



UNIVERSITY
OF MANITOBA

Graduate Calendar

For the Academic Year 2010-2011

**The University of Manitoba
Winnipeg, Manitoba
R3T 2N2**

Website: umanitoba.ca/graduate_studies

Important Notice

The University of Manitoba reserves the right to make changes in the information contained in the *Undergraduate Calendar and Registration Guide* and the *Graduate Calendar* without prior notice. The University of Manitoba web site, umanitoba.ca is a source for updated information.

Not every course listed in the *Undergraduate Calendar and Registration Guide* or the *Graduate Calendar* will be offered in this academic year.

It is the responsibility of all students

- To familiarize themselves each year with the university's academic regulations and policy in general;
- To familiarize themselves with the regulations and policies applying specifically to their faculty, school, or program;
- To familiarize themselves with the specific graduation requirements of the degree, diploma, or certificate they are seeking; and
- To ensure that the courses they have selected are appropriate to their programs.

In the event of an inconsistency between the general academic regulations and policies published in the *Undergraduate Calendar and Registration Guide* and the *Graduate Calendar*, and such regulations and policies established by Senate and the councils of the faculties and schools, the version established by Senate and the councils of the faculties and schools shall prevail.

The regulations and policies contained in this year's editions of the *Undergraduate Calendar and Registration Guide* and the *Graduate Calendar* apply, subject to change, only for the academic year indicated on the cover page of each publication.

The material in the current editions of the *Undergraduate Calendar and Registration Guide* and the *Graduate Calendar* was submitted by the academic and administrative units concerned. The university neither represents nor warrants that all general information and course references used in these publications is accurate although reasonable efforts have been used to check the accuracy of the information.

Students also agree by the act of registration to be bound by the regulations, policies, and bylaws of the University of Manitoba that are in effect at the time of registration, including any amendments which may be enacted during the period of their registration. Students agree by the act of registration to be bound by the regulations, policies, and bylaws of the faculty or program in which they have registered, including any amendments which may be made during the period of their registration. Students also acknowledge that such amendments may have retroactive application.

No liability shall be incurred by the University of Manitoba for any loss or damage suffered or incurred by any student, or any party claiming through or under any student, as a result of delays in, or termination of, services, courses or classes by acts of God, fires, floods, riots, wars, strikes or lock-outs, damage to university property, financial exigency, or any occurrence beyond the reasonable control of the university. Further, the University of Manitoba shall not be liable for any losses or damage suffered by a student who discloses his/her personal identification number (PIN) to anyone other than a university employee in the course of registration.

The Freedom of Information and Protection of Privacy Act and The Personal Health Information Act at the University of Manitoba

The Freedom of Information and Protection of Privacy Act (FIPPA) and *The Personal Health Information Act* (PHIA) both apply to the University of Manitoba. Should any of the University's policies conflict with FIPPA or PHIA, the provisions of FIPPA or PHIA shall prevail unless otherwise expressly provided for at law.

Notice Regarding Collection, Use, and Disclosure of Personal Information by the University

The University collects personal information in the course of admission, registration and related activities. This personal information is collected under the authority of *The University of Manitoba Act*. It may be shared with other educational institutions, government departments, and co-sponsoring organizations and, for those students who are members of UMSU, it will be disclosed to the University of Manitoba Students' Union. Information regarding graduation and awards may be made public. Upon graduation, name and address together with information on degrees, diplomas, and certificates earned will be given to and maintained by the alumni records department in order to assist in the University's advancement and development efforts. All personal information is protected by the protection of privacy provisions of the *Freedom of Information and Protection of Privacy Act*. Questions about the collection of information should be directed to the FIPPA Coordinator's Office, University of Manitoba Archives and Special Collections, 331 Dafoe Library, University of Manitoba, Winnipeg, Manitoba, R3T 2N2 (telephone: 204 474 8339).

Notification of Disclosure of Personal Information to Statistics Canada

Statistics Canada is the national statistical agency. As such, Statistics Canada carries out hundreds of surveys each year on a wide range of matters, including education.

It is essential to be able to follow students across time and institutions to understand, for example, the factors affecting enrolment demand at post-secondary institutions. The increased emphasis on accountability for public investment means that it is also important to understand "outcomes." In order to carry out such studies, Statistics Canada asks all colleges and universities to provide data on students and graduates. Institutions collect and provide to Statistics Canada student identification information (student's name, student ID number, Social Insurance Number), student contact information (address and telephone number, student demographic characteristics, enrolment information, previous education, and labour force activity).

Under the Federal *Privacy Act*, individuals can request access to their own, individual information held on federal information banks, including those held by Statistics Canada.

The Federal *Statistics Act* provides the legal authority for Statistics Canada to obtain access to personal information held by educational institutions. The information may be used only for statistical purposes, and the confidentiality provisions of the *Statistics Act* prevent the information from being released in any way that would identify a student.

Students who do not wish to have their information used are able to ask Statistics Canada to remove their identifying information from the national database.

Further information on the use of this information can be obtained from Statistics Canada's web site: <http://www.statcan.ca> or by writing to the Postsecondary Section, Centre for Education Statistics, 17th Floor, R. H. Coates Building, Tunney's Pasture, Ottawa, Ontario, Canada, K1A 0T6.

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The University of Manitoba

Building on a long tradition of excellence, innovation and global influence, the University of Manitoba is the province's premier university. Since 1877, the University of Manitoba has been shaping leaders, supporting our community and conducting important research which continues to have a profound impact here at home and around the world. As the province's only medical-doctoral university, the University of Manitoba plays a vital role in educating the majority of doctors, nurses, teachers, lawyers, engineers, pharmacists and political and business leaders who serve our province. Each year, more than 27,000 students take advantage of the over 100 programs offered to establish their career path and forge their futures.

The University of Manitoba has a physical presence across the province. The main Fort Garry campus is located on the banks of the Red River in south Winnipeg. Our downtown presence includes the Bannatyne campus which is located adjacent to the Health Sciences Centre in central Winnipeg. Here, students in a variety of health care related programs like Dentistry, Medicine, Pharmacy and Medical Rehabilitation, study, learn and hone their skills in a collaborative way alongside some of the best practitioners in the country. An inner-city Social Work facility offers students the chance to learn while supporting disadvantaged populations at the same time. The University of Manitoba also operates agricultural field stations and education centres in Glenlea, Carman, Delta Marsh, Star Lake and Wallace Lake. Northern and distance education programs, such as the Northern Medical Unit and Northern Social Work programs allow residents of more remote communities to pursue their education closer to home.

