course is offered under various subtitles. Consult Department for details.
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Pure Mathematics 505 H(3-0)

Topology I
Metric spaces. Introduction to general topology.
Prerequisite: Pure Mathematics 435 or 455 or consent of the Division.

Pure Mathematics 511 H(3-0)

Rings and Modules
Ring theory, and structure of modules. Application to Abelian groups and linear algebra. Additional topics.
Prerequisite: Pure Mathematics 431 or Mathematics 411 or consent of the Division.
Note: Credit for both Pure Mathematics 511 and 611 will not be allowed.

Pure Mathematics 521 H(3-0)

Complex Analysis
A rigorous study of functions of a single complex variable. Consequences of differentiability. Proof of the Cauchy integral theorem, applications.
Prerequisite: Pure Mathematics 435 or 455 or consent of the Division.

Pure Mathematics 529 H(3-0)

Advanced Cryptography and Cryptanalysis
Probability and perfect secrecy. Provably secure cryptosystems. Prime generation and primality testing. Cryptanalysis of factoring-based cryptosystems. Discrete log based and elliptic curve cryptography and cryptanalysis. Other advanced topics may include hyperelliptic curve cryptography, other factoring methods and other primality tests.
Prerequisites: Pure Mathematics 429.

Pure Mathematics 545 H(3-0)

Honours Real Analysis II
Sequences and series of functions; theory of Fourier analysis, functions of several variables: Inverse and Implicit Functions and Rank Theorems, integration of differential forms, Stokes' Theorem, Measure and Lebesgue integration.
Prerequisite: Mathematics 455; or a grade of B+ or better in Pure Mathematics 445.

Graduate Courses

In addition to the prerequisites listed below, consent of the Pure Mathematics Division is a prerequisite for all Graduate Courses in Pure Mathematics.

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 601 H(3-0)

Integration Theory
Abstract measure theory, basic integration theorems, Fubini's theorem, Radon-Nikodym theorem, further topics.
Prerequisite: Pure Mathematics 545 or consent of the Division.
Note: Credit for both Pure Mathematics 601 and 501 will not be allowed.
Note: Lectures may run concurrently with Pure Mathematics 501.

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
General topology, elementary combinatorial topology.
Prerequisite: Pure Mathematics 505 or consent of the Division.

Pure Mathematics 611 H(3-0)

Rings and Modules
Ring theory, and structure of modules. Application to Abelian groups and linear algebra. Additional topics.
Prerequisite: Pure Mathematics 431 or Mathematics 411 or consent of the Division.
Note: Lectures may run concurrently with Pure Mathematics 511.

Pure Mathematics 613 H(3-0)

Introduction to Field Theory
Field theory, Galois theory.
Prerequisite: Pure Mathematics 431 or consent of the Division.

Pure Mathematics 615 H(3-0)

Topics in Logic
MAY BE REPEATED FOR CREDIT

Pure Mathematics 621 Q(2S-0)

Research Seminar
Reports on studies of the literature or of current research.
Note: All graduate students in Mathematics and Statistics are required to participate in one of Applied Mathematics 621, Pure Mathematics 621, Statistics 621 each semester.
MAY BE REPEATED FOR CREDIT
NOT INCLUDED IN GPA

Pure Mathematics 627 H(3-0)

Topics in Computational Number Theory
Examines some difficult problems in number theory and discusses a few of the computational techniques that have been developed for solving them. Such problems include: modular exponentiation, primality testing, integer factoring, solution of polynomial congruences, quadratic partitions or primes, invariant computation in certain algebraic number fields, etc. Emphasis will be placed on practical techniques and their computational complexity.
Prerequisite: Pure Mathematics 427 or consent of the Division.

Pure Mathematics 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: Pure Mathematics 315 or consent of the Division.

Pure Mathematics 631 H(3-0)

Algebraic Topology I
Elements of category theory and homological algebra. Various examples of homology and cohomology theories. Eilenberg-Steenrod axioms. Geometrical applications.

Pure Mathematics 633 H(3-0)

Algebraic Topology II
Cohomology operations, CW-complexes, introduction to homotopy theory.

Pure Mathematics 669 H(3-0)
(Computer Science 669)

Cryptography
An introduction to the fundamentals of cryptographic systems, with emphasis on attaining well-defined notions of security. Public-key cryptosystems; examples, semantic security. One-way and trapdoor functions; hard-core predicates of functions; applications to the design of cryptosystems.
Prerequisite: Consent of the Division.
Note: Computer Science 413 and Mathematics 321 are recommended as preparation for this course.

Pure Mathematics 685 H(3-0)

Topics in Algebra
The following topics are available as decimalized courses: Algebraic Number Theory, Algebraic K-Theory, Algebraic Geometry, Representation Theory, Abelian Group Theory, Brauer Group Theory, Homological Algebra, Ring Theory, Associative Algebras, Commutative Algebra, Universal Algebra.
MAY BE REPEATED FOR CREDIT

Pure Mathematics 727 H(3-0)

Advanced Topics in Computational Number Theory
Depending on student demand and interests this could cover topics concerning efficient computation in various number theoretic structures such as number rings, finite fields, algebraic number fields and algebraic curves.

Pure Mathematics 729 H(3-0)

Advanced Topics in Cryptography
Depending on student demand and interests this could cover topics in cryptography developed in diverse mathematical structures such as: finite fields, lattices, algebraic number fields and algebraic curves.

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.

Statistics (STAT)

Undergraduate Courses

Only where appropriate to a student's program will graduate credit be received for courses numbered 500-599.

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 505 H(3-1T)

Time Series Analysis
Trend fitting, auto-regressive schemes, moving average models, periodograms, second-order stationary processes, ARCH models, statistical software for time series. Additional topics may include Bayesian analysis, spectral theory, Kalman filtering.
Prerequisite: Statistics 429 or consent of the Division.

Statistics 509 H(3-0)

Operations Research
Topics selected from: decision analysis, linear programming, dynamic programming, integer programming, probabilistic models of queues and inventories, project scheduling, systems reliability.
Prerequisite: Mathematics 323 or consent of the Division.
Note: Credit for both Statistics 509 and Actuarial Science 435 will not be allowed.

Statistics 517 H(3-1)

Practice of Statistics
Intended for students in their final year of study. Introduction to real-world statistical practice. Model selection. Messy data. Statistical software. Report writing and presentation. Working in groups. Ethical considerations in statistics.
Prerequisite: Statistics 429 or consent of the Division.
Note: Not open to students with Statistics 513 or 515.
Note: Prior or concurrent completion of Statistics 429 is strongly recommended.

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.
Prerequisites: Mathematics 323 and 353 or consent of the Division.
Note: Statistics 421 is highly recommended as preparation.

Statistics 523 H(3-0)

Nonparametric Statistics
Nonparametric estimation and tests of hypotheses. Distributions useful to handle nonparametric inference. Distribution-free tests. Asymptotic Theory.
Prerequisites: Mathematics 323 and 353 or consent of the Division.
Note: May not be offered every year. Consult the department for listings.

Statistics 525 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.
Prerequisite: Statistics 421 or consent of the Division.
Note: May not be offered every year. Consult the department for listings.

Statistics 529 H(3-1)

Special Topics in Applied Statistics
Content of the course will vary from year to year. Consult the Statistics Division for information on choice of topics.
Prerequisite: Consent of the Division.
MAY BE REPEATED FOR CREDIT

Statistics 531 H(3-1)

Monte Carlo Methods and Statistical Computing
Introduction to a variety of statistical languages and packages and introductory statistical programming in SPLUS. Pseudo-random variate generation. Bootstrapping. Variance reduction techniques. Computation of definite integrals. Model design and simulation, with applications.
Prerequisite: Mathematics 323 or consent of the Division.
Note: Statistics 421 is highly recommended as preparation.

Graduate Courses

In addition to the prerequisites listed below, consent of the Statistics Division is a prerequisite for all graduate Courses in Statistics.

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.

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.

Graduate Courses

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; nonparametric 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.
Note: Lectures may run concurrently with Statistics 519.

Statistics 621 Q(2S-0)

Research Seminar
Reports on studies of the literature or of current research.
Note: All graduate students in Mathematics and Statistics are required to participate in one of Applied Mathematics 621, Pure Mathematics 621, Statistics 621 each semester.
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.
Note: Lectures may run concurrently with Statistics 525.

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)

Nonlinear 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.

MEDICAL SCIENCE MDSC

Contact Info

Location: Health Sciences Centre, Room G321
Faculty number: (403) 220-6852
Fax: (403) 210-8109
E-mail 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. Students can specialize in an area covered by one of the Faculty of Medicine Research Institutes and include topics as wide-ranging as Medical Education to Physiology. Cancer Biology, Critical Care Medicine, Mountain Medicine and High Altitude Physiology, Joint Injury and Arthritis, and Medical Education also have their own specializations within the Medical Science Graduate Program. A part-time option may be available within these specializations. In addition to these areas students may also specialize in Biomechanics and Biomedical Ethics. Students may select additional areas of specialization with the approval of the Graduate Coordinator.

In co-operation with the Department of Surgery, a Master of Science program with a specialization in surgery is also offered through the Surgeon Scientist Program.

Students in the Faculty of Medicine or 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.

Combined MD/MSc and MD/PhD programs are offered under the title “Leaders in Medicine.”

The Universities of Calgary and Alberta offer a joint Biomedical Engineering Program. Further information can be obtained at the website http://www.eng.ucalgary.ca/Biomedical/.

2. Admission Requirements

In addition to Faculty requirements, the Medical Science Graduate Program requires:

a) A minimum admission grade point average of 3.20 on a four point scale, or equivalent
b) For applicants required to provide proof of proficiency in the English language, a minimum TOEFL score of 600 (paper based test), 250 (computer-based test) or 100 (internet-based test); specializations may have additional requirements
c) 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 in thesis-based programs may be admitted for September, January, May, or July. Contact the Medical Science Graduate Program office for general application deadlines.

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

Advanced credit is not normally given in a thesis-based program.

5. Program/Course Requirements

In addition to Faculty requirements, the Department requires:

Master of Science

a) A minimum of two half-courses
b) 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 minimum of three half-courses
b) 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 one half-day Research Integrity Day seminar during their program. Students must attend this seminar before they are approved to defend their thesis.

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 2.5 years, 4.5 years in the PhD program. Maximum completion time is four years in the MSc program and six 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. Maximum completion time is six years for the MD/MSc program and eight years for the MD/PhD program.

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 to six months of initial registration (depending on specialization). The Graduate Coordinator must approve the composition of the supervisory committee. Specializations may have additional requirements.

Master of Science students in the Leaders in Medicine program must have a supervisory committee constituted according to the regulations of the graduate program. Both MSc and 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 Director of Admissions and Student Affairs of the Faculty of Medicine.

10. Required Examinations

The doctoral candidacy examination has a written and an oral component. The written component must be completed before the oral component. Both the written and oral components must be acceptable to the candidacy committee in order to receive a passing grade. Questions on the research proposal will not be included in the oral candidacy examination. Exactly four weeks before the scheduled examination, the student will be given four questions. The student must prepare written papers for three of the four questions and submit a copy of each of the papers to each examiner one week before the oral exam. Each paper should not exceed 20 double-spaced pages. The supervisor is a non-voting observer at the doctoral candidacy oral examination.

11. Research Proposal Requirements

The student must present a written research proposal to the supervisory committee no later than twelve months after initial registration. The proposal, with an approval form signed by all members of the supervisory committee, must be sent to the Medical Science office to be placed in the student’s 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. Financial assistance is not normally available to course-based students.

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://research.myweb.med.ucalgary.ca/InstitutesandCentres.html

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.

Medical Science 501 H(3-0)
(Biology 501)

Principles and Mechanisms of Pharmacology
Basic principles of pharmacology, with specific emphasis on receptor signaling mechanisms.
Prerequisites: 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: 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 Graduate Sciences Education Office must be signed by the Associate Dean (Graduate Sciences Education) before a student can register.
Prerequisite: Consent of the BHSc Honours department.
MAY BE REPEATED FOR CREDIT

Medical Science 508 2xF(0-6)

Honours Thesis and Research
Capstone research course in the BHSc to be conducted through any one of the basic research departments. Students would be expected to spend a minimum of 15 hours/week conducting research. Culminates with a Research Symposium Day during which students present and defend their research before an audience of peers and mentors, share their research with the faculty and staff at large through poster presentations and submit a written research thesis.
Prerequisite: After consultation with a faculty member who will supervise the chosen problem, an approval form obtained from the USE office must be signed by the Associate Dean (Undergraduate Science Education) before a student can register.
Note: This course is worth 2.0 FCE and is only 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.
Prerequisites: Biochemistry 443 and 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.
Prerequisites: Biochemistry 443 and Biology 331.

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 Graduate Sciences Education Office must be signed by the Associate Dean (Graduate Sciences Education) before a student can register.
Prerequisite: Consent of the BHSc department.
MAY BE REPEATED FOR CREDIT

Medical Science 541 H(3-0)
(Medical Science 641.01)

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: Medical Science 341 or Biology 311 and consent of the faculty.
Note: Lectures run concurrently with Medical Science 641.01.

Medical Science 543 H(3-0)
(Medical Science 641.03)

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: Medical Science 341, 402 or permission of the instructor.
Note: Lectures run concurrently with Medical Science 641.03.
Note: Previous completion of Medical Science 541 is suggested but not required.

Medical Science 545 H(3-0)
(Medical Science 641.04)

Genomics
Prerequisite: Medical Science 341 or Biology 311 and consent of the faculty.
Note: Lectures run concurrently with Medical Science 641.04.

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.
Prerequisites: Biochemistry 443, Biology 331, and Cellular, Molecular and Microbial Biology 411.

Graduate Courses

Medical Science 603 H(3-1)
(Biology 603)

Biology of Laboratory Animals
The course is based on the Canadian Council of Animal Care Syllabus "Basic Principles of Laboratory Animal Science for Research Scientists." In addition to the study of common, research, farm and exotic animals, topics covered include ethical considerations, regulation and legislation, animal models, animal facilities and husbandry, hazard control, surgery, anaesthesiology, euthanasia and post-mortem examinations. Practical sessions will provide experience in handling and restraint of specific laboratory animals, injections, blood collection, anaesthesiology and surgery.
Prerequisite: 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: Consent of the Faculty.
Note: Lectures run concurrently with Medical Science 404.

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: 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: Medical Science 537 (Biochemistry 537) or equivalent and consent of the Faculty.
Note: 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.
Prerequisites: 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: Medical Science 612 or Cellular, Molecular and Microbial Biology 421 or 521 or consent of the Faculty.

Medical Science 619 H(3-0)

Neurosciences
Introductory neuroscience courses covering aspects of cellular, molecular, and systems physiology, neuroanatomy, and neurodevelopment.
619.01. Cellular and Molecular Neuroscience
619.02. Systems Neuroscience
619.03. Developmental Neuroscience
619.04. Neuroanatomy
Prerequisite: Consent of the Faculty.
Note: Medical Science 619.02 is open only to graduate students registered in the Neuroscience graduate program or other graduate students approved by the course coordinator. Not open to undergraduate students.

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
Prerequisites: Zoology 461 and Biochemistry 441 and 443 or consent of the Faculty.

Medical Science 623 H(3-1T)

Respiratory Science
Respiratory physiology; aspects of morphology, biochemistry and pharmacology necessary to an understanding of respiration.
623.01. Pulmonary Mechanics and Gas Exchange
623.02. Respiratory Muscle Physiology and Control of Breathing
623.03. Respiratory Science: Basic
623.04. Respiratory Science: Applied
Prerequisite: Zoology 463 or 465 or consent of the Faculty.

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: 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: 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: 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
Prerequisite: Medical Science 604 or equivalent or consent of the Faculty.

Medical Science 635 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. In doing so, makes use of lectures, readings, video tapes, case discussions, and current research.
Prerequisite: Consent of the Faculty.
Note: Credit for both Medical Science 635 and 645.14 will not be allowed.

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 coordinator that will also be presented orally to the class.
637.01. Organization and Function of the GI Tract
Prerequisite: Consent of the Faculty.

Medical Science 638 H(3-0)

Mucosal Pathophysiology
An independent study course that 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 tutorials, written assignments and laboratory exercises. The course will be divided into three sections.
Note: Medical Science 637.01 recommended.

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 Immunology
639.03.Topics in Immunology
639.04. Inflammation
Prerequisite: Consent of the Faculty.
Note: Credit for both Medical Science 639.01 and 755.01 will not be allowed.
Note: Credit for both Medical Science 639.02 and 641.01 will not be allowed.
Note: Credit for both Medical Science 639.03 and 641.03 will not be allowed.
Note: Credit for both Medical Science 639 and 639.04 will not be allowed.

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: Consent of the Instructor.

Medical Science 643 H(3-2)

Biostatistics
Focuses on the key methods necessary to understand and critically interpret results from common biostatistical analyses, as well as gaining hands-on experience analyzing data using statistical software. Medical Science 643.01 introduces the fundamental concepts of summarizing data and statistical inference, including graphical displays, hypothesis testing, p-values, confidence intervals, and sample size determination. Medical Science 643.02 extends the fundamental concepts to modelling health outcomes using modern regression analysis techniques. Logistic and linear regressions, and their extensions, are covered in detail. Medical Science 643.03 broadens the techniques to include generalized linear models (GLM), generalized additive models (GAM), Poisson regression, generalized estimating equations (GEE), and proportional hazards regression. In all three courses, students gain hands-on experience analyzing data using statistical software.

643.01 Biostatistics I: Essentials of Biostatistics
643.02 Biostatistics II: Models for Health Outcomes.
643.03. Biostatistics III: Models for Repeated Measures Studies and Time-to-Event Studies

Prerequisites: Medical Science 643.01 requires no formal prerequisites but good quantitative and mathematical skills are an asset. Medical Science 643.02 requires either 643.01 or a graduate-level introductory course in (bio)statistics. Medical Science 643.03 requires Medical Science 643.02.

Note: Admission to a graduate program in Community Health Sciences is normally required for enrolment in the Medical Sciences 643 courses; these courses are not available to Open Studies students.

Medical Science 644 H(3-0)

Community Health Sciences Overview
These courses provide an overview of key foundation areas in Community Health Sciences.

644.01. Introduction to Community Health Sciences

644.02. Determinants of Health I
Prerequisite: Consent of the Instructor.
Note: Admission to a graduate program in Community Health Sciences is required for enrolment in Medical Science 644 courses.

Medical Science 645 H(3-0)

Health Care
The components of the health care system; the structure and function of the Canadian health care system and issues in the organization of health care delivery; environmental and psycho-sociocultural factors in health, illness and health care; specific problems and issues in health care.
645.01. Systems of Health and the Health Care System
645.02. Determinants of Health II
645.03. Environmental Health
645.10. Leadership in Health Care Organizations
645.13. Health of Canadian Aboriginal Peoples
645.15. Health Policy: Policy Issues in the Canadian Health Care System
645.16. Global Health and Development
645.17. Introduction to the Legal and Ethical Framework of Health Care in Canada
Prerequisite: Consent of the Faculty. Medical Science 645.03 prerequisite is MDSC 647.01.
Note: Medical Science 645.03: one or more field trips may be required outside regular class time.

Medical Science 646 H(3S-0)

Seminars in Occupational Health and Medicine
Current issues in occupational health and medicine; topics to be based on a pre-course survey.
Prerequisite: Consent of the Instructor.
NOT INCLUDED IN GPA

Medical Science 647 H(3-2)

Epidemiology
Principles and methods of descriptive, analytic and experimental epidemiology. Epidemiological methods specific to certain health conditions and the preventive strategies available for various health conditions.
647.01. Fundamentals of Epidemiology
647.05. Epidemiology of Aging.
647.07. Research in Infection Control and Hospital Epidemiology
647.09. Epidemiology of Chronic Diseases
647.10. Surveillance 1: Data Handling for Infection Control
647.11. Surveillance 2: Principles of Surveillance
647.12. Introduction to Population Health Surveillance
647.15 Clinical Epidemiology
Prerequisites: Medical Science 643.01 or consent of the Faculty.
Note: Admission to a graduate program in Community Health Sciences is normally required for enrolment in Medical Science 647.01; it is not available to Open Studies students.

Medical Science 649 H(1-3)

Practicum in Community Health Sciences
Clinical or laboratory-based practicum for students enrolled in certain programs of the Department of Community Health Sciences.
649.01. Practicum in Community Medicine
649.02. Practicum in Hospital Epidemiology
Prerequisite: Consent of the Faculty.
NOT INCLUDED IN GPA

Medical Science 651 H(3-0)

Population/Public Health
The courses within the Population/Public Health family are intended to provide graduates the opportunity to gain the competencies required to become researchers, planners, and practitioners in fields that require a depth of understanding of the determinants of health, the values and philosophies of population and public health, behaviour change theory, and the role of the ecosystem in promoting and protecting the health of the public.
651.01. Health Promotion Planning
651.02. Health Promotion for Women
651.03. Community Interventions: Theory, Research and Practice
651.04. Fundamentals of Population/Public Health
Prerequisite: Consent of the Instructor.

Medical Science 657 H(3-0)

Telehealth and E-health
These online courses explore many aspects of e-health, beginning with an initial focus on telehealth. They reflect a range of practice-based activities and research areas in e-health including business plan development, implementation and evaluation of clinical and learning applications.
657.02. e-Health Sustainability: From Business Case to Policy Development
657.03. Evaluation of e-Health Initiatives
Prerequisite: Consent of the Faculty.
Note: These are online courses.

Medical Science 659 H(3-2)

Methods in Health Research
An introduction to research design, sampling, measurement, data collection and data analysis applied to health research including evaluation research.
659.02. Health Research Methods
659.03. Health Program Planning and Evaluation
659.04. Introduction to Clinical Trials
659.05. Qualitative Health Research
659.06. Decision Analysis in Health Economic Evaluation
659.07. Administrative Data Analysis Methodology
Prerequisite: Medical Science 643.01 or consent of the Faculty.

Note: Admission to a graduate program in Community Health Sciences is normally required for enrolment in Medical Science 659.02; it is not available to Open Studies students.

Medical Science 660 F(3-1.5)

On-line Basic Infection Control
Provides novice Infection Control Professionals (ICPs) with the basic knowledge, tools and strategies needed to do Infection Control in a broad 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: Consent of Instructor.

Medical Science 661 H(3-0)

Science Value and Philosophy
Philosophical issues which fall into two categories: the Nature of Scientific Inquiry and Science and Moral Value.
Prerequisite: Consent of the Instructor.

Medical Science 663 H(3-0)
(Kinesiology 663) (Mechanical Engineering 663)

Advanced Biomechanics
Theoretical and applied aspects of biomechanics in the acquisition and performance of sport skills.
Prerequisite: Consent of the Faculty.

Medical Science 670 F(0-6)

Practicum in Biomedical Technology
A laboratory-based full course carried out in an academic or industrial setting for a period of at least ten 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 in one of the Faculty of Medicine laboratories or in an industrial setting.
Prerequisite: Consent of the Faculty.
Note: Completion of all other course requirements in Master of Biomedical Technology program is normally required prior to registration for this course.
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: 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: Consent of the Biomedical Technology Graduate Coordinator.
Note: Admission to the Master of Biomedical Technology program is required for enrolment in this course.

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.
Note: Admission to the Master of Biomedical Technology program is normally required for enrolment in this course.

Medical Science 674 F(3-0)

Integrated Systems Course
The principles of physiology, pharmacology, microbiology and immunology. 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 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 demonstrations, tours and special lectures that provide industry perspectives in these disciplines.
674.01. Physiological and Pharmacological Aspects of Therapeutics Development
674.02. Principles of Microbiology and Immunology
Prerequisite: Consent of the Faculty.
Note: Admission to the Master of Biomedical Technology program is normally required for enrolment in either section of this course.

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: Consent of the Faculty.

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.
Prerequisites: Consent of both the faculty member who will supervise and the MBT faculty member who will co-supervise the chosen study.
Note: Admission to the Master of Biomedical Technology program is required for enrolment in this course.
MAY BE REPEATED FOR CREDIT

Medical Science 678 H(1-6)

Project in Biomedical Technology
Conduct a business or laboratory-based project throughout the year. Business-based projects include running a business, doing market research for companies or working with their business mentor. Laboratory-based students will get credit for the laboratory components that complement the core program with the project orientated around their new drug.
678.01. Laboratory-Based Project
678.02. Business-Based Project
Prerequisite: Consent of the Faculty.
Note: Admission to the Master of Biomedical Technology program is required for enrolment in this course.

Medical Science 679 H(3-0)
(Economics 679)

Health Economics I
Applies basic concepts from economics to the 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 in interventions.
Prerequisite: Consent of the Faculty.

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: Consent of the Faculty.

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: Consent of the Faculty.

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: 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)

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: Interest in reproductive health/reproductive biology. Consent of course co-ordinator and student's supervisor, if applicable.

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: Should have some previous experience with dissection. Consent of the instructors.

Medical Science 705 H(3-0)

Advanced Methods in Health Research
Advanced health research designs (both quantitative and qualitative) and measurement techniques.
Prerequisite: Medical Science 659.02.

Medical Science 706 H(3-0)
(Social Work 679/699)

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
Note: This course is open to registered graduate students in medicine and the mental health professions, all others will require consent of the instructor.

Medical Science 706 H(3-0)
(Social Work 679/699)

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
Note: This course is open to registered graduate students in medicine and the mental health professions, 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: 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: Consent of Instructor. Must have an undergraduate degree in a relevant domain (including, but not limited to medicine, psychology, nursing, social work, spiritual care/theology).

Note: This is an online course.

Medical Science 709 H(3-2)

Advanced Epidemiology
Topics to include causal inference, epidemiologic measures, induction latent period, internal and external validity, control of confounding variables and interaction between study factors.
Prerequisite: Medical Science 647.01.

Medical Science 711 H(3S-0)

Systematic Reviews and Meta-Analysis
Exposes students to all steps involved in the conduct of a systematic review and meta-analysis.
Prerequisite: Medical Science 643.01, 643.02, 647.01 and 659.02, or consent of Instructor.

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: Consent of Instructor.

Medical Science 717 H(150 hours)

Functional Genomics Technologies
An intensive "hands on" laboratory course supplemented with lectures that provides experience and theory underlying current techniques used in functional genomics research. Methods include DNA microarrays, bioinformatics analysis of DNA and protein sequences, retro-recombinant screening, gene marker and mutation analysis, gene product interactions and yeast two-hybrid screens, site-specific mutagenesis, mammalian expression systems and in situ hybridization. More conventional molecular biology methods involving plasmid preparation, Northern and Southern blotting techniques, PCR technology, restriction digestions, subcloning of DNA fragments, and others are included.
Prerequisites: Registration in the Master of Biomedical Technology program or one of Medical Science 537, 609.01, 609.02, 613.05 or equivalent, and consent of the Faculty.
Prerequisite or Corequisite: Medical Science 537 (Biochemistry 537) or equivalent.

Medical Science 721 H(3-0)

Biochemistry and Molecular Biology
Historical and recent developments in analysis of eukaryotic genomes and control of gene expression, chromosome structure, bioinformatics, sequencing, proteomics, regulatory networks, metabolomics and related technologies and their applications to the study of human disease.

Medical Science 731 H(1S-4)

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: Consent of the Faculty.

Medical Science 733 H(3-1)

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 explored and utilized.
Prerequisite: Consent of the Instructor.
Note: Admission to the Medical Education specialization of the Medical Science graduate program is normally required for enrolment in this course.

Medical Science 735 H(3-0)

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: Consent of Instructor.

Medical Science 737 H(3-0)

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: Consent of Instructor.

Medical Science 739 H(3-0)

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: Consent of Instructor.

Medical Science 751 H(3-0)

Topics in Medical Science
751.02. Cellular and Molecular Pathogenic Mechanisms of Diabetes
751.03. Biostatistics
751.07. The Physiological Development of the Fetus and Newborn
751.09. Ion Channel Diseases
751.18. Neural Control of Posture and Movement
751.30. Transdisciplinary Bone and Joint Health
751.31. Joint Injury and Disease Biomechanical Focus
751.41. Critical Perspectives in Proteomics
Prerequisite: Consent of the Faculty.

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: Consent of faculty member who will supervise the chosen study.
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.

MICROBIOLOGY AND INFECTIOUS DISEASES MDMI

Contact Info

Location: Health Sciences Centre, Room G329
Faculty number: (403) 220-2558
Fax: (403) 210-8109
E-mail 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.
Combined MD/Master's and MD/PhD programs are offered under the title "Leaders in Medicine."

2. Admission Requirements

In addition to Faculty requirements, the Department requires:
(a) A minimum admission grade point average of 3.20 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), 237 (computer-based test) or 92 (internet-based test)

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:
15 May for September admission
15 September for January admission
15 January 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

The applicant must make advanced credit requests as part of the admission process. Credit will be not 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 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.

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.

The Graduate Coordinator approves supervisors and supervisory committees. Master of Science students in the Leaders in Medicine program must have a supervisory committee constituted according to the regulations of the graduate program. Both Master of Science and doctoral 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

Doctoral candidacy examinations have a written and an oral component. The student has three weeks to prepare three written papers from a choice of five questions. The three papers are to be submitted to the examiners one week before the examination. One of the papers will normally be in the form of a grant proposal. Each paper will not exceed 20 double-spaced typewritten pages excluding references and figures

The responses to the written examination questions, along with the research proposal, provide the basis for the candidacy oral examination.

11. Research Proposal Requirements

A written research proposal must be presented to the student's supervisory committee no later than twelve months after initial registration as a full-time graduate student. The supervisory committee approves the research proposal after an oral presentation of the written proposal.

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.ucalgaryca/microinfect/faculty

MILITARY AND STRATEGIC STUDIES CMSS

Contact Info

Location: Library Tower, 7th floor
Faculty number: (403) 220-4038
Fax: (403) 282-0594
E-mail 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

Students in the Master of Military and Strategic Studies program may choose an interdisciplinary specialization in Israel Studies. For further information on the Israel Studies (Interdisciplinary) specialization, see the separate listing in this Calendar.

2. Admission Requirements

In addition to the requirements of the Faculty of Graduate Studies, CMSS requires:

Master of Strategic Studies (MSS), course-based

a) A Bachelor's degree grade point average of at least 3.4 on a 4.0 point scale
b) A writing sample
c) Agreement to supervise from a potential supervisor
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.

Prerequistes for admission to the PhD program are:

a) A completed Master's Degree.
b) A GPA of 3.7 on a four point scale over all completed graduate courses in the Master's program; 3.4 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 with a minimum score of 260 (computer-based) or 7+ on the IELTS. 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:
15 January for September admission

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 Faculty requirements, the Centre for Military and Strategic Studies requires:

a) That all Master's students take, in any sequence, the following three core area half courses:
STST/HTST 655 Classics of Strategy
POLI 681 Advanced Analysis of International Relations
POLI 685 Strategic Studies

b) That students take, in any sequence, two of the following core half-courses from the listed areas of concentration:
(1) Arctic Security
STST 661 Circumpolar Security
(2) Canadian Military Studies
STST 613/HTST 613 Canada and the First World War
STST 611 Canadian Military Studies
(3) Defence Economics
ECON 611 Independent Study: Topics in Defence Economics
(4) Domestic Security/Hemispheric Security
(5) Ethics and Morality in Conflict
POLI 619 War and Interpretation
PHIL 609 Topics in the History of Philosophy – Just War Theory
(6) Intelligence and Security
STST 657 Intelligence, Information Operations and Command, Control, Communications and Computers
(7) Israeli Security Studies
ISST 601 Modern Israel
(8) Military Anthropology
ANTH 641 Graduate Seminar in Civil Military Relations
(9) Sea Power
STST 659 Sea Power
(10) Unconventional Warfare
POLI 689 Unconventional Warfare
POLI 675 Special Topics in Comparative Politics

c) That all students take one elective half-course:
STST 651 Reading Seminar I
STST 653 Research Seminar I
Any other graduate course pertinent to the student's thesis topic (with the approval of the Graduate Coordinator).
d) That in addition to five core half-courses, course-based students take seven half-course electives Consult the department website for a list of recommended elective courses. The co-operative education option is part of the course-based MSS program. Students will complete an 8-month work placement during their second year, which will replace three elective half-courses. Thesis-based MSS students will be permitted to transfer to the 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 department website.

Doctor of Philosophy

a) Course Work:
Each student must normally take four half-course equivalents including three core courses:
- Political Science (POLI) 681: Advanced Analysis of International Relations
- POLI 685: Strategic Studies
- Strategic Studies (STST) 655: *Classics of Strategy*.

Students will have two major fields of study, one of these being strategic studies and the other the thesis area, and will be required to take one half-course in each, namely POLI 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

Students enrolled in the thesis program may apply to take one 500-level half-course for graduate credit, but may be required to complete additional assignments for the 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

Students in the course-based program are required to pass an oral comprehensive examination no later than six months after the completion of the course work. This examination is designed to test the student's mastery of the core requirements of the program as well as his/her chosen area of technical or specialized expertise.
All course work must be completed, the second language requirement met (if applicable), and a thesis proposal approved by the Supervisory Committee 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 a area closely related to the student's thesis 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 thesis proposal is submitted to the members of the student's Supervisory Committee, and the student defends the proposal in a meeting of that Committee. After the proposal is passed by the Committee, the student can go on to write his or her candidacy exams.

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.

Strategic Studies (STST)

Permission of the Graduate Coordinator is needed for enrolment in Strategic Studies 651 653, 751 and 753.