The first university to be established in western Canada, the University of Manitoba has thrived and grown from its early days with a staff of only six professors. Today, the Fort Garry campus occupies over 233 hectares where more than 60 major buildings support teaching and research activities. And we're not finished growing. The Fort Garry campus continues to be revitalized through a number of initiatives – a new 10,000 square foot Welcome Centre, a new Pedestrian Mall and a multi-year, multi-million dollar project to retrofit buildings and facilities called Project Domino are all underway. When all of the dominos have fallen into place, 13 faculties or units will be relocated and a stunning new 360-bed residence will have been added to the campus. Included in the project is a complete transformation of the historic Taché Hall (1912), one of the iconic buildings on campus. This current residence will be redeveloped into an exciting study, rehearsal and performance space for the Marcel A. Desautels Faculty of Music.

Since its inception over 130 years ago, the University of Manitoba has been a vital contributor to the success and development of the province. Today, the University of Manitoba contributes \$1.8 billion annually to the provincial economy and supports over 19,000 jobs around Manitoba.

The Mission and Vision of the University of Manitoba

Universities serve society by contributing to: the development of an educated and enlightened population, capable of informed judgment and responsible citizenship; the availability of persons who have the knowledge, skills and adaptability required by public and private enterprise, or by individuals seeking professional service; and the advancement of knowledge, skill and human creativity. It is within this context that the University of Manitoba has articulated the following statement concerning its mission, goals, distinctive role and accountability.

Mission

The mission of the University of Manitoba is to create, preserve and communicate knowledge and, thereby, contribute to the cultural, social and economic well-being of the people of Manitoba, Canada and the world.

Goals

In fulfilling its mission, the University of Manitoba seeks to:

- Provide the highest possible quality of undergraduate and graduate university teaching in the humanities, social sciences, natural and applied sciences, the fine and performing arts and the professions;
- Enhance student success by fostering an environment conducive to intellectual and personal growth;
- Conduct original scholarship and basic and applied research, and produce creative works of highest quality as judged by international standards;
- Serve the community directly by making its expertise available to individuals and institutions, and by providing as much access to the university's intellectual, cultural, artistic and physical resources as its primary teaching and research responsibilities permit;
- Preserve and protect academic freedom and intellectual independence, and provide a forum for critical inquiry and debate; and,
- Promote equity in access and employment and in the conduct of the university's affairs.

Role

The University of Manitoba as the largest and most comprehensive institution of higher learning in Manitoba plays a distinctive role within the province. In addition to offering undergraduate liberal education in arts, science and education, the University of Manitoba provides programs in a broad range of professional studies, applied sciences and fine and performing arts and is responsible for the vast majority of graduate education and research in Manitoba. The University of Manitoba serves all parts of the province, including inner city and suburban areas, rural and northern regions and attracts students from all population groups and from all walks of life.

It manages and delivers a comprehensive array of both degree and non-degree credit courses not only on its campuses but also by correspondence and other distance education modalities both throughout the province and beyond the province, thereby significantly increasing accessibility to university education.

The University of Manitoba is also distinctive among post-secondary institutions in the province by virtue of the multi-disciplinary activity within the university and through its participation in multi-institutional consortia and networks. It seeks to advance its traditional role in teaching and learning, research and community service through the establishment of new linkages with business, industry, arts organizations, social agencies, non-profit organizations and governments designed to contribute directly to the economic life of Manitobans and to provide lifelong learning opportunities for them. Through residential educational programs for seniors, Mini-Universities

for youngsters, the summer ballet school, the music preparatory program, public lectures, concerts, recitals, theatrical productions, art exhibits, library and archival services, athletic and recreational programs and in many other ways, the university seeks to reinforce its role as an important part of the culture and heritage of Manitoba.

The university is an active contributor to national and international development by conducting educational programs and research under contract. It also contributes to international development through the opportunities provided to students and visiting scholars from other countries to study at the University of Manitoba. Recognizing that many of the intellectual and practical challenges facing society require an integrated disciplinary approach, the university has established a variety of centres, institutes and specialized research groups designed to tackle important problems in a number of areas.

Accountability

In recognition of its mission, goals and role, the University of Manitoba is accountable for:

- Facilitating access to its programs for as many students as meet its admission requirements and as can be accommodated and effectively educated within the available resources;
- Providing programs that meet accepted and appropriate standards for admission, evaluation and graduation of students and for curriculum content and teaching effectiveness;
- Facilitating research, scholarship and creative works that are of high quality as judged by international standards;
- Providing an exemplary environment for work and study with particular attention to policies and procedures designed to foster equity; and,
- Exhibiting responsible management of physical and human resources.

Vision

The following vision statement was articulated in Building on Strengths, the report of the Task Force on strategic planning in 1998:

We believe that the University of Manitoba will be a leader among Canadian universities as it becomes known for meeting challenges while it advances knowledge and understanding. We will not only be the oldest of western Canada's universities we will also be among the best of Canada's universities. We will be respected for our knowledge of the world and for our understanding of the complexities of our Prairie region in its cultural, socioeconomic and scientific dimensions, which we will articulate according to international standards of science and scholarship. We will be recognized for our centrality in the development of Manitoba's knowledge-based society in a knowledge-based global economy.

We will attain our vision by:

- Providing outstanding education in undergraduate and selected professional and graduate areas;
- Producing research, scholarship and creative work that is recognized internationally, nationally, and locally;
- Providing an equitable environment focused on learning; and
- Enhancing a strong tradition of community and professional service.

University Officers

SECTION 1: Members of the Board of Governors

CHAIR

Terry Sargeant, B.A., LL.B.

VICE-CHAIR

Janice Lederman, B.A., LL.B.

CHANCELLOR

Harvey Sexter, B.Comm, LL.B., LL.M., LL.D.

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Patricia Bovey, B.A., FRSA

Evan Bowness

Amelia Curran, B.A.

Judi Daly, B.A., B.S.W.

Mona Forsen, B.Comm. (Hons.), M.B.A

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Richard Mahé, B.A.

Heather Milan, B.Sc.

Michael Robertson, B.A., M.A., MAA, MRAIC

Terry Sargeant, B.A. LL.B.

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ELECTED BY SENATE

Joanne Embree, M.D., FRCPC

Doug Ruth, B.Sc., M.Sc., Ph.D.

Richard Sigurdson, B.A., M.A., Ph.D.

ELECTED BY GRADUATES

Romel Dhalla, B.A., B.Comm. (Hons.)

Gwen Hatch, B.A., LL.B.

Rennie Zegalski, B.Comm. (Hons.)

ELECTED BY THE UNIVERSITY OF MANITOBA STUDENTS' UNION

Andy Bonar, B.A.

Mitch Tripple

Sid Rashid, B.Sc.

UNIVERSITY SECRETARY

Jeffrey M. Leclerc, B.Ed., M.Ed.