Graduate Courses

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

Strategic Studies 600 M(3-0)

MSS Co-operative Education
Strategic Studies Co-operative Education Work Placement
Prerequisite: Admission to the co-operative education option of the MSS program.

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(3-0) (History 613)

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.

Strategic Studies 651 H(3-0)

Reading Seminar
Prerequisite: Permission of the Graduate Co-ordinator.
MAY BE REPEATED FOR CREDIT

Strategic Studies 653 H(3-0)

Research Seminar
Prerequisite: Permission of the Graduate Co-ordinator.
MAY BE REPEATED FOR CREDIT

Strategic Studies 655 H(3-0) (History 655)

Classics of Strategy
Strategic thought from Sun Tzu to Clausewitz, Mahan to Corbett. Analyzes the writings of classic strategic thinkers and then, by way of case studies, examines their theories as they pertain to military and political planners from the Peloponnesian War to the present.

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 661 H(3S-0)

Circumpolar Security
Assessment of the security environment of the Arctic region. This seminar will assess both the differing theoretical conceptualizations of security in the Arctic and the policies of the circumpolar states as they pursue Arctic security.

Strategic Studies 751 H(3-0)

Reading Seminar
Prerequisite: Permission of the Graduate Coordinator.
MAY BE REPEATED FOR CREDIT

Strategic Studies 753 H(3-0)

Research Seminar
Prerequisite: Permission of the Graduate Coordinator.
MAY BE REPEATED FOR CREDIT

MUSIC MUSI

Contact Info

Location: Craigie Hall D 209
Faculty number: (403) 220-5383
Fax : (403) 282-6925
E-mail address: fasst@ucalgary.ca
Web page URL: http://www.ffa.ucalgary.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD) with specialization in Musicology, Composition, or Music Education
Master of Arts (MA) thesis-based with specialization in Musicology
Master of Music (MMus) thesis-based with specializations in Performance, Conducting, Composition, or Music Education

2. Admission Requirements

In addition to Faculty requirements, the Department requires that all applicants submit a one-page letter detailing their specific reasons for pursuing graduate study. 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.

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 three ways:
- A video of approximately fifteen minutes
- A rehearsal of a University ensemble (during Fall and Winter)

c) Demonstrated competence on a major instrument or voice

Master of Music (Composition)

a) A completed Bachelor of Music degree, including study in composition
b) A portfolio of at least three recent compositions, together with recordings where available

Master of Music (Music Education)

Normally, two years of successful teaching experience or equivalent professional involvement in music education
An essay on a topic in Music Education prepared during or subsequent to the applicant's undergraduate work

Master of Arts (Musicology)

a) 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

3. Application Deadline

The deadline for the submission of complete applications for both Master's and doctoral program is 15 January 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 1 December to 15 April. Specific dates and times can be arranged by contacting the Graduate Administrator at (403) 220-5383.

For consideration for university scholarships, complete applications (including the audition and the required TOEFL score, if applicable) must be concluded by 15 January. Departmentally-administered funding (such as graduate teaching assistantships and research scholarships) will be decided after 15 April .

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, excluding qualifying courses, requires:

Master's Degrees

Master of Music (Music Education): MUHL 603, MUHL 651 and three full approved graduate level courses

Master of Music (Composition): MUTC 671, MUHL 651, MUTC 695.01/, MUTC 691 and two full approved graduate level courses

Master of Music (Performance): MUHL 603, MUHL 651, MUPF 691, MUPF 693, one half course at the graduate level in MUTC or MUHL and three other approved half course options.

Master of Music (Conducting): MUHL 603, MUHL 651, MUPF 632 or MUPF 634 and two full approved graduate level courses

Master of Arts (Musicology): MUHL 603, MUHL 651 and three full approved graduate level courses

Restrictions

No more than one full course for the Master of Music and Master of Arts degrees may be taken in an area other than Music.

Doctor of Philosophy

Students entering the PhD program will normally be required to complete at least six half-courses:

a) An interdisciplinary half-course designed by the student and supervisor

b) Five additional approved graduate level half courses. Students in the Doctor of Philosophy (Composition) program must take MUHL 651 unless this course (or its equivalent) has been completed as part of a Master's degree.

6. Additional Requirements

Diagnostic examinations in music history and theory will be given to all entering 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) and (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 Graduate Studies Committee of the Department.

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 Coordinator 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 a large-scale compositional project and an accompanying descriptive essay related to the project. Normally, the project will be presented in a public recital.

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.

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 Coordinator 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 (Music Education) and Master of Music (Composition)
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.

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 Department's 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 Coordinator 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 Open Scholarship Competition by 15 January.

15. Faculty Members/Research Interests

Current faculty members and their areas of interest can be found at http://www.ffa.ucalgary.ca.

Music Education (MUED)

Undergraduate Courses

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

Graduate Courses

Music Education 655 H(3-0)

Independent Study
Individual study in a selected music education area.
Prerequisite: Consent of the Department.
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: Consent of the Department.
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: Consent of the Department.
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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music History and Literature (MUHL)

Undergraduate Courses

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

Music History and Literature 573 H(3-0)

Studies in the Music of Selected Composers
Specific composers or groups of composers; may include Beethoven, Debussy, the Second Viennese School, etc.
Prerequisite: Music History and Literature 305 or consent of the Department.
MAY BE REPEATED FOR CREDIT

Music History and Literature 596 F(1-4)

Honours Project
A major project with an emphasis upon historical and/or cultural issues.
Prerequisites: Music History and Literature 305 and consent of the Department.
Note: Restricted to students in the BA Honours (Music) program.

Music History and Literature 598 F(1-4)

Senior Project
Major project in music history and literature.
Prerequisites: Music History and Literature 305 and consent of the Department.

Graduate Courses

Music History and Literature 603 H(3S-0)

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: Consent of the Department.
Note: Required course for all MMus and MA (Musicology) students.

Music History and Literature 651 H(3-0)

Research Techniques and Bibliography of Music
Exploring the basic reference materials and techniques for musical research at the graduate level.
Prerequisite: Consent of the Department.
Note: Required course for all MMus and MA (Musicology) students.

Music History and Literature 655 H(3-0)

Independent Study
Individual study in a selected area of musicology.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music History and Literature 671 H(3-0)

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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music History and Literature 771 H(3-0)

Selected Topics in Musicology
Various topics in the field of Musicology (doctoral level).
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Performance (MUPF)

Undergraduate Courses

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

Graduate Courses

Music Performance 632 F(2-3)

Advanced Choral Conducting
Prerequisite: Consent of the Department.

Music Performance 634 F(2-3)

Advanced Instrumental Conducting
Prerequisite: Consent of the Department.

Music Performance 641 H(0-4)

Advanced Chamber Ensemble I
Intensive coaching in departmental chamber ensembles.
This course meets for three hours per week over the fall and winter session.
Prerequisite: Consent of the Department.

Music Performance 643 H(0-4)

Advanced Chamber Ensemble II
Continuation of Music Performance 641.
This course meets for three hours per week over the fall and winter session.
Prerequisite: Music Performance 641 or consent of the Department.

Music Performance 655 H(3-0)

Independent Study
Individual study in a selected performance area.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Performance 657 H(0-3)

Studies at the Banff Centre
Advanced music studies. 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.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT
NOT INCLUDED IN GPA

Music Performance 671 H(3-0)

Topics in Music Performance
Various topics such as applied music literature, applied pedagogy, accompanying, phonetics and others.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Performance 691 H(2-3)

Advanced Performance Practicum I
Applied instruction in instrument or voice.
Prerequisite: Consent of the Department.

Music Performance 693 H(2-3)

Advanced Performance Practicum II
Continuation of Music Performance 691.
Prerequisite: Music Performance 691 or consent of the Department.

Music Theory and Composition (MUTC)

Undergraduate Courses

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

Music Theory and Composition 555 H(3-0)

Independent Study
Individual study in a selected theory or composition area.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Theory and Composition 575 H(3-0)

Selected Topics in Theory and Composition
Advanced topics in music theory and composition selected from such subjects as: analysis of tonal or post-tonal music, rhythmic analysis, acoustics, critical approaches to music theory, electroacoustic music, orchestration, counterpoint and fugue.
Prerequisite: One of Music Theory and Composition 471, 473, 475, 477, 479 or consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Theory and Composition 577 H(3S-0)

Seminar in Theory and Composition
Creative and analytic approaches to the study of selected repertoire with an emphasis upon contemporary music.
Prerequisite: One 400-level Music Theory and Composition course or consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Theory and Composition 581 H(3-0)

Jazz Harmony
Detailed study of the harmonic materials of jazz.
Prerequisite: Music Theory and Composition 303 or consent of the Department.

Music Theory and Composition 596 F(1-4)

Honours Project
A major project with an emphasis upon analytic or creative issues.
Prerequisites: Two half courses in Music Theory and Composition at the 400 or 500 level; or Music Theory and Composition 493; or consent of the Department.
Note: Restricted to students in the BA Honours (Music) program.

Music Theory and Composition 598 F(1-4)

Senior Project
Major project in theory or composition.
Prerequisites: Two half courses in Music Theory and Composition at the 400 or 500 level; or Music Theory and Composition 493; or consent of the Department.

Graduate Courses

Music Theory and Composition 655 H(3-0)

Independent Study
Individual study in a selected theory or composition area.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Theory and Composition 671 H(3S-0)

Seminar in Theory and Composition
Advanced creative and analytic approaches to the study of selected repertoire with an emphasis upon contemporary music.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Theory and Composition 673 H(3-1)

Selected Topics in Theory and Composition
Various topics (masters level).
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Theory and Composition 675 H(3-0)

Pedagogy of Music Theory
Refining ideas about music theory and its teaching, while developing and strengthening teaching skills.
Prerequisite: Consent of the Department.
Note: Required course for all PhD (Composition) students.

Music Theory and Composition 691 H(2S-2)

Composition Seminar
Prerequisite: Consent of the Department.

Music Theory and Composition 695 H(2-2)

Composition
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Theory and Composition 755 H(3-0)

Independent Study
Individual study in a selected theory or composition area (doctoral level).
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Theory and Composition 775 H(3-0)

Advanced Topics in Theory and Composition
Various topics (doctoral level).
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Music Theory and Composition 795 H(3-0)

Composition
Individual study in musical composition (doctoral level).
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Fine Arts (FINA)

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: 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: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

NEUROSCIENCE MDNS

Contact Info

Location: Health Sciences Centre, Room G329
Faculty number: (403) 220-2558
Fax: (403) 210-8109
E-mail 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
Combined MD/Master's and MD/PhD programs are offered under the title "Leaders in Medicine."

2. Admission Requirements

In addition to Faculty requirements, the Department requires:
(a) A minimum admission grade point average of 3.20 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), 237 (computer-based test) or 92 (internet-based test)

3. Application Deadline

Deadlines for submission of complete applications for students with Canadian and U.S. transcripts:

15 May for September admission
15 September for January admission
15 February for May admission
15 April for July admission

Students with international transcripts should contact department for application deadlines.
Students applying to the MD/Master's or MD/PhD program must apply individually to each program and complete a supplementary preliminary application for the Leaders in Medicine Program.

4. Advanced Credit

Not given.

5. Program/Course Requirements

In addition to the Faculty requirements, the Department requires:

Master of Science

a) Satisfactory completion of at least one of Cellular and Molecular Neuroscience (MDSC 619.01), Systems Neuroscience (MDSC 619.02), Developmental Neuroscience (MDSC 619.03), or Neuroanatomy (MDSC 619.04)

b) Participation in a seminar program and journal club, and presentation of research seminar.

Doctor of Philosophy

a) Satisfactory completion of at least two of Cellular and Molecular Neuroscience (MDSC 619.01), Systems Neuroscience (MDSC 619.02), Developmental Neuroscience (MDSC 619.03), or Neuroanatomy (MDSC 619.04). In some cases, where the supervisory committee agrees, one of the two core Neuroscience courses can be supplemented with an equivalent graduate level course in an area that is pertinent to the student's thesis project.

b) 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. Maximum completion time is four years in a Master's program and six years for a doctoral program.

Leaders in Medicine - Expected completion time is four to five years for the MD/Master's program, and six to seven years for the MD/PhD. Maximum completion time is six years for the MD/Master's and eight years for the MD/PhD.

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 Coordinator. For relevant criteria and responsibilities of supervisors, see the *Policies and Procedures of the Department of Neuroscience.* 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*.

Master's and PhD students in the Leaders in Medicine program must have a supervisory committee constituted according to the regulations of the graduate program.

10. Required Examinations

Doctoral candidacy examinations have a written and an oral component. The written component will consist of a grant proposal to be written over a period of three weeks and submitted to the examination committee one week before the Oral Candidacy Examination. The oral examination, normally two hours long, occurs one week after the submission of the written material. The oral examination will use the material written by the candidate as a basis for exploring the candidate's knowledge of neuroscience. Both the written and oral components need to be satisfactory for successful completion of the exam. The supervisor is a non-voting observer at the doctoral oral candidacy examination.

For further information see the *Policies and Procedures of the Department of Neuroscience* at: http://www.ucalgary.ca/neuroscience

11. Research Proposal Requirements

Preparation and approval of a research proposal within twelve months of first registration.

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 recommended). 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/research/sections.php?sid=4&cid=162&edit=1.

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 (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 following the Medical Science heading.

15. Faculty Members/Research Interests

The research interests of the department can be found at either the Department of Neuroscience website (http://www.ucalgary.ca/neuroscience) or the HBI website http://www.hbi.ucalgary.ca/research/sections.php?sid=5&cid=36

NURSING NURS

Contact Info

Location: Professional Faculties Building, Room 2279
Faculty number: (403) 220-6241
Fax: (403) 284-4803
E-mail 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 (NP)

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 advanced nurse practitioners in specialized areas of practice. The course-based program prepares nurses with advanced skills; the thesis-based program offers 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 equivalent to University of Calgary Nursing 309 or 539
e) Have successfully completed one undergraduate half-course in statistics
f) Normally have a minimum of two years' (full-time or equivalent) clinical experience in the proposed area of study
g) Submit three references: specific instructions are included in the MN Program application package
h) Submit a minimum TOEFL score of 600 (written test), 250 (computer-based test) or 100 (internet-based test) if required to provide proof of proficiency in English
i) Have an interview(s) with a faculty member, if requested by the Faculty

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 641) 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) Submit a minimum TOEFL score of 600 (written test), 250 (computer-based test) or 100 (internet-based test) for applicants required to provide proof of proficiency in English
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.

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:

- 1 December (for the following September)
- 1 February (for the following September)
- 15 September (for the following January).

There are three application deadlines for the PMNP diploma program:

- 1 December and 1 February for admission in September if the prerequisite courses are completed
- If the prerequisite courses are not completed, applications must be submitted by 15 September for admission to the Winter, Spring, or Summer semesters 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 (course-based)

a) Successful completion of the following core courses: Nursing 605, Nursing 611, Nursing 621, Nursing 683, Nursing 691, Nursing 693, Nursing 695
b) One graduate level half-course in statistics (Statistics 603)
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, Nursing 611, Nursing 621, Nursing 661, Nursing 663, Nursing 665, Nursing 683, Nursing 691
e) One graduate level half-course in statistics (Statistics 603)
f) Successful completion of the following core NP courses: Nursing 641, Nursing 644, Nursing 646, Nursing 650, Nursing 667

Post Master's Nurse Practitioner Diploma

g) Successful completion of pre-requisite courses: Nursing 661, Nursing 663, Nursing 665
h) Successful completion of the following core NP courses: Nursing 641, Nursing 644, Nursing 646, Nursing 650, Nursing 667

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 of 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.

Master of Nursing (thesis-based)

a) At minimum successful completion of the following core courses: Nursing 605, Nursing 611, Nursing 621, Nursing 675, Nursing 683
b) One graduate level half-course in statistics (Statistics 603)

Evaluation of nursing practicum will be weighted at 40% of the final grade across all of the practica in the MN course-based and MN thesis-based programs, with a weight of 60% 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, Nursing 769, two courses in advanced research methods, and two doctoral thesis seminars (Nursing 711 and Nursing 733)
b) Students in the doctoral program are required to take one of the 700-level advanced research methods courses offered in the Faculty of Nursing, either Nursing 721 or Nursing 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) The supervisor for an MN thesis student must be determined by the end of the student's first term in program.
b) In addition to normal regulations for assignment of supervisors in the MN program, a supervisory

committee must be struck for all MN thesis students by the end of the student's second term in program (usually April).

c) 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.

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.

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 1 February. 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 1 February deadline.

14. Other Information

None

15. Faculty Members/Research Interests

Current faculty and their research interests can be found at http://nursing.ucalgary.ca/directory

Graduate Courses

Nursing 601 H(3S-0)

Seminar on Special Topics Related to Health Care and Nursing
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Nursing 603 H(156 hours)

Independent Supervised Clinical Practicum
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Nursing 605 H(3S-0)

Philosophical Foundations for Advanced Nursing Practice
Exploration of the philosophical foundations of advanced nursing practice. A process of critical analysis and deconstruction of the various conceptual frameworks and paradigms leading to articulation of the philosophical perspectives that guide advanced nursing practice.
Prerequisite: Consent of the Faculty.

Nursing 607 H(39 hours)

Independent Guided Study
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Nursing 611 H(3-0)

Substantive Theory for Advanced Nursing Practice
Introduction to substantive theory related to advanced nursing practice.
Prerequisite: 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: Consent of the Faculty.

Nursing 621 H(3S-0)

Health Research Methods: Quantitative Designs
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: Consent of the Faculty.

Nursing 641 H(24S-68 within 6-week block)

Nurse Practitioner Practicum I
Opportunity for students to acquire advanced knowledge and skills related to clinical decision-making and client management of commonly presented health problems.
Prerequisites or Corequisites: 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: Nursing 641.
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: Nursing 644.
Note: Not open to students with credit in Nursing 648.
NOT INCLUDED IN GPA

Nursing 648 F(52S-180 within 6-week block)

Nurse Practitioner Practicum III (Neonatal)
Learning opportunities and practice experience in Neonatal Intensive Care and Special Care Nursery with emphasis on clinical diagnosis, diagnostic imaging, laboratory tests, differential diagnosis, and management of high-risk hospitalized infants. Open to Neonatal Nurse Practitioner students only.
Prerequisite: Nursing 644.
Note: Not open to students with credit in Nursing 646.
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.
Prerequisites: Nursing 667 and one of 646 or 648.
NOT INCLUDED IN GPA

Nursing 661 H(3S-0 within 3-week block)

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: Consent of the Faculty.

Nursing 663 H(3S-1)

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: Consent of the Faculty.

Nursing 665 H(35S-30 within 3-week block)

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 judgement, as well as selected diagnostic skills necessary for advanced practice.
Prerequisite: Consent of the Faculty.

Nursing 667 H(3S-0 within 3-week block)

Nurse Practitioner Practice Issues and Role Integration
Systems aspects related to management of complex health problems in NP practice, medical-legal and role development in extended practice environment.
Prerequisite: Nursing 646 or 648.

Nursing 675 H(2S-1T-12)

Advanced Nursing Practice: MN Thesis and MN/NP
Application of advanced nursing knowledge to practice. Emphasis on evidence based assessment tools and intervention skills for advanced practice with individuals, families, or communities. Development of a conceptual framework that could be used to guide advanced nursing practice or the research project.
Prerequisites: Nursing 605 and 611.
Note: Not open to students with credit in Nursing 691.
Note: Open to MN Thesis and MN/NP students only.

Nursing 681 H(3S-0)

Families and Illness
Facilitates understanding of the reciprocity between illness and family dynamics. Emphasis is on the family dynamics when a family member is experiencing a chronic illness, life-threatening illness or a psychosocial problem.
Prerequisite: Consent of the Faculty.

Nursing 683 H(3S-0)

Health Research Methods: Qualitative Designs and Analyses
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: Consent of the Faculty.

Nursing 685 H(3S-0)

Family Research
This interdisciplinary course addresses the conceptual and methodological research issues encountered when the family is the unit of measurement and analysis. The focus will be on critique of research addressing family variables in health care and illness.
Prerequisite: Consent of the Faculty.
Note: A graduate level research methods course is required.

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.
Prerequisites: Nursing 605 and 611.
Note: 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: 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 strategies whereby advanced nursing practice enables clients, their families and communities, including organizations and regions, to design innovative responses across the continuum of care.
Prerequisite: Nursing 693.

Nursing 701 H(3-0)

Doctoral Special Topics
Prerequisite: 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: Consent of the Faculty.

Nursing 707 H(39 hours)

Directed Study
Prerequisite: Consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Nursing 721 H(3-0)
(formerly Nursing 701.02)

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: Nursing 621 or equivalent

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.
Prerequisites: Nursing 705 and one graduate level advanced research course.
NOT INCLUDED IN GPA

Nursing 711 H(2S-0)
(formerly Nursing 735)

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: Consent of the Faculty.
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: Consent of the Faculty.

Nursing 783 H(3-0)
(formerly Nursing 701.01)

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: Nursing 683 or equivalent.

PHILOSOPHY PHIL

Contact Info

Location: Social Sciences Building, Room 1248
Faculty number: (403) 220-5533
Fax: (403) 289-5698
E-mail 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), course-based (full and part-time) and thesis-based (full-time)

The Department also offers a Master of Arts degree with a specialization in the History and Philosophy of Science and a Master of Arts degree with a specialization in the Philosophy of Religion. These two degrees are offered in cooperation with the Departments of History and Religious Studies respectively.

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements, the Department requires a third letter 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.

3. Application Deadline

The deadline for submitting complete applications is 15 January for September admission.
Candidates applying for financial assistance should ensure that all documents relevant to their scholarship application reach the Department by 15 January. 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 Doctoral programs, no more than one half-course of Directed Reading can be taken for credit.

In addition to Faculty of Graduate Studies 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 10 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. 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.

a) Details of the written component:
   i. The written component will consist of two three-hour written examinations. The written examinations are to be completed within one week.
   ii. The written component of the examination must be judged to be either acceptable ('Pass') or unacceptable ('Fail').
b) The student shall not be permitted to proceed to the oral component if the student does not secure a 'Pass' on the written component.
c) The oral examination will be held within two weeks following the written component. The oral examination will not be limited to the questions in the written examinations but will test the student's general knowledge of the areas selected for examination.
d) Details of the oral component:
   i. The oral examination is a formal examination, not an informal discussion with the student.
   ii. All examiners must be given an opportunity to question the student early in the examination, e.g. by rounds of questioning.
   iii. The oral examination shall not exceed two hours. This does not include deliberation time of the committee.
   iv. The oral component of the examination must be judged to be either acceptable ('Pass') or unacceptable ('Fail').
e) Each examiner is required to submit a written assessment of the of the student's written examination performance, to be submitted to the Chair of the examination committee prior to the examination.
f) 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.

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 15 January.

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/

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 609	H(3-0)
Topics in the History of Philosophy MAY BE REPEATED FOR CREDIT	
Philosophy 623 (formerly Philosophy 621)	H(3-0)
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 (formerly Philosophy 663)	H(3-0)
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 (formerly Philosophy 681)	H(3-0)
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	

PHYSICS AND ASTRONOMY PHAS

Contact Info

Location: Science B, Room 605
Faculty number: (403) 220-3617
Fax: (403) 289-3331
E-mail 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

Areas of specialization: Astrophysics, Medical Physics, Physics, Radiation Oncology Physics, and Space Physics

Post PhD Diploma 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 Advanced Physics Graduate Record Examination

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.

Doctor of Philosophy

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

3. Application Deadline

Deadlines for the submission of complete applications:
1 March for September admission
1 July 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.

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, register in the Graduate Seminar, Physics 691, during fall and winter sessions 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, Physics 611, Physics 613, and Physics 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, Medical Physics 625, at least two of Physics 609, Physics 611, Physics 613, and Physics 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, Medical Physics 625, Medical Physics 633, Medical Physics 637, Medical Physics 639, Medical Physics 689.01, and two of Physics 609, Physics 611, Physics 613, and Physics 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, Physics 605, Physics 609, Physics 611, Physics 613, Physics 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 ASPH 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 M.Sc. degree in Radiation Oncology Physics, Medical Physics 623 , Medical Physics 625 , Medical Physics 633 , Medical Physics 637 , Medical Physics 639 , and Medical Physics 689.01 , and two courses from Physics 609 , Physics 611 , Physics 613 , or Physics 615

Post PhD Diploma

Eight half course equivalents including MDPH 711, 712, 721, 722, 731, 741 and two of HROD 793, HROD 741 or SGMA 797.01

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

Credit for a maximum of two half-course equivalents may be given for courses taken at the 500-level.

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.

9. Supervisory Assignments

Newly admitted students will normally be supervised by the graduate coordinator or an interim supervisor in their field of interest during the first year 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 within the department by the end of their first year in program. Registrants in the Post-PhD Diploma program are supervised by the Director of Medical Physics or designate, Tom Baker Cancer Centre.

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.

Doctor of Philosophy

Students are required to write a qualifying examination within their first year in program. This uniform examination, taken by all students, examines the student's background in undergraduate physics at the honours level. The examination will normally be conducted during May or June, and again in December. Students who fail the examination the first time will retake it during the next sitting of the examination. A second failure will result in the withdrawal of the student from the doctoral program.

Students are required to complete the oral candidacy exam. This exam may include questions on the written examination, general research knowledge and thesis proposal.

Final thesis defence is required. The oral thesis defence is open.

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 February 1. 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/astro
Environmental Physics:
http://www.phas.ucalgary.ca/~annlisen/
Complexity Science:
http://www.phas.ucalgary.ca/complexity/
General Relativity: http://phas.ucalgary.ca/astro
Isotope Science: http://www.phas.ucalgary.ca/isl/
Medical Physics:
http://www.cancerboard.ab.ca/tbccmedphys/
http://www.med.ucalgary.ca/mrcentre
Quantum Optics: http://.iqis.org/
and http://qis.ucalgary.ca/QO/
Space and Plasma Physics:
http://www.phys.ucalgary.ca/

Astrophysics (ASPH)

Undergraduate Courses

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

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: Astrophysics 403.

Astrophysics 507 H(1-6)

Senior Astrophysics Laboratory
Lectures and laboratory sessions in observational astronomy. Modern methods of observation, data reduction, and analysis. Observations will be carried out at the Rothney Astrophysical Observatory and/or the main campus.
Prerequisite: Astronomy 213 or Astrophysics 213.
Prerequisite or Corequisite: Any 400-level Astrophysics course.

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: Astrophysics 503.

Graduate Courses

Astrophysics 607 H(3-3)

Advanced Observational Astrophysics
Principles and tools of modern ground-based and space astronomy emphasising 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.

Astrophysics 699 H(0-9)

Projects in Astrophysics
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.

Medical Physics (MDPH)

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: 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.
Prerequisites: 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.
Prerequisites: Medical Physics 625 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.
Prerequisites: Medical Physics 623 and 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.
Prerequisites: Medical Physics 625 and consent of the Department.

Medical Physics 711 H(0-8)

Clinical Competency 1
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.

Medical Physics 712 H(0-8)

Clinical Competency 2
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: Medical Physics 711.

Medical Physics 721 H(0-8)

Clinical Projects 1
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.

Medical Physics 722 H(0-8)

Clinical Projects 2
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: Medical Physics 721.

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.

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.

Physics (PHYS)

Undergraduate Courses

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

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.
Prerequisites: Physics 325, 457; Mathematics 353 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.
Prerequisites: Physics 443 or Chemistry 373; Physics 449, 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.
Prerequisites: Physics 343 or 433; 455.

Physics 521 H(3-0)

Nonlinear Dynamics
Topics: Introduction to nonlinear dynamical systems: Phase space representation, nonlinear oscillators, bifurcations, normal forms, pattern formation, amplitude equations, deterministic chaos, attractors, fractals, synchronization
Prerequisites: Applied Mathematics 433; Physics 381; and Physics 449; or consent of the Department

Physics 533 H(3-0)

Advanced Mathematical Methods of Physics
Hilbert space. Complete orthonormal sets of functions. Sturm-Liouville theory. Green functions. Integral equations.
Prerequisites: Physics 443 or Chemistry 373; Physics 455.

Physics 535 H(3-3)

Computational Methods in Physics
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).
Prerequisites: Physics 443 or Chemistry 373, Physics 455 and 499 or 381.
Note: A knowledge of a high level programming language (C, C++, Fortran or Pascal) is highly recommended.

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: 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: Consent of the Department.

Physics 571 H(3-0)

Laser Physics
Theoretical aspects of lasing and lasers. Principles of operation of solid-state, liquid, and gas lasers. Applications of laser systems to research, medical, and industrial projects.
Prerequisites: Physics 443, 455.
Note: Physics 449 is suggested but not required.

Physics 573 H(3-0)
(formerly Applied Physics 573)

Atmospheric and Environmental Physics
Quasi-static uniform atmosphere. Atmospheric optics. Scattering in the atmosphere. Atmospheric visibility and aerosols. Cloud physics. Atmospheric electricity. Radiative transfer. Atmospheric circulation. Hydrological cycling. Stable isotopic techniques. Pollutants. Energy transfer. Turbulence. Sky shortwave and visible radiation distribution. Near infrared sky radiation, cloud detection and estimation.
Prerequisite: Physics 347 or 447 or Chemistry 371 or 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.
Prerequisites: Physics 325, 457, Applied Mathematics 413.
Note: Credit will not be allowed for both Physics 575 and 471.

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: Physics 497 or Physics 325, 355, and 407.

Physics 598 F(0-6)

Research in Physics
Research project in Physics.
Prerequisites: Physics 443, 449, 455 and consent of the Department.

Physics 599 H(0-9)

Independent Study
Each student will be assigned a project in consultation with a tutor. A written report and oral presentation are required.
Prerequisite: 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 nonequilibrium 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: Physics 611.
Note: It is expected that a student's background will include Physics 481 or its equivalent.

Physics 621 H(3-0)

Nonlinear Dynamics and Pattern Formation
Topics: Introduction to pattern formation and self-organization in nature: Reaction-diffusion systems, hydrodynamical systems, bistable media, excitable and oscillatory media, stability analysis, bifurcations, pattern selection, amplitude equations and normal forms, fronts, traveling waves, topological defects, spiral waves, spatiotemporal chaos, defect-mediated turbulence, spatiotemporal point processes
Note: It is expected that a student's background will include Physics 521, Physics 451 and Physics 481 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 H(2-1)
(Geology 663)

Applications of Stable Isotopes
Applications in archaeology, biology, chemistry, engineering, geography, geology, medicine, meteorology, paleontology, physics and space sciences. Topics include hydrology, paleoclimates, ore deposits, geothermometry, fossil fuels exploration and recovery, pollutant tracing, food webs and forensic investigations.
Prerequisite: 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 Nonlinear Optics
Fundamentals of quantum and nonlinear 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: Consent of the Department.

Physics 691 Q(2S-0)

Scientific Communication Skills (formerly Graduate Seminar)
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 3 terms of Physics 691 during each graduate course, although the normal load is 4 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 Physics
691.12 Graduate Seminar for MSc Students I Physics
691.13 Effective Scientific Writing for MSc Students Physics
691.14 Graduate Seminar for MSc Students II Physics
691.16 Graduate Seminar for MSc Students III Physics
691.18 Graduate Seminar for MSc Students IV Physics
691.21 Effective Scientific Speaking for PhD Students Physics
691.22 Graduate Seminar for PhD Students I Physics
691.23 Effective Scientific Writing for PhD Students Physics
691.24 Graduate Seminar for PhD Students II Physics
691.26 Graduate Seminar for PhD Students III Physics
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' send 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)

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

Space Physics (SPPH)

Graduate Courses

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 coordinate systems, reconnection, current flow in the magnetosphere, substorms, and particle acceleration.
Note: It is expected that a student's background will include Physics 509 and 555 or equivalent.

POLITICAL SCIENCE POLI

Contact Info

Location: Social Sciences Building, Room 756
Faculty number: (403) 220-5921
Fax: (403) 282-4773
E-mail 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
Students in the Department of Political Science may choose an interdisciplinary specialization in Israel Studies. For further information on the Israel Studies (Interdisciplinary) specialization, see the separate listing in this Calendar.

The MA and PhD programs in Political Science are offered as full-time programs only.

2. Admission Requirements

In addition to the Faculty requirements, the Department requires:

Master of Arts

a) A minimum grade point average of 3.4 on a four-point scale over the last ten full-course equivalents taken in the applicant's undergraduate program

b) Normally a 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 the TOEFL with a minimum score of 620 (paper-based), 260 (computer-based) or 105 (internet-based) or 7+ on the IELTS.

Doctor of Philosophy

a) A minimum grade point average of 3.7 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 the TOEFL with a minimum score of 620 (paper-based), 260 (computer-based) or 105 (internet-based) or 7+ on the IELTS.

3. Application Deadline

Deadline for the submission of completed applications is 15 January.

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 Department will allow the student to claim up to two half-courses at our graduate level towards the MA requirements should the student be admitted into our MA program.

5. Program/Course Requirements

In addition to the Faculty requirements, the Department normally requires that all students complete POLI 691. In addition:

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
   - A maximum of one half-course can be a reading course
b) Master of Arts students must demonstrate a basic knowledge of research methods equivalent to POLI 691. If students are required to take POLI 691, it will be included in these five half-courses. Students who have an equivalent of POLI 691 will still be required to take five half-courses.

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 of these courses must be POLI 791: Scope and Methods of Political Science
   - A maximum of two half-courses may be reading courses
   - Language courses will not be considered part of the six half-course-requirement
b) PhD Students must demonstrate a basic knowledge of research methods equivalent to POLI 691. If students are required to take POLI 691 it will not be considered part of the six half-course equivalent.
c) A candidacy examination with written and oral components, normally completed within sixteen months of first registration.
d) A thesis proposal, defended within one month of the oral candidacy exam.
e) 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.

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.

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 coordinator (and/or Department Head), 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 coordinator 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 coordinator (and/or Head) and must be established as soon as possible and no later than three months after the supervisor's appointment.

10. Required Examinations

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. Examinations are usually three hours long and are scheduled in each of the fall and winter terms at suitably arranged times.

11. Research Proposal Requirements

Doctoral students must submit 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 15 January.

14. Other Information

None.

15. Faculty Members/Research Interests

Current departmental research interests can be found at: http://poli.ucalgary.ca/graduate.
Individual faculty members' areas of research can be found at: http://poli.ucalgary.ca/research

Courses numbered 600-799 are offered either as special reading courses or as seminars, as required. Students should consult the Department regarding enrollment in these courses.

Graduate Courses

Political Science 615 H(3-0)

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 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 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 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 689 H(3-0)

Unconventional Warfare
Analysis of warfare conducted by, or against, sub-state groups. This may include in-depth studies of guerrilla warfare, asymmetric conflict, or terrorism.

Political Science 691 H(3-0)

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: 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.

PSYCHOLOGY PSYC

Contact Info

Location: Administration Building, Room 274
Faculty number: (403) 220-5659
Fax: (403) 282-8249
E-mail 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 below.

Psychology (PSYC)

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)
Master of Science (MSc), thesis-based

2. Admission Requirements

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.

In addition to Faculty 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 Advanced Subtest.
e) For applicants required to provide proof of proficiency in English, a TOEFL score of 600 (written test), or 250 (computer-based test), or 100 (internet-based test)

3. Application Deadline

Deadlines for the submission of completed applications:
15 January for May or September admission
1 October 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

Master of Science

Master's students must take six half-courses, two of which must come from Psychology 611, Psychology 613, Psychology 615, Psychology 617, or Psychology 619, and two of which must come from Psychology 605, Psychology 621, Psychology 623, Psychology 625, Psychology 627, Psychology 629, Psychology 631, or Psychology 637 (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.

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.

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 a thesis research proposal that must be typed and 10 to 30 double-spaced pages (12 pt font, reference list extra). Students must consult with their supervisors. The oral examination questions will be based on the written thesis proposal 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 (for Master's level) 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 15 January.

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)

Contact Info

Location: Administration, Room 274
Faculty number: (403) 220-5659
Fax: (403) 282-8249
E-mail 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 Faculty requirements, the program requires:

a) An honour's degree in psychology (or equivalent) with a minimum grade point average of 3.6 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 250 (computer-based test), or 100 (internet-based) test

3. Application Deadline

The deadline for complete applications is 7January 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

The Program outline is as follows:

Year 1
Psychology 650, Psychology 651, Psychology 653, Psychology 659, Psychology 660, Psychology 671, Psychology 673, Psychology 615, thesis work

Year 2
Psychology 601, Psychology 650, Psychology 681, Psychology 683, plus a graduate-level Psychology Statistics course or Methodology course (Psychology 617 or equivalent), completion of the thesis

Year 3
Psychology 750, Psychology 760, a graduate-level breadth course, elective, the Candidacy Examination, thesis work
Year 4
Psychology 750, Psychology 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 and courses offered by the Department of Psychology. A list of approved breadth courses is available through the Graduate Psychology Program Office.

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 one breadth course 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.

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 15 January.

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 seven years (2004-2011).

15. Faculty Members/Research Interests

Research and clinical interests of the Program faculty can be found at
http://psychology.ucalgary.ca/research/groups

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: Consent of the Department.

Psychology 603 H(3-0)

Graduate Conference Course in Psychology
Offered under various subtitles. Consult Department for details.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 604 F(3-0)

Graduate Conference Course in Psychology
Offered under various subtitles. Consult Department for details.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 605 H(3-0)

Advanced Topics in Theoretical Psychology
An advanced survey of some of the fundamental issues and recent developments in theoretical psychology.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 607 H(3-0)

Advanced Research Design and Methodology in Social Psychology
Survey of advanced topics in the conduct of social 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, and social cognitive procedures; and ethics. Addresses data analytic issues of particular concern to social psychologists such as analysis of data from dyads and groups and quantitative syntheses of social psychological research.
Prerequisite: Consent of the Department.

Psychology 611 H(3-3)

Advanced Research Analysis in Qualitative and Historical Psychology
Qualitative Research Designs and Historical Research in Psychology. Topics include Discourse Analysis, Grounded Theory and related techniques, problems of theory development in research and archival research methods in the history of psychology.
Prerequisite: 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: Consent of the Department.

Psychology 615 H(3-3)

Advanced Research Design and Analysis I
Applications of the general linear model to research design and analysis. Topics include analysis of variance, regression, and analysis of covariance.
Prerequisite: Consent of the Department.

Psychology 617 H(3-3)

Advanced Research Design and Analysis II
Multivariate techniques and design issues, including canonical correlation, discriminant analysis, multivariate analysis of variance, multivariate regression, principal components analysis and factor analysis.
Prerequisite: Psychology 615, or consent of the Department.

Psychology 619 H(3-3)

Special Topics in the Design of Psychological Research
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 621 H(3-0)

Advanced Topics in Sensation and Perception
An in-depth survey of classic findings and contemporary issues in visual and auditory processing, including attentional mechanisms and imaging research.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 622 F(0-3)

Research in Sensation and Perception
Original project on a contemporary research problem in vision and/or audition. Specific project will vary with student and supervisor interest as well as available research facilities. Possible research areas include aspects of sight or hearing, speech perception, visual attention, and age-related changes in these functions.
Prerequisite: Consent of the Department.

Psychology 623 H(3-0)

Advanced Topics in Cognition
An advanced survey of some of the fundamental issues and recent developments in the cognitive sciences.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 624 F(0-3)

Research in Cognition
Empirical research in cognition or cognitive development, conducted under the supervision of a faculty member.
Prerequisite: Consent of the Department.

Psychology 625 H(3-0)

Advanced Topics in Developmental Psychology and Aging
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 626 F(0-3)

Research in Development/Aging
Original faculty-supervised research project on a contemporary research problem in infancy, childhood, adolescence or adult aging. While specific project will vary with student and supervisor interest as well as available facilities, possible research areas include age-related differences or change in auditory, cognitive, language, moral, social, clinical or visual functioning.
Prerequisite: Consent of the Department.

Psychology 627 H(3-0)

Advanced Topics in Social/Personality Psychology
Prerequisites: An undergraduate course in social psychology and consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 628 F(0-3)

Research in Social/Personality
Completion of an original research project in the areas of social and/or personality psychology.
Prerequisite: Consent of the Department.

Psychology 629 H(3-0)

Advanced Topics in Cognitive Development
An advanced survey of fundamental issues and recent developments in cognitive development.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 631 H(3-0)

Advanced Topics in Behavioural Neuroscience
Prerequisites: Psychology 476, or equivalent and consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 632 F(0-3)

Research in Behavioural Neuroscience
Behavioural neuroscience theory and techniques including behavioural analysis, electrophysiological recording and anatomical methods.
Prerequisite: Consent of the Department.

Psychology 637 H(3-3)

Topics in Engineering Psychology
Introduction to psychological principles, research and methods as they relate to human interaction and performance in work settings.
Prerequisite: Consent of the Department.

Psychology 638 F(0-3)

Research in Engineering Psychology
Original project on a research problem in the human factors, including human-computer interaction, driving behaviour, usability, and performance in work settings.
Prerequisite: 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: 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)

Adult Psychopathology
Current theory, issues, and research regarding the epidemiology, etiology, diagnosis, and prognosis of adult psychopathology. Implications for assessment and treatment.

Psychology 653 H(3-0)

Child Psychopathology
Current theory, issues, and research regarding the epidemiology, etiology, diagnosis, and prognosis of child psychopathology. Implications for assessment and treatment. Topics include internalizing and externalizing disorders, risk and protective factors, and developmental continuities and discontinuities in psychopathology.

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)

Psychological Assessment of Children
An overview of theoretical, professional and ethical issues in the 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 699 H(0-3)

Research Course in Psychology
Offered under various subtitles. Consult the Department for details.
Prerequisite: Consent of the Department
Note: May be repeated for credit with the consent of the Department.

Psychology 705 H(3S-0)

Seminar in History/Systems/Theoretical Psychology
Selected topics in the history of twentieth-century psychology and the theoretical problems of modern psychology.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 706 F(0-3)

Research in History/Systems/Theoretical Psychology
Advanced research in recent developments in theory, methodology and foundational issues and/or the development of historiography in the discipline.
Prerequisite: Consent of the Department.

Psychology 722 F(0-3)

Research in Sensation and Perception
Advanced project on a contemporary research issue in vision and/or audition. Specific project will vary with student and supervisor interest as well as available research facilities, possible research areas include spatiotemporal aspects of sight or hearing, speech perception, visual attention, and age-related changes in these functions.
Prerequisite: Consent of the Department.

Psychology 724 F(0-3)

Research in Cognition
Empirical research in cognitive psychology conducted under the supervision of a faculty member.
Prerequisite: Consent of the Department.

Psychology 725 H(3S-0)

Seminar in Developmental Psychology
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 727 H(3S-0)

Seminar in Social/Personality Psychology
Selected topics related to interpersonal processes, gender, justice, and personality and its assessment.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 728 F(0-3)

Research in Social/Personality Psychology
Advanced research project in the areas of social and/or personality psychology.
Prerequisite: Consent of the Department.

Psychology 731 H(3S-0)

Seminar in Behavioural Neuroscience
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 732 F(0-3)

Research in Behavioural Neuroscience
Behavioural neuroscience theory and techniques including: behavioural analysis, electrophysiological recording and anatomical methods.
Prerequisite: Consent of the Department.

Psychology 733 H(3S-0)

Seminar in Cognitive Development
Selected topics in cognitive development.
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Psychology 734 F(0-3)

Research in Cognitive Development
Empirical research in cognitive development conducted under the supervision of a faculty member.
Prerequisite: Consent of the Department.

Psychology 737 H(3S-0)

Seminar in Ergonomics
Application of psychological principles and methods to the design of complex systems and to the operator/system interface.
Prerequisites: Psychology 637 and 639 or 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.
Prerequisites: 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/Consultation
750.02. Neuropsychology
750.03. Family Therapy
750.04. Group Therapy
750.05. Diversity Issues in Clinical Psychology
750.06. Clinical Geropsychology
750.07. Couple and Sex Therapy
750.08. Forensic Psychology
750.09. Addictions
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.
NOT INCLUDED IN GPA

Psychology 799 H(0-3)

Research Course in Psychology
Offered under various subtitles. Consult the Department for details.
Prerequisite: Consent of the Department.
Note: May be repeated for credit with the consent of the Department.

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.

RELIGIOUS STUDIES RELS

Contact Info

Location: Social Sciences Building, Room 1301
Faculty number: (403) 220-6988
Fax: (403) 210-0801
E-mail 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

The three study streams at the graduate level are Eastern Religions, Nature of Religion, and Western Religions. Feasibility of programs within these streams depends on available research resources and faculty expertise.

Research is supported in the following areas:

Eastern Religions – Buddhist Studies; east Asian Religions; Hinduism; Indian philosophy

Nature of Religion – Comparative religion; African religions; new religious movements; science and religion; women and religion; philosophy and religion; comparative philosophy of religion; hermeneutics; theory and method in the study of religion

Western Religions – Ancient Israel; Hebrew Bible; Bible, myth, and literature; Second Temple Judaism; rabbinic Judaism; early Christianity; Islamic and Jewish philosophy; medieval Jewish-Islamic studies; radical Protestant groups (Anabaptism, German Pietism)

2. Admission Requirements

In addition to the Faculty requirements, the Department requires:

Master of Arts

a) An admission grade point average of 3.3 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.

Doctor of Philosophy

a) A degree comparable to the University of Calgary Religious Studies Master of Arts with a minimum grade point average of 3.5 on a four-point scale

Students with an Honours Bachelor of Arts degree in Religious Studies, a grade point average of 3.7 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 substantial piece of written work and 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 7 January for September admission.

4. Advanced Credit

Applicants must make advanced credit requests 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

Note*: The Departmental Graduate Committee will determine the exact number and kinds of courses in each student's program.*

In addition to Faculty requirements, the Department normally requires:

Master of Arts (thesis-based)

a) Two and a half full-course equivalents, including RELS 609 and at least one half-course in each of the three streams of study, in addition to individualized requirements set by the Departmental Graduate Committee at the time of admission.
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 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 – Topics in the Study of Religion
   - 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 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 – Topics in the Study of Religion
   - 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 Coordinator, 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 makes interim supervisory assignments when applicants are 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. Questions on the research proposal will not be included in the oral candidacy examination.

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 shall 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 1 February.

14. Other Information

None.

15. Faculty Members/Research Interests

Current faculty research areas can be found at http://www.ucalgary.ca/rels/people

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)
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)
Topics in the Study of Religion
MAY BE REPEATED FOR CREDIT

Religious Studies 709 H(3-0)
Advanced Critical Discourses in the Study of Religion
MAY BE REPEATED FOR CREDIT

SOCIAL WORK SOWK

Contact Info

Locations
Calgary:
Professional Faculties Building, Room 3270
Faculty number: (403) 220-6945
Fax: (403) 282-7269
E-mail address: fswgrad@ucalgary.ca

Edmonton :
#444, 11044-82 Avenue
Faculty number : (780) 492-3888
Fax : (780) 492-5774
E-mail address : eefleck@ucalgary.ca

Lethbridge :
4401 University Drive
Faculty number : (403) 329-2794
Fax : (403) 329-2787
E-mail address : aiken@uleth.ca

1. Degrees and Specializations Offered

Doctor of Philosophy (PhD)
Master of Social Work (MSW), course-based (full-time and part-time) and thesis-based

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 9 courses, a candidacy exam, and a thesis.

The Faculty of Social Work also offers a Post-Master's Diploma in Advanced Studies in Social Work. For information on the Post-Master's Diploma (PMD) in Advanced Studies in Social Work, consult the Student Services Office in the Faculty of Social Work.

MBA/MSW
The Faculty of Social Work and the Haskayne School of Business offer a combined program leading to the Master of Business Administration/ Master of Social Work (MBA/ MSW) degree.

The Master of Business Administration/ Master of Social Work (MBA/ MSW) program is designed to prepare students for competent and visionary management of human service organizations. This program is available only to full-time students in the Leadership in the Human Services specialization.

MSW
The Faculty of Social Work offers MSW programs in Calgary, Edmonton, and Lethbridge. The objective of the MSW program is to prepare students for advanced professional practice in social work. In all locations, students are required to choose a course-based or thesis route to the degree. 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.

Calgary Location
In Calgary, after selecting either a course-based or a thesis-based program, MSW students choose one of two specializations: Clinical Practice or Leadership in the Human Services (LEAD). Calgary thesis-based and course-based MSW students in both specializations also have the option of focused study in International Social Work, Child and Family Services, or Gerontology.

Edmonton Location
In Edmonton, the Faculty of Social Work offers the Clinical Social Work Practice specialization. Program delivery blends web-based and on-site formats, allowing students from Edmonton and throughout central and northern Alberta to continue working while pursuing graduate education. Students with a BSW complete the Clinical Specialization program in 2 years. Students with an undergraduate degree in other disciplines complete a Foundation program followed by the Clinical program, requiring a total of 4 years of study. Admission occurs in odd-numbered years (i.e., 2009, 2011, 2013, etc.).

Lethbridge Location
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 2 years. Admission occurs in odd-numbered years (i.e., 2009, 2011, 2013, etc.).

Distance Program
The MSW course-based program with a Leadership in the Human Services (LEAD) specialization is also offered as a distance program. Please consult the Faculty of Social Work website: http://fsw.ucalgary.ca/. 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 part-time study. Admission occurs in even-numbered years

(i.e., 2008, 2010, 2012, etc.). For information, consult the website or contact the Student Services Office in the Faculty of Social Work.

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, the Faculty of Social Work requires:

Doctor of Philosophy

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, and research interests;
c) Substantial professional experience
d) Samples of written work including, for example, published and/or unpublished scholarly papers and/or professional reports

Master of Business Administration/ Master of Social Work (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

Master of Social Work

a) A Bachelor of Social Work degree, or a four year Bachelor's degree from another discipline and the equivalent of two years of full-time paid or volunteer work in the human services field.
b) A study plan outlining the applicant's educational goals and career expectations. The study plan must indicate the applicant's intended area of specialization (Clinical Practice or Leadership in the Human Services).
c) For applicants to the thesis-based program, an expanded application providing a rationale for selecting the thesis route and outlining the area of research interest.

Master of Social Work (Distance Delivery)

Leadership in Human Services Specialization

a) A Bachelor of Social Work degree
b) A study plan outlining the applicant's educational goals and career expectations

3. Application Deadline

Final submission deadlines are as follows:

- PhD program: 31 January for September admission (in exceptional cases, applicants may be accepted for alternative admission dates).
- Leadership in the Human Services Program (distance delivery): 31 January for July admission.
- Calgary MSW programs (all Specializations; MSW/MBA): 31 January for September admission).
- Edmonton and Lethbridge MSW programs: 31 January for September admission in odd-numbered years (2009, 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.

5. Program/Course Requirements

In addition to Faculty of Graduate Studies requirements, the Faculty of Social Work requires:

Master of Social Work (course-based) for students with a BSW

a) A minimum of ten half-course equivalents; Specialization and option courses are listed below. Social Work 696: Advanced Practicum extends for a full academic year and requires that students be in a field placement three days per week. It is advised that students be concurrently registered in the Theory and Methods courses.

Master of Social Work (thesis-based) for students with a BSW

a) A minimum of nine half-course equivalents. Specialization and option courses are listed below.

Master of Social Work (course-based) for students without a BSW

a) A minimum of nineteen half-course equivalents;
b) Required Foundation courses to be completed prior to Specialization courses include:
   - Social Work 637: Human Behaviour in the Environment (one half-course)
   - Social Work 621: History and Foundation of the Profession (one half-course)
   - Social Work 632: Social Policy and Social Justice (one half-course)
   - Social Work 629: Communication and Interviewing (one half-course)
   - Social Work 641: Models of Practice (one half-course)
   - Social Work 645: Research and Evaluation (one half-course)
   - Social Work 625: Practice with Individuals, Families and Groups (one half-course)
   - Social Work 627: Practice with Organizations and Communities (one half-course)
c) Social Work 633: Foundational Practicum extends from January through early May, with students in practicum three days/week during the semester and 4 days/week for 3 weeks following the semester.
d) Required Specialization courses and option courses are listed below.

Note: Timetables for programs are available on the website.

Social Work 696: Advanced Practicum extends for a full academic year and requires that students be in a field placement three days per week. It is advised that students be concurrently registered in the Theory and Methods courses.

Master of Social Work (thesis-based) for students without a BSW

a) A minimum of eighteen half-course equivalents
b) Required Foundation courses to be completed prior to Specialization courses include:
   - Social Work 637: Human Behaviour in the Environment (one half-course)
   - Social Work 621: History and Foundation of the Profession (one half-course)
   - Social Work 632: Social Policy and Social Justice (one half-course)
   - Social Work 629: Communication and Interviewing (one half-course)
   - Social Work 641: Models of Practice (one half-course)
   - Social Work 645: Research and Evaluation (one half-course)
   - Social Work 625: Practice with Individuals, Families and Groups (one half-course)
   - Social Work 627: Practice with Organizations and Communities (one half-course)
   - Social Work 633: Foundational Field Practicum (one half-course or 426 hours)
c) Required Specialization courses and option courses are listed below.

Note: Timetables for programs are available on the website.

Master of Business Administration/ Master of Social Work

a) A minimum of eight half-course equivalents in the MSW program, Leadership in the Human Services Specialization
   Specific MSW Specialization courses include:
   - LEAD Research (two half-course equivalents)
   - LEAD Theory & Methods (two half-course equivalents)
   - LEAD Policy (one half-course equivalent)
   - LEAD Advanced Practicum (two half-course equivalents)
   - LEAD Special Topics (two half-course equivalents).
   - Social Work 697: Diversity, Oppression, and Social Justice (one half-course equivalent)
b) A minimum of sixteen half-course equivalents in the MBA program
   - Required MBA half-courses include:
   - Accounting 601: 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: Business Analysis
   - Management Studies 615: Strategic Business Analysis
   - Operations Management 601: Operations Management
   - Strategic and General Management 701: Strategic Management
   - Business and Environment 777: Global Environment of Business
   - and four elective courses in the student's area of interest.

Master of Social Work (Distance Delivery)

Leadership in Human Services

a) A minimum of ten half-course equivalents
Required courses include:
- Social Work 655: Research I (one half-course)
- Social Work 695: Research II (one half-course)
- Social Work 667: Theory and Methods I (one half-course)
- Social Work 669: Theory and Methods II (one half-course)
- Social Work 696: Practicum (the equivalent of two half-courses or 600 hours)
- Social Work 665: Policy (one half-course delivered on campus)
- Social Work 679.04: Special Topics I – Transforming Human Services Organizations (one half-course)
- Social Work 697: Diversity, Oppression, and Social Justice (one half-course)
- Social Work 699.02 : Special Topics II - Community Capacity Building (one half-course)

Master of Social Work (Central and Northern Region)

Clinical Specialization

The MSW (Edmonton) is offered on a part-time basis, through blended delivery format to students with a BSW and to students with an undergraduate degree in another discipline. Please refer to the information provided above regarding admission and course requirements for the course-based and thesis-based MSW routes.

Master of Social Work (Southern Alberta Region)

Clinical Specialization

The MSW (Lethbridge) is offered on a part-time basis through a combination of face-to face and on-line instruction to students who hold a BSW. The program is designed to allow students to maintain employment for most or all of its duration. Please refer to the information provided above regarding admission and course requirements for the course-based and thesis-based MSW routes.

Doctor of Philosophy

a) A minimum of nine half-course equivalents
b) Required core courses include:
- *Social Work 741: Research Foundations: Epistemology and Professional Knowledge-Building (one half-course)
- Social Work 743: Social Work Theory, History, and Philosophy: Values, Ethics and Professional Beliefs (one half-course)
- *Social Work 745: Research Methods I: Quantitative (one half-course)
- *Social Work 747: Research Methods II: Qualitative (one half-course)
- *Social Work 749: Quantitative Data Analysis (one half-course)
- Social Work 721: Integrative Research Seminar (one half-course)

*Equivalent courses may be taken outside the Faculty with the approval of the Faculty of Social Work.

c) Three 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.
d) A thesis research proposal.

6. Additional Requirements

For all students: participation in an Orientation Session is recommended for incoming students held at the beginning of the Fall.

7. Credit for Undergraduate Courses

Credit for undergraduate courses will not be awarded.

8. Time Limit

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 MBA/MSW program.
Expected completion times are:
(1) one 12-month year for full-time course-based MSW students with a BSW
(2) two 12-month years for full-time course-based MSW students without a BSW
(3) two 12-month years for the MBA/MSW
(4) two years for a thesis-based MSW
(5) four years for a PhD
(6) two 12-month years for a part-time MSW with a BSW
(7) four 12-month years for a part-time MSW without a BSW

9. Supervisory Assignments

Course-based MSW and MBA/ MSW students select a faculty advisor no later than the end of the first semester in 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. A change of advisor is most likely to happen once the student has settled on a substantive area and chooses a chair for the final comprehensive examining committee.

PhD, PMD 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. 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

Master of Social Work (course-based) and Master of Business Administration/Master of Social Work
The final comprehensive examination for the course-based MSW and for the MBA/MSW has 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 Faculty of Social Work comprehensive examination guidelines for further detail.

Master of Social Work (thesis-based)
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.

Doctor of Philosophy
The doctoral candidacy examinations are taken within 28 months of the student's admission to the program and after all required course work has been completed. 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 must similarly defend their dissertation to the satisfaction of the examining committee. Questions on the research proposal will not be included in the Oral Candidacy Exam. Students should consult the Faculty of Social Work candidacy examination guidelines for further detail.

Questions on the research proposal may be included in the oral candidacy examination.

Thesis oral exams 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. A copy of the proposal becomes part of the student's record within the Faculty of Social Work.

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, and consult with the Student Services Office in the Faculty of Social Work.

14. Other Information

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.
Requests for information should be directed to Student Services Office, Faculty of Social Work.
Admission to all Faculty of Social Work graduate programs is competitive; therefore, not all qualified applicants may be admitted. Information on the Faculty of Social Work and its programs is available on-line at http://www.fsw.ucalgary.ca.

15. Faculty Members/Research Interests

Current faculty members and their research interests can be found at http://fsw.ucalgary.ca/

Graduate Courses

Please note that not all programs/courses are offered every semester. The number of options will vary across the program locations.

Full-time and part-time students should consult the timetables available on the University website and the Master Timetable for suggested sequences and availability of courses.

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)

Research and Evaluation
An introduction to research methodology and evaluative strategies.
Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 655 H(3S-0)

Research I
Conceptualization of social work research problems, research design, data collection and analysis within a chosen specialization.
Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 665 H(3S-0)

Policy
An exploration of social welfare policy, structures and programs within a chosen specialization or within the context of examining the impact of oppression on populations-at-risk.
Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 667 H(3S-0)

Theory and Methods I
An in-depth and advanced understanding of social work theory and practice within a chosen specialization.
Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 669 H(3S-0)

Theory and Methods II
Application of theories learned in Social Work 667 to various problems and diversity issues encountered by social workers within a chosen specialization.
Prerequisites: Social Work 667.
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.
Note: Restricted to Social Work MSW students or consent of the Faculty.
MAY BE REPEATED FOR CREDIT

Social Work 688 F(0-32)

Advanced Practicum I and II
Supervised learning experience in practice.
Note: Normally completed in Calgary. For course based students only. Restricted to Social Work MSW students or consent of the Faculty.
NOT INCLUDED IN GPA

Social Work 695 H(3S-0)

Research II
Extends students' abilities to utilize research knowledge as a problem-solving tool in social work practice within a chosen specialization.
Prerequisites: Social Work 655.
Note: Restricted to Social Work MSW students or consent of the Faculty.

Social Work 696 F(600 hours within two consecutive sessions)

Advanced Practicum
Direct and indirect Social Work practice opportunities with professional supervision in student's area of specialization.
Prerequisite or Corequisite: Social Work 667 and 669 or consent of the Faculty.
Note: Not open to students with credit in Social Work 687, 688 or 689. 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.
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 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 only or 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 only or 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 only or 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 only or 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 only or consent of the Faculty.

SOCIOLOGY SOCI

Contact Info

Location: Social Sciences Building, Room 956
Faculty number: (403) 220-3216
Fax: (403) 282-9298
E-mail address: costello@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 Faculty requirements, the Department requires:

Master of Arts

a) Demonstrated competence, normally through course work, in classical and contemporary theory, research methods, and statistics
b) A written statement of intent
c) A sample of written work

Doctor of Philosophy

a) A grade point average of 3.50 on a four-point scale over a Master's program
b) Demonstrated competence in theory, methodology, and statistics, in addition to a substantive interest

3. Application Deadline

Deadlines for the submission of complete applications:
1 February 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-level or 700-level half-courses.

5. Program/Course Requirements

In addition to Faculty requirements, the Department requires:

Master of Arts

a) Competence in sociological statistics, methods of sociological research, and sociological theory demonstrated by completing Sociology 611; Sociology 613 or 615; and Sociology 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, achieved through Sociology 613 or 615.

Doctor of Philosophy

a) Sociology 611; Sociology 702; Sociology 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 Graduate Administrator.
c) A candidacy examination with a written and an oral component.

6. Additional Requirements

None.

7. Credit for Undergraduate Courses

None.

8. Time Limit

Expected completion time is 20-24 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. 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 doctoral students, the supervisor and student will select two other faculty members to serve on the student's supervisory committee.

10. Required Examinations

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 six-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.

Thesis Oral Examinations
Final thesis oral examinations are open.

11. Research Proposal Requirements

Students whose research involves human subjects must receive approval from the departmental Ethics Review Committee and the University of Calgary Conjoint Faculties Research Ethics Board before beginning data collection.

Master of Arts students are required to prepare a thesis prospectus.

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 on-line Graduate Student Handbook. For further information on awards, please see the Awards and Financial Assistance section of this Calendar.

Students applying for scholarships through the Faculty of Graduate Studies must submit their applications to the Department by 1 February.

14. Other Information

Students should refer to the Department's on-line information and the Graduate Student Handbook 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.

Graduate Courses

Sociology 601 H(3-0)

Conference Course in Sociology
Arranged for various topics of Sociology on the basis of special interest and need.
Prerequisite: 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: 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 nonlinear models, analysis of variance, analysis of covariance, and causal modelling.
Prerequisite: Consent of the Department. (Sociology 311 and 315 normally required.)

Sociology 613 H(3S-2)

Seminar in Quantitative Research Methods
Prerequisite: Sociology 313 or consent of the Department.

Sociology 615 H(3S-2)

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: Sociology 313 or consent of the Department. Sociology 413 is recommended.

Sociology 625 H(3S-0)

Seminar on Deviant Behaviour
Prerequisite: Sociology 325 or consent of the Department.

Sociology 631 H(3S-0)

Seminar in Sociological Theory
Prerequisites: Sociology 331 and 333 or equivalents; or consent of the Department.

Sociology 653 H(3S-0)

Seminar on Urban Sociology
Prerequisite: Sociology 353 or consent of the Department.

Sociology 665 H(3S-0)

Seminar on Social Stratification and Inequality
Prerequisite: Consent of the Department.

Sociology 667 H(3S-0)

Seminar on Ethnic Relations
Prerequisite: Sociology 375 or consent of the Department.

Sociology 671 H(3S-0)

Seminar on the Sociology of Families
Prerequisite: Sociology 471 or consent of the Department.

Sociology 677 H(3S-0)

Seminar in Sociology of Gender Relations
Prerequisite: Consent of the Department.

Sociology 695 H(3S-0)

Seminar in Work
Prerequisite: Consent of the Department.

Sociology 699 Q(0-3)

Special Topics in Sociology
Prerequisite: 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: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Sociology 702 F(3/2S-0)

Doctoral Seminar in Professional Sociology
Prerequisite: Consent of the Department.
NOT INCLUDED IN GPA

Sociology 705 Q(3S-0)

Selected Topics in Advanced Methodological Issues
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Sociology 711 Q(3S-3)

Selected Topics in Advanced Quantitative Methods
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Sociology 715 Q(3S-2)

Selected Topics in Advanced Qualitative Methods
Prerequisite: Consent of the Department.
MAY BE REPEATED FOR CREDIT

Sociology 731 H(3S-0)

Doctoral Seminar in Sociological Theory
Prerequisite: Consent of the Department.

SUSTAINABLE ENERGY DEVELOPMENT SEDV

Contact Info

Location: Haskayne School of Business, Room 457
Faculty number: (403) 220-3997
Fax: (403) 282-0095
E-mail address:
CALGARY: sed@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) with a specialization in Sustainable Energy Development, course-based

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.

CALGARY, Alberta, Canada: The program is offered at the University of Calgary campus in Calgary, Alberta, Canada over a period of 16 months beginning in May of each year.

QUITO, Ecuador: In partnership with the Universidad San Francisco de Quito (USFQ) and the Latin American Energy Organization (OLADE), the program is offered at USFQ campus in Quito, Ecuador, South America, over a period of 16 months beginning in August of each year.

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, 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/environmental management such that they will be able to ensure sustainable energy development and minimize the impact of development on the environment.

2. Admission Requirements

In addition to Faculty of Graduate Studies and Haskayne School of Business requirements, the Program requires:

a) Letter of intent outlining background, research interest and goal for the Program
b) Curriculum Vitae
c) Work experience (to be assessed by the Program director)
d) Certificate of proficiency in the English language or TOEFL or IELTS *[for International students whose mother tongue is NOT English]*

3. Application Deadline

CALGARY:
Canadian Residents: 31 March for May admission
Intl Students: 31 December for May admission
QUITO:
Residents not requiring a study permit: 30 June for August admission
Canadian/International students: 30 April for August admission

4. Advanced Credit

The applicant must make advanced credit requests as part of the admission process.

5. Program/Course Requirements

In addition to the Faculty of Graduate Studies and Haskayne School of Business requirements, the Program requires:

CALGARY and QUITO:
a) Successful completion of 14 graduate-level courses
b) Attendance and participation in seminars, upgrade courses and field trips
c) Attendance and participation in Recapitulation session

QUITO only:
Completion of English upgrading course (2-3 week duration) for non-native English students *subject to the discretion of the 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

A final comprehensive oral examination is required upon completion of all course work. The purpose of the examination is to determine the student's ability to integrate and apply all interdisciplinary aspects of the Program. The examination will be based on content from the 14 courses and seminars. All students must successfully complete all course and seminar requirements before the comprehensive examination.

11. Research Proposal Requirements

Please refer to SEDV 625 course requirements.

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. 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.

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: 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: 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: 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: 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: 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: 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: 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 practices of environmental impact assessment, with application to energy development projects.
Prerequisite: 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: 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: 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: 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: 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: 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: Consent of the Program Director.