SECTION 2: Senior Administrative Officers

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Vice-President (Academic) and Provost

Joanne C. Keselman, B.A., M.A., Ph.D.

Vice-President (Administration)

Deborah J. McCallum, B.Sc.

Vice-President (Research)

Digvir Jayas, B.Sc., M.Sc., Ph.D.

Acting Vice-President (External)

John G. Alho, B.A. (Hons.)

University Secretary

Jeffrey M. Leclerc, B.Ed. M.Ed.

Vice-Provosts

Karen R. Grant, B.A., M.A., Ph.D.

Richard A. Lobdell, B.A., M.A., Ph.D.

David R. Morphy, B.A., M.A., Ph.D.

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Gary Glavin, B.A., M.Sc. Ph.D.

Janice Ristock, B.A., M.A., Ph.D.

Alan Simms, B.Comm. (Hons.), LL.B.

Director of Libraries

Karen Adams, B.A (Hons.), M.L.S.

Executive Director, Information Services and Technology

Gerry Miller, B.Sc.

Executive Director, Human Resources

Terry D. Voss, B.Comm. (Hons.), C.H.R.P.

SECTION 3: Affiliated, Member and Constituent Colleges

St. Andrew's College

Acting Principal: Very Rev. Fr. Roman Bozyk, B.A., M.Div., M.A.

Collège Universitaire de Saint-Boniface

Rectrice: Raymonde Gagné, B.A., Cert. Ed., M.B.A.

St. John's College

Warden: Janet A. Hoskins, B.E.S., M.Sc., Ph.D.

St. Paul's College

Rector: Denis Bracken, B.A., M.A., Ph.D.

Approved Teaching Centres

William and Catherine Booth College

Prairie Theatre Exchange

SECTION 4: Distinguished Professors

Anna, T.E., B.A., M.A., Ph.D. (Duke); **Berkes**, F., B.Sc., Ph.D. (McGill); **Butler**, M., B.Sc.(Hons.)(Birm.), M.Sc.(Wat.), Ph.D. (King's College, London); **Chaturvedi**, M.C., B.Sc. (Met.) (Banara), M.Met., Ph.D. (Sheffield), P.Eng.; **Chochinov**, H. M., O.M., M.D., Ph.D.(Man.), F.R.C.P.C., F.R.S.C., F.C.A.H.S.; **Degner**, L.F., B.N., M.A., Ph.D. (Michigan); **Friesen**, G., B.A. (Saskatchewan), M.A., Ph.D. (Toronto); **Gole**, A.M., B.Tech. (IIT Bombay), M.Sc., Ph.D.; **Hawthorne**, F.C., O.C., B.Sc. (Spec.) (Imperial College), A.R.S.M. (Royal School of Mines, London), Ph.D. (McMaster), F.R.S.C., F.G.A.C., F.M.S.A.; **Jayas**, D.S., B.Sc. (G.B.Pant), M.Sc. (Manitoba), Ph.D. (Saskatchewan), P.Ag., P.Eng.; **McCance**, D.C., Cert. Ed., M.A., Ph.D. (Manitoba); **Oleszkiewicz**, J.A., M.Sc.(Wroclaw), M.Sc.(Vanderbilt), Ph.D., F.C.S.C.E.; **Page**, J.H., B.Sc.(Hons.)(Dal.), D.Phil.(Oxf.); **Perry**, R.P., B.A. (UBC), M.Sc., Ph.D. (Calgary); **Plummer**, F., B.Sc. (Hons.), M.D. (Manitoba), F.R.C.P.C.; **Roos**, L., A.B. (Stanford), Ph.D. (MIT); **Shafai**, L., B.Sc. (Tehran), M.Sc., Ph.D. (Toronto), F.R.S.C.; **Smil**, V., M.S. (Prague), Ph.D. (Pennsylvania State), F.R.S.C.; **Toles**, G., B.A., M.A., Ph.D. (Vir-

ginia); **Wolfart**, H.C., [B.A. equiv.] (Albert-Ludwigs-Universität, Freiburg im Breisgau), M.A. (Yale), M.A. (Cornell), M.Phil., Ph.D. (Yale), F.R.S.C.

Distinguished Professors Emeriti

Antonisen, N.R., A.B. (Dartmouth), M.D. (Harvard), Ph.D. (McGill); **Cohen**, H., B.Sc.(Hons.) (Manitoba), Sc.M. (Brown), Ph.D. (Minnesota); **Eales**, J.G., B.A.(Hons.) (Oxford), M.Sc., Ph.D. (UBC), F.R.S.C.; **Friesen**, H.G., O.C., B.Sc. (Med.), M.D. (Manitoba), D.Sc. (Western Ontario), F.R.C.P.(C), F.R.S.C.; **Gibson**, D., B.A., LL.B. (Manitoba), LL.M. (Harvard); **Klostermaier**, K.K., D.Phil. (Gregorian), Ph.D. (Bombay); **Kroetsch**, R.P., B.A. (Alberta), M.A. (Middlebury), P.S. (Iowa), F.R.S.C.; **Kwong**, J., B.A. (Hong Kong), M.Ed. (Alberta), Ph.D. (Toronto); **Martin**, G., B.A. (Colorado), M.A., Ph.D. (Arizona); **Morrish**, A.H., F.R.S.C., B.Sc.(Hons.) (Manitoba), M.A. (Toronto), Ph.D. (Chicago); **Ronald**, A.R., M.D., B.Sc., (Med.) (Manitoba); **Sehon**, A., B.Sc., M.Sc., Ph.D., D.Sc. (Manchester), F.R.S.C.; **van Oers**, W.T.H., Ph.D. (Amsterdam); **Younes**, M., Ch.B., D.P.H. (Egypt), F.R.C.P., Ph.D.

SECTION 5: Chancellors and Presidents Emeriti

Chancellors Emeriti

Auld, I.G., B.A.(Hons.); M.A.; LL.D.

Mauro, A.V., O.C., Q.C., B.A., LL.B., LL.M., LL.D. (Manitoba), D.Comm. (Lakehead)

Presidents Emeriti

Naimark, A., B.Sc. (Med.), M.D. (Manitoba), M.Sc., (M.), LL.D., F.R.C.P.C., F.R.S.C.

Szathmáry, E.J.E. C.M., B.A. (Hons.), Ph.D., LL.D. (Toronto), D.Sc. (Western Ontario), D.Litt.S. (St. Michael's College), F.R.S.C.