Sustainable Energy Development 629 H(3-0)
(formerly Energy and the Environment 629)

Advanced Seminars
Prerequisite: 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: Consent of the Program Director.
MAY BE REPEATED FOR CREDIT

UPDATED (Dec. 17, 2009)

VETERINARY MEDICAL SCIENCES VMS

Contact Info

Location: Teaching Research and Wellness (TRW) Building, Room 2D09
Faculty number: (403) 210-6628
Fax: (403) 210-8121
E-mail 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
*All students are registered full-time.

2. Admission Requirements

In addition to the Faculty of Graduate Studies requirements, the Faculty of Veterinary Medicine requires:

a) A Baccalaureate degree** or its equivalent from a recognized institution with a minimum admission grade point average of 3.0 on a 4.0 grade point scale or equivalent, and a minimum of 3.2 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), or a minimum IELTS score of 7.0.

***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 on-line application and receipt of ALL required supporting documents by the following deadlines:

Admission Term	Canadian and US Admission Deadline	International Admission Deadline
September	1 June	1 March
January	1 November	1 June
May	1 March	1 November

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 take:

a) *VM 600 - Seminars in Veterinary Medical Sciences:* Presentation of an annual seminar to the Faculty and a final seminar that precedes the thesis defence;
b) *VM 601 - Professional Skills in Health Science Research:* Series of one-day workshops focusing on skills essential for success in health science research - Research Integrity, Grants and Grant Writing, Verbal and Written Communication of Research Findings, Career Development, and Career Options in the Health Sciences;
c) *VM 605: Research Design and Methods in the Health Science*. This is an introductory course in experimental design and statistics centered on first year graduate students working in the health sciences. The course is open for auditing with permission of course coordinator. Alternatively, a suitable entry-level biostatistics course may be taken (e.g. Medical Sciences 643 - Biostatistics);
d) MSc students must take at least one additional and PhD students must take at least two additional graduate level half-courses appropriate to their field of study and approved by their Supervisory Committee.

6. Additional Requirements

All Graduate Students will meet with the Graduate Training Manager at least once per year to review their research and scholarly progress.
Contributions to the published research literature and presentations at scientific conferences are encouraged.

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.

8. Time Limit

Expected completion time for an MSc is two years with a maximum time of four years, for students in full-time study; students in PhD programs are expected to complete in four years but not longer than six years.

9. Supervisory Assignments

Students will normally have identified a permanent supervisor at the time of admission. Alternatively, the VMS Graduate Program has an optional rotation program that may last up to six months. This program will only be available for the September admission term. The rotation program allows each student to sample different research areas and thus to make a highly-educated choice of research topic, supervisor, and their research team. Rotations are 8 weeks in duration during which the student works closely with the supervisor or member of the research team as part of an ongoing study, as well as focusing on their course work. Students will be paid the standard stipend by the Program during the rotation period (prorated from $20,000 per year = $10,000 for six months or less if the student chooses a permanent supervisor early). After the rotation program, the student will select a permanent supervisor and is encouraged to apply for further funding. For further details, please contact vmgrad@ucalgary.ca.
In consultation with their supervisor(s), a Supervisory Committee will be selected which includes a minimum of two additional faculty members (MSc) or three additional faculty members (PhD). In the case of the PhD, one member should come from outside the Veterinary Medical Sciences graduate program. The Graduate Program Coordinator will approve the composition of the committee within the first four months of enrolment.

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 basis for the written component of the candidacy exam. In the Veterinary Medical Sciences Graduate Program, the oral part of the exam is based both on the written proposal and all relevant related topics assigned by the exam committee. Therefore, it is required that the candidacy is completed early in the student's program, at the latest by 18 months. 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. 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 as non-voting members.
The final thesis defence for MSc and PhD degrees will consist of a public seminar followed by an open oral examination.

11. Research Proposal Requirements

The VMS Graduate Program requires all Masters and PhD 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 Masters students, this must happen no later than 12 months after initial registration in the program. For VMS PhD students the defense of the proposal is part of the candidacy exam. All components of the candidacy exam must be completed within 18 months of first registration. All Masters students who transfer to a PhD must present and defend a revised proposal to their Supervisory Committee within six months of program transfer as a component of their 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 for the duration of their program (normally two years for MSc and four to five years for PhD students). Funding comes from a variety of sources, including grants, external salary awards, and UCVM Entrance Awards ($18,000). Students who hold relevant professional degrees (e.g. DVM, MD) are also eligible to apply for generous post-professional awards of up to $40,000 per year for two years through the UCVM Entrance Awards.Admission to the Program is conditional on demonstration of internal or external studentship support.

Although initially required to pay a differential tuition fees, International students registered in the VMS Graduate Program will be reimbursed the full value of their differential fee each year.
Further information on funding opportunities can be found at http://vet.ucalgary.ca/awards_amp_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 Coordinator. 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 at: http://vet.ucalgary.ca/research_areas. 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 – INTERDISCIPLINARY SPECIALIZATION

Contact Info

Location: Earth Sciences 852
Faculty number: 403-220-2665
Fax: 403-282-9562
E-mail address: wwilson@ucalgary.ca
Web page URL: http://www.fp.ucalgary.ca/bioanth

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
Specialization: Biological Anthropology (Interdisciplinary)

2. Admission Requirements

In addition to Faculty 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 3.3 on a 4.0 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:
15 January 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 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 Ph.D. 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 and meet to finalize their decision no later than two days prior to the scheduled Oral Candidacy Exam. 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 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 home program by 2 January.

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 – INTERDISCIPLINARY SPECIALIZATION

Contact Info

Location: Faculties of Kinesiology, Medicine, Nursing and Social Work
Faculty number: To be announced
Fax: To be announced
E-mail address: clinres@ucalgary.ca

1. Degrees and Specializations Offered

The University offers an interdisciplinary specialization in Clinical Research to students registered in an existing graduate program in the Faculties of Kinesiology, Medicine, Nursing and Social Work. The student will receive the degree offered by the home program:

Doctor of Philosophy (PhD)
Master of Nursing (MN)/Science (MSc)/Social Work (MSW)
Specialization: Clinical Research (Interdisciplinary)

The Clinical Research multidisciplinary program is offered in collaboration with the above Health Sciences faculties and the curriculum is designed for students with undergraduate or Master's degrees in those faculties. Background experience and qualifications, as well as areas of interest of the applicants will be taken into account at the time of admission.

2. Admission Requirements

In addition to Faculty of Graduate Studies requirements, this multidisciplinary program requires:

a) A four-year Baccalaureate degree from a recognized institution with a minimum grade point average of 3.30 on a four-point scale over the last two full years or equivalent
b) For students required to provide proof of proficiency in English, a TOEFL score of 600 (written test) or 250 (computer-based test), an IELTS score of 7.50. Foreign students are encouraged to submit GRE scores, which should in the 70th percentile in the analytical and quantitative sections.
c) A concise (one-page) statement outlining the applicant's research interests and reasons for wishing to take the Clinical Research interdisciplinary specialization
d) Indication on the application which home faculty the candidate is considering

3. Application Deadline

Deadline for submission of complete applications is 1 March for September admission.

4. Advanced Credit

Advanced credit requests must be made by the applicant as part of the admission process. Any credit to be given for courses completed will be included in the letter recommending the student's admission to the Faculty of Graduate Studies.

5. Program/Course Requirements

In addition to the Faculty requirements, the Specialization requires:

a) Completion of a minimum three full-course equivalents for the Master' program and a minimum six full-course equivalents for the doctoral program. Students transferring from a Master's program to the doctoral program will be required to take a minimum of 6 half-course equivalents in addition to work already completed. Please note that several graduate courses are required program components and that elective courses must be chosen in consultation with the supervisor and approved by the Graduate Coordinator. Course requirements may include courses offered by other departments.
b) For Master's students, completion of practicum in year 1. For doctoral students, completion of practica in years 1 and 2 before being eligible for the doctoral candidacy examination
c) Completion of the appropriate number of Research Seminar courses in addition to (a) above
d) Presentation of a Departmental seminar on the results of the thesis research

6. Additional Requirements

Contributions to journals, relevant clubs and/or seminars are desirable.

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 coursework must be at the 600-level or higher and only where appropriate to a student's program may credit be received for courses numbered 500-599.

8. Time Limit

Expected completion time for a Master's degree is two years and maximum completion time is four years.

Expected completion time for a PhD is four years and maximum completion time is six years.

9. Supervisory Assignments

Applicants normally contact specific faculty members within their home faculty about possible supervision. The program does not accept students unless at least one faculty member has indicated a willingness to act as supervisor. The supervisor, in consultation with the student, selects a supervisory committee consisting of the supervisor and at least two other faculty members, one of whom must be from a faculty other than the student's home faculty.

10. Required Examinations

Doctoral candidacy examinations have a written component followed by an oral component. Doctoral candidates are given three weeks to complete three substantive essays in answer to questions, which focus on the student's field of study, submitted by their candidacy committee. One week after the submission of the answers, the oral component will take place. The supervisor is a non-voting observer at the doctoral candidacy examination.

Final thesis oral examinations are open.

11. Research Proposal Requirements

Master's students must present a written research proposal to their supervisory committees no later than 12 months after initial registration in program. Doctoral students must present a written research proposal to their supervisory committees no later than 24 months after initial registration in program The research proposal will be presented and defended before the supervisory committee.

12. Special Registration Information

A request for transfer of program from the Master's 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 additional half-courses to complete the requirements of the doctoral program and must meet the 36-month deadline for the candidacy examination.

13. Financial Assistance

Financial assistance is provided from the ACCESS Practicum fund for Years 1 and 2 for doctoral students and for year 1 for Master's students. Students may also be eligible for awards. For information on awards, see the Awards and Financial Assistance section of this Calendar. In principle, the following resources are available: GA(T), GRS, Dean's Excellence Awards, Dean's Entrance Awards, Open Scholarship competition (FGS), external

scholarships, and operating grants from Faculty investigators.

14. Other Information

For further information on graduate program application, admission and courses, consult the department website at: http://www.clinres.ucalgary.ca.

15. Faculty Members/Research Interests

The research interests of current faculty members can be found at http://www.clinres.ucalgary.ca.

ENERGY AND ENVIRONMENTAL SYSTEMS-INTERDISCIPLINARY SPECIALIZATION

Contact Info

Location: Earth Sciences Building, Room 602
Faculty number: (403) 220-8872
Fax: (403) 210-3894
E-mail address: eespinfo@ucalgary.ca
Web page URL: http://www.ucalgary.ca/ees

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):

- Schulich School of Engineering
- Faculty of Environmental Design
- Haskayne School of Business
- Faculty of Law
- Faculty of Science
- Faculty of Social Sciences

The student will receive the degree offered by the home graduate program:

- Doctor of Philosophy (PhD)
- Master of Arts (MA)
- Master of Laws (LLM thesis-based only)
- Master of Science (MSc)
- Master of Geographic Information Systems (MGIS)
- Specialization: Energy and Environmental Systems (Interdisciplinary)

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 three 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. Admission to the specialization itself requires:

a) A sample of the applicant's written work: a term paper, research paper, or a Master's / honours thesis, that the applicant considers representative of his or her best work.
b) A concise statement (500 words maximum) of the applicant's academic interests and reasons for wishing to pursue graduate work in the EES specialization. A proposed area of thesis research should also be discussed.
c) A current curriculum vitae.
d) For students required to provide proof of English proficiency, a TOEFL score of at least 550 (written) or 213 (computer-based) or 80 (internet based), or an IELTS score of 7.0. However, if the graduate program to which the student is applying requires higher scores, then these must be met.
e) Submission of GRE scores are strongly encouraged but not required.

Applicants must indicate their intention of applying for the EES specialization to the home graduate program, and likewise inform the EES Program Office of their application status as per the instructions on the EES Web site.

Note that 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 specialization.

3. Application Deadline

The deadlines for the submission of complete applications correspond to those of the respective home graduate program to which students are applying.

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 home graduate program's requirements, students undertaking the EES specialization must successfully complete the following:

EES Specialization at the Master's Level (thesis-based)

Required core courses:

- EES 601: Introduction to Energy and Environmental Systems
- EES 603: Project Course
- EES 605: Graduate Seminar
- EES 607: Tools for System Analysis (block week course)

Depending on their home program and area of study, students may take additional EES related courses in consultation with their research supervisor.

NOTE: In accordance with Faculty of Graduate Studies' regulations, students in thesis-based programs may obtain a reduction in course load. This may be appropriate in cases where there is overlap between EES courses and the home graduate program's course requirements. Such requests may be agreed to by the student's supervisor, and be submitted to and approved by the Graduate Coordinator of the home graduate program and the EES Program Director or designated EES Committee Member.

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 Core Courses (EES 601, EES 603, and EES 605). Students are not required to take GEOG 683, but must take the other core courses in the MGIS program (GEOG 647, GEOG 633, GEOG 639, and GEOG 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 GEOG 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 at the Doctoral Level

Doctoral students are required to take the same EES core courses that are required at the Master's level, if they have not previously completed the EES specialization. Doctoral students must also comply with requirements of their home graduate program. Students who have previously earned a Master's degree with the EES specialization have no other required EES courses. However, they may need to take courses relevant to their area of study as recommended by their thesis supervisor. Doctoral students may seek a reduction in course load as per the rules for thesis-based Master's students shown above.

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 normally 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 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 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 have a formal supervisor appointed to them within twelve months of beginning the EES specialization. Supervisory arrangements must be approved by the EES Program Director.

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

Doctoral students and thesis-based Master's students must present a written and oral research proposal to their supervisory committees no later than twelve (Master's) and twenty (PhD) months after initial registration. The research proposal must be submitted to the EES Program Director for approval and placed on file.

This requirement of research proposal approval does not apply to students pursuing the EES specialization through the Interdisciplinary Graduate Program, since the research proposal must be approved as part of IGP's admission process.

12. Special Registration Information

None.

13. Financial Assistance

Financial assistance will be available to all qualified full-time graduate students. 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.

15. Faculty Members/Research Interests

See the Web site of the home department of the faculty member.

For bios and research interests of those faculty directly associated with the Energy and Environmental Systems Group, visit http://www.ucalgary.ca/EES/People.

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 EES 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.

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: Graduate standing in EES specialization.

Energy and Environmental Systems 605 H(0-2S)

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: Graduate standing in the EES specialization.
NOT INCLUDED IN GPA

Energy and Environmental Systems 607 H(3-0)

Tools for System Analysis
This intensive block week 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 modeling. Software tools include Excel, and extensions such as Crystalball, general purpose systems such as Matlab and Mathematica; and GIS tools for non-specialists.
Prerequisite: Graduate standing in the EES specialization.

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: Graduate standing in the EES specialization.
MAY BE REPEATED FOR CREDIT

ENGINEERING, ENERGY & ENVIRONMENT – INTERDISCIPLINARY SPECIALIZATION

Contact Info

Location: Information & Communications Technology Building, Room ICT248
Faculty number: (403) 210-9892
Fax: (403) 210-9892
E-mail 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 multi-disciplinary 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)
Master of Engineering (MEng)

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 US transcripts.

4. Advanced Credit

See "Engineering Programs" in this Calendar.

5. Program/Course Requirements

Master of Engineering (Courses Only Route)

10 half-courses of which a minimum of six must be graduate half-courses. At least four courses must be selected from a list of courses related to Energy & Environment available from CEERE.

Students with non-engineering undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

Master of Engineering (Thesis Route)

A minimum of four graduate half-courses. At least two courses must be selected from a list of courses related to Energy & Environment available from CEERE.

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 graduate half-courses. At least two courses must be selected from a list of courses related to Energy & Environment available from CEERE.

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 Master of Science degrees in Engineering:

A minimum of two graduate half-courses. At least one course must be selected from a list of courses related to Energy & Environment available from CEERE.

For applicants with a Bachelor's degree in Engineering, but without a completed Master's degree:

A minimum of six graduate half-courses. At least

three courses must be selected from a list of courses related to Energy & Environment available from CEERE.

Students with non-engineering undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

6. Additional Requirements

Not applicable.

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

All final thesis oral examinations involve a public seminar/presentation before a closed oral examination.

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 – INTERDISCIPLINARY SPECIALIZATION

Contact Info

Location: Information & Communications Technology Building, Room ICT248
Faculty number: (403) 210-9892
Fax: (403) 210-9892
E-mail 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 multi-disciplinary 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)
Master of Engineering (MEng)

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 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 US transcripts.

4. Advanced Credit

See "Engineering Programs" in this Calendar.

5. Program/Course Requirements

Master of Engineering (Courses Only Route)

10 half-courses. ENEN 603 and 605 are normally required, together with at least one of ENEN 621, 623, 625 or 627. ENEN 601 is not required.

Students with non-engineering undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

Master of Engineering (Thesis Route)

A minimum of five half-courses. ENEN 603 and 605 are normally required, together with at least one of ENEN 621, 623, 625 or 627. ENEN 601 is not required.

Students with non-engineering undergraduate degrees may be required to take additional prerequisite courses at the undergraduate level.

Master of Science

A minimum of five half-courses plus ENEN 601. ENEN 603 and 605 are normally required, together with at least one of ENEN 621, 623, 625 or 627.

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 Master of Science degrees in Environmental Engineering:

A minimum of three half-courses plus ENEN 601. One of ENEN 621, 623, 625 or 627 is normally required.

For applicants with Bachelor of Science and Master of Science degrees in Engineering, but not Environmental Engineering:

A minimum of four half-courses and ENEN 601. ENEN 603 and 605 are normally required, together with at least one of ENEN 621, 623, 625 or 627.

For applicants with a Bachelor's degree in Engineering, but without a completed Master's degree:

A minimum of eight half-courses plus ENEN 601. ENEN 603 and 605 are normally required, together with at least two of ENEN 621, 623, 625 or 627.

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, in each of the Fall and Winter terms.

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

All final thesis oral examinations involve a public seminar/presentation before a closed oral examination.

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.

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 (in each of Fall and Winter terms).
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. Physical and transport properties of homogeneous and heterogeneous mixtures. Analysis of water; air, and land pollution. Atmospheric sciences. Thermodynamic and phase equilibria considerations. Contaminant partitioning and transport in air, surface water and groundwater. 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. Life cycle analysis. Introduction to environmental objectives, standards and guidelines.

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.
Note: 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).
Note: Credit for both Environmental Engineering 621 and Chemical Engineering 619.45 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 nonlinear 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 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(2-2)

Remote Sensing for Environmental Modelling
Application of geomatics technologies to monitoring, modelling and mitigation of environmental engineering problems. Remote sensing (RS) and Geographic Information Systems (GIS) for estimating parameters in earth systems modelling and land based processes including evapotranspiration, precipitation, snowmelt, temperature, and effects of El Nino. Monitoring of climate change and impacts of anthropogenic activities such as farming induced erosion and desertification. Science and engineering of water quality in inland, coastal and deep ocean environments and the use of RS and GIS to monitor and model eutrophication, sediment levels and temperature.

Environmental Engineering 633 H(3-0)

Fuzzy Logic for Environmental Engineering
Complex, nonlinear, 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.
Note: 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 641 H(3-0)
(Chemical Engineering 643)

Air Pollution Control Engineering
Introduction to air quality and air pollution. Impact of air pollution and greenhouse gases on health and climate change. Energy and air pollution. Fundamentals of fossil fuel combustion and related air pollution. Pre-combustion air pollution control strategies: fossil fuel cleaning/refinery, renewable energy (wind, solar, biomass, etc.), and alternative energy sources (hydrogen, etc). In-combustion air pollution control. Post-combustion air pollution control. Industrial air pollution control. Control of particulate matter. Control of VOCs, SOx, and NOx. Adsorption and absorption of air pollutants. GHG emission control. Indoor air quality engineering. Recent advances on related topics.

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.
Note: 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)

Geo-Environmental Aspects of Landfill Design
Soil-chemical interactions and implications. Waste disposal system design. Leachate migration in unsaturated/saturated zones. Analytical and numerical solution of flow and transport equations. Case studies of groundwater contamination. Design and construction of barrier systems. Leachate collection systems. Landfill closure issues. Landfill gas issues and control systems.
Note: 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.
Note: Credit for both Environmental Engineering and Civil Engineering 747 or 619.62 will not be allowed.

Environmental Engineering 655 H(3-0)
(Civil Engineering 745)

Hazardous Waste and Contaminated Site 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 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.

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.
Note: Credit for both Environmental Engineering 663 and Civil Engineering 619.21 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.
Note: Credit for both Environmental Engineering 665 and Chemical Engineering 619.79 will not be allowed.

Environmental Engineering 671 H(3-0)

Energy and Environment
A graduate seminar course. Lectures will alternate with discussion based on assigned reading. Topics will be selected to satisfy the interests of students from the following list. Energy overview from primary energy to end use including, quantities, fuels and prices; energetics of natural systems; formation, extraction, and transformations of fossil fuels; physics and engineering of nuclear power; modern renewables: biomass, solar and wind; electricity generation, transmission and economics; building energy systems; heat and power integration; overview of climate science: paleo-climatology, processes that determine climate, predictions and observations of anthropogenic climate change; technical options for reducing CO_2 emissions.
Note: 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 and Cogeneration Systems
Fundamentals of thermodynamics, fluid mechanics and heat transfer. Thermal and energy systems, heat exchangers, co-generation, etc. 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.
Note: Credit for both Environmental Engineering 673 and Mechanical Engineering 619.13 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.
Note: 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.
Note: 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
Risk analysis: characterizing uncertainty, defining risk, probabilistic risk analysis and fault trees, estimating dose-response relationships, limits to risk analysis. Decision analysis: utility, decision-making under uncertainty. Benefit-cost analysis: elementary economics including rents, consumer and producer surplus and discounting, value of life. Structure and evolution of environmental regulation.

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.

ISRAEL STUDIES – INTERDISCIPLINARY SPECIALIZATION

Contact Info

Location: SS 618
Faculty number: (403) 220-4097
Fax: (403) 282-8606
E-mail address: skeren@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 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 Director of the Program 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 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.

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

RESERVOIR CHARACTERIZATION – INTERDISCIPLINARY SPECIALIZATION

Contact Info

Contact the departments of GeoScience or Chemical and Petroleum Engineering for further information.

Department of Chemical and Petroleum Engineering

Location: Schulich Schoool of Engineering, Room B202
Phone: (403) 220 - 4802
Fax: (403) 284 - 4852
Email Address: gradstud@ucalgary.ca
Web page URL:
http://www.eng.ucalgary.ca/Chemical

Department of GeoScience

Location: Earth Sciences 118
Phone: (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), or
Master of Science (MSc) (Geology and Geophysics)
Specialization: Reservoir Characterization (Interdisciplinary)

2. Admission Requirements

In addition to Faculty 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 Geology and Geophysics plus ENPE 507 – Well Logging and Formation Evaluation, 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 complete 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.

In addition to the Faculty of Graduate Studies and the home program requirements, the Specialization requires:

a) Students with undergraduate degrees in geology must take an applied mathematics course in the block week before the first term in program.

   Students with undergraduate degrees in engineering and geophysics may also be required to take an applied mathematics course in the block week before the first term in program, at the discretion of their academic advisors and the specialization coordinator.

b) Students will be required to take five half-course equivalents from the two fields that are not part of their undergraduate degree.

Year 1
No more than half of the courses from the stream lists can be at the 500 level.

Engineering Stream
Engineering students must take 5 half-course equivalents from the following list of which at least 3 half-course equivalents must be in geoscience:

ENCH 619.87 – Petroleum Economics
ENPE 543 – Geological Characterization of Oil and Gas Reservoirs
GLGY 595.03 – Reservoir Evaluation and Hydrocarbon Play Assessment
GLGY/GOPH 649 – Petrophysical Techniques
GLGY 693.02 – Stratigraphy and Sedimentation of clastic rocks (Q)*
GLGY 693.03 – Stratigraphy and Sedimentation of carbonate rocks (Q)*
GLGY 699.16 – Geological History of the Western Canada Sedimentary Basin
GOPH 559 – Geophysical Interpretation
GOPH 671 – Inverse Theory and Methods

Geology Stream

Geology students must take 5 half-course equivalents from the following list of which at least 3 half-course equivalents must be in engineering:

ENCH 619.87 – Petroleum Economics
ENGG 407– Numerical Methods
ENPE 523– Introduction to Reservoir Engineering,
ENPE 525 – Waterflooding and Enhanced Oil Recovery**
ENPE 533 – Petroleum Production Engineering
ENPE 543 – Geological Characterization of Oil and Gas Reservoirs
GLGY 595.03 - Reservoir Evaluation and Hydrocarbon Play Assessment
GLGY 613 – Flow in Porous Media**
GLGY 649/GOPH649 – Petrophysical Techniques
GOPH 559– Geophysical Interpretation

Geophysics Stream
Geophysics students must take 5 half-course equivalents from the following list of which at least 3 half course equivalents must be in engineering:

ENCH 619.87 – Petroleum Economics
ENGG 407 – Numerical Methods
ENPE 523 – Introduction to Reservoir Engineering,
ENPE 525 – Waterflooding and Enhanced Oil Recovery**
ENPE 533 – Petroleum Production Engineering
ENPE 543 – Geological Characterization of Oil and Gas Reservoirs
GLGY 595.03 - Reservoir Evaluation and Hydrocarbon Play Assessment
GLGY 613 – Flow in Porous Media**
GLGY 649/GOPH649 – Petrophysical Techniques
GLGY 693.02 – Stratigraphy and Sedimentation of clastic rocks (Q)*

GLGY 693.03 – Stratigraphy and Sedimentation of carbonate rocks (Q)*

* (Q) = quarter course taught in ½ semester; GLGY 693.02 and .03 together make-up one (1) HCE.
** Choose only one (1) of GLGY 613 or ENPE 525

UPDATED (Sept. 16, 2009)
Year 2
The second year is common to all students and requires the completion of: RSCH 621 – Reservoir Simulation for Reservoir Characterization; RSCH 661 – Geostatistics for Reservoir Characterization or GLGY 697 Advanced Geostatics; HROD 789 – Optimizing Team Dynamics; ENCH 698 – Reservoir Characterization for Field Development or GLGY 698 – Reservoir Characterization for Field Development with the Capstone Project.

Capstone Project
Each team is required to analyze and integrate seismic data, petrophysical logs, core analysis, well tests, DSTs, PVT data on reservoir fluids, well locations, well completion information and any production/pressure history data from a real field. Each member of the team is expected to have proficiency on the software packages for geophysical interpretation, geological mapping, geostatistical modeling and reservoir flow modeling. The reservoir characterization will require the evaluation and assessment of a geostatistical model of the field that will be used for a successful history match and to propose future development. An economic evaluation will be included. The project will conclude with a formal presentation to experts from both academia and industry.
UPDATED (Sept. 16, 2009)
Successful completion of the Capstone Project and required comprehensive oral examination on the project is the exit requirement for the program.

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 coordinator.

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

See description of the Capstone Project above.

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.


ANCIENT
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Awards And Financial Assistance For Graduate Students

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 greatly 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://www.grad.ucalgary.ca. Additional information is available from your program. Because this Awards 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 available varying numbers of graduate assistantships to be awarded on the basis of merit. Individuals interested in such appointments should contact the appropriate 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, Non-Teaching and Trust).

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*.

Graduate Assistantships (Trust)

A graduate student is appointed to a Graduate Assistantships (Trust) to build academic experience by assisting with a research project, with duties similar to those described above for a Graduate Assistantship (Non-Teaching). GA (Trust) appointments are funded from the research support accounts held in trust for University staff 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

A Graduate Project Employee (GPE) is funded from a trust 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 and/or area of research. The service provided is normally supervised by someone other than the student's supervisor and is treated as regular employment. Graduate students employed as Graduate Project Employees are governed by the Project Employment Guide.

III. Sessional Instructorship

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* (www.ucalgary.ca/HR/policies/academic.html).

IV. Graduate Teaching Fellowships (GTF)

A Graduate Teaching Fellowship (GTF) is an award of merit to a doctoral student who has completed candidacy. A senior graduate student appointed as a Sessional Instructor may be recommended by the department for a GTF award of $3,000, in addition to the normal stipend for the sessional instructorship. Normally, a student may not be a Sessional Instructor for more than one half-course or one full course at any one time.

V. Dean's Research Excellence (DREA) Awards

The Faculty of Graduate Studies offers Dean's Research Excellence Awards (DREA) to students entering a Master's or doctoral program with a major national scholarship won on a competitive basis (e.g., Natural Sciences and Engineering Research Council, Social Sciences and Humanities Research Council, or Canadian Institutes of Health Research). Students must be assessed full program fees and be registered full-time in the Faculty of Graduate Studies in a thesis program at the University of Calgary to be eligible for a Dean's Research Excellence Award. Doctoral Students may be eligible for a DREA on the first anniversary date of their registration in the program Students holding NSERC or SSHRC awards will receive the DREA upon presentation of their Payment Activation Form (PAF) to the Faculty of Graduate Studies Graduate Scholarship Office. Students holding CIHR or other non-TriCouncil national awards must apply for the Dean's Research Excellence Award by sending a letter with proof of the award and evidence of its competitive nature to the Graduate Scholarship Office, Faculty of Graduate Studies, Room 720, Earth Sciences Building, University of Calgary, 2500 University Drive NW, Calgary, Alberta T2N 1N4. Payment of the award is made in tandem with the student's registration date only, and in accordance with the Faculty of Graduate Studies Payment Schedule.

VI. 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, AHFMR, iCORE, and Alberta Ingenuity, if eligible.

VII. 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.

VIII. 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, 350 MacEwan Student Centre, telephone (403) 220-5997, and application deadlines are October and February. Contact the GSA office for further information.

VIX. 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/.

X. International Students

International students planning to do graduate work at the University of Calgary should be aware that a number of Canadian scholarship programs require Canadian citizenship or permanent residence status. However, the Government of Canada does support a number of programs designed to assist individuals who wish to study in Canada on a Study Permit. These programs are usually organized through agencies of the individual's own government, and prospective students are encouraged to explore these possibilities. International students may apply for Graduate Assistantships, Graduate Teaching Fellowships and FGS Scholarships.

XI. 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 Awards Database which is found through the MyUofC portal or at http://www.grad.ucalgary.ca/.

XII. University Research Grants Committee Thesis Research Grants

The University Research Grants Committee recognizes that there are instances where the ordinary resources for thesis research available through a program or faculty may not be adequate to attend to certain special needs of a particular thesis research project or where unpredictable circumstances have made it impossible to provide funds from current budgets.

Thesis Research Grants are made to assist graduate students with the acquisition of special equipment, services or materials or for fieldwork essential to the conduct of their thesis projects. These awards are competitive. An application guide and the application form may be found at http://www.ucalgary.ca/research/files/Thesis%20Research%20Guide%202009-01.doc Further information is available through the Office of Research Services, Main Floor, 3512 33St. NW, University Research Park Calgary, Alberta. Telephone (403) 220-6354.

XIII. Conference Travel Grant (Graduate Students)

Graduate Student Travel Grants 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. These awards are competitive. An application guide and the application form may be found at http://www.ucalgary.ca/research/files/Grad%20Travel%20Guide%202009-01.doc. Further information is available through the Office of Research Services, Main Floor, 3512 33St. NW, University Research Park Calgary, Alberta. Telephone (403) 220-6354.

XIV. 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 in the searchable Graduate Awards Database found through the MyUofC portal or a link at http://www.grad.ucalgary.ca.

Scholarships and fellowships are awarded on the basis of academic standing and demonstrated potential for advanced study and research. Normally, only 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. Written requests, endorsed by the supervisor and graduate coordinator, 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 specifies otherwise.

Amount of Award	Payment
Up to $2,500	One lump sum payment
$2,501 to $6,000	Paid in equal monthly installments over a four month term
$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) from awards made in the Open Scholarship competition, the Special Awards and Bursaries competitions, 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 Open Scholarship competition (with the exception of an Honorary Izaak Walton Killam Doctoral Scholarship), for the Special Awards and Bursaries competition, or for 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.

The Dean's Entrance Scholarship (DES), Dean's Research Excellence Awards (DREA), and Graduate Teaching Fellowships (GTF) are not subject to the limits just described. Similarly, funds awarded by programs from their Graduate Student Support allocation are not subject to this limit.

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
Open Scholarship Competition	On-line application: http://www.grad.ucalgary.ca/. 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://www.grad.ucalgary.ca/ or with the graduate program administrator for details.
Special Awards Competition	Complete the *Application for Graduate Scholarships.* Submit to the Graduate Scholarship Office, including all supporting documents.
Bursary Competition	Complete the *Application for Graduate Bursary.* Submit to the Graduate Scholarship Office, including all supporting documents. NOTE: Applicants must show financial need commensurate with the value of the award

Full Terms of Reference and application documents for each award are available through the searchable database tool, found on the web at http://www.grad.ucalgary.ca/.

When required, complete application packages should be sent to:

Graduate Scholarship Office
Faculty of Graduate Studies
University of Calgary
Earth Sciences 720
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.

Please note that the following lists of awards, although current at time of compilation, may change over the year. The searchable Graduate Awards Database is the most up-to-date and reliable source for available awards and their complete terms of reference (https://pr1web.ucalgary.ca/UofC_FGSA/public/publichome.aspx).

GRADUATE AWARDS

Award Name	Donor	Field of Study	Value	Nomination Method
A.T.J. Cairns Memorial Scholarship	Estate of A.T.J Cairns, matching grant provided by the Province of Alberta's Advanced Education Endowment Fund	English	$1,000 - $5,000	Recommended by Program
Achievers in Medical Science Graduate Recruitment	Endowed by an anonymous donor, through an endowment established with the Calgary Foundation	Academic medical or biomedical research	$25,000	Recommended by Program
Achievers in Medical Science Leaders in Medicine Scholarship	Endowed by an anonymous donor, through an endowment established with the Calgary Foundation	Academic medical or biomedical research	up to $40,000	Recommended by Program
Achievers in Medical Science Post-doctoral Scholarship	Endowed by an anonymous donor, through an endowment established with the Calgary Foundation.	Academic medical or biomedical research	up to $15,000	Recommended by Program
Achievers in Medical Science Research Excellence Award	Endowed by an anonymous donor, through an endowment established with the Calgary Foundation	Academic medical or biomedical research	$3,500 per year	Recommended by Program
Alastair H. Ross Memorial Graduate Scholarship	Endowed by Mrs. Joan Ross and family, and friends of Alastair H. Ross	Management, with a focus on technology as it relates to the study of Management	$8,500	Recommended by Program
Albert Comanor Memorial Graduate Social Work Scholarship	Endowed by family, friends, colleagues from the University of Calgary and elsewhere in Canada and the United States in honour of Albert Comanor, Professor Emeritus, matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Social Work	$1,600	Recommended by Program
Alberta Association of Architects - Cecil Scott Burgess Scholarship	Alberta Association of Architects from the Estate of Cecil Scott Burgess	Architecture	$500	Recommended by Program
Alberta Association of Architects - Norman Fleming Award	Endowed by the Alberta Association of Architects, friends and colleagues of Norman Fleming	Architecture	$600	Recommended by Program
Alberta Association, Canadian Institute of Planners (AACIP) Danny Makale	Alberta Association, Canadian Institute of Planners (AACIP) and the Danny Makale Memorial Educational Trust	Planning	$1,500 plus Silver Medallion	Recommended by Program
Alberta Building Envelope Council South Award	Alberta Building Envelope Council South	Architecture	$1,500	Recommended by Program
Alberta Foundation for the Arts Graduate Scholarships in the Department of Art	Endowed by the Alberta Art Foundation, matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Major fields of study in the Department of Art	$7,000	Recommended by Program
Alberta Graduate Student Scholarships	Endowed by the Province of Alberta, Alberta Learning	Unrestricted	$2,000 each	Recommended by Program
Alberta Law Foundation Graduate Scholarship	Alberta Law Foundation	Natural Resources, Energy and Environmental Law	$14,000	Recommended by Program
Alexa W. Church Graduate Scholarship in Medical Sciences	Endowed by the B.C. Church family	Medical Sciences	$10,000	Special Awards and Bursaries
Allan Clowes Family MBA Fellowship	Endowed by Allan Clowes	Management	$5,000 per year	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
Allan H. Bill Memorial Scholarship	Allan Bill Memorial Fund Society, Calgary (Calgary Fish and Game Association)	Ecological Management	$1,200	Recommended by Program
Anita K.F. Li Graduate Scholarship	Endowed by the colleagues, friends, students, and family of Anita K.F. Li, on the occasion of her retirement from the University of Calgary	Applied Psychology	$3,000	Recommended by Program
Anne Severson Memorial Graduate Scholarship in Fine Arts	Endowed by family and friends of Patricia Anne Severson	Major fields of study in the Department of Art	$1,000	Recommended by Program
AOSTRA/Devenny Graduate Scholarship	Endowed by Dr. David Devenny	Environmental Engineering	$900	Recommended by Program
Archibald Waynne Dingman Memorial Graduate Scholarship	Endowed through a bequest of the late Corinne Patteson, in memory of her father	Petroleum Industry	$3,300	Special Awards and Bursaries
Arthur J.E. Child Memorial Bursary in Economics	Endowed by the Arthur J.E. Child Foundation	Economics	$12,000	Special Awards and Bursaries
Arthur J.E. Child Memorial Bursary in History	Endowed by the Arthur J.E. Child Foundation	History	$12,000	Special Awards and Bursaries
ASME Pipeline Systems Division Award	Endowed by the ASME Pipeline Scholarship Fund, Drs. M. Mohitpour, H. Golshan and Alan Murray	Engineering studies related to pipeline transportation	$2,200 per year	Special Awards and Bursaries
Bantrel Co. Graduate Scholarship	Bantrel Co.	Management	up to $2,500, each	Recommended by Program
Barker Award	Calgary Co-operative Association Ltd, matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Business Administration with emphasis on Entrepreneurship, New Venture Development and Marketing	$1,800	Recommended by Program
BCW Architects Entrance Scholarship	BCW Architects	Environmental Design Architecture	$3,000	Recommended by Program
Bernie Lieff Memorial Award	Friends and family of Bernard Charles Lieff	Parks, protected areas, and/or ecosystem management	$2,000	Special Awards and Bursaries
Bettina Bahlsen Memorial Graduate Scholarship	Bettina Bahlsen Memorial Fund; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Cellular, Molecular, Microbial or Biochemical Biology	$19,000	Open Scholarship
Bill Ross Scholarship	Endowed by Professor Bill Ross, Calgary	Environmental Design	$1,400	Recommended by Program
Brian R. Sinclair Graduate Scholarship in Environmental Design	Brian R. Sinclair and the University of Calgary Keynote Series on Sustainable Environmental Design	Environmental Design	$1,500	Recommended by Program
Bruce M. Irons Memorial Scholarship	Bruce M. Irons Memorial Scholarship Fund endowed by relatives, friends & colleagues in honour of the late Bruce Moncur Irons & a matching grant provided from Alberta's Advanced Education Endowment Fund: also royalty payments from books written by Bruce Irons	Civil Engineering	$5,000	Recommended by Program
C.F. Gauss Award	Klaus-Peter Schwarz, Alex Bruton, and Craig Glennie	Mathematical models for Geomatics	$3000	Recommended by Program
Calgary Airport Authority Graduate Scholarship	Calgary Airport Authority	Transportation	$5,000	Special Awards and Bursaries

Award Name	Donor	Field of Study	Value	Nomination Method
Calgary Chamber of Commerce & ENMAX Graduate Scholarship in Global Climate Change Research	Calgary Chamber of Commerce and ENMAX Corporation	Climate Change	$1,000	Special Awards and Bursaries
Calgary Chapter of the Schizophrenia Society of Alberta, Dr. S.K. Littman Graduate Award	Endowed by the Calgary Chapter of the Schizophrenia Society of Alberta, in memory of Dr. S.K. Littman	Schizophrenia	$1,200	Special Awards and Bursaries
Calgary Chapter of the Strategic Leadership Forum Scholarship	Endowed by the Calgary Chapter of the Strategic Leadership Forum; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Strategic Management/Planning Studies	$3,000	Recommended by Program
Calgary Housing Commission Prize	Endowed by the City of Calgary Housing Commission and the Calgary Real Estate Board	Planning	$1,000	Recommended by Program
Calgary Institute for the Humanities Frances Spratt Graduate Fellowship	Calgary Institute for the Humanities and anonymous donors	Humanities approach to any discipline, as stated above	$7,500 with office amenities for an eight-month period, in the Calgary Institute for the Humanities, with limited administrative support	Recommended by Program
Canadian Association of Petroleum Producers Award	Canadian Association of Petroleum Producers	Management	$800	Recommended by Program
Canadian Defense and Foreign Affairs Institute & Arthur J.E. Child Memorial Doctoral Scholarship in Military and Strategic Studies	Arthur J.E. Child Foundation and an anonymous donor	Military and Strategic Studies	$60,000 annually in the recommended allotment of: Up to three awards of $20,000 each, up to four awards of $15,000 each, up to six awards of $10,000 each and up to twelve awards of $5,000 each	Recommended by Program
Canadian Defense and Foreign Affairs Institute & Arthur J.E. Child Memorial Master's Scholarship in Military and Strategic Studies	Arthur J.E. Child Foundation and an anonymous donor	Military and Strategic Studies	$19,000 in allotments ranging from $1,000 to $6,000 depending upon the candidate's qualifications, experience, and graduate program.	Recommended by Program
Canadian Environmental Scholarship	Endowed by an anonymous donor	Environmental Science	$1,750	Special Awards and Bursaries
Canadian Gas Association Scholarship	Canadian Gas Association	Topics relevant to the Canadian Energy Industry	$2,750	Recommended by Program
Canadian Heavy Oil Association Graduate Scholarship	Canadian Heavy Oil Association	Heavy Oil	$3,000	Special Awards and Bursaries
Canadian Natural Resources Limited Graduate Scholarship	Endowed by Canadian Natural Resources Ltd (formerly Sceptre Resources Limited); matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Economics, Geoscience, Engineering or Management	$9,000	Special Awards and Bursaries
Cantos Music Foundation Organ Graduate Scholarship	Cantos Music Foundation	Organ Performance	up to $10,000	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
Captain Nichola K.S. Goddard Memorial Graduate Scholarship	Endowed by the family, friends and colleagues of Nichola Goddard	Unrestricted	$5,000	Special Awards and Bursaries
Carl O. Nickle Graduate Scholarship	Endowed by family and friends of Carl O. Nickle, Alberta Natural Gas Co. Ltd. (now Trans Canada PipeLines) and the Province of Alberta's Advanced Education Endowment Fund	Western Canadian Studies, including history, culture, art, economics, political science; studies related to the growth and development of Western Canada	$4,500	Special Awards and Bursaries
Certified General Accountants, Alberta, Graduate Scholarship for Excellence in Accounting	Certified General Accountants, Alberta	Accounting	$5,000	Recommended by Program
Certified Management Accountants, Alberta, Graduate Scholarship for Excellence in Management Accounting	Certified Management Accountants, Alberta	Accounting	$2,500	Recommended by Program
CFUW /Calgary, Hall/Street Graduate Scholarship in Nursing	Endowed through a gift from the Calgary Chapter, Canadian Federation of University Women in honour of Gertrude M. Hall and Margaret M. Street, pioneers in Nursing Ed; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Nursing	$1,500	Recommended by Program
CFUW/Calgary Graduate Scholarship in Social Work or Social Sciences (Canadian Federation of University Women)	Canadian Federation of University Women/Calgary	Social Work or Social Sciences	$1,000	Special Awards and Bursaries
Chancellor Norford Graduate Scholarship	Endowed by alumni, students, senators, governors and other friends of the University of Calgary	History	$5,000	Recommended by Program
Chancellor's Challenge Graduate Scholarship	Chancellor's Challenge Golf Tournament	Unrestricted	$5,000	Open Scholarship
Chancellor's Graduate Medal	Faculty of Graduate Studies, in honour of the Chancellor of the University of Calgary	Unrestricted	Silver medal and certificate	Medals and Prizes
Charles B. Locke Graduate Award in Tourism	Endowed by Charles B. Locke	Tourism Management	$6,000	Recommended by Program
Charles E. & Walton Kendrew Scholarship	Endowed by the estate of Ethel May Kendrew	Ecological Management	$6,000	Recommended by Program
Charles R. Steele Memorial Scholarship	Endowed by family and friends of the late Charles R. Steele; matching grant provided by the Province of Alberta's Advanced Education Endowment Fund	English	$7,500	Recommended by Program
Choquette Family Foundation Global Experience Graduate Scholarship	The Choquette Family Foundation	Unrestricted	$10,000	Special Awards and Bursaries
Christ Church Peter Craigie Memorial Graduate Award	Parishioners of the Christ Church, Calgary; matched by the Province of Alberta's Advanced Education Endowment Fund	Religious Studies, with a specialization in biblical studies	$1,200	Recommended by Program
Christiane Adèle Roy Scholarship	Endowed by the family, friends, and colleagues of Christiane Adele Roy	Workplace and Adult Learning (formerly the Master of Continuing Education program)	$5,000 per year	Recommended by Program
CN Graduate Award in Transportation	CN	Transportation Studies	$10,000	Special Awards and Bursaries
Cogeco Inc. Graduate Scholarship	Cogeco Inc.	Communications Studies	$7,500	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
COHOS EVAMY Integratedesign Travel Scholarship	Endowed by Cohos Evamy Partners, Calgary	Architecture	$6,000	Recommended by Program
Colt Geomatics Graduate Scholarship	Colt Geomatics	Geographic Information Science	$1,000	Recommended by Program
Cooper H. Langford Graduate Scholarship	Endowed by Cooper H. Langford III	Chemistry, Civil Engineering, Communications Studies or Philosophy	$750	Recommended by Program
Coutts Family Western Canadian Graduate Archaeology Scholarship	Endowed by David B. Coutts	Western Canadian Archaeology	$2,500	Recommended by Program
Coutts Family Western Canadian Graduate History Scholarship	Endowed by David B. Coutts	Western Canadian History	$2,500	Recommended by Program
CPANS Air & Waste Management Prize	Canadian Prairie and Northern Section (CPANS) of the Air & Waste Management Association	Research that focuses on the advancement of environment practices with specific emphasis on either air or waste management issues	$1,000 and student membership to CPANS	Special Awards and Bursaries
D.L. Mills Graduate Sociology Scholarship	Endowed by family, friends and University of Calgary colleagues in honour of D.L. Mills, and a matching grant provided from the Province of Alberta Advanced Education Endowment Fund	Sociology	$2,000	Recommended by Program
D.S. Stevens Memorial Scholarship	Endowed by family & friends of the late Donald S. Stevens	Architecture	$2,000	Recommended by Program
Danny Browning, R.N. Graduate Scholarship	Dr. Jack Browning in memory of his wife, Danny Browning	Nursing	$3,500	Recommended by Program
David Johnston Research Travel Award	Sheila Moore Johnston	Schizophrenia and/or Bi-Polar disorders	$1,000	Special Awards and Bursaries
David Wilson Memorial Graduate Scholarship in Geoscience	Family, Friends and Colleagues of David Wilson	Heavy Oil or Coal	$1,000	Recommended by Program
Dean's Doctoral Scholarship	Faculty of Graduate Studies	Unrestricted	$15,000	Open Scholarship
Dean's Entrance Scholarship	Faculty of Graduate Studies	Unrestricted	$6,000	Recommended by Program
Dean's Master's Scholarship	Faculty of Graduate Studies	Unrestricted	$5,000	Open Scholarship
Dean's Research Excellence Award	Faculty of Graduate Studies	Unrestricted	$3,000	FGS/GSO Approval
Denise H.S. Owen Scholarship	Endowed by Mr. and Mrs. Robert M.S. Owen in memory of their daughter	Applied Psychology	$3,500	Recommended by Program
Dennis Parkinson Graduate Scholarship	Endowed by Edward A. Johnson and Kiyoko Miyanishi	Biological Sciences	$3,500	Recommended by Program
Department of Chemical and Petroleum Engineering Graduate Award	Endowed by the Conference Organizing Committee of the 5th International Conference on Petroleum Phase Behaviour and Fouling (2004) and other contributors	Phase behaviour and fouling of petroleum fluids/solids	$2,500	Recommended by Program
Department of Chemistry Graduate Scholarship	Members of the Department of Chemistry, the University of Calgary and other private donors; matching funds provided by the Province of Alberta's Advanced Education Endowment Fund	Chemistry	$2,500	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
Department of Religious Studies Graduate Scholarship	Endowed by members of the Department of Religious Studies, the University of Calgary, and the Humanities Associates Program; matched by the Province of Alberta's Advanced Education Endowment Fund	Religious Studies	$2,200	Recommended by Program
Detomasi Master's Degree Project Award	Endowed by Dr. and Mrs. D.D. Detomasi, friends, and colleagues	All programs in Environmental Design	$1,000	Recommended by Program
Dobson Family Master of Nursing Scholarships		Nursing	$2,500	Recommended by Program
Dominion Exploration Canada Limited MBA Scholarship	Dominion Exploration Canada Ltd. (formerly Dominion Energy Canada Limited)	Management	$2,700	Recommended by Program
Donald N. Byers Memorial Killam Prize for Best Statement of Program of Studies and Research	Endowed through a bequest of the late Dorothy J. Killam and the Izaak Walton Killam Memorial Fund for Advanced Studies	Unrestricted	$1,000	Open Scholarship
Donald R. Hayes Memorial Scholarship	Endowed by the Kodaly Society of Canada and the graduates of the Kodaly Diploma Program (Faculty of Fine Arts, The University of Calgary)	Music Education - Kodaly concentration	$400	Recommended by Program
Doreen & Donald Lougheed Graduate Scholarship	Endowed by Doreen and Donald Lougheed	Business	$9,000 per year	Recommended by Program
Doreen F. Wilson Legacy Graduate Award	W. Brett Wilson & Calgary Communities Against Sexual Abuse	Sexual Abuse and Sexual Assault	$2,500	Special Awards and Bursaries
Douglas W. Mack Award	Endowed by Mrs. Margaret Mack in honour of her husband, Dr. Douglas W. Mack; matching grant provided by the Government of the Province of Alberta's Advanced Education Endowment fund.	Business Administration	$1,500	Recommended by Program
Dr Chen Fong Chancellor's Club Doctoral Scholarship	University of Calgary Chancellor's Club	Unrestricted	$20,000	Open Scholarship
Dr Paul and Mrs Apar Sarpal Graduate Scholarship in Mechanical Engineering	Dr Gurcharan (Paul) & Mrs Apar Sarpal	Mechanical Engineering, thermal fluids in energy-related areas	$5,000	Recommended by Program
Dr. Alfred A. Levinson Memorial Graduate Scholarship In Mineralogy/Geochemistry	Endowed by family, friends and colleagues of the late Dr. Alfred A. Levinson	Mineralogy/Geochemistry	$1,000	Recommended by Program
Dr. Anthony Russell Distinguished Faculty Achievement Graduate Scholarship in Zoology	Endowed by the Distinguished Faculty Achievement Award Fund	Zoology	$1,000	Recommended by Program
Dr. Benno Nigg Distinguished Faculty Achievement Graduate Scholarship	Endowed by the Distinguished Faculty Achievement Award Fund	Research related to human neuro-musculo-skeletal health and wellness from birth to old age	$1,000	Recommended by Program
Dr. Bonnie Shapiro Distinguished Faculty Achievement Graduate Scholarship	Endowed by the Distinguished Faculty Achievement Award	Education, with a focus on one of: science education, teacher education, environmental education, curriculum inquiry or interpretive studies in education	$1,000	Recommended by Program
Dr. Devendra Singh Mohindra Memorial Bursary	Cukee Mohindra (wife) and Family	Mechanical Engineering	$1,200	Special Awards and Bursaries

Award Name	Donor	Field of Study	Value	Nomination Method
Dr. Frank Eyck Memorial Graduate Scholarship in European History	Rosemarie Eyck, family, friends and colleagues	European History	$3,000	Recommended by Program
Dr. Frank Ramsay Graduate Award In Neuroscience	The Parkinson's Society of Southern Alberta	Neurosciences related to Parkinson's disease	$1,000	Special Awards and Bursaries
Dr. G. Barry Mellon Graduate Award	Endowed by the ALBERTA ENERGY RESEARCH INSTITUTE (Formerly known as: Alberta Oil Sands Technology Research Authority - AOSTRA)	Business Administration	$1,000	Recommended by Program
Dr. George Self Graduate Scholarship	Endowed by members of the Department of History, University of Calgary and matched by the Province of Alberta's Advanced Education Endowment Fund	History	$2,500	Recommended by Program
Dr. Gordon Nelson Graduate Scholarship in Interdisciplinary Studies	Interdisciplinary Graduate Program	Unrestricted	$4,000	Recommended by Program
Dr. Jeanette Nicholls Graduate Scholarship	Endowed by the friends of Dr. Jeanette Nicholls	Unrestricted	$5,000	Special Awards and Bursaries
Dr. Monica Scarabello Memorial Graduate Research Award	Family in memory of Dr. Monica Scarabello	Cardiovascular Research	$2,000	Recommended by Program
Dr. Murray Fraser Memorial Graduate Scholarship	Graduate Students' Association of the University of Calgary	Open	$1,500	Open Scholarship
Dr. Roger Butler Memorial Graduate Scholarship	Endowed by the family, friends, colleagues, and students of Roger Butler	Chemical and Petroleum Engineering	$10,000	Recommended by Program
Dr. Roland Lambert Applied Psychology Bursary	Endowed by the Family and Friends of Dr. Roland Lambert	Applied Psychology	$1,000	Special Awards and Bursaries
Dr. Tristram Chivers Distinguished Faculty Achievement Graduate Scholarship	Endowed by the Distinguished Faculty Achievement Award Fund	Inorganic Chemistry	$1,000	Recommended by Program
Dr. Wojciech Studzinski Memorial Scholarship in Chemical Engineering	NOVA Chemicals	Petrochemicals	$1,000	Recommended by Program
Drs. George and Susannah Kurian Doctoral Scholarship in Sociology	George and Susannah Kurian	Sociology	$5,000 per year	Recommended by Program
Economics Alumni Graduate Scholarship	Endowed by Graduate Alumni and Faculty of the Economics Department	Economics	up to $2,500	Recommended by Program
Economics Society of Calgary Graduate Scholarship	Economics Society of Calgary with matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Economics	$2,500	Recommended by Program
Education for the Future Doctoral Scholarship in Nursing	Anonymous	Nursing	$3,000	Recommended by Program
Education for the Future Master of Nursing Scholarship	Anonymous	Nursing	$2,000	Recommended by Program
Educational Technology Entrance Award	Faculty of Education Graduate Division of Educational Research through the Government of Alberta Access Fund Program	Educational Technology	$1,000	Recommended by Program
Eleanor Luxton Historical Foundation Graduate Scholarship	Eleanor Luxton Historical Foundation	Western Canadian History in Banff, the Bow Valley, and Western Canada in the 19th and 20th centuries	$15,000 annually; One award of $5,000 in the Masters program and one award of $10,000 in the Ph.d. program	Recommended by Program
Elsie Mary Bell Graduate Scholarship in Music	Endowed by Dr. Graeme I. Bell	Music	$10,000	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
Emeritus Professors of English Award	Endowed by Susan Stratton, with members and friends of the University of Calgary's English department	English	$500	Recommended by Program
Eratosthenes Award	Klaus Peter Schwarz and Naser El-Sheimy	History of Geomatics Engineering	$1,000	Recommended by Program
Eric Milner Graduate Scholarship	Endowed by family, friends and colleagues of Eric Milner	Mathematics	$5,000	Recommended by Program
Estelle Milner Memorial Scholarship	Endowed by a gift from Dr. E.C. Milner in memory of Estelle Milner, the first PhD student in the department of English; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	English	$3,000	Recommended by Program
EVDS Alumni Scholarship	EVDS Annual Fund Donors	Environmental Design	$500	Recommended by Program
EVDS Dean’s Advisory Council Entrance Scholarship	EVDS Dean's Advisory Council	Environmental Design	$1,000	Recommended by Program
F.R. Helmert Award	Klaus-Peter Schwarz, Alex Bruton, and Craig Glennie	Geomatics Engineering with a research specialization in gravity field modeling and geodynamics.	$3,000	Recommended by Program
Fabjob.com Graduate Award	FabJob.com	Technology in Communications	$500.	Recommended by Program
Faculty of Education Endowment Graduate Scholarship	The Education Endowment Fund	Graduate Division of Educational Research or Applied Psychology	$4,000	Recommended by Program
Faculty of Environmental Design Gold Medal	University of Calgary	Any program in the Faculty of Environmental Design	Gold medallion	Recommended by Program
Faculty of Graduate Studies Doctoral Scholarship	Faculty of Graduate Studies	Unrestricted	$10,000	Open Scholarship
Faculty of Humanities Graduate Scholarship	Endowed by the faculty and staff members of the Faculty of Humanities	Humanities	$1,500	Special Awards and Bursaries
Faculty of Law Graduate Scholarship	Endowed through contributions made to the Focus on Natural Resources Law Campaign; matching grant provided from the Province of Alberta	Natural Resources, Energy and Environmental Law	$10,500	Recommended by Program
Faculty of Nursing Alumni Graduate Bursary	Endowed by the Faculty of Nursing Alumni of the University of Calgary	Nursing	$2,500	Special Awards and Bursaries
FirstEnergy Graduate Bursary in Engineering Studies in Energy	FirstEnergy Community Foundation	Engineering with a focus on energy-related studies	$10,000	Special Awards and Bursaries
Frank Mink Graduate Economics Scholarship	Economics Society of Calgary and the Alberta Energy and Utilities Board (AEUB)	Economics	$2,000	Recommended by Program
Friends of Head-Smashed-In Graduate Scholarship	Endowed by the Friends of Head-Smashed-In Buffalo Jump Interpretive Centre	Canadian Plains Anthropology and Archaeology	$6,000	Special Awards and Bursaries
Frost Graduate Scholarship In Cardiology	Frost Fund at the Calgary Foundation	Cardiovascular Sciences	$5,000	Recommended by Program
Gallagher-Galileo Fellowship	Jack Gallagher Education Fund of the Calgary Foundation	Integration of technology into teaching and learning	$35,000	Recommended by Program
GEC Award of Excellence in Comprehensive Design	Graham Edmunds Cartier Architects, Calgary in honour of Donald Stanley Stevens	Architecture	$1,000	Recommended by Program
Gene Huber Graduate Thesis Prize in Biological Sciences	Endowed by Dr. Gene Huber	Biological Sciences	$1,000	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
George and Joan Wing Memorial Graduate Bursary	Endowed by the family of George and Joan Wing	English	$1,250	Special Awards and Bursaries
Gibbs Gage Graduate Scholarship in Architecture	Gibbs Gage Architects	Architecture	$2,500	Recommended by Program
Gifted Studies Graduate Scholarship	Endowed by the Central Alberta Supporters of Quality Education for Gifted Students	Gifted education	$500	Recommended by Program
Glaholt Graduate Entrance Scholarship in Ecological Design	Randal Glaholt	Environmental Science	$10,000	Recommended by Program
Glaholt Graduate Entrance Scholarship in Sustainable Environmental Design	Randal Glaholt	Environmental Design	$10,000	Recommended by Program
Gordon Lewis Hedberg Doctoral Scholarship	Endowed by the estate of Gordon Lewis Hedberg	Electrical and Computer Engineering	$8,000 per year	Recommended by Program
Governor General's Gold Medal	Governor General of Canada	Unrestricted	Gold medal and certificate	Medals and Prizes
Graduate Faculty Council Scholarship	University of Calgary Graduate Faculty Council	Unrestricted	$5,000 each.	Open Scholarship
Graduate Scholarship for Calgary/Israel Study Exchange	The Kahanoff Foundation and Hyman and Jenny Belzberg through the Canada Israel Foundation for Academic Exchanges, matching grant from the Government of Alberta	Humanities or Social Sciences	Up to $18,000 ($1,500 per month)	Special Awards and Bursaries
Graduate Teaching Fellowships (GTF)	Faculty of Graduate Studies	Unrestricted	$3,000 per half-course	Recommended by Program
Graeme Bell and Norman Kay Sullivan-Bell Graduate Scholarship in Biology	Endowed by Graeme I. Bell and Norma Kay Sullivan-Bell	Biology	$4,500	Recommended by Program
Grant Mossop Graduate Scholarship in Geology	Endowed by the family and friends of Grant Mossop	Geology	$5,000	Recommended by Program
Grant Spratt Graduate Scholarship in Geology	Endowed by Frances (Jane) Birdsell	Geology	$1,100	Recommended by Program
Harry and Laura Jacques Bursary	Award endowed through a bequest from the Estate of the late Laura Jacques	Unrestricted	$4,000	Special Awards and Bursaries
Haskayne School of Business MBA Entrance Scholarships	Haskayne School of Business, from differential fee student support revenue	Business	up to $2,500 or up to $5,000 per year	Recommended by Program
Haskayne School of Business MBA Entrance Scholarships for Evening Students	Haskayne School of Business, from differential fee student support revenue	Business	$2,000	Recommended by Program
Haskayne School of Business MBA Scholarships for Continuing Students	Haskayne School of Business, from differential fee student support revenue	Business	$2,000	Recommended by Program
Helen McWilliam Memorial Scholarship	Relatives, friends and colleagues of Helen McWilliam, Supervisor of School Psychology, Calgary Board of Education 1963-1982; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	School Psychology	$2,000	Recommended by Program
Helmut Moritz Graduate Scholarship	Endowed from proceeds of the Inertial Systems Conference 1985, Dr. K.P. Schwarz and various private and corporate donors, matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Geodesy	Up to $3,200	Recommended by Program
Henrietta Weyland Graduate Scholarship in Mathematics	Endowed by Henrietta Weyland	Mathematics and Statistics	$2,500	Open Scholarship

Award Name	Donor	Field of Study	Value	Nomination Method
Hillhurst Sunnyside Prize	Endowed by L. Douglas Rae, through the Calgary Foundation	Social, political or physical issues relating to the development or preservation of Calgary's inner city	$1,000	Special Awards and Bursaries
Honourable N.D. McDermid Graduate Scholarships	Endowed by the McDermid Law Fund	Law	$12,000	Recommended by Program
Hopewell Teaching English as a Second Language Graduate Scholarship	Mr. Sanders Lee and friends of the Faculty of Education, matched by a bequest from Marilyn McClinton	Teaching English as an Additional Language	$4,000	Recommended by Program
Husky Energy Inc. Scholarship	Husky Energy Inc. Calgary	Environmental Science	$1,000	Recommended by Program
Ian N. McKinnon Memorial Fellowship	Award endowed by gifts from Consolidated Natural Gas Ltd., B.P. Canada, Inc. and Kaiser Resources	All areas relevant to the effective development and utilization of energy resources, with special emphasis on economics, engineering and geology	$3,500	Special Awards and Bursaries
Illuminating Engineering Society of North America, Chinook Section Scholarship	Illuminating Engineering Society of North America, Chinook Section	Architecture	up to $1,000	Recommended by Program
Innovation in Mobile Mapping Award	Klaus Peter Schwarz and Naser El-Sheimy	Geomatics Engineering with a research specialization in INS/GNSS integrated systems for mobile mapping, and positioning	$3,500	Recommended by Program
Institute for Space Research Graduate Scholarship in Space Physics	Canadian Corporation for University Space Science	Space Physics	$1,000	Recommended by Program
Institute of Navigation (ION) Alberta Section Graduate Award	Institute of Navigation (ION) Alberta Section	Satellite based, ground-based and integrated wireless location and navigation systems	$1,000	Recommended by Program
Institute of Navigation (ION) Graduate Award	Institute of Navigation (ION) Alberta Section	Satellite based navigation systems	Canadian dollar equivalent of US $1,000	Recommended by Program
Institute of Navigation (ION) National Graduate Award	Institute of Navigation (ION)	Satellite based and integrated navigation systems	Canadian dollar equivalent of US $1,250	Recommended by Program
International Association for Impact Assessment - Western & Northern Canada - Scholarship	International Association for Impact Assessment, Western and Northern Canada	Environmental Design (all programs)	$2,500	Recommended by Program
Izaak Walton Killam Pre-Doctoral Scholarships	Endowed through a bequest of the late Dorothy J. Killam And the Izaak Walton Killam Memorial Fund for Advanced Studies	Unrestricted	$25,000 plus a research allowance of up to $3,000 for special equipment and/or travel in direct connection with the PhD research	Open Scholarship
J.B. Hyne Graduate Scholarship	Endowed with contributions from friends and associates as a tribute to J.B. Hyne, the first Dean of the Faculty of Graduate Studies as the University of Calgary and a matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Unrestricted	$2,400	Open Scholarship