2010-2011 Academic Schedule

Note: Admission Application Deadlines may be found on the web at umanitoba.ca/student/admissions

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Section 1: Orientation Sessions for Fall/Winter Session

IDDP Year 1	May-June 2010
University 1	Sept. 7-8, 2010
Agriculture Diploma	Sept. 17, 2010
School of Art Orientation	Sept. 7-8, 2010
Asper School of Mgmt, Year 1 student welcome luncheon	Sept. 7, 2010
Asper School of Mgmt, Year 1 CSA orientation and Barbeque	Sept. 8, 2010
Education, Year 1	TBA
Education, Year 2 and Year 5 Integrated	TBA
Kinesiology and Recreation Management	July 6 or 8, 2010
Medicine Inaugural Exercises	Aug. 25, 2010
Music	Sept. 7, 2010
Nursing, Year 2 (2180)	
Tuesday/Wednesday clinical orientation	Sept. 1, 2010
Nursing, Year 2 (2190)	
Tuesday/Wednesday clinical orientation	Sept. 1, 2010
Nursing, Year 2 (2180)	
Thursday/Friday clinical orientation	Sept. 2, 2010
Nursing, Year 2 (2190)	
Thursday/Friday clinical orientation	Sept. 2, 2010
Nursing, Year 2 (2180 continues)	
Tuesday/Wednesday clinical orientation continues	Sept. 8, 2010
Nursing, Year 2 (2180 continues)	
Thursday/Friday clinical orientation continues	Sept. 9, 2010
Nursing, Year 2 (2190 continues)	
Both rotations clinical orientation continues	Sept. 9, 2010
Nursing, Year 2 (2180 and/or 2190)	
Tuesday/Wednesday clinical begins	Sept. 14, 2010
Nursing, Year 2 (2180 and/or 2190)	
Thursday/Friday clinical begins	Sept. 9, 2010
Nursing, Year 3 clinical orientation	
Tuesday/Wednesday clinical rotation begins	Sept. 28, 2010
Nursing, Year 3 clinical orientation	
Thursday/Friday clinical rotation begins	Sept. 30, 2010
Nursing, Year 4 clinical orientation	Sept. 9, 2010

Nursing Lectures in NURS 2120 (Health Assessment) and Nursing labs in NURS 2120 (Health Assessment) and NURS 2130 (Skills Year2), NURS 3280 (Skills Year 3) start week of Sept. 13, 2010

NOTE: Immunizations/CPR due for all newly admitted Aug. 1, 2010
Nursing students

Occupational Therapy, Year 1 Linking Days	Aug. 26 - 27, 2010
Pharmacy, Year 1 orientation session	Sept. 8, 2010
Social Work, Year 1	Sept. 8, 2010
Social Work, Year 2 and 3 Field Orientation	Sept. 7 and 8, 2010

Section 2: Start and End Dates for Fall/Winter Session

(Classes, practica, experiences)

The following start and end dates are for students in **most** faculties and schools.

See Section 5 for mid term break and other university closures.

Students registering for **Distance and Online Education** courses should consult the Distance and Online Education Calendar available from Distance Education.

Education courses may have unique start and end dates. Students are referred to the Aurora Student Class Schedule.

Fall Term 2010 (including full courses)	Start	End
Most faculties and schools	Sept. 9, 2010	Dec. 8, 2010
Agriculture diploma	Sept. 20, 2010	Dec. 3, 2010
Dentistry, Years 1 and 2	Aug. 16, 2010	Dec. 3, 2010
Dentistry, Year 3	Aug. 9, 2010	Dec. 3, 2010
Clinics	Aug. 30, 2010	Dec. 17, 2010
Dentistry, Year 4	Aug. 9, 2010	Dec. 10, 2010
Clinics	Aug. 23, 2010	Dec. 17, 2010
Dental Hygiene, Year 1	Aug. 23, 2010	Dec. 3, 2010
Clinics	Sept. 17, 2010	Dec. 3, 2010
Dental Hygiene, Year 2	Aug. 16, 2010	Dec. 3, 2010
Clinics	Aug. 30, 2010	Dec. 10, 2010
Law	Sept. 7, 2010	Dec. 6, 2010
Medicine, Years 1	Aug. 24, 2010	Dec. 21, 2010
Medicine, Years 2	Aug. 30, 2010	Dec. 21, 2010
Medicine, Years 3 and 4	Aug. 30, 2010	Dec. 21, 2010
Medicine, B.Sc.	May 24, 2010	Aug. 20, 2010
Occupational Therapy Year 1	Aug. 30, 2010	Nov. 19, 2010
Basic Fieldwork	Nov. 22, 2010	Dec. 17, 2010
Occupational Therapy Year 2	Aug. 30, 2010	Dec. 17, 2010
Pharmacy, Year 4 (classes)	Sept. 7, 2010	Nov. 1, 2010
(Experiential Rotations - Block 1)	Nov. 8, 2010	Dec. 17, 2010
(Electives - Block 1)	Nov. 4, 2010	Dec. 22, 2010
Physical Therapy Year 3	Aug. 30, 2010	Dec. 10, 2010
Respiratory Therapy Years 1, 2, 3	Aug. 23, 2010	Dec. 17, 2010
Respiratory Therapy,		
Year 1 Basic Fieldwork	Sept. 17, 2010	Dec. 17, 2010
Year 2 Basic Fieldwork	Sept. 17, 2010	Dec. 17, 2010
Social Work, Field Instruction Years 2 & 3	Sept. 7, 2010	Dec. 10, 2010

Winter Term 2011 (including full courses)

	Start	End
Most faculties and schools	Jan. 5, 2011	April 8, 2011
Agriculture Diploma	Jan. 5, 2011	Mar. 29, 2011
Dental Hygiene, Years 1 and 2 classes	Jan. 4, 2011	April 8, 2011
Year 1 clinic	Jan. 4, 2011	April 8, 2011
Year 2 clinic	Jan. 4, 2011	April 21, 2011
Dentistry, Years 1 and 2	Jan. 4, 2011	April 21, 2011
Dentistry, Year 3 classes	Jan. 4, 2011	April 8, 2011
Year 3 clinics	Jan. 4, 2011	April 21, 2011
Dentistry, Year 4 classes	Jan. 4, 2011	Feb. 11, 2011
Year 4 clinics	Jan. 6, 2011	April 21, 2011
Law	Jan. 4, 2011	April 11, 2011