Award Name	Donor	Field of Study	Value	Nomination Method
Jacques Cartier Award	Klaus-Peter Schwarz, Alex Bruton, Craig Glennie	Geomatics Engineering with a research specialization in the field of navigation	$3,000	Recommended by Program
Jake Duerksen Memorial Scholarship	Endowed by the family and friends of Jake Duerksen; matching funds provided by the Province of Alberta's Advanced Education Endowment Fund	Biology	$2,500	Recommended by Program
Jake Swart Memorial Graduate Scholarship	Robert Swart	Geoscience	$2,500	Recommended by Program
James Frideres Award in Quantitative Sociology	Endowed by Dr. James Frideres	Sociology	$250	Recommended by Program
James Gripton Doctoral Scholarship in Social Work	Mary Valentich, family and friends of James Macpherson Gripton and the Faculty of Social Work, University of Calgary.	Social Work	$1,000	Recommended by Program
Jim and Jean Cragg Doctoral Scholarship in Biological Sciences	Endowed by the Estates of Jim and Jean Cragg	Ecology	$6,000 per year	Recommended by Program
Jim and Jean Cragg Doctoral Scholarship in Environmental Design	Endowed by the estate of Jim Cragg	Environmental Design, with an interest in environmental sustainability	$6,000 per year	Recommended by Program
Jocelyn Monsma Selby Graduate Scholarship in Social Work	Jocelyn Monsma Selby	Social Work	$1,000	Recommended by Program
Joe Woodsworth Memorial Scholarship	Endowed by family members, friends, students and colleagues of Dr. Joseph Woodsworth	Applied Psychology	$9,000	Recommended by Program
John D. Petrie, QC, Memorial Bursary	Endowed by the estate of Mary H. Petrie	Unrestricted	$10,000 per year	Special Awards and Bursaries
John F. Morrall Graduate Scholarship in Transportation Engineering	Transoft Solutions Inc.	Transportation Engineering	$5,000	Recommended by Program
John Labatt Limited Scholarship	Endowed through a gift from John Labatt Limited; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Business, Management and related areas	$3,300	Recommended by Program
John M. Dalgarno Memorial Award	Frank R. Anton; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Agricultural Economics	$1,800	Recommended by Program
John O. Galloway Memorial Scholarship	Family of John O. Galloway and associated companies; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Geoscience	$6,000	Recommended by Program
John S. Poyen Scholarship	TransCanada PipeLines (formerly Alberta Natural Gas Co. Ltd.) with matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Analysis of energy economics and related environmental policy issues in the producing, transportation, and consuming sectors	$4,000	Special Awards and Bursaries
Julius Schulich Award for Entrepreneurship	Endowed by the Julius Schulich Foundation	Master of Business Administration with a specialization in Entrepreneurship Studies	$15,000	Recommended by Program
Karen Gammie Graduate Scholarship	Endowed by the Karen Gammie Memorial Fund of the Calgary Real Estate Board Charitable Foundation	Paediatric Nursing	$2,500	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
Kasian Graduate Scholarship in Architecture	Kasian Architecture Interior Design and Planning Ltd	Architecture	$10,000	Recommended by Program
Kathleen and Russell Lane Canadian Writing Scholarship	Endowed by the Estate of Kathleen Isabell Lane	Creative Writing	$1,200	Recommended by Program
Kenneth MacLean Glazier Scholarship	Endowed by Kenneth MacLean Glazier, family and friends	Environmental Design	$1,500	Recommended by Program
Kenneth Victor Nasedkin Memorial Award	Endowed by the estate of Kenneth Victor Nasedkin, Calgary	Architecture	$1,200	Recommended by Program
Kertland Family Doctoral Scholarship in Vascular Biology	Endowed by David S. Kertland	Vascular Biology	$10,000	Recommended by Program
Kertland Family Postdoctoral Fellowship in Vascular Biology	Endowed by David S. Kertland	Vascular Biology	$20, 000	Recommended by Program
KIS-94 Graduate Scholarship	Endowed from proceeds of the Kinematic International Conference 1994, Dr M. Elizabeth Cannon and Dr. Gerard Lachapelle, Faculty of Engineering, the University of Calgary	Satellite navigation	$2,000	Recommended by Program
Klohn Crippen Berger Graduate Scholarship	Klohn Crippen Berger Limited	Geotechnology	$5,000	Recommended by Program
L.R. (Dick) Newby Memorial Award	Endowed by the friends, family and associates of L.R. (Dick) Newby	Geomatics Engineering	$750	Recommended by Program
Leaders in Medicine Scholarship	An anonymous donor and the Faculty of Medicine	Leaders in Medicine program	Full or partial MD program fees	Recommended by Program
Lillian A. Jones/Whyte Museum of the Canadian Rockies Graduate Scholarship	Whyte Museum of the Canadian Rockies	Western Canadian History	$6,000	Recommended by Program
Linda Barry-Hollowell Graduate Scholarship	Family and friends in memory of Linda Barry-Hollowell, Q.C.	Law, Nursing or Counselling Psychology	$5,000	Special Awards and Bursaries
Lloyd and Florence Cooper Doctoral Scholarship in Integrative Medicine	Florence Cooper	Integrative health care	$35,000	Special Awards and Bursaries
Lockhart Family Graduate Scholarship In Computer Science	May and John Lockhart	Computer Science	$1,000	Recommended by Program
Lorne and Pat Gordon/YWCA of Calgary Graduate/Undergraduate Award	Anonymous	Social Work	$1,250	Special Awards and Bursaries
Lorraine M. Wright Family Nursing Scholarship	Endowed by the friends and family of Dr. Lorraine M. Wright	Family Systems Nursing	$500	Recommended by Program
Luke Bridgewater Memorial Scholarship	Endowed by the family and friends of Luke Bridgewater	Greek & Roman Studies	$5,000	Recommended by Program
Lynda R. Hodges-Zwerman Memorial Scholarship	The Lynda R. Hodeges-Zwerman Memorial Scholarship Fund endowed by family and friends, in honour and memory of Lynda and matching grant provided from the Province of Alberta's Education Endowment Fund	Communications Studies (Electronics)	$4,500	Recommended by Program
M. Lilian Dick Graduate Scholarship in Social Work	M. Lilian Dick	Clinical Practice	$750	Recommended by Program
Margaret (Peg) Brown Award In Wildlife Management	Endowed by Mrs. Margaret (Peg) Brown	Environmental Science	$2,500	Recommended by Program
Margaret P. Hess Graduate Scholarship	Margaret P. Hess; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Environmental Protection, Land Use, Ecology	$3,500	Special Awards and Bursaries

Award Name	Donor	Field of Study	Value	Nomination Method
Marion Janet and Ian Stormont Forbes Graduate Scholarships	Endowed by the estate of Marion Janet and Ian Stormont Forbes	Finance, Haskayne School of Business	$44,000 annually; in the recommended allotment of: Three awards of $8,000 in the MBA program and Two awards of $10,000 in the PhD program	Recommended by Program
Maritime Awards Society of Canada Graduate Scholarship	Endowed by the Maritime Awards Society of Canada	Any subject that deals with improving the national awareness of the importance of maritime affairs to Canada's future, which could include economic, environmental, historic, political, scientific, and sociological issues	TBA	Special Awards and Bursaries
Martha Biggar Anders Memorial Award	Endowed by relatives, friends and colleagues in honour of the late Martha Biggar Anders	Archaeology	$2,200	Recommended by Program
Masonry Contractors Association of Alberta Award	Endowed by the Masonry Contractors Association of Alberta,Southern Region	Architecture	$1,200	Recommended by Program
Maunders R. McNeil Award	Maunders R. McNeil Foundation Inc., matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Business Administration	$5,550	Recommended by Program
Mavis Marteinson Graduate Scholarship in Social Work	Mavis Marteinson	Social Work	$800	Recommended by Program
Meloche Monnex Alumni Graduate Scholarship	Endowed by Meloche Monnex Inc.	Business	$2,000	Recommended by Program
Meredith Graduate Doctoral Fellowship	Funded by the Workers' Compensation Board - Alberta (WCB)	Research that falls within the Workers' Compensation Board's Research Program, Solutions for Safer Alberta Workplaces	$25,000	Special Awards and Bursaries
Meredith Graduate Master's Scholarship	Funded by the Workers' Compensation Board - Alberta (WCB)	Research that falls within the Workers' Compensation Board's Research Program, Solutions for Safer Alberta Workplaces	$15,000	Special Awards and Bursaries
Mildred Shaw Book Prize	Endowed by Mildred L.G. Shaw	Science or Engineering	$300 University of Calgary Bookstore certificate for purchase of books	Special Awards and Bursaries
Military and Strategic Studies Graduate Scholarship	Centre for Military and Strategic Studies, Security and Defense Forum	Military and Strategic Studies	$15,000 annually in the recommended allotment of: Up to three awards at $1,000 each, up to seven awards at $2,000 each or up to three awards at $4,000 each	Recommended by Program
Mogens Smed Scholarship in Sustainable Interior Architecture	Endowed by the SMED Group	Environmental Design	$500	Recommended by Program
Murray L. Davis Graduate Scholarship	Endowed by Sam and Ida Switzer and the family and friends of Murray L. Davis	Management	$1,000	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
Murray W. Waterman Architectural Awards	Endowed by the estate of Murray W. Waterman	Architecture	Variable, depending on funds available and qualified candidates	Recommended by Program
Murray W. Waterman Architectural Entrance Scholarship	Endowed by the estate of Murray W. Waterman	Architecture	up to $10,000	Recommended by Program
Murray W. Waterman Senior Architectural Awards	Endowed by the estate of Murray W. Waterman	Architecture	Variable, depending on funds available and qualified candidates	Recommended by Program
Murray W. Waterman Study Abroad Awards	The estate of Murray W. Waterman	Architecture	Variable, depending on funds available and qualified candidates	Recommended by Program
N. Bruce Spankie Architectural Scholarship	Endowed by BKDI Architects, friends and colleagues of Bruce Spankie	Architecture	$1000	Recommended by Program
Naomi Heffler Memorial Scholarship in Avalanche or Snow Science	Alliance Pipeline	Engineering, with specific interest in avalanche or snow science	$5,000	Recommended by Program
Nat Christie Fellowship in Accounting	Nat Christie Foundation	Management	$5,000 for one graduate award recipient, OR if unable to award to a graduate student then $2,500 for two senior undergraduate recipients	Recommended by Program
Nicholls International Graduate Archaeology Scholarship	Endowed by Lesley Nicholls	Archaeology	$1,000	Recommended by Program
Nora and Ken Green Graduate Scholarship	Data-Line Realty Ltd.	English Literature	$1,000	Recommended by Program
Norlien Foundation Bursary	Norlien Foundation	Music Performance	$1,000	Special Awards and Bursaries
Norman J. Kennedy Graduate Scholarship	Doris Kennedy	Music	$2,000	Recommended by Program
North West Group Graduate Scholarship	North West Group	Digital Photogrammetry	$5,000	Recommended by Program
OMAE Calgary Chapter Graduate Scholarship in Engineering	Endowed by the American Society of Mechanical Engineers Offshore Mechanics and Arctic Engineering Division Calgary Chapter	Engineering	$4,200	Special Awards and Bursaries
Paul F. Gans Scholarship	Endowed by PCL - Braun - Simons Ltd.	Project Management	$2,000	Special Awards and Bursaries
Penn West Energy Trust Graduate Scholarship In Geology and Geophysics	Penn West Energy Trust	Geoscience	$10,000	Recommended by Program
Peter C. Craigie Memorial Scholarship	Endowed through the Peter C. Craigie Memorial Scholarship Fund, endowed by friends, family, and colleagues, matching funds provided from the Province of Alberta's Advanced Education Endowment Fund	Humanities	$4,500	Special Awards and Bursaries
Peter Valentine, FCA, Essay Prize in Corporate Governance, Business Ethics and Professionalism	Chartered Accountants Education Foundation	Corporate Governance, Business Ethics and Professionalism	$2,500	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
Petroleum History Society Graduate Scholarship	Petroleum History Society	Petroleum History	$1,500	Special Awards and Bursaries
Petroleum Society of CIM Graduate Scholarship	Petroleum Society of CIM	Petroleum-related research	$2,500	Recommended by Program
Phil Libin Graduate Scholarship in Business Administration	Harriet Libin, Sheryl and Howard Ackman, Toby and Stuart Libin and families	Business Administration	$500	Recommended by Program
Philip E. Vernon Award	Endowed by Dorothy Vernon, colleagues, former students and friends of Dr. Philip E. Vernon; matching grant from the Province of Alberta's Education Endowment Fund	Humanities, Social Sciences, Educational Psychology, Fine Arts with especial reference to Music and Genetics	$2,000	Special Awards and Bursaries
Pine Creek Research Centre Scholarship	The Organizing Committee of the International Water Association 2005 Watershed and River Basin Management Specialty Conference, Calgary 2005	Innovation in Watershed Management/Water-related research	$4,000	Special Awards and Bursaries
Polyna Savridi Memorial Foundation Scholarship	Endowed by the Polyna Savridi Memorial Foundation with matching grant provided by the Province of Alberta's Advanced Education Endowment Fund	Vocal Performance, or Vocal Composition, or Vocal Study	$1,400	Recommended by Program
Professor Allan Gordon Bell Distinguished Faculty Achievement Graduate Scholarship in Music	Endowed by the Distinguished Faculty Achievement Award Fund	Music	$1,000	Recommended by Program
Queen Elizabeth II Graduate Scholarships	Province of Alberta	Unrestricted	Master's level - up to $10,800 and Doctoral level - up to $15,000	Open Scholarship
Richard Hirabayashi Award	Endowed by family, colleagues, and friends of Richard Hirabayashi	Education, specializing in Early childhood education, ethnic diversity, human rights, or multicultural and First Nation issues	$1,000	Recommended by Program
Richard J. Schmeelk Canada Fellowship	Schmeelk Canada Foundation	Unrestricted	$10,000 per term	Medals and Prizes
Richard Johnston Award in Chamber Music Composition	Award endowed through a bequest of the estate of Richard Johnston	Music	$1,000	Recommended by Program
Richard R. Singleton Bursary in Architecture	Mrs. Donald L. Dunklee	Architecture	$1,250	Special Awards and Bursaries
RKA Graduate Scholarship in Sustainable Architecture	Riddell Kurczaba Architecture Engineering Interior Design Ltd.	Architecture	$3,000	Recommended by Program
Robert A. Willson Doctoral Management Scholarship	Haskayne School of Business	Management	Up to $10,000	Recommended by Program
Robert B. Paugh Memorial Scholarship in Engineering	Family of Robert B. Paugh, a former student of the University of Alberta	Engineering	$750	Open Scholarship
Robert G. Kellaway, Mervyn G. Graves, C. Sheldon Buckles, Gordon J. Cummings Scholarship	Endowed by C. Sheldon Buckles, Gordon J. Cummings and Mervyn G. Graves	Environmental Science	$1,200	Recommended by Program
Robert M.S. Owen Award	Endowed by Mrs. R.M.S. Owen in honour of her husband, Mr. Robert M.S. Owen and matching grant provided from the Province of Alberta	Applied Psychology	$4,000	Recommended by Program
Robert T.D. Wickenden Memorial Scholarship	Endowed by Lyla E. Wickenden in honour of her late husband, Robert T.D. Wickenden	Micropalaeontology, Geology	$1,700	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
Ron Ghitter Award in Human Rights	Endowed by the Honourable Ron Ghitter and Myrna Ghitter	Advocacy and exploration of human rights	$2,500	Special Awards and Bursaries
Ron T. Clare Memorial Fellowship	Endowed by family, Colt Engineering, W.Y. Svrcek, T.V. Vysniauskas, W.D. Sim, extended family, friends and colleagues of Ron T. Clare	Chemical Engineering	$2,500	Special Awards and Bursaries
Ronald P. Mathison MBA Fellowship	Endowed by Ronald P. Mathison	Management	$10,000	Recommended by Program
Roslyn McCowan Memorial Scholarship In Music	Endowed by family, friends and colleagues of Roslyn McCowan	Music Performance	up to $2,500	Special Awards and Bursaries
Royal Trust Graduate Scholarship in Social Work	Endowed by the Royal Trust Corporation of Canada and a matching grant provided from the Province of Alberta's Education Endowment Fund	Social Work with a specialization in the study of families with special needs	$3,500	Recommended by Program
Ruth Hilland Graduate Scholarship in Social Work	Ruth Hilland	Social Work	$1,000	Recommended by Program
S.P. Cran and Family Graduate Scholarship	Susan and Tyler Cran	Community Rehabilitation and Disability Studies	$1,000	Recommended by Program
Safiya Fathi Graduate Scholarship	Anonymous	Contemporary social, cultural, development, economic, political or modern historical studies of women in the Middle East. The scope of the region of the Middle East shall be as defined by the International Journal of Middle East Studies.	$6,000	Special Awards and Bursaries
Saint Lazarus Graduate Bursary in Religious Studies	The Military and Hospitaller Order of Saint Lazarus of Jerusalem	Ecumenical Religious Studies	$1,000	Special Awards and Bursaries
Sarla Sethi Graduate Scholarship	Endowed by Dr. Sarla Sethi, family and friends	Nursing	$1,500	Recommended by Program
ScotiaMcLeod Scholarship	Award endowed through a gift from Mcleod Young Weir Limited; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Business, Management and related areas	$4,000	Recommended by Program
Shanti Swarup & Shanti Devi Chugh Graduate Scholarship in Nursing	Dr. Sarla Sethi, in memory of her parents	Nursing	$1,500	Recommended by Program
Sharon Aikenhead Waugh Memorial Scholarship	Endowed by Dr. & Mrs. J.D. Aikenhead and the Calgary & District Council of the International Reading Association, in memory of Sharon Aikenhead Waugh	Curriculum and Instruction	$2,000	Recommended by Program
Sharon Wilkens Graduate Scholarship	Endowed by family, friends and colleagues of Sharon Wilkens	Biological Sciences	$1,250	Recommended by Program
Shirley Bird Memorial Award	Endowed by Muriel and Eric E. Wiedman (parents of Shirley Bird)	Architecture	$1,800	Recommended by Program
Smith Mack Lamarsh Graduate Scholarship	Smith, Mark, Lamarsh, Barristers and Solicitors	Master of Business Administration with a specialization in Entrepreneurship Studies	$2,000	Recommended by Program
Solar Energy Society of Canada Inc. (SESCI) '84 Scholarship	Solar Energy Society of Canada Inc., Calgary Chapter from proceeds of the 1984 national conference held at the University of Calgary	Environmental Design or Engineering	$850	Recommended by Program

Award Name	Donor	Field of Study	Value	Nomination Method
SSEF Excellence Award in Steel Design	Steel Structures Education Foundation	Architecture, focusing on use and design, utilizing steel products.	$3,000	Recommended by Program
Stantec / Faculty of Environment Design Scholarship	Stantec & the Faculty of Environmental Design	Environmental Design	$5,000	Recommended by Program
Stephen G. Peitchinis Memorial Graduate Recruitment Scholarship	Endowed by students, friends, family and colleagues of the late Stephen Peitchinis	Economics	$5,000	Recommended by Program
Talisman Energy Graduate Scholarship in Energy & Related Studies	Talisman Energy	Energy-related studies	$10,000 per year	Special Awards and Bursaries
Terry and Sue White Doctoral Scholarship	Endowed by friends and family of Sue and Terry White on the completion of Dr. White's term as President	Unrestricted	$11,000 per year	Open Scholarship
Terry Douglas Memorial Graduate Scholarship	Calgary Directors Education Program Class 3, 2006, members of the Canadian Tire Dealers Association, Canadian Tire, the Institute of Corporate Directors, family, friends and colleagues of Terry Douglas	Management	$5,000	Recommended by Program
The Gerald L. (Jerry) Weber - Cosmopolitan International Club of Calgary Graduate Scholarship	The Cosmopolitan International Club of Calgary	Diabetes mellitus	$21,000	Recommended by Program
Thomas Dick Graduate Scholarship in Humanities	Endowed by the family of Thomas S. Dick	Humanities with a focus on cultural diversity, and a goal of increasing tolerance in religious and racial relations	$1,500	Special Awards and Bursaries
Tom Baldwin Memorial Graduate Scholarship in Planning	Community Planning Association of Alberta	Planning	$1,000	Recommended by Program
Trevithick Book Prize	Award endowed through a gift from the Gordon Roy Trevithick Family; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Interdisciplinary Graduate Program (IGP) [Formerly known as the Resources and the Environment Program (RESR) or the Committee on Resources and the Environment (CRE)]	$250	Recommended by Program
Tsinghua University Doctoral Scholarship	Office of the Vice-President - Research & International, University of Calgary	Control, Automation, Nano/MEMS; Design & Manufacturing; Applied Mechanics; or Thermal-Fluids, Energy Systems and Environment	$4,000 per year	Recommended by Program
University of Calgary Alumni Association Graduate Scholarship	Endowed by Alumni of the Faculty of Graduate Studies at the University of Calgary	Unrestricted	$4,500	Open Scholarship
University of Calgary Board of Governors Graduate Scholarship	Endowed with contributions from friends and associates of the Board of Governors as a tribute to the University of Calgary's 40th anniversary	Unrestricted	$5,000	Open Scholarship
University of Calgary Faculty Women's Club Graduate Scholarship	University of Calgary Faculty Women's Club	Unrestricted	$1000	Special Awards and Bursaries
University of Calgary Nursing Alumni Scholarship	Endowed by the University of Calgary Nursing Alumni (First Graduating Class, 1974)	Any area or discipline at the Master's level related to Nursing	$1,500	Recommended by Program
University of Calgary Ruby Doctoral Scholarship	Faculty of Graduate Studies	Unrestricted	$16,000	Open Scholarship

Award Name	Donor	Field of Study	Value	Nomination Method
University of Calgary Silver Anniversary Graduate Fellowships	Endowed by an anonymous Donor and matched by the Province of Alberta	Unrestricted	Up to $20,000 but in no case less than $16,000	Open Scholarship
University Technologies International Inc. Fellowship - UTI	University Technologies International Inc.	Medicine, Engineering, and Science	$15,000 per fellowship, annually	Recommended by Program
Ursula & Herbert Zandmer Graduate Scholarship	Endowed through a bequest from the Estate of Ursula & Herbert Zandmer	Applied Energy & Science-Based Research	$10,000	Recommended by Program
Ursula and Herbert Zandmer Graduate Recruitment Scholarship	Endowed through a bequest from the Estate of Ursula & Herbert Zandmer	Applied Energy & Science-Based Research	$10,000	Recommended by Program
Vedanta Society Graduate Scholarship	Endowed by the Vedanta Society of Calgary, The Ragamala Performing Arts of Canada, and the Hindu Society of Calgary, along with a matching grant from the Province of Alberta	Eastern Religions	$1,400	Recommended by Program
Ves Thomas Memorial Scholarship	Endowed by Mrs. Ainslie Thomas, family and friends of Veslof Thomas	Curriculum and Instruction (Language Education)	$2,000	Recommended by Program
W. Frank Johns - Calgary Real Estate Board Award	Endowed by the Calgary Real Estate Board Cooperative Limited, in honour of W. Frank Johns, F.R.I.; matching grant provided from the Province of Alberta's Advanced Education Endowment Fund	Business Administration	$1,200	Recommended by Program
W.R. Unruh Scholarship	W. R. Unruh	Applied Psychology	$10,000	Recommended by Program
Walter Dilger Graduate Scholarship in Structural Engineering	Endowed by Dr. Walter Dilger	Structural Engineering	$2,500	Recommended by Program
Warren Veale Doctoral Entrance Scholarship	Colleagues of Warren Veale, and the University of Calgary	Unrestricted	$1000	Open Scholarship
Waugh Scholarship in Architecture	Endowed by James P.M. Waugh, Calgary	Architecture	$7,000	Recommended by Program
Werner Graupe International Fellowship in Engineering	Antje Graupe Pryor Foundation	Geomatics Engineering, Petroleum Engineering, Electrical, Computer and Software Engineering, and Mechanical and Manufacturing Engineering	$25,000	Recommended by Program
West Canadian Scholarship in Architecture	West Canadian, Calgary	Architecture	$500	Recommended by Program
Wigham Family Scholarship	Endowed by Darol and Ev Wigham	Greek and Roman Studies, or Archaeology with a proven interest in Mediterranean Studies	$2,500	Recommended by Program
William H. Davies Medical Research Scholarships	Award endowed through a bequest of the late William H. Davies	Medical Sciences	$3,000 to $11,000 depending upon the candidate's qualifications, experience, and graduate program	Recommended by Program
William T. Perks Scholarship in Sustainable Community Design	Professor W.T. Perks and the Faculty of Environmental Design	Environmental Design	$800	Recommended by Program
Zandmer Graduate International Educational Experience Award	Endowed through a bequest from the Estate of Ursula & Herbert Zandmer	Chemical and Petroleum Engineering	up to $5,000	Recommended by Program

Student Services

Student and Enrolment Services

"will enhance the student experience by providing high quality service and support for all aspects of student life at the University of Calgary, particularly for the educational priorities detailed in our Academic Plan, "*Raising our Sights*"."

Associate Vice-Provost (Student Services): Jim Dunsdon, BEd, MBA
Telephone: (403) 220-3922
Fax: (403) 210-3889

Acting Associate Vice-Provost (Enrolment) and Registrar: David Johnston, BA, MA
Telephone: (403) 220-7993
Fax: (403) 220-0762
Location: MacKimmie Library Block 117

Prospective Students Recruitment and Admissions

Director: Elaine Wong

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

Services for prospective students include:

- Application and admissions advising
- Presentations at Canadian high schools
- Attendance at education or career fairs
- Hosting application and admission workshops.

Other services provided are:

- Centralized undergraduate application and admission services for both domestic and international applicants to programs offered by twelve faculties.
- Evaluation of domestic and foreign credentials for purposes of admission and transfer credit.
- Coordination and facilitation of requests for transfer credit agreements from other Alberta post-secondary institutions.

Telephone: (403) 210-ROCK (7625)
Fax: (403) 220-0762
Location: MacKimmie Library Block 117
Website: www.ucalgary.ca/futurestudents

International Recruitment and Admissions

Telephone: (403) 210-7625
E-mail:
Prospective International Undergraduate Students:
international.students@ucalgary.ca
Website: www.ucalgary.ca/intlundergrad/

Prospective Graduate students:
graduate@ucalgary.ca
Location: Earth Sciences 720
Website: www.grad.ucalgary.ca

Career Services

Director: Voula Cocolakis

Career Services facilitates on-campus recruitment activity and career development programs for students and alumni both on-line at www.ucalgary.ca/careerservices and in person at MacEwan Student Centre 188:

- Extensive online job postings for permanent, summer, part-time and co-op and internship positions
- Six annual career fairs, employer information sessions, on-campus interviews, industry panels and, networking events
- Resume and cover letter review available by appointment, at drop-in sessions or on-line
- On-line workshops and resources providing general and faculty specific career and job search information and assistance
- Dedicated faculty specific advisors to provide students with tools for employment success
- Web calendar and online registration for up-coming Career Services events
- Administration and information concerning Co-operative education and Internship programs
- Coordination with Students' Union, Student Enrolment Services, Faculty and Student Clubs to provide and/or participate at career related events

*Services are partially funded by Student and Enrolment Services and the Students' Union

Telephone: (403) 220-8020
Fax: (403) 284-1755
E-mail: recruit@ucalgary.ca for employment services; coop@ucalgary.ca for Co-operative Education and Internship services
Location: MacEwan Student Centre 188
Web site: www.ucalgary.ca/careerservices

Centre for International Students and Study Abroad (CISSA)*

Director: Glynn Hunter, BA, MA

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 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 and International Week
- Volunteer opportunities on campus, in Canada and abroad
- Publication of handbooks for international students and study abroad students
- Provide orientations and workshops for students studying in Canada or preparing to go abroad

Telephone: (403) 220-5581
Fax: (403) 289-4409
E-mail: cissa@ucalgary.ca
Location: MacEwan Student Centre 275
Web Site: www.ucalgary.ca/cissa/

*CISSA reports to the Vice Provost International

Centre for Community Service-Learning and Student Engagement

The Centre for Community Service-Learning and Student Engagement offers programs and services to support the institutionalization of service-learning and civic engagement and to link the university to the greater community. Our programs seek to enhance the student experience in and out of the classroom. The Centre's services include:

- Co-curricular service-learning programs including Calgary Serves Canada, an 'alternative' Reading Week project
- International service-learning programs
- Support to faculty developing service-learning courses
- Events to foster enhanced civic consciousness
- A place of contact for community organizations
- Peer Helper positions and a Peer Helper work space

Telephone: (403) 210-6509
Fax: (403) 210-.3889
Location: 4th Floor, MacEwan Student Centre
Website: http://www.ucalgary.ca/servicelearning

Counselling Centre

Associate Director Wellness Centre (Counselling): Michael McKernan, MSW, Registered Social Worker (Alberta)

The Counselling Centre is part of the newly launched Wellness Centre seeing the integration of Health Services, Counselling Centre and the Chaplaincy. 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.

The Counselling Centre offers the following services:

- Time-limited individual and couples counselling provided by well-qualified counsellors or counsellors-in-training;
- A variety of workshops including managing time, stress and sleep; managing test anxiety; overcoming procrastination; making educational and career decisions;
- Career Clinic, drop-in times 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; and
- Website information including FAQs, tip sheets and useful links to personal, academic and career information.

Telephone: (403) 220-5893
Fax: (403) 284-0069
Location: MacEwan Student Centre 375
Website: http://www.ucalgary.ca/counselling/

Disability Resource Centre

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
- Assessment of students encountering learning difficulties
- Accommodated exam support

Telephone: (403) 220-8237
Fax: (403) 210-1063
E-mail: jusmith@ucalgary.ca
TTY: (403) 220-2823
Location: MacEwan Student Centre 293
Website: www.ucalgary.ca/drc

The Multi-faith Chaplain's Centre

The Multi-Faith Chaplains' Centre invites you to to enjoy the gift of one another, the richness of ideas, the celebration of faith, and to join in serving the world together. There are ten chaplains who provide spiritual counselling for those who are searching for meaning (many faith traditions represented). Space is provided within our offices and also at the other end of MacEwan Student Centre in a Prayer Room and Chapel for prayer and meditation. All are welcome to drop in and visit.

Telephone: (403) 220-5451
Email: chaplain@ucalgary.ca
Location: MacEwan Student Centre 373
Website: www.ucalgary.ca/chaplain

The Native Centre

Director: Shawna Cunningham, BA, MA

The Native Centre was established in 1972 by the University of Calgary to provide culturally sensitive support services and programs to Aboriginal students. It also provides an important venue for the establishment of cultural links between aboriginal and non-aboriginal students, the University of Calgary, and the aboriginal community at large. Below is a list of the programs and services:

Student Advisory Services

- Pre-admissions advising and program information
- Advice and Assistance with Applications to the University of Calgary
- Registration information and assistance with online services
- Program Advising for Open Studies
- Information and Referrals to Campus-wide services
- Advise and assistance with Post-secondary funding for Aboriginal Students
- Peer tutoring
- Personal counselling
- Cultural and Spiritual Advising
- Cultural Enrichment Lecture Series in partnership with International Indigenous Studies

Special Programs

- NAPI Ambassador Aboriginal Youth Outreach Program
- LYNX Aboriginal Student Career and Employment Program
- Program Assistant for Student Services program (PASS)
- Program for Social Events
- Student Volunteer Opportunities

Special Annual Events

- Pipe Ceremonies (each semester)
- Women's Tea Ceremonies (monthly)
- Tipi Raising Workshop
- Annual Graduation Banquet and Pow-wow
- Native Awareness Days, hosted by the First Nations Student Association

Facilties

- The Red Lodge, Student Lounge
- First Nations Student Association Offices
- Computer Lab
- Study Space

In honour of the diversity of our campus community, The Native Centre is an open welcome space for all students, faculty, and staff. For more information, please contact us at:

Telephone: (403) 220-6034
Fax: (403) 220-6019
Location MacEwan Student Centre 390z
Website: www.ucalgary.ca/nativcr

Office of the Student Experience

Through exceptional campus-wide programming, service and research, the Office of the Student Experience supports the success and leadership development of students through the different stages of their university experiences. The OSE offers:

- Orientation and registration assistance (Summer Orientation, New Student Drop-in Centre and Fall Orientation Week)
- Online resources (discussion forums, Transition Guide, leadership resources)
- U of C Leadership Program (UCL); Personal, Team, and Community Leadership tiers;
- An Emerging Leaders Program for first-year students
- The U of C Co-Curricular Record. Your Complete Student Experience. Documented.
- Ongoing workshops and communications (Student Success Seminars);
- Services for graduate students (Graduate Student Orientation, Graduate UCL sessions);
- Parent and family services (orientation, parent and family email)
- Volunteer and leadership opportunities (Peer Helper Program, Orientation Leaders);
- Research and program assessments.

Telephone: (403) 220-2277
Fax: (403) 220-0190
Email: theose@ucalgary.ca
Location: MacEwan Student Centre 460
Website: www.ucalgary.ca/ose
Hours: Monday to Friday, 8:30 am - 4:30 pm

Residence Services

Director Residence Services: Joel Lynn
Living in residence offers a blend of academic and personal growth that makes a university education truly great! Residence students' close proximity to class, to faculty, to peers and to study groups facilitates an interactive, accessible and supportive university learning lifestyle. The University of Calgary has many kinds of accommodation available on campus for its diverse population of students including traditional style residences for first year students, apartment style residences for upper year undergraduate and graduate students and townhouses for students with families. Applications are available online at www.ucalgary.ca/residence.

Single Student Housing

The single student residence complex, located on the southwest corner of the University Campus, consists of eight buildings and offers a variety of accommodation styles.

Rundle and Kananaskis Halls are traditional style residences accommodating approximately 650 students in double and single rooms (there is a limited number of single rooms available). Housing consists of single-gender and co-ed wings or floors to best meet the needs of individual students. Each floor has a Community Advisor available to respond to students' needs and concerns. Laundry facilities, recreational lounges and academic lounges are all available for student use. Meal plans are required for students living in these buildings. More information on meal plans can be found at www.ucalgary.ca/foodservices/resdiningprogram.html

Cascade Hall, Norquay Hall, Brewster Hall and Olympus Hall accommodate approximately 600 students in furnished, self-contained studio, one bedroom (single occupancy), two bedroom and four bedroom apartments. These apartments are designated for new and returning undergraduate students. Each building has its own academic lounge and recreational lounge, and also has Community Advisors available to support each student's residential experience.

Glacier Hall and Castle Hall are designated as graduate student apartment style buildings with the same services as our undergraduate buildings.

Students who have specific accessibility, mobility or medical needs are asked to indicate these needs on their application. Residence Services will work with students to meet their specific needs where possible.

Students must apply online for residence accommodation at www.ucalgary.ca/residence. First-Year Undergraduate Students are guaranteed a space in Residence if their application is received prior to April 30 of each year. All other new students are encouraged to apply as soon as possible, as demand for space is high, and assignments are completed on a first-come, first-served basis. Returning students are assigned based on a lottery system, with applications due by February 29th. Applications are available each year in January.

Telephone: (403) 220-3210
Email: rezserv@ucalgary.ca
Location: Dining Centre 018
Website: www.ucalgary.ca/residence

Student Family Housing

Student Family Housing consists of 250 townhouses, arranged in a garden court setting that is ideal for students with families. In addition to the facilities offered, Residence Life Staff facilitate programs to meet all family members' needs, including community barbecues, homework help, summer camps and ESL conversation groups.

Space is limited in Student Family Housing, and the waitlist is processed based on date of application. To apply online or to learn more about student family housing, please visit our website.

Telephone: (403) 220-7227
Location: 3735 - 32 Avenue N.W., Calgary, Alberta T3B 2X1
Web Site: www.ucalgary.ca/residence/

Student Awards and Financial Aid

Director: Claudia Barrett

Awards

Administers Scholarships and Bursaries:

- Awards for entering undergraduate students: University of Calgary Automatic Admission Scholarships , Dean's Merit Admission Awards, High School Awards, Outstanding Achievement Awards, Seymour Schulich Scholarships and Awards, IB Diploma Scholarships
- Transfer Awards
- Awards for continuing undergraduate students: Undergraduate Awards
- Faculty of Law Awards
- Faculty of Medicine Awards
- Alberta Scholarship Programs: Louise McKinney Scholarships, Jimmie Condon Athletic Scholarships, Jason Lang Scholarships, Laurence Decore Awards, Lois Hole Humanities and Social Sciences Scholarship
- Canada Millennium Scholarship Foundation: Millennium Excellence Awards including National In-Course Awards, World Petroleum Congress Awards
- External awards administration
- Liaison with donors; establish new awards

Student Loans

- Liaison between students encountering difficulties with their financial assistance and the appropriate government funding agencies
- Emergency loans and bursaries administration

For further information on financial aid, refer to the Awards and Financial Assistance section of this Calendar.

Telephone: (403) 210-7625
Fax: (403) 282-2999
Questions:
www.ucalgary.ca/currentstudents/asktherock/
Location: MacKimmie Library Block 124
Website: www.ucalgary.ca/awards/

University Health Services

Wellness Centre Director: Debbie Bruckner

Unversity Health Services offers the following services to the university community:

- Confidential health services from family physicians with extensive experience in collegiate health care- including walk-in services and family medicine
- Physician referrals to specialists as indicated
- Health promotion and education
- Immunization programs and flu vaccines
- Psychiatric services
- Chiropractic services
- Massage therapy
- Nutritionist services

We are working with the Chaplains and Counselling Centre to provide integrated wellness support for students!

Telephone: 220-5765
Fax: 282-5218
Location: MacEwan Student Centre 370
Website:
http://www.ucalgary.ca/UofC/departments/UHS

U of C Service Stop

Director: Alyson Woloshyn, BA

The U of C Service Stop assists students in carrying out their administrative requirements at the University of Calgary. The Service Stop provides front-line services for the Fees Office, Student Awards and Financial Aid, Admissions, and Registrations. Enrolment Service Advisors are available to support students with any questions in these areas. Advisors can be accessed as follows:

- On the Phone – 1-403-210-ROCK (7625):*General student inquiries
- Fee/admission/registration inquiries
- Student award and financial aid inquiries

*Limited information and service can be provided on the phone due to the Freedom of Information and Protection of Privacy Act legislation

In-person

- On demand transcripts
- Proof of Enrolment letters (or forms signed) for undergraduate students (not necessary for in person as long as it is not for government loans)
- Fee payments
- Student loan inquiries
- Undergraduate registration Issues
- Undergraduate adding/dropping/withdrawing from courses
- Undergraduate award/scholarship inquiries

The following online services are available 24 hours a day, 7 days a week:

- Request transcripts in advance
- Pay fees using MasterCard, Visa or online banking
- Add/drop/swap courses
- Update personal information
- Print T2202A tax receipt (available online only)
- Print Proof of Enrolment letters (not for government student loans)

Telephone: 1-403-210-ROCK(7625)
Fax: 1-403-289-1253
Location: MacKimmie Library Block 117
Website: http://www.ucalgary.ca/registrar
Hours of Operation: Monday to Friday – 09:30-16:30, and Thursday – 10:00 – 16:30*
*Service Stop may stop generating tickets prior to 4:30 depending on service demands

The Service Stop 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

Bookstore

The Bookstore is proud to be owned and operated by the University. A portion of every dollar spent at the Bookstore is re-invested towards the improvement and maintenance of the campus community.

The main Bookstore is located centrally on campus, on the ground floor of the MacEwan Student Centre. We offer required and recommended textbooks for courses at the publisher's list price and make every effort to obtain the least expensive options for students. We also provide a used textbook buyback service, a free online classified service, and a buyback alert service. In our digital world, books can be located from a variety of sources, however your campus Bookstore offers the advantage of having exactly the books you need, in stock for the beginning of classes, all with a hassle-free returns policy.
We are more than just textbooks! The main Bookstore carries one of Calgary's largest selections of general reading books, and we can special order any book still in print. We are also pleased to offer University of Calgary clothing and souvenirs, Dinos merchandise, and a wide selection of stationery and art supplies. We also operate Seasons Card and Gift shop (one stop gift shopping!) and are proud to brew Starbucks coffee in our café.

The Bookstore has a secure online store that features the required and recommended textbook list each semester, online ordering for textbooks, clothing, gifts, and select general reading titles. Order your textbooks online, with the option of in store pick-up or delivery and avoid the back-to-school rush! Check out our site at www.calgarybookstore.ca.

The Bookstore operates 5 other satellite locations. The Medical Bookstore located in the Health Sciences building serves the Faculty of Medicine and the general Medical community by offering textbooks, general medical reference, stethoscopes and other instruments, and electronic media. Stuffs Food and Convenience Store is located in the Dining Centre to serve the residency community. The Art Store is located in the Art Building, with easy access for all Art students. The Microstore is located across from the main Bookstore, and offers the campus community academic pricing on computer hardware and software. The Loft, located on the 4th floor of MacEwan Student Centre, is a comfortable gathering point with wireless internet and includes a Café that brews Starbuck's coffee.

Hours*:
Main Bookstore: 09:00 to 18:00 Monday to Friday, 10:00 to 17:00 on Saturdays
Seasons Card and Gift Shop: 08:00 to 18:00 Monday to Friday, 10:00 to 17:00 on Saturdays
Medical Bookstore: 09:00 to 17:00 Monday to Friday
Microstore: 09:00 to 17:00 Monday to Friday
Art Store: 09:00 to 14:00 Monday to Thursday, September to April

Stuffs Convenience Store: 08:00 to 21:00 Monday to Friday, 12:00 to 21:00 Saturday, 12:00 to 18:00 Sunday
The Loft: 09:00 to 20:00 Monday to Friday

*Special extended hours apply during back-to- school periods, during the summer months (May through August), and the above hours may be subject to change, so please call or check our website for the most current information.

Telephone: (403) 220-5937
Toll free: 1-877-220-5937
E-mail: bkstore@ucalgary.ca
Website: www.calgarybookstore.ca

Campus Recreation

Campus Recreation at The University of Calgary provides a diverse range of programs and services to satisfy the physical and recreational needs of both the University and the community at large. All students become All Access members of Campus Recreation through a fee assessed with their tuition. Students may also purchase family memberships at special student rates. Memberships are available to alumni, staff, and faculty at a discounted rate. Memberships are also available to the general public.

The following is an overview of what Campus Recreation offers. Complete information may be obtained from the Kinesiology Client Services Office (Kinesiology A 104) and from the GoActive, Active Kids, Camps for Kids, Intramural and Outdoor Centre Program Guides in display racks located around campus.

Telephone: (403) 220-7749
Website: www.ucalgaryrecreation.ca

Open Recreation Hours

A listing of all facilities and a schedule of activities are available from the Kinesiology Client Services Office or by calling (403) 220-6942 (24 hours) or at the above web site.

Facilities

The Fitness Centre
This 10,500 square foot weight training facility features Olympic and free weights, multi-station and individual strength training machines, treadmills, rowing ergometers, electronic stair climbers, bikes, a Super Circuit and a 6 lane 200 meter indoor track. Certified staff are available for fitness appraisals, fitness and nutrition counselling, and customized programs.

FITNESS AND LIFESTYLE CENTRE

The Racquet Centre

As Calgary's largest racquet facility, it features 12 international squash and 4 international racquetball courts; 6 to 10 badminton courts; and 4 outdoor tennis courts. Computerized and on-line web booking services allow students and members to book 3 courts up to 21 days in advance. There are no court fees. The Racquet Centre provides instructional lessons for all levels of players.

The Aquatic Centre

This centre features an Olympic size pool and diving facility. Aquatic instruction and certification is available for both adults, and children and youth. Programs include Red Cross and Royal Life Saving Society.

The Outdoor Centre

The Outdoor Centre offers the broadest possible range of outdoor recreational opportunities.

Equipment Rental: Features over 10,000 items of quality outdoor equipment. Members and non-members may rent this equipment. Equipment is available for both summer and winter activities.

Programs: Courses are available to get you started in a variety of outdoor pursuits. There are also hundreds of trips, ranging from day hikes or skiing in Kananaskis Country to week-long sea kayak tours along the B.C. Coast. There are hundreds of adventure outings to choose from.

Indoor Climbing: The climbing wall is specifically designed for climbing instruction. There are a variety of routes to satisfy all climbing abilities. Orientation sessions are required and instruction is available. An on-line web booking service allows participants to book climbing times.

Programs

Intramural Sports
The intramural sports program provides the opportunity to participate in team sports through a variety of leagues and tournaments. Participants can register as a team or as an individual. Most sports are offered at both competitive and recreational levels, allowing all skill levels the ability to participate and compete.

Sport Clubs

The Campus Recreation Sport Club program provides opportunities for instruction, competition, and social affiliation in a variety of activities not always offered in traditional intramural or adult sport instruction programs. All levels of skill are welcome.

Adult Instruction

The Health & Recreation Centre offers a wide variety of general interest recreation programs and certifications. Instruction is offered in fitness, first aid and CPR, pre-hospital care, skating, swimming, and court sports.

Active Kids

Throughout the year, the Active Kids program offers gymnastics, swimming, skating, court sports, outdoor activities and Karate programs for all ages from pre-school to teens.

Camps for Kids

The University of Calgary hosts a huge range of summer camp programs for kids. These include:

Mini-University PHD Program: an educational program designed to give participants a practical experience in a fun, creative and discovery-based environment. Participants that will be going into grade 2 through 10 will experience a taste of University life in 3 distinctive themes (Science, Social Science and Fine Arts). All three themes involve structural physical activity that maximizes a child's Pedagogical and Health Development (PHD). Mini-University is run in conjunction with 20 faculties and departments on campus. Instructors are graduate and senior undergraduate students and are assisted by a faculty advisor. This program runs in two-week full-day sessions throughout the summer.

Minds in Motion: a series of 1 week comps in the fields of engineering and science.

Computer Camps and Gifted Education SUCCESS Camps.

Dinosaur Development Camps for Junior and Senior High School students.

Outdoor Camps that range from multi-activity camps for younger children to single activity camps for teens and an Outdoor Leaders in Training Program.

English for Academic Purposes

Interim Director: Dr. Anuradha Sengupta

The English for Academic Purposes Program enables students who qualify for a degree program to meet the University's English language proficiency requirement.

The program has also developed specialized seminars for non-native English speaking graduate students, post doctoral scholars and researchers, as well as visiting professors. EAP Graduate seminars help individuals with academic/scholarly writing and several core aspects of academic oral communication and dissertation, thesis and proposal writing. These seminars have been approved by the Faculty of Graduate Studies.

For more information please contact the EAP Office or see our website.

Location: Education Block, Room 170
Telephone: (403) 220-3485
Fax: (403) 210-8554
Email: eapg@ucalgary.ca
Web site: http://www.education.ucalgary.ca/eap/

Food Services

Senior Director: Jan Morel

The University of Calgary's Food Services operated by Chartwells Education Dining Services is dedicated to exceeding the expectations of our customers through product and service excellence. Food Services is responsible to provide the majority of retail, dining plan and catering services to the campus community.

Food Services operates 14 retail food operations in 11 different buildings on campus. The Alberta Room in the Dining Centre offers the greatest choice of any operation and is available to the entire campus community. Each operation is distinct in menu offerings, operating hours, service style and atmosphere. The Dining Plan Program offers convenience and flexibility to Students at any of our operations through use of The Campus Card. Our Impressions Catering, servicing the campus is available to provide any type of catering service required. Catering consultants can be reached at 220-5541.

Telephone: (403) 220-5541
E-mail: food.services@ucalgary.ca
Location: Dining Centre 110
Website: 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 successfully 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.

Healthy UofC coordinates health promotion events throughout the year, Information can be found at www.ucalgary.ca/HealthyUofC.

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 will be 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. See the Smoking Reduction Policy at the following website for details – https://pr1web.ucalgary.ca/UofCPandPA_R1/Forms/MainHome.aspx.

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 www.ucalgary.ca/scentfree 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 honored 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 coordinating 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 Ancillary Services.

ID Card Office (Campus Card)

The Campus Card gives members of the University community (faculty, staff, and registered students) access to a wide variety of information services and technologies. Card holders who are not part of the academic community may also be entitled to some of these privileges. The Campus Card is an identification card and can also serve as a library card, campus recreation membership card, electronic door access card and debit card (for food, photocopying and laser printer copies).

The Campus Card is issued by the ID Card Office/Campus Security, located in MacEwan Student Centre, Room 260. The office is open Monday to Friday 08:30-16:30 with extended hours (until 18:00) at the beginning of the fall and winter terms. Please check this web site for extended hours of operation: www.ucalgary.ca/security.
To report a lost or stolen card please phone (403) 220-7290.

All financial/debit functions of the Campus Card are handled by the Campus Card Office, located in the Dining Centre, Room 01, telephone: (403) 220-4922.

For more information on these services please check this website: www.ucalgary.ca/campuscard/.

Information Technologies

Student Centre * E-mail * Web Publishing * Internet * High Performance Computing * Computer Labs * Multimedia * Wireless * Course Management (Blackboard - Elluminate)

University of Calgary Information Technologies (UCIT) http://www.ucalgary.ca/it/ is responsible for providing computing and networking support to U of C students in their learning and research needs via pc computers, Unix and high performance computing facilities.

As a student, you may use UCIT-supported PC and Unix workstation laboratories across campus. Particularly important is the Information Commons http://library.ucalgary.ca/services/informationcommons/ on the second floor of the MacKimmie Library Block, where you will find over 250 PCs, printing/scanning facilities, extensive technical and reference assistance, collaborative work rooms, basic instruction in use of the library catalogue, article indexes, and Microsoft Word, PowerPoint, and Excel, etc. The Information Commons also has access to AirUC (U of C's wireless network) and provides wireless printing. In addition to the IC, the Elbow Room (Room 142 Science Theatres), a "drop-in" microcomputer lab with UCIT staff available to offer technical assistance. It too is a wireless environment with printing available to the student. As well, there are several teaching labs which offer drop in access when not scheduled for credit instruction. For more information, please see http://www.ucalgary.ca/itlabs.

Every student is entitled to a UCIT computing account on the central computing system. More information on getting an account and the benefits of an UCIT account can be found at: http://www.ucalgary.ca/it/getitaccount. You can use this account for Internet access, Web-storage (Webdisk), access to software via the web (Webware), E mail, Web page publishing, course information (Blackboard), wireless access and many other applications. To register online for a UCIT account, go to http://www.ucalgary.ca/it/register.

Students also have access to many web-based applications through the U of C portal, a designated, single sign-on, personalized "desktop". Applications such as, the Student Center and Blackboard are found in the portal. To access these applications, log in to the MyUofC portal with your eID. To register for an eID online, go to https://my.calgary.ca.

UCIT supports many academic applications including Blackboard, Elluminate, Breeze, database management, graphics, printing and e mail, Web tools, statistical analysis, simulation, a comprehensive range of programming languages and scientific applications, and text processing. Documentation, consulting, and non credit courses on software and hardware are also available.

UCITs Com/Media unit provides audio-visual, portable computing and other communications media support for teaching and learning activities. A wide range of educational media technology is available by contacting any of the Com/Media cross campus booking and service centres. Equipment is then scheduled, delivered, set-up and made ready for the class. If you have special media requirements then Com/Media can meet these needs with consulting services for complex integrated video, audio, and control systems, and non credit training in the use of media technology. See http://www.ucalgary.ca/commedia for more information.

Hardware repairs and service for your own computer can be done through UCIT's authorized service centre located in the basement of Math Sciences (057/058) http://www.ucalgary.ca/it/repairs.

For information on purchasing hardware & software (Microsoft Office 2007), through the University's partnership with Dell or Apple, consult the Student Laptop & Software Purchase Program. To purchase Dell desktops, go to http://www.ucalgary.ca/buyadell/

UCIT also co ordinates site-license agreements and volume discounts for specialized software. For more information, go to http://www.ucalgary.ca/it/software. UCIT distributes site licensed anti-virus software for detecting, removing and preventing computer viruses. Go to http://www.ucalgary.ca/it/virus for more information or a free download.

To provide you with on line access, UCIT operates the campus network with connections to the Internet and the World Wide Web. Additional networking services include: AirUC (the U of C wireless network) available throughout the campus. For more information about wireless service please go to http://www.ucalgary.ca/it/wireless; and RezNet – U of C's high-speed network for students living on campus. Browse the Web, check your e-mail, work online from almost anywhere in your campus home. For more information, please see http://www.ucalgary.ca/reznet/.

Dialup service provides you with dialup access to University services and the Internet. See http://www.ucalgary.ca/it/dialup. You can also get high-speed access to our services via Shaw Internet (http://www.shaw.ca) or Telus Velocity ADSL (http://www.telus.com/).

Get help from:
IT Support Centre: (403) 220-5555
E-mail: itsupport@ucalgary.ca
Location: 7th Floor, Math Sciences Building

For more information on all Information Technology Services go to: www.ucalgary.ca/it/services

Parking and Traffic Services

The University has approximately 8,800 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 session. In addition to the on campus facilities, parking capacity for some 700 cars is available just south of the campus at McMahon Stadium.

Further information and applications for parking assignments can be obtained from Parking Services. Lot locations and costs 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
E-mail: parking@ucalgary.ca
Location: Olympic Volunteer Centre (OVC), North end of McMahon Stadium
Hours of operation: 07:30 – 17:00 Monday to Friday
Website: www.ucalgary.ca/parking

Student Legal Assistance (SLA)

Director: Maureen Mallett

Run by law students, Student Legal Assistance (SLA) is a registered charity that delivers a range of free legal assistance and representation to undergraduate students at the University of Calgary, as well as those in the Calgary area who are unable to afford a lawyer.

Graduate students may be eligible for services of the SLA if they meet the SLA financial guidelines. A one-time nominal dispersement charge applies. (Undergraduate students are exempt from this charge.)

SLA operates a legal clinic on the University campus four evenings per week during the school year, and on a full-time basis throughout the summer months.

SLA can assist in most matters at the Provincial Court of Alberta, as well as some Administrative Tribunals. Most common areas SLA assists with include:

- Student Appeals (Academic and Non-Academic)
- Landlord Tenant Issues
- Employer Disputes
- Traffic Violations
- Bylaw Infractions
- Criminal Law
- Contract Issues
- Family Matters

For appointments call: (403) 220-6637
Fax: (403) 282-0473
Location: Murray Fraser Hall 3390

University Child Care Centre (UCCC)

Our mandate is to provide and promote childcare services for the children of students, faculty and staff that make up the University of Calgary Community.

At the UCCC we believe that play is imperative during the early years of life. 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.

The Centre is open from 07:30am to 5:30pm Monday thru Friday. We are closed on all statutory holidays, two professional days per year as well as the week between Christmas and New Years.

Admission to UCCC

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, in which case sibling placement takes priority. At our new 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 Wait List does NOT guarantee you a spot at the centre. On average, most children are on the waitlist 1 to 3 years.

For more information please call us at (403) 220-3303 or email us at waitlist@ucalgary.ca.

University Library

... connecting people and information

The University Library provides a vast range of information resources, services and research expertise to support the diverse information needs of students and faculty in all disciplines.

Ranked among the largest research libraries in Canada, our collection includes in excess of seven million books, journals and microforms, plus: maps, airphotos, audio recordings, music scores, film, video, CDs, DVDs, purchased digital images, slides, architectural and literary archives, electronic full-text, image and data files. The digital resource base is expanding rapidly and includes over 600 databases,, more than 48,000 unique electronic journal titles, and close to 600,000 electronic books.

MacKimmie Library (the 'main library') is located at the centre of campus. Four branch libraries are situated near the faculties or departments that use their services most frequently: Gallagher Library of Geology and Geophysics, Health Sciences Library, Bennett Jones Law Library, and the Business Library.

The Information Commons is the focal point on campus for information services. It is an integrated learning environment in which information resources and technologies are combined with expert staff who provide research consultation, information navigation, and technological assistance to support scholarly use and production of recorded knowledge. For student convenience, there is 24-hour access (Sunday-Thursday, during term, on Fridays and Saturdays the hours are the same as the rest of the Library) to this state-of-the-art facility, 2nd floor MacKimmie Library.

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) 220-5962
E-mail: libinfo@ucalgary.ca
Web: library.ucalgary.ca/

The Writing Centre

The Writing Centre offers free half-hour individual writing tutorials for students at all levels who want to improve their writing. In a Writing Centre tutorial, students can:

- Discuss their writing process and learn strategies to write more effectively
- Review returned papers to understand how to improve their written assignments
- Get information on writing papers, book reviews, or other assignments
- Get advice on how to use and document sources
- Work with an instructor on an ongoing basis to improve essay structure, paragraph development, sentence structure and style, grammar, and punctuation
- Get help with English as a Second Language
- Prepare for the Effective Writing Test by getting feedback on practice essays

Note that Writing Centre instructors will give general advice on papers being prepared for credit courses; however, they will not proofread student papers.

To book a half-hour Writing Centre appointment, please visit http://efwr.ucalgary.ca.
For Writing Centre help via e-mail, write to wconline@ucalgary.ca, describing your writing assignment, questions, and concerns in detail.

Telephone: (403) 220-7255
E-mail: cmsopcza@ucalgary.ca
Location: Social Sciences 106
Effective Writing Office: SS 110
Website: http://efwr.ucalgary.ca

About the University
Highlights in the History of the University of Calgary

The University of Calgary is a comprehensive research university that, in its short 43-year history, has grown to take its place among the finest institutions in Canada. Combining the best of long-established university traditions with the City of Calgary's vibrant energy and diversity, the university aims to provide a research and scholarly foundation for students eager to acquire the knowledge and skills essential for a successful personal and professional life.

Our 213-hectare campus provides a beautiful and dynamic setting for scholars in 16 faculties. Our 2,600 faculty members are actively engaged in research and scholarship. With more than 2,900 support staff, the university is Calgary's fifth largest employer. More than 27,600 students, including over 2,000 international students from 100 countries, are enrolled in undergraduate, graduate and professional degree programs. The U of C has more than 130,000 alumni living in 130 countries.

Research and Education

As one of Canada's top seven research universities, 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. Thanks to the sustained efforts of U of C faculty, students, postdoctoral researchers, and staff, the U of C's research funding totals $252.2 million. 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 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. The university also offers students a variety of experiential, or hands on learning opportunities, including internships, international travel, coop placements and directed research.

The U of C is the first university in Canada to offer a four-year graduation guarantee to students embarking upon four-year degree programs in the faculties of Communication and Culture, Social Sciences, Science and Humanities. 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 will now be 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 project is a first for universities in Western Canada.

Our efforts have raised our global profile, enhanced the quality of our undergraduate and graduate programs, promoted innovation and excellence in scholarly activity and provided 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 arts gallery, four performance theatres, a childcare centre and residences for single students and students with families.

The U of C is pursuing the biggest single capital expansion in its history. The university has embarked updon a plan to add capacity for more students and hose of new teaching and research activities. These major developments, including the Taylor Family Digital Library, a downtown campus, International House and the new Energy, Environment and Experiential Learning building, are fulfilling distinct academic strategies and creating progressive learning environments.

The Faculty of Medicine is located on the south campus adjacent to the Foothills Hospital. Satellite institutes of the university include, the Kananaskis Field Stations, 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, featuring Canada's only covered speedskating oval and home to the fastest ice in the world. The Oval also 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 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

International Studies - Make Your Degree More International

The University of Calgary is committed to preparing its students for life in an increasingly global economy and society. An International Component will be part of every undergraduate student's degree program at the University when the current curriculum changes are finished, and are already a requirement of many programs. An International Component will provide students with an understanding of international relationships and issues with a particular view to the benefits and challenges of interaction of peoples, cultures and environments around the globe. It provides opportunities to develop an awareness of international, multicultural or aboriginal perspectives.

All students are encouraged to enrich the international component in their program in one or more of the following ways:

By participating in a term-abroad, field school, credit travel study, or student exchange experience in another country. Students should contact their faculty or the Centre for International Students and Study Abroad (CISSA). Visit the CISSA website for more information (www.ucalgary.ca/UofC/students/CISSA)

By including in their program a Major or Minor that focuses on international, aboriginal, or multicultural issues:

African Studies

Anthropology

Chinese

Development Studies

East Asian Studies

East Asian Language Studies

French

Geography

German

International Indigenous Studies

International Relations

Italian

Japanese

Latin American Studies

Russian

South Asian Studies

Spanish

By taking courses where the language of instruction is a language other than English. (Call (403) 220-4000 for a list of such courses offered in French.) By including several of the following courses in a degree program. Please note that some of the following courses have prerequisites or other registration restrictions. The courses can be taken as part of a major field or minor or among the degree options:

African Studies 301, 400, 501

Anthropology 203, 213, 303, 317, 319, 321, 323, 331, 335, 337, 341, 355, 363, 379, 405, 419, 421, 427, 435, 465, 473, 481, 535, 541

Applied Psychology 323

Archaeology 205, 303, 305, 307, 325, 341, 343, 345, 347, 351, 353, 355, 357, 395, 399, 401, 409, 419, 421, 423, 427, 431, 433, 511, 553

Architectural Studies 457

Art History 323, 325, 357, 359, 365, 367, 369

Astronomy 301

Biology 307, 451

Botany 309

Canadian Studies 309, 311, 313, 315, 333, 351, 353, 361

Central and East European Studies 313

Chinese 205, 207, 229, 301, 303, 311, 313, 317, 331, 333, 355, 421, 431, 461

Comparative Literature 201, 203, 303, 399, 405, 517

Dance 574

Development Studies 201, 375, 485, 501, 591

East Asia 300, 500

East Asian Studies 317, 319, 321

Economics 321, 327, 337, 423, 425, 491, 527, 537

English 385, 392, 450, 462, 492, 507, 511, 513

Film 301

Finance 461

French 209, 211, 213, 215, 217, 235, 237, 315, 317, 323, 333, 339, 343, 349, 359, 369, 399, 415, 439, 449, 459, 479, 499, 515, 539, 549, 557, 599

General Studies 300, 359, 401

Geography 211, 213, 251, 321, 365, 367, 371, 377, 391, 397.01, 397.02, 397.03, 425, 429, 451, 463, 590, 592

Geophysics 375

German 200, 202, 204, 221, 223, 313, 315, 317, 331, 333, 349, 353, 357, 359, 369, 397, 401, 403, 451, 469, 497, 551, 561, 591

Greek 201, 203, 301, 303, 401, 413, 525, 551

Greek and Roman Studies 205, 209, 305, 315, 321, 325, 327, 355, 357, 431, 455, 457, 551

Hindi 205

History 201, 205, 207, 209, 303, 307, 309, 311, 315, 317, 331, 333, 345, 361, 365, 367, 385, 387, 389, 391, 401, 403, 405, 407, 411, 412, 413, 415, 421, 427, 445, 447, 457, 461, 463, 465, 467, 469, 471, 473, 487, 491, 499, 503, 513, 515, 517, 529, 543, 553, 565, 569, 583

International Relations 501, 597

Italian 201, 203, 301, 309, 401, 405, 407, 409, 499, 501

Japanese 205, 207, 301, 303, 317, 331, 333, 341, 461

Kinesiology 455, 487

Latin 201, 203, 205, 207, 301, 303, 333, 401, 413, 433, 453, 525, 551

Latin American Studies 201, 203, 301, 303, 401, 501

Linguistics 531

Management Studies 571

Marketing 467

Native Languages 205, 207

Northern Planning and Development Studies 401, 405

Political Science 283, 359, 361, 363, 365, 369, 371, 375, 377, 381, 383, 385, 387, 391, 435, 437, 461, 463, 465, 467, 469, 471, 473, 475, 479, 485, 489, 507, 561, 567, 569, 577, 579, 581, 583

Religious Studies 201, 203, 207, 209, 211, 213, 215, 217, 219, 221, 305, 313, 319, 323, 325, 327, 329, 339, 341, 347, 353, 381, 401, 403, 441, 443

Romance Studies 299, 399

Russian 201, 203, 209, 301, 303, 317, 331, 333, 355, 361, 363, 397, 401, 403, 451, 461, 463, 497, 541, 551, 561

Slavic 355

Sociology 307, 375, 467, 487

South Asian Studies 315, 415

Spanish 201, 203, 301, 303, 321, 323, 405, 407, 421, 423, 441, 471, 473, 475, 499, 505, 553, 555, 557, 565, 571, 581, 583, 593, 597, 599

Strategy and Global Management 571, 573, 575

In addition to the credit opportunities listed above, University of Calgary students can participate in a wide variety of non-credit activities that contribute to the international dimension of university experience. Contact the Centre for International Students and Study Abroad (CISSA) for suggestions.

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 my 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.

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.

ID Card Office

The Campus Card gives members of the University community (faculty, staff, and registered students) access to a wide variety of information services and technologies. Card holders who are not part of the academic community may also be entitled to some of these privileges. The Campus Card is an identification card and can also serve as a library card, campus recreation membership card, electronic door access card and debit card (for food, photocopying and printing).

The Campus Card is issued by the ID Card Office, located in Macewan Student Centre, Room 260. The office is open Monday to Friday 08:30-16:30 with extended hours (until 18:00) at the beginning of the fall and winter terms. Please check their web site for extended hours of operation. To report a lost or stolen card, please phone (403) 220-7290.

Telephone: (403) 220-7290
Location: MacEwan Student Centre, Room 260
Website: www.ucalgary.ca/security

Conference and Special Event Services

Conference and Special Event Services provides a wide range of services including conferences, classroom-space booking, and organisation of meetings. This office also operates the Olympic Volunteer Centre which offers a large selection of meeting rooms in an off-campus environment.

The Campus Ticket Centre (2nd Floor, MacEwan Student Centre) provides tickets for events on and off campus, ticket printing services, phone cards (cell and long distance) and complete Ticket Master and Lottery Services. This outlet is also the location for UPass sticker distribution.

The Postal Outlet provides a full range of Canada Post retail services (located in MacEwan Student Centre, 1st floor).
Telephone: (403) 220-7101
E-mail: sausten@ucalgary.ca
Administration Location: Olympic Volunteer Centre
www.ucalgary.ca/specialevents

Environment, Health and Safety

The University of Calgary is a leader of educational institutions in Alberta by meeting and exceeding expectations of any applicable piece of health, safety and environmental legislation, as set by the various government agencies. Environment, Health and Safety is a key resource for all members of the University community for any safety related matters or concerns at the University of Calgary.

Students leaving the University of Calgary will take with them the knowledge and behaviours that integrates and accepts good health and safety practices as a value in their everyday activities.

The Environment, Health and Safety website provides information on legislation; policies and procedures; safety courses and on-line 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: www.ucalgary.ca/safety

Libraries and Cultural Resources

Libraries and Cultural Resources combines the expertise and services of the University's information providers – the University Archives and Special Collections, the University Library, The Nickle Arts Museum, and the University of Calgary Press – to assure provision of full access to the best recorded knowledge and creativity in a variety of formats and media.

The University Archives

The University Archives' mission is to acquire, preserve and provide access to the institutional, administrative, research and cultural heritage of the University of Calgary. In pursuit of this mission, the Archives is responsible for the management of two related programs described below.

The Archival Program ensures the preservation of the academic, cultural and research heritage of the University. Under this program the Archives acquires and maintains all records of permanent value created and received by the various governing bodies of the university and its officials. In addition to the institutional records of the University of Calgary, the Archives selectively acquires private records which pertain to areas of research pursued on campus. Included amongst these are the political development of Western Canada and post-secondary education in Southern Alberta.

Through its Information Management Program (IMP) the Archives provides leadership in record-keeping literacy, and develops record-keeping rules that ensure the creation, management and preservation of reliable records which are trustworthy as evidence. The Information Management Program also provides advice on and develops electronic record-keeping strategies for the University of Calgary community.

The University Archives' Reading Room is located on the 12th floor of the MacKimmie Library Tower. Reference services are available Monday to Friday, from 10:00 AM to 4:30 PM.

Telephone: (403) 220-7271
Website: www.ucalgary.ca/archives

Visual Resources Centre

The Visual Resources Centre provides educational media and image collections and services in support of teaching, learning and research for all University of Calgary programs, including provision of bookable viewing facilities and assistance in identifying and using these resources.

The VRC is comprised of the Media Library, which has a multi-disciplinary collection of over 10,000 DVD/VHS/film titles and the Image Library, with a collection in excess of 250,000 slides and 50,000 digital images addressing subject areas from prehistoric civilization to modern gardens. These educational collections can be used by individuals or in classroom situations.

E-mail: vrc@ucalgary.ca
Location: MacKimmie Library Block 040, Lower Level (downstairs from U of C Service Stop)
Website:
www.library.ucalgary.ca/services/visualresourcescentre

University Press

Established in 1981, University of Calgary Press (UC Press) is a non-profit, scholarly publisher committed to producing high-calibre academic and trade books and journals on a wide range of subjects.