Medicine, Years 1 and 2	Jan. 4, 2011	May 27, 2011
Medicine, Year 3	Jan. 5, 2011	Aug. 26, 2011
Medicine, Year 4 Clerkship	Jan. 3, 2011	May 6, 2011
Occupational Therapy Year 1	Jan. 4, 2011	April 29, 2011
Occupational Therapy Year 2		
Intermediate Fieldwork 2	Jan. 3, 2011	Feb. 25, 2011
Occupational Therapy Year 2	Mar. 7, 2011	June 24, 2011
Pharmacy, Year 2, experiential rotations	May 2, 2011	May 13, 2011
Pharmacy, Year 3 Community Practice	April 4, 2011	April 29, 2011
Pharmacy, Year 4,		
(Experiential Rotations - Block 2)	Jan. 4, 2011	Feb. 11, 2011
(Electives - Block 2)	Jan. 3, 2011	Feb. 18, 2011
(Experiential Rotations - Block 3)	Feb. 21, 2011	April 1, 2011
(Electives - Block 3)	Feb. 21, 2011	April 8, 2011
Physical Therapy	Jan. 4, 2011	variable; depends on clinical placements
Resp. Therapy Year 1 Basic Fieldwork	Jan. 7, 2011	Mar. 25, 2011
Resp. Therapy Year 2 Basic Fieldwork	Jan. 7, 2011	Mar. 25, 2011
Respiratory Therapy Years 1 and 2	Jan. 3, 2011	April 29, 2011
Respiratory Therapy Year 3	Jan. 3, 2011	June 24, 2011
Social Work Years 2 and 3 field instruction	Jan. 4, 2011	April 15, 2011

Section 3 Registration and Withdrawal Dates

NOTE: 1. The refund schedule will be published on the Registrar's Office web site in July 2010.

2. Some courses have irregular Voluntary Withdrawal deadline dates. Please refer to your faculty or school section of the Calendar.

Fall Term 2010 (including full courses)	Start	End
Nursing Clinical Courses: last date to register for Fall Term 2010 and Winter Term 2011	Aug. 18, 2010	
Last Date to register and pay fees without penalty for all programs (except Agriculture Diploma)	Sept. 8, 2010	
Agriculture Diploma	Sept. 17, 2010	
Law: Registration after this date requires Associate Dean's approval	Sept. 7, 2010	
Registration revisions and late registration in all programs (except Agriculture Diploma). A financial penalty is assessed on all late registrations during this period	Sept. 9, 2010	Sept. 22, 2010
Agriculture Diploma	Sept. 20, 2010	Sept. 29, 2010
Last date in all programs (except Agriculture Diploma) to withdraw from Fall Term 2010 and full courses and not be assessed a "VW"		Sept. 22, 2010
Agriculture Diploma		Sept. 29, 2010
Last date for Voluntary Withdrawal from Fall Term 2010 courses without academic penalty in all faculties and schools. (see refund schedule, published on the Registrar's Office web site in July 2010, for financial implications) (For a refund schedule, please check the Registrar's Office website after July 1, 2010.)		Nov. 17, 2010
Winter Term 2011		
Registration and Revision period in Winter Term 2011 half courses in all programs (except Agriculture Diploma)	Jan. 5, 2011	Jan. 18, 2011
Agriculture Diploma	Jan. 5, 2011	Jan. 17, 2011
Last date for registration in Winter Term 2011 half courses, including Challenge for Credit, and/or registration revisions in all programs (except Agriculture Diploma)		Jan. 18, 2011
Agriculture Diploma		Jan. 17, 2011
Winter Term 2011 half courses and full courses dropped after this date from any program (except Agriculture Diploma) are recorded as Voluntary Withdrawals		Jan. 18, 2011
Agriculture Diploma		Jan. 17, 2011
Last date for Voluntary Withdrawal from Winter Term 2011 half courses and full courses without academic penalty in all faculties and schools (except Agriculture Diploma). (see refund schedule, published on the Registrar's Office web site in July 2010, for financial implications) (For a refund schedule, please check the Registrar's Office website after July 1, 2010.)		Mar. 18, 2011

Agriculture Diploma	Mar. 10, 2011
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Section 4: Fee Deadlines

Last date for all students to pay Fall Term 2010 and 1 st instalment fees without late fee (except Agriculture Diploma)	Sept. 8, 2010
Agriculture Diploma	Sept. 17, 2010
Last date for all students to pay Winter Term 2011 and 2 nd instalment fees without late fee	Jan. 6, 2011

Section 5: Dates of University Closure and Mid Term Break

When the University is closed no classes/examinations will be held.	Start	End
Canada Day (Holiday Observed)	July 1, 2010	
Civic Holiday	Aug. 2, 2010	
Labour Day	Sept. 6, 2010	
Thanksgiving Day	Oct. 11, 2010	
Remembrance Day (Holiday Observed)	Nov. 11, 2010	
December Holidays	Dec. 23, 2010	Jan. 3, 2011
Mid-Term Break* for all faculties and schools (except Medicine, Education, Occupational Therapy, Physical Therapy Yr. 3 and Respiratory Therapy Yr. 3)	Feb. 21, 2011	Feb. 25, 2011
Louis Riel Day	Feb. 21, 2011	
Occupational Therapy	Feb. 28, 2011	Mar. 4, 2011
Medicine Years 1 and 2	Mar. 21, 2011	Mar. 25, 2011
Good Friday	April 22, 2011	
Easter Monday (Respiratory Therapy department only)	April 25, 2011	
Victoria Day	May 23, 2011	

*The academic and administrative offices will be open during this period, but there will be no classes/examinations held for students

Section 6: Fall/Winter Session Examination and Test Dates

Students are reminded that they must remain available until all examination and test obligations have been fulfilled.

Fall/Winter Session 2010-2011

Fall Term 2010 (including full courses)	Start	End
Most faculties and schools	Dec. 10, 2010	Dec. 22, 2010
Agriculture Diploma*	Dec. 6, 2010	Dec. 13, 2010
Dentistry, Years 1, 2, and 3	Dec. 6, 2010	Dec. 17, 2010
Dentistry, Year 4	Dec. 13, 2010	Dec. 17, 2010
Dental Hygiene Year 1	Dec. 6, 2010	Dec. 17, 2010
Dental Hygiene Year 2	Dec. 13, 2010	Dec. 17, 2010
Law	Dec. 10, 2010	Dec. 22, 2010
Pharmacy, Year 4	Nov. 2, 2010	Nov. 3, 2010

Winter Term 2011 (including full courses)

Most faculties and schools	April 11, 2011	April 26, 2011
Agriculture Diploma	Mar. 31, 2011	April 8, 2011
Dental Hygiene, Years 1 and 2	April 11, 2011	April 15, 2011
Dentistry, Years 1, 2 and 3	April 25, 2011	May 6, 2011
Year 4	Feb. 14, 2011	Feb. 18, 2011
Law	April 13, 2011	April 27, 2011
Pharmacy, Year 3	Mar. 26, 2011	Mar. 30, 2011
Respiratory Therapy		
Clinical Entrance Exams Year 2	April 29, 2011	
Composite Exams Year 3	June 20, 2011	

Section 7: Challenge for Credit, Supplemental and Other Special Examinations and Tests