It seeks to:
publish works that give voice to the heartland of the continent;
publish works that are innovative, experimental, and offer alternative perspectives;
publish works that offer diverse views on international themes;
help new writers break into academic and trade markets and nurture their careers; and
link the creation and dissemination of new knowledge.

University of Calgary Press is particularly proud of its role as a regional publisher for Alberta and the West. As one of only a handful of western Canadian university presses, UC Press fills an important role in publishing titles that focus on the history, politics, economy, and culture of the prairies, mountains, and northern regions. Aboriginal topics are a related and inextricable piece of this component of our mandate. UC Press also publishes in such subject areas as: media and cultural studies, political studies and economics, environmental studies, philosophy, women's studies, Latin American studies, and African studies.

UC Press offices are located in the basement of the MacKimmie Library Block. 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
E-mail: ucpress@ucalgary.ca
Website: www.uofcpress.com

The Nickle Arts Museum

The Nickle Arts Museum (The Nickle) is an outstanding centre for object based learning, academic research and aesthetics. Located on the west campus next to MacEwan Hall, the Nickle offers a full program of exhibitions and events addressing compelling social, historical and contemporary cultural topics. Arguably one of the finest and largest exhibition spaces of any Canadian university museum, the Nickle was built from a bequest to the University of Calgary by the late Calgary oilman Samuel C. Nickle. The later donation by his son, Dr. Carl Nickle, created the base of the museum's exceptional numismatic collection.

The museum promotes critical thinking, visual literacy, and experiential learning through provocative exhibitions, tours, lecture series and symposia. The Nickle's programming is centred on contemporary Canadian art, numismatics, carpets and textiles and extends to historic and international art, indigenous heritage, archaeology, anthropology, history, and popular culture.

The Nickle Arts Museum is home to outstanding public collections of art, numismatics and textiles. The permanent collection of art concentrates on Western Canadian art of the twentieth century and extends to artists of national importance. The numismatic collection now comprises approximately 16,000 items, the majority of which are from the ancient Mediterranean region, but also include ethnographic numismatic items from around the

world. The carpet and textile collection is the largest in any Canadian museum, consisting mainly of the tribal or cottage woven carpets of Central and West Asia. These collections and exhibitions support teaching and research from across the University of Calgary, and are available to visiting scholars and classes from all disciplines. The Nickle is central to the minor degree in Museum and Heritage Studies offered through the Faculty of Communication and Culture.

The Museum Shop offers a wide selection of unique giftware, stationery and jewellery, plus an excellent selection of art publications. Located on the main floor of the museum, admission to the shop is free. Admission to The Nickle is free at all times for University of Calgary students, staff and faculty, $2 for children and seniors, $5 for adults, and free to all every Tuesday, and every Thursday evening during the academic year.

Telephone: (403) 220-7234
Fax: (403) 282-4742
E-mail: nickle@ucalgary.ca
Website: www.ucalgary.ca/~nickle

Residence Services

Please see the Student Services section of this Calendar for further information on Residence Services for students.

Conference Housing

Conference Housing is available year round; limited space is available September to April. Conference Housing offers a wide variety of accommodation from traditional dormitory rooms to hotel style accommodation. We welcome conferences, meetings, visiting faculty and guests to the University & City of Calgary.

Visiting Scholars

Visiting Scholar Suites offer assistance to those scholars visiting the campus for a limited time period and seeking accommodation on campus. There are eight fully furnished apartments available year round. For more information please contact the Conference Housing Office in Cascade Hall.

Telephone: (403) 220-3203
Email: conference.housing@ucalgary.ca
Website:
http://www.ucalgary.ca/residence/guestaccommodation

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.

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 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.

Boris Roubakine Recital Hall

The Boris Roubakine Recital Hall is a 200-seat lecture theatre converted to provide performance facilities for small music recitals, film presentation, slide shows and similar events. It is available for both academic and community use.

Website: http://www.ffa.ucalgary.ca/uts

University of Calgary Alumni Association

When university students graduate, they officially join a family of alumni—fellow graduates who share similar experiences and memories of a profound time of their lives. At the University of Calgary, we think of all of our students as part of this growing family; after all, undergraduates are alumni in the making.

And it is a growing family. The U of C's Alumni Association now counts among its members 125,000 graduates who make remarkable contributions to the business, health, social, cultural and political life of Calgary and many other communities around the world.

In fact, in addition to the two-thirds of University of Calgary alumni who stay in Calgary to live and work after their university experience, our alumni are found in more than 125 countries, expanding the U of C's global reach every year.

The Alumni Association's role is to keep our alumni connected to the university, to each other and to their communities; to support them in their pursuits throughout their lives; and to celebrate their achievements, large and small.

Over the years, the Alumni Association has recognized the contributions of 29 of its graduates through the Distinguished Alumni Award and the Graduate of the Last Decade (GOLD) Award, known jointly as the Arch Awards and the highest honour for our 125,000 alumni.

In 2007, we recognized Dr. Ken Storey, BSc'71, one of the world's most frequently-cited biologists whose ambitious research is leading to innovations in areas ranging from organ transplants to reducing diabetes complications, with the Distinguished Alumni Award.

Ravinder Minhas, BSc'05, co-founded several highly-successful businesses by the age of 25. Bestowed the 2007 GOLD award, Minhas is a strong supporter of socially responsible causes—a pioneer in the beer and liquor industry, he introduced warning labels to raise awareness of fetal alcohol syndrome.

Membership in the alumni family has its practical benefits, from preferred rates for home and auto insurance, to career services, to savings on goods and services from university partners. Other exclusive offers include invitations to one-of-a-kind events and free subscriptions to *U*, the U of C's flagship magazine, and to Arch-E, our monthly alumni newsletter.

Perhaps the greatest benefit of the alumni family, though, is being connected to a network of people who share a love of knowledge and a desire to see our graduates succeed.

Telephone: (403) 220-8500
Fax: (403) 220-1312
Email: alumni@ucalgary.ca
Website: alumni.ucalgary.ca

Research Institutes and Centres

University Research Institutes and Centres

Alberta Global Forum

Biogeosciences Institute of Kananaskis

Calgary Centre for Research in Finance

Calgary Centre for Innovative Technology

Calgary Institute for the Humanities

Canadian Centre for the Study of Higher Education

Centre for Advanced Technologies of Life Sciences (includes the Southern Alberta Microarray Facility, Centre for Mouse Genomics and the Sun Centre of Excellence for Visual Genomics)

Centre for Bioengineering Research and Education

Centre for Environmental Engineering Research and Education

Centre for Gifted Education

Centre for Health and Policy Studies

Centre for Information Security and Cryptography

Centre for Mathematics in Life Sciences

Centre for Microsystems Engineering

Centre for Military and Strategic Studies

Centre for Public Interest Accounting

Centre for Radio Astronomy

Centre for Research in the Fine Arts

Centre for Social Work Research and Development

Experimental Imaging Centre

iNFORMATICS Research Centre

Institute for Advanced Policy Research

Institute for Biocomplexity and Informatics

Institute for Gender Research

Institute for Quantum Information Science

Institute for Space Research

Institute for Sustainable Energy, Environment and Economy

Institute for United States Policy Research

Institute of Professional Communication

International Institute for Resource Industries and Sustainable Studies

Julia McFarlane Diabetes Research Centre

Kananaskis Field Stations

Language Research Centre

Latin American Studies Research Centre

Pipeline Engineering Centre

Risk Studies Centre

Partnership Research Institutes and Centres

Alberta Bone & Joint Health Institute (includes the McCaig Centre for Joint Injury and Health Research)

Alberta Civil Liberties Research Centre

Alberta Gaming Research Institute

Alberta Ingenuity Centre for Carbohydrate Science

Alberta Ingenuity Centre for In Situ Energy

Alberta Ingenuity Centre for Water Research

Alberta Sulphur Research Ltd.

Alberta Synchrotron Institute

Arctic Institute of North America

Bamfield Marine Sciences Centre

Banff International Research Station

Canadian Energy Research Institute

Canadian Institute of Resources Law

Canadian Research Institute for Law and the Family

Centre for Leadership and Learning

Hotchkiss Brain Institute

Institute of Health Economics

Institute of Infection, Immunity & Inflammation

Institute of Maternal and Child Health

Libin Cardiovascular Institute of Alberta

Macleod Institute for Environmental Analysis

Miistakis Institute for the Rockies

Pacific Institute for Mathematical Sciences

Pine Creek Research Centre for Sustainable Water Resources

Prairie Action Foundation

Research and Education for Solutions to Violence and Abuse

Southern Alberta Cancer Research Institute

Telecommunications Research Laboratories

The Centre for Innovation Studies

Van Horne Institute, The

Vocational and Rehabilitation Research Institute

World Tourism Education and Research Centre

Networks of Centres of Excellence

Advanced Foods and Materials Network

Allergy, Genes and Environment Network

ArcticNet

AUTO21

Canadian Arthritis Network

Canadian Institute for Photonic Innovations

Canadian Language & Literacy Research Network

Canadian Stroke Network

Canadian Water Network

Geomatics for Informed Decisions Network

Institute for Robotics and Intelligent Systems

Intelligent Sensing for Innovative Structures

Mathematics of Information Technology and Complex Systems

PrioNet Canada

Stem Cell Genomics and Therapeutics Network

Sustainable Forest Management Network

International Education: UC Global
Study Abroad and Student Exchange Programs

International Student Programs
International Projects & Research

"Recruiting excellent students and providing them with a fulfilling educational experience are keys to our broad mission and to our success as a university. In short, the programs and experience we offer must be appropriate to the needs, aspirations, and futures of our students, and must meet society's need for qualified people in many areas. ." *Raising Our Sights*, Academic Plan 2002-2006

"UCGlobal" is committed to raising the profile of the UofC worldwide and making the university an attractive destination for international students, academics and researchers as well as providing options for students to study around the world as part of their University of Calgary degree. Increasingly, 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 1900 international students registered on campus (Fall 2007) from 100 countries. In addition, our alumni, including Canadians, are living in all areas of the world, proving the importance of an international education. Beginning in 2007 the UofC offered major entrance scholarships and awards for 1st year undergraduate students as well as a number of awards for continuing students. It is a part of the UofC support for internationalization and to international students. The University of Calgary has agreements to receive funded/scholarship students from a number of countries including Malaysia, Saudi Arabia, Yemen and Kazakhstan.

In Fall 2006 President Weingarten announced an ambitious plan that by 2010 the University of Calgary would have 30% of its graduating class having a study abroad 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). Enhance your academic program, employment prospects and personal growth by studying abroad for a term or year. International experience is a desirable notation on a graduate's transcript.

The University of Calgary offers a variety of study abroad options in more than 35 countries including: Student Exchange Programs for a term or full year; Semester Abroad Programs in China, India, Czech Republic, Spain and Thailand with U of C courses taught on site; Field Schools to selected sites which offer intensive study opportunities abroad with U of C faculty members during Spring and Summer Sessions and Block Weeks. Students may also use their initiative to design their own program of study.

Studying abroad is a valuable intellectual experience but is also demanding, particularly where a student is exposed to a different culture and another language. While some study programs require knowledge of a language other than English, not all the U of C exchange partners expect a student to be fluent in order to participate. It is possible to combine study abroad with language learning. A number of university departments collaborate to offer 'International Studentships' (grants of $500 - $2000) to support U of C students including an international study experience in their program.

Students unable to study abroad may get involved with international activities on campus: volunteering with international offices or 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 .

The U of C has over 250 international alliances that include collaborative research, joint academic and scientific studies, collaborative degrees and student exchanges, training programs, internships and practicums. These include participation in:

Program for North American Mobility in Higher Education

North American Mobility in Higher Education: North American Scholars Program
"Designing a Professional Practice Curriculum for Cross-Cultural Mobility and Community Engagement" (2003) EVDS

Canada-European Community Program for Co-operation in Higher Education & Training
A Multidisciplinary, Distributed, Cooperative Education Initiative in Software Engineering
Canadian-European Cooperation on Regulatory Issues in National Resources, Environmental and Energy Studies

Biotechnology and Managed Biodiversity in Agriculture and the Environment
"The Displaced Persons Project: A Euro-Canada Social Work Exchange" (2005)

The University of Calgary opened its first branch campus “UofC Qatar” in Fall 2007. Initially it will offer a Bachelors of Nursing and post degree diploma programs to residents of the Gulf region.

U of C offers study abroad opportunities in the following countries (2009/10):

Americas
Antigua
Argentina
Belize
Brazil
Chile
Ecuador
Mexico
Cuba
Peru
United States

Africa/Middle East
Ghana
South Africa
Turkey

Asia/Pacific
Australia
China
Hong Kong (SAR)
India
Japan
New Zealand
Republic of Korea (S. Korea)
Singapore
Taiwan
Thailand
Vietnam

Europe
Austria
Belgium
Czech Republic
Denmark
Finland
France
Germany
Greece
Iceland
Ireland
Italy
The Netherlands
Norway
Spain
Sweden
Switzerland
United Kingdom

The University's International education, international development, international business, student exchange and study abroad programs involve many countries around the world. For further details consult the International Directory available at www.ucalgary.ca/international.

UC Global is headed by Dr. Tim Goddard, Vice Provost International
http://www.ucalgary.ca/provost/international/

Highlights

The Faculty of Medicine has Health Exhange Programs with Faculty, students or research trainees in : Kuala Lumpar, Malaysia; Zamboanga, Philippines; Harbin, China; Sapporo and Takamatsu, Japan; Concepcion, Chile; Bangkok, Thailand; Vientiane, Laos; and South Korea.

Education students at the University of Calgary and the Hokkaido University of Education in Japan engage in exchange visits to learn about the education system in the host country.
Agreements with universities in Australia will permit Student Exchanges in Adelaide, Brisbane,, Melbourne, Perth, Sydney and Newcastle.
A variety of short-and long-term English as a Second Language programs are offered at the University of Calgary

Curriculum redesign requires every undergraduate program at the University of Calgary to include an international component.
The University of Calgary has developed a Master's program in energy and the environment offered in Quito, Ecuador.

Student groups such as AIESEC or Engineers Without Borders are active on campus.

Schulich 1, the U of C Solar Car, has participated in competitions in USA and Australia.

The Student Refugee Committee of the Students' Union sponsors one 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

The University of Calgary's Co-op program offers a limited number of placements in European institutions.

A term abroad in Barcelona, Spain is offered annually to EVDS and Fine Arts students.

Each year, International Week on campus highlights international issues and opportunities.

UC Qatar offers Bachelor of Nursing degree to residents of the Gulf region.

The University of Calgary offers Semester Abroad programs in India, China, the Czech Republic, Spain, and Thailand.

In 2007, more than 1000 University of Calgary students studied abroad as part of their degree programs. Many participate in spring or summer schools abroad.

1900 international students for 100 countries are registered at the University of Calgary.

Main offices involved in international education:
http://www.ucalgary.ca/international

Centre for International Students & Study Abroad (CISSA)

Room 275 MacEwan Student Centre
Tel: 403-220-5581
Fax: 403-289-4409
Email: cissa@ucalgary.ca
Website: www.ucalgary.ca/cissa

Centre for International Partnerships and Relationships and Centre for Innovation & Research in International Development

Room 14 Dining Centre
Tel: 403-220-7700
Fax: 403-289-0171
Email: jmorgan@ucalgary.ca
Website: www.ucalgary.ca/ic

Centre for Language Assessment

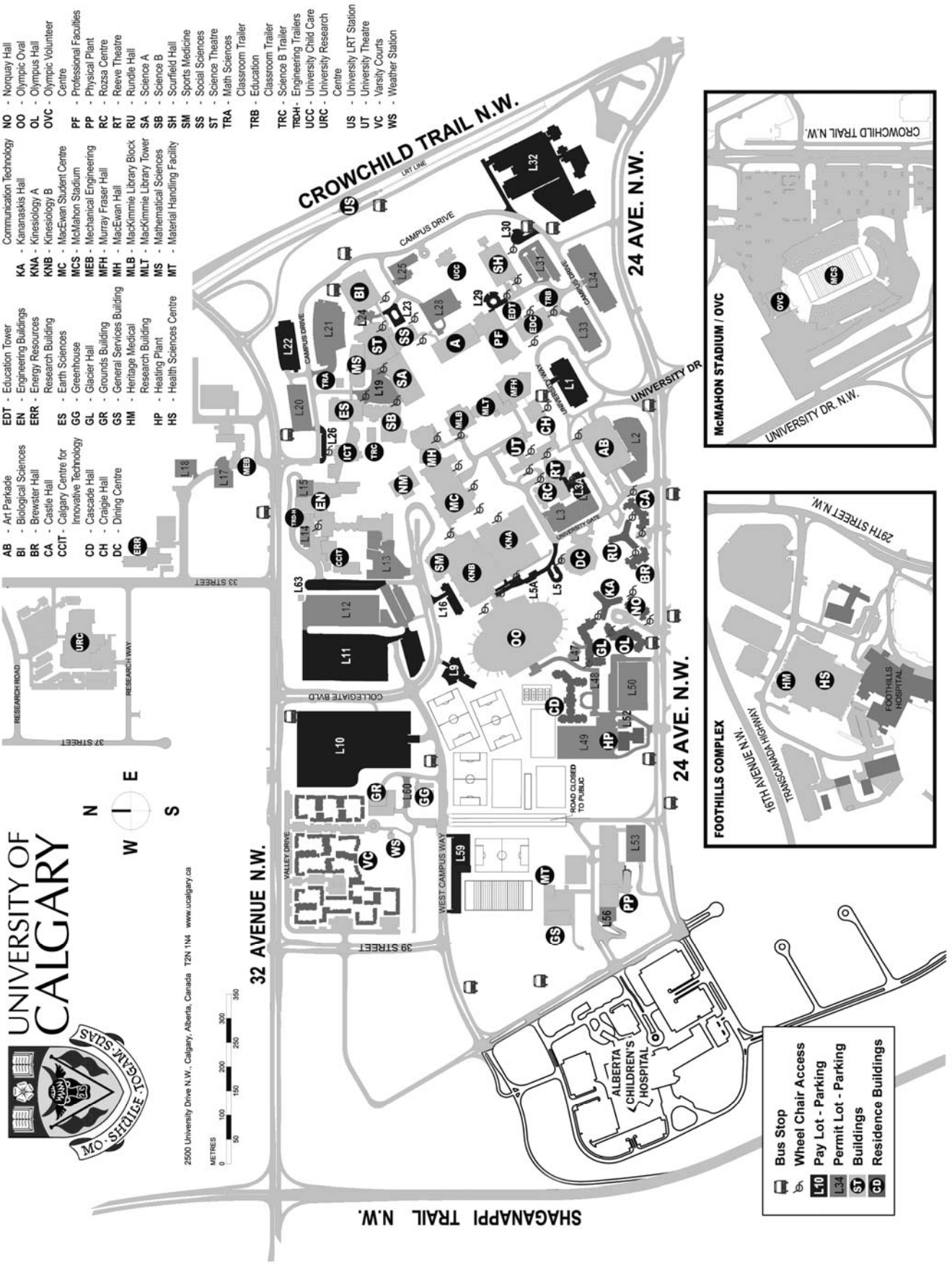
Room 702 Education Tower
Tel: 403-220-5836
Fax: 403- 282-5849
Email: kdodge@ucalgary.ca
Website:
http://education.ucalgary.ca/esli/htdocs/pages/item.php?id=3

International Recruitment and Admissions

Prospective International Undergraduate Students:
international.students@ucalgary.ca
Website: www.ucalgary.ca/intlundergrad/

Prospective Graduate students:
graduate@ucalgary.ca
Location: Earth Sciences 720
Website: www.grad.ucalgary.ca

CAMPUS MAP


A - Administration
AB - Art Parkade
BI - Biological Sciences
BR - Brewster Hall
CA - Castle Hall
CCIT - Calgary Centre for Innovative Technology
CD - Cascade Hall
CH - Craigie Hall
DC - Dining Centre
EDC - Education Classroom Block
EDT - Education Tower
EN - Engineering Buildings
ERR - Energy Resources Research Building
ES - Earth Sciences
GG - Greenhouse
GL - Glacier Hall
GR - Grounds Building
GS - General Services Building
HM - Heritage Medical Research Building
HP - Heating Plant
HS - Health Sciences Centre
ICT - Information & Communication Technology
KA - Kananaskis Hall
KNA - Kinesiology A
KNB - Kinesiology B
MC - MacEwan Student Centre
MCS - McMahon Stadium
MEB - Mechanical Engineering
MFH - Murray Fraser Hall
MH - MacEwan Hall
MLB - MacKimmie Library Block
MLT - MacKimmie Library Tower
MS - Mathematical Sciences
MT - Material Handling Facility
NM - Nickle Arts Museum
NO - Norquay Hall
OO - Olympic Oval
OL - Olympus Hall
OVC - Olympic Volunteer Centre
PF - Professional Faculties
PP - Physical Plant
RC - Rozsa Centre
RT - Reeve Theatre
RU - Rundle Hall
SA - Science A
SB - Science B
SH - Scurfield Hall
SM - Sports Medicine
SS - Social Sciences
ST - Science Theatre
TRA - Math Sciences Classroom Trailer
TRB - Education Classroom Trailer
TRC - Science B Trailer
TRDH - Engineering Trailers
UCC - University Child Care
URC - University Research Centre
US - University LRT Station
UT - University Theatre
VC - Varsity Courts
WS - Weather Station
CROWCHILD TRAIL N.W.
LRT LINE
CAMPUS DRIVE
24 AVE. N.W.
UNIVERSITY DR
32 AVENUE N.W.
SHAGANAPPI TRAIL N.W.
33 STREET
37 STREET
39 STREET
RESEARCH ROAD
RESEARCH WAY
COLLEGIATE BLVD
VALLEY DRIVE
WEST CAMPUS WAY
ROAD CLOSED TO PUBLIC
UNIVERSITY GATE
McMAHON STADIUM / OVC
UNIVERSITY DR. N.W.
FOOTHILLS COMPLEX
16TH AVENUE N.W.
TRANSCANADA HIGHWAY
29TH STREET N.W.
FOOTHILLS HOSPITAL
ALBERTA CHILDREN'S HOSPITAL
Bus Stop
Wheel Chair Access
L10 Pay Lot - Parking
L34 Permit Lot - Parking
Buildings
CD Residence Buildings
UNIVERSITY OF CALGARY
2500 University Drive N.W., Calgary, Alberta, Canada T2N 1N4 www.ucalgary.ca
METRES
N
S
E
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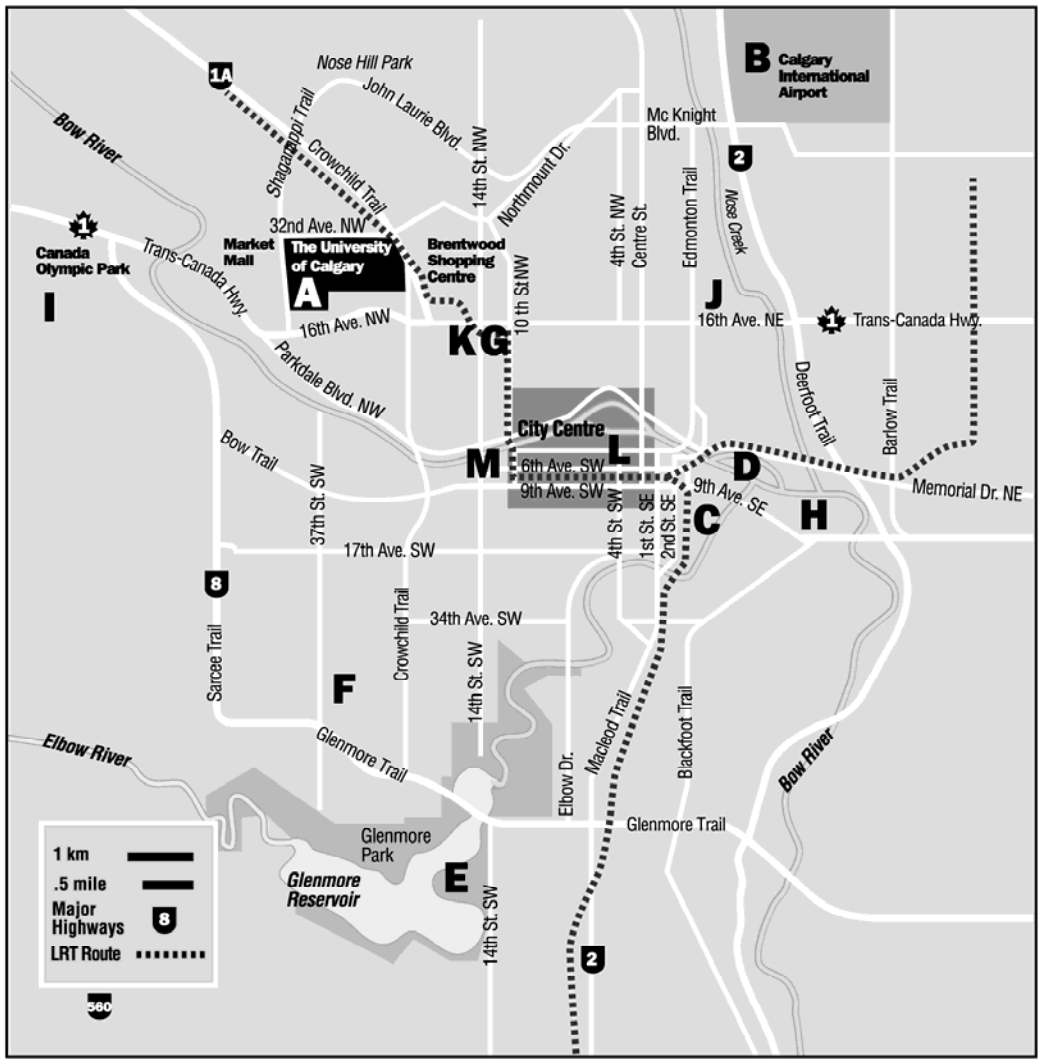
CALGARY MAP



Calgary Points of Interest

A The University of Calgary is located in the northwest quadrant of the city. It's accessible by bus or LRT. The cost of a one-way fare is $2.00 B Calgary International Airport is a 25 minute taxi ride to the University; cost is approximately $20-$25.	D The Calgary Zoo, Botanical Gardnes and Prehistoric Park is a world class zoological institution filling roles in public eduction, wildlife conservation, research, captive breeding of endangered speciies and public recreation.	F Mount Royal College. Calgary's community college offers an innovative blend of educational opportunities including diplomas, certificates, degrees and university transfer programs.	H Fort Calgary Site, the historic origins of the city. It is now a 40-acre riverside park. I Canada Olympic Park. Capture the Olympic spirit and visit the ski jump tower or the Olympic Hall of Fame. Day and evening skiing is available. Check out the bobsled run.	K The Southern Alberta Jubilee Auditorium is a multi-purpose performance space opened in 1957 to commemorate Alberta's 50th anniversary as a province. L The Glenbow Museum houses exhibition space as well as an archive and library. It has permanent displays of Western Canadian history.
C Stampede Park is the site of the Greatest Outdoor Show on Earth, "The Calgary Stampede", which takes place every year in early July. It is also the site of the Pengrowth Saddledome, which is the home of our National Hockey League team, the Calgary Flames.	E Hertiage Park Historical Village is Canada's largest living historical village. Turn of the century town, team trains and vintage vehicles. Ride the stern-wheeler "S.S. Moyie" around the waters fo the Glenmore Reservoir.	G SAIT. The Southern Alberta Institute of Technology is known worldwide for its quality technical education and hands-on training. The Alberta College of Art and Design is also on this site.	J The Golf Dome at Fox Hollow. This year-round golf driving range has two levels.	M Alberta Science Centre. Learn about the wonders of science and visit the Discovery Dome.

ACADEMIC STAFF 2009/2010

A

Abdalla, M.J.; MEd (AKU), BA Ed (UDSM); Adjunct Instructor (Faculty of Education)

Abdel-Keriem, M.A.; FRCPC, MB BS (Alexandria), MRCP (Alexandria); Clinical Assistant Professor (Psychiatry)

Abdullah, A.; FRCPC, LMCC, MABP, MD (Baghdad); Clinical Assistant Professor (Pathology & Laboratory Med)

Abdul-Rahaman, A.S.; CGA, CPA, BSc (UG), MMS (Waikato), PhD (Waikato); Associate Professor (Haskayne School of Business)

Abedi, J.; PEng (APEGGA), BSc (AbadanInst), MASc (UofT), PhD (UofT); Associate Professor (Chemical & Petroleum Eng)

Abelseth, G.A.; FRCPC, BEng (MUN), MD (UofC); Clinical Assistant Professor (Surgery)

Abernethy, R.J.; MD; Clinical Associate Professor (Family Medicine)

Abou Reslan, W.F.; BSc, MD; Clinical Assistant Professor (Paediatrics), Clinical Assistant Professor (Radiology)

Abu-Hakima, M.A.; BSc, FRCPC, MD; Clinical Assistant Professor (Department of Medicine)

Abungu, A.; Diploma (Kenyatta); Adjunct Instructor (Faculty of Education)

Achari, G.; PEng (APEGGA), BSc (IITD), MSc (UofC), PhD (UofC); Professor (Civil Engineering)

Adair, C.E.; BA (UofA), MSc (UofC), PhD (UofC); Adjunct Associate Professor (Community Health Sciences), Adjunct Associate Professor (Psychiatry)

Adamiak, E.J.; MBBS; Clinical Assistant Professor (Department of Medicine)

Adams, B.L.; FRCPC, BSc (UofS), MD (UofS); Associate Professor - Medicine (Psychiatry)

Adams, B.W.; PA, BSc(Agr) (UofA), MSc (UofA); Adjunct Associate Professor (Environmental Design)

Adams, C.L.; MSW (UWO), BSW (UofC), PhD (UofG); Associate Professor (Vet Clinical & Diagnostic Scie), Adjunct Associate Professor (Faculty of Social Work)

Adams, S.P.; FRCPC, MD (UofS); Clinical Assistant Professor (Department of Medicine)

Addicott, J.F.; BA (UC), MSc (UMICH), PhD (UMICH); Adjunct Professor (Biological Sciences)

Addington, D.E.N.; FRCPC, MRCPsych, MB BS (UofLondon); Professor - Medicine (Psychiatry)

Addington, J.M.; MA (Edinburgh), PhD (UofC), BEd (UofS); Professor - Medicine (Psychiatry), Novartis Chair Schizophren Res (Psychiatry)

Addy, H.D.; BSc (UofA), MSc (UofA), PhD (UofG); Senior Instructor (Biological Sciences)

Adegbesan, K.K.O.; PEng, MEng (McMaster), BSc (UNB), PhD (UofC); Adjunct Professor (Chemical & Petroleum Eng)

Adrian, C.H.D.; BSc, FRCPC, MD; Clinical Lecturer (Psychiatry)

Agarwal, J.; MBA (CAU), BComm(Hon) (Calcutta), PhD (GATECH); Associate Professor (Haskayne School of Business)

Aggarwal, S.G.; FRCPC, MD (UofT); Clinical Assistant Professor (Department of Medicine), Clinical Assistant Professor (Cardiac Science)

Aghajafari, F.; CCFP, MD (S.B.U.), MSc (UofT); Assistant Professor - Medicine (Family Medicine)

Agopian, E.E.; MM (Juilliard), BMus (UofT); Professor (Department of Music)

Aguilera, R.; PEng (APEGGA), MEng (Mines), PhD (Mines); Professor (Chemical & Petroleum Eng), Conoco Phillips Indtl Rsch Chr (Chemical & Petroleum Eng)

Ahmad, A.; MBBS; Clinical Assistant Professor (Department of Medicine)

Ahmed, S.B.; MMS (Harvard), BSc (Queen's), MD (UofT); Assistant Professor - Medicine (Department of Medicine)

Ainslie, M.D.; FRCPC, MD (Queen's); Clinical Assistant Professor (Department of Medicine)

Aitken, E.M.; BSc (UBC), MLIS (UWO); Associate Librarian (Libraries & Cultural Resources)

Aitken, S.E.; MD; Clinical Assistant Professor (Paediatrics)

Akierman, A.R.; DABP, FRCPC, LMCC, MB BS (UWI); Associate Professor - Medicine (Paediatrics)

Alakija, P.; CNBME, DABP, FCAP, FRCPC, LMCC, MD (UBC); Assistant Professor - Medicine (Pathology & Laboratory Med)

Alcantara, J.A.; BSc, MSc, PhD; Adjunct Assistant Professor (Microbiology & Infect Disease)

Alderson, K.G.; PhD (UofA), BA (UofC), MSc (UofC); Adjunct Associate Professor (Psychology), Associate Professor (Faculty of Education)

Alexander, S.M.; BComm (UofA), MSc (UofC), PhD (UofC); Associate Professor (Geography)

Ali, Z.; BSc(Hons) (McMaster), MSc (UWO), PhD (UofC); Adjunct Associate Professor (Biochem & Molecular Biology)

Alladin, A.; MSc (Leicester), PhD (Manchester), BSc(Hons) (UofLondon); Adjunct Assistant Professor (Psychology), Adjunct Associate Professor (Psychiatry)

Allen, M.; MSN (CWRV), PhD (CWRV), BN (UNB), MSN (UWO); Adjunct Professor (Faculty of Nursing)

Altabbaa, G.; BA, FRCPC, MD (Dalhousie); Clinical Assistant Professor (Department of Medicine)

Althouse, N.R.; BA (AU), MBA (UofC); Instructor (Haskayne School of Business)

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