Faculties and schools that extend supplemental examination privileges: last date for applications for autumn supplemental examinations	July 2, 2010
Language reading tests for graduate students	Sept. 4, 2010
Last date to apply for Challenge for Credit for courses offered in Fall Term 2010	Sept. 22, 2010
International Dental Degree Program on-site assessment	TBA
Last date to apply for Challenge for Credit for courses offered in Winter Term 2011	Jan. 18, 2011
Agriculture Diploma Last date for applications for Fall Term 2010 supplemental examinations	Jan. 4, 2011
Fall term supplementary examinations	Jan. 10, 2011
Language reading tests for graduate students	April 2, 2011
Agriculture Diploma Last date for applications for Winter Term 2011 supplemental examinations	April 29, 2011
Winter Term supplementary examinations	May 20, 2011
Last day to register for Challenge for Credit for examinations in June series	April 29, 2011
Medical Council of Canada examinations	May 2 -10, 2011

Section 8: Final Grade Appeal Dates

Appeal period for final grades received for Fall Term 2010 courses	Jan. 4, 2011	Jan. 24, 2011
Appeal period for final grades received for Winter Term 2011 courses and full courses	May 24, 2011	June 13, 2011

Section 9: University Convocation

Fall Convocation	Oct. 20-21, 2010
Last date to apply online to graduate in October	July 29, 2010
Last date to apply online to graduate in February	Sept. 22, 2010
Last date to apply online to graduate in May	Jan. 18, 2011
Graduation date for students graduating in February 2011 (Ceremony for February grads is in May 2011)	Feb. 2, 2011
School of Agriculture graduation ceremony	April 29, 2011
Faculty of Medicine Convocation ceremony	May 12, 2011
Spring Convocation	May 31, June 1, 2, 2011
Convocation ceremony at Collège universitaire de Saint-Boniface	June 6, 2011

Section 10: Other University Special Events

Parents Orientation	June 5, 2010
2010 School Counsellors Admissions Seminar	Sept. 2010
Enrolment Services/Student Recruitment: Evening of Excellence	Oct. 2010
Memorial events for 14 women murdered at l'Ecole Polytechnique in 1989	Dec. 6, 2010
Information Days for high school students	Feb. 23-24, 2011
Annual traditional graduation Powwow in honour of Aboriginal students	May 7, 2011

Section 11: Distance and Online Education 2010/2011 Deadline Dates

Start and End Dates	
Fall term 2010 (including Full Courses)	Refer to Section 2 for start & end dates
Winter Term 2011	Refer to Section 2 for start & end dates
Winter/Summer Term 2011	Jan. 5, 2011 July 5, 2011
Summer Term 2011	May 2, 2011 July 29, 2011
Registration and Withdrawal Dates	
Fall Term 2010 (including full courses)	Refer to Section 3 for registration & withdrawal dates
Winter Term 2011	Refer to Section 3 for registration & withdrawal dates

Winter/Summer Term 2011		
Registration and Revision period	Jan. 5, 2011	Jan. 18, 2011
Last date for Voluntary Withdrawal	June 8, 2011	
Summer Term 2011		
Registration and Revision period	May 2, 2011	May 13, 2011
Last date for Voluntary Withdrawal	July 8, 2011	
Application to write examinations at a location other than the University of Manitoba		
Fall term 2010	First working day of October	
Fall/Winter and Winter term 2011	First working day of February	
Winter/Summer term 2011	First working day of May	
Summer term 2011	First working day of June	
Examination and Test Dates		
Fall Term 2010	Refer to Section 6 for examination and test dates	
Winter Term 2011	Refer to Section 6 for examination and test dates	
Winter/Summer term 2011	July 6, 2011	July 8, 2011
Summer Term 2011	Aug. 2, 2011	Aug. 8, 2011

Section 12: Summer Session 2010

Start and End Dates

For more detailed information, please consult the Summer Session Calendar available from the Summer Session Office, 166 Extended Education Complex. The Summer Session Calendar is available on-line at umanitoba.ca/summer.

May Day, June Day, May-June Day	Start	End
Classes	May 3, 2010	June 22, 2010
Examinations		
May Day	May 28, 2010	May 29, 2010
June Day & May-June Day	June 24, 2010	June 25, 2010
May-June Eve, June-Aug. Eve, May-Aug. Eve		
Classes	May 3, 2010	Aug. 5, 2010
Examinations		
May-June Eve	June 18, 2010	June 19, 2010
June-Aug Eve & May-Aug Eve	Aug. 6, 2010	Aug. 7, 2010
July Day, Aug. Day, July-Aug. Day		
Classes	June 28, 2010	Aug. 19, 2010
Examinations		
July Day	July 24, 2010	July 26, 2010
Aug. Day & July-Aug. Day	Aug. 21, 2010	Aug. 23, 2010
Other		
Nursing Summer Term	April 26, 2010	July 28, 2010
Occupational Therapy Year 1 Summer Term		
Intermediate Fieldwork 1	May 3, 2010	June 25, 2010
Occupational Therapy Year 2 Summer Term		
Advanced Fieldwork	June 28, 2010	must end by (flexible start date) Sept. 10, 2010
Physical Therapy Summer Term	variable; depend on clinical placements	

Section 13: Summer Session 2011

Class Start Dates

Nursing summer term begins	April 25, 2011
Summer Session Start Date	May 2, 2011
Medicine, BSc.	May 30, 2011 - Aug. 26, 2011
Occupational Therapy Year 1 Summer Term	
Intermediate Fieldwork 1	May 2, 2011 - June 24, 2011
Occupational Therapy Year 2 Summer Term	
Advanced Fieldwork	June 27, 2011 - must end by flex. start date Sept. 16, 2011
Physical Therapy Summer Term	variable; depend on clinical placements

The other summer session dates are not available yet.

Section 14: Faculty of Graduate Studies Submission Dates for 2010-2011

For reports on theses/practica (and the corrected copies of the theses/practica), comprehensive examinations and M.Eng. projects to be submitted to Graduate Studies by students expecting to graduate in October Aug. 26, 2010

For receipt in Graduate Studies Office of Ph.D. theses (for distribution) from graduate students expecting to graduate in February Oct. 5, 2010

For distribution of Master's theses/practica (to examining committee) by students expecting to graduate in February Oct. 18, 2010

For reports on theses/practica (and the corrected copies of theses/practica), comprehensive examinations and M.Eng. projects to be submitted to Graduate Studies by students expecting to graduate in February. Jan. 4, 2011

For receipt, in Graduate Studies Office, of Ph.D. theses (for distribution) from graduate students expecting to graduate in May. Jan. 17, 2011

For distribution of Master's theses/practica (to examining committee) by students expecting to graduate in May Jan. 24, 2011

For reports on theses/practica (and the corrected copies of theses/practica), comprehensive examinations and M.Eng. projects to be submitted to Graduate Studies by students expecting to graduate in May April 6, 2011

For receipt by the Faculty of Graduate Studies, of Annual Progress Reports for Master's and Ph.D. students June 15, 2011

For receipt, in Graduate Studies Office, of Ph.D. theses (for distribution) from students expecting to graduate in October June 13, 2011

For distribution of Master's theses/practica (to examining committee) by students expecting to graduate in October June 20, 2011

Faculty of Graduate Studies

Admissions

General Office

500 University Centre

Telephone: (204) 474 9377

Fax: (204) 474 7553

Web: umanitoba.ca/graduate_studies

e-mail: Graduate_Studies@umanitoba.ca

Chapter Contents

SECTION 1: Preface

SECTION 2: Admission

- 2.1 Degrees and Diplomas Offered
 - 2.2 Admission to Graduate Studies
 - 2.3 Application
 - 2.4 Classification of Students
-

SECTION 1: Preface

At the University of Manitoba, graduate study and research were conducted on a modest scale from the foundation of the university and during its early years. In 1949, a Faculty of Graduate Studies and Research was established to systematize efforts in these fields. Currently more than 3,300 graduate students are registered at the university. A substantial number of graduate students received fellowships, scholarships, or assistantships made available under such arrangements as the Natural Sciences and Engineering Research Council, and the university itself. Providing additional opportunity for graduate students, research work funded through grants from business corporations and government bodies is now conducted at the university.

Agriculture Canada and the Department of Fisheries and Oceans maintain major research establishments on the Fort Garry campus. Additional and extensive research facilities are available in the faculties of Dentistry and Medicine located in central Winnipeg and the university's Bannatyne Campus. The Faculty of Medicine operates in close conjunction with the major teaching hospitals.

Graduate work at the doctoral level is offered in the faculties of Agricultural and Food Sciences, Arts, Clayton H. Ridell Faculty of Environment, Earth and Resources, Dentistry, Education, Engineering, Human Ecology, Medicine, Science, Social Work, and the Asper School of Business/Faculty of Management.

The Faculty of Graduate Studies is governed by the Faculty Council of Graduate Studies. The Faculty Council delegates powers to the Executive Committee of Graduate Studies which in turn delegates responsibilities to standing committees of the faculty, such as the Guidelines and Policy Committee and the Awards Committee.

SECTION 2: Admission to Graduate Studies

2.1 Degrees and Diplomas Offered

The Faculty of Graduate Studies offers advanced courses of instruction and facilities for research leading to the following:

Master of Architecture (M.Arch.)
Master of Arts (M.A.)
Maîtrise ès Arts (Collège universitaire de Saint-Boniface)
Master of Business Administration (M.B.A.)
Master of City Planning (M.C.P.)
Master of Dentistry (M.Dent.)
Master of Education (M.Ed.)
Maîtrise en Éducation (Collège universitaire de Saint-Boniface)
Master of Engineering (M.Eng.)
Master of Environment (M.Env.)
Master of Fine Arts (M.F.A.)
Master of Interior Design (M.I.D.)
Master of Landscape Architecture (M.Land.Arch.)
Master of Laws (LL.M.)
Master of Mathematical, Computational and Statistical Sciences (M.M.C.S.S.)
Master of Music (M.Mus.)
Master of Natural Resources Management (M.N.R.M.)
Master of Nursing (M.N.)
Master of Occupational Therapy (M.O.T.)
Master of Physician Assistant Studies (M.P.A.S.)
Master of Public Administration (M.P.A.)
Master of Public Health (M.P.H.)
Master of Science (M.Sc.)
Master of Social Work (M.S.W.)
Doctor of Philosophy (Ph.D.)
Diploma in Population Health (Dip.P.H.)

See the Graduate Studies Program index in this *Calendar* for listings of graduate programs by unit.

2.2 Admission

General Policy on Admission

The general policy on admission to the Faculty of Graduate Studies is found in the Academic Guide section of this *Calendar*. Note that admission standards as well as criteria and procedures for admission may vary from program to program. Consult the specific departmental listing in this *Calendar* for details.

Admission to the Faculty of Graduate Studies is competitive and a combination of factors is considered in the admission decision, including:

- The past academic performance of the applicant and assessments of referees. These are used as indicators of the likelihood that the applicant can successfully complete the course of studies and research for the degree.
- The capacity of the department (unit, faculty, institute, etc.) to provide the program of study and research requested by the applicant, including adequate study and research facilities.

The availability and willingness of a faculty member competent to supervise the program of study and research of the applicant.

Application Forms

Applications can be made online at umanitoba.ca/graduate_studies/. Paper application forms are available from the Faculty of Graduate Studies general office and from all departments. For application deadline dates, refer to the specific graduate program in this *Calendar*. Application to live in residence is made separately (See Housing and Student Life in the Student Affairs chapter.)

2.3 Application

Departmental Deadlines

Please refer to the Department to which you wish to apply in the Graduate Programs Section of this *Calendar*.

Application Fee

This fee must accompany all admission applications:

Canadian/permanent residents - \$100. (CAD)

International applicants - \$100. (CAD)

Application Declaration

All persons seeking admission to the University of Manitoba must sign the following declaration on the Application for Admission Form: "I hereby certify that I have read and understood the instructions and information sheet attached to this application form and that all statements made in conjunction with this application are true and complete. I understand that my application will be rejected if I have not disclosed my complete academic record or have submitted false information in support of my application to the Faculty of Graduate studies. In such an event I understand that future applications from me will not be considered."

Application Fraud or Misconduct

It should be noted that the commission of application fraud or misconduct may result in acceptance and registration being withdrawn and the applicant disqualified from consideration, not only in the year of application, but, in all subsequent sessions. If discovered in a subsequent session it may result in dismissal from the university. Application fraud or misconduct includes the following:

- Failure to declare attendance at another post-secondary institution;
- Presenting falsified academic documentation or causing or encouraging another person to falsify records through translation or data changes;
- Presenting falsified personal documentation, e.g. using a false name, date of birth, country of origin, etc.;
- Presenting falsified or fictitious reference documentation;
- Cheating on or having another person write a standardized entry exam such as TOEFL, MCAT, LSAT, DAT or GMAT;
- Presenting another person's standardized test score as one's own to falsify a test result; and
- Failure to report suspensions from another post-secondary institution.

2.4 Classification of Students

The classification of a student at the University of Manitoba is determined on admission to a program of study.

Please refer to Section 1.4 of the Academic Guide in this *Calendar* for Student Status/Classification of Students.

University Policies

Chapter Contents

PART ONE:

SECTION 1: Policy on the Responsibilities of Academic Staff with Regard to Students

SECTION 2: Policy on Respectful Work and Learning Environment

SECTION 3: Accessibility Policy for Students

SECTION 4: Disclosure and Security of Student Academic Records

SECTION 5: Language Usage Guidelines

SECTION 6: Conflict of Interest Between Evaluators and Students Due to Close Personal Relationships

SECTION 7: Other Policies of Interest to Students

- 7.1 Campus Alcohol Policy
- 7.2 HIV/AIDS Policy
- 7.3 Parking Regulations

PART TWO:

SECTION 1: Student Discipline Bylaw

SECTION 2: Inappropriate or Disruptive Student Behaviour

SECTION 3: Hold Status

- The Freedom of Information and Protection of Privacy Act (FIPPA) and The Personal Health Information Act (PHIA) both apply to the University of Manitoba. The Board of Governors appointed the president as the designated head under the act. The president, in turn, has delegated her duties to the FIPPA coordinator and the FIPPA Review Committee. Should any of the University's policies conflict with FIPPA or PHIA, the provisions of FIPPA or PHIA shall prevail unless otherwise expressly provided for at law. For access to university information, including personal information, apply under the appropriate act (FIPPA or PHIA). Application forms can be accessed at: umanitoba.ca/libraries/archives/fippa

- The University of Manitoba's Governing Documents are available online at http://umanitoba.ca/admin/governance/governing_documents/index.html. Students encountering difficulty locating documents on the website should contact the Office of the University Secretary, 312 Administration Building.

PART ONE:

SECTION 1: Policy on the Responsibilities of Academic Staff with Regard to Students

I. Objectives

The objectives of this policy are to identify the responsibilities of academic staff with regard to students; to promote harmonious relations between academic staff and students; and to promote fair and equitable treatment of students.

II Definitions

For purposes of this document, the following terms shall be defined as provided by this article:

1. Academic staff shall include all individuals holding full- or part-time appointments at the rank of Instructor I, Instructor II, senior instructor, lecturer, assistant professor, associate professor or professor. The term shall include also academic administrators, academic librarians, counsellors, adjunct professors, professional associates, research associates, research assistants, student research assistants, and student teaching assistants, insofar as such persons perform duties within the ambit of the policy.

2. Student shall mean any person who is registered as a student in the university.

III Statement of Responsibilities

Some of the responsibilities of academic staff with regard to students rest with the individual staff member, while others are collective responsibilities, to be exercised through the actions of department and faculty/school administrators and councils.

A. Individual Responsibilities

The individual responsibilities of academic staff members with regard to students are primarily instructional and scholarly, and secondarily administrative. They may include:

1. Undergraduate, graduate, and continuing education instruction, including the organization, preparation and delivery of course material, the evaluation of student academic progress, the reporting of such evaluation in accordance with approved policies and schedules, consultation with students out of class or laboratory hours, and supervision of student research and thesis preparation;

2. Scholarly attainment through personal study and research, including study for purposes of academic self-improvement or course improvement, keeping abreast of new developments, and research that leads to a useful or original contribution toward the advancement of knowledge and understanding; and,

3. Administrative work as required for instructional and scholarly activities, including committee work at various levels - departmental, faculty, university - as it pertains directly or indirectly to students.

B. Collective Responsibilities

The collective responsibilities of the academic staff belonging to an academic unit are to provide an effective learning environment and to endeavour to ensure fair and consistent treatment of students. They include:

1. Periodically reviewing and updating all courses and programs;

2. Ensuring that academic regulations and policies provide for fair and consistent treatment of students; and,

3. Providing for convenient student access to information on policies, regulations and procedures that may affect their academic progress, including the provision of names of instructors assigned to teach particular courses and sections at the earliest possible opportunity.

IV Discharge of Responsibilities

A. Individual Responsibilities

1. Academic staff members shall discharge their instructional responsibilities with academic integrity, scholarly competence, and pedagogic effectiveness.

2. Academic staff members shall maintain their familiarity with current university faculty/school and/or department policies regarding plagiarism and cheating, examination impersonations, student access to final examination scripts, student discipline, grade appeals, and the University policy regarding sexual harassment.

3. In discharging their instructional responsibilities, academic staff members shall adhere to regulations pertaining to the format, content and con-

duct of courses and laboratories, including regulations pertaining to examinations, term work, grades, and related matters.

4. A course outline or syllabus shall be provided in each course section, within the first week of classes:

- a) The academic staff member responsible for that section shall provide in writing to every member of the class:
 - name of instructor;
 - office number and telephone number;
 - a list of textbooks, materials and readings that the student is required to obtain including the appropriate referencing style guide(s) acceptable to the instructor and/or discipline in courses where it is relevant;
 - an outline of the topics to be covered;
 - a description of the evaluation procedure to be used, including the weighting of the components that will contribute to the final grade and whether evaluative feedback will be given to the student prior to the voluntary withdrawal date (see note);
 - an indication of instructor availability for individual student consultation;
 - a tentative schedule of term assignments and tests; and
 - a statement of the practice to be following regarding late submission of assignments.

NOTE: It is understood by Senate that the provision of this information is not intended to affect the question of equity in multi-sectioned courses in any way.

b) The academic staff member shall provide in writing to every member of the class information regarding academic integrity which shall include:

a reference to statements on academic dishonesty including “plagiarism and cheating” and “examination personation” found in the *University General Calendar*; and,

where appropriate, a reference to specific course requirements for individual work and group work. Students should be made aware that group projects are subject to the rules of academic dishonesty and that group members must ensure that a group project adheres to the principles of academic integrity. Students should also be made aware of any specific instructions concerning study groups and individual assignments. The limits of collaboration on assignments should be defined as explicitly as possible.

5. Academic staff members shall teach their courses with due regard to calendar descriptions.

6. It is the responsibility of academic staff members to specify textbooks and materials in accordance with announced purchasing deadlines.

7. In their dealings with students, academic staff shall:

- a) not deny registration for instruction in those courses for which the permission of the instructor is required, except where the student lacks appropriate qualifications or where an approved policy on limited enrolment is in effect;
- b) comply with existing human rights legislation, and refrain from differential treatment of individual students on the basis of their actual or presumed membership in, or association with, some class or group of persons;
- c) not accept money or other goods or services from students for assistance with any course offered by the University. This clause, however, shall not prevent student teaching assistants or other part-time instructors from accepting payment for tutoring in courses/sections which do not fall within the scope of their University employment;
- d) be available for a reasonable amount of time, on a known and posted basis, for individual consultation with students registered in their courses or laboratories;
- e) evaluate student academic performance in a fair and reasonable manner, and by means of appropriate academic criteria only;
- f) where appropriate, provide written evaluative feedback prior to the voluntary withdrawal deadlines specified in the *General Calendar*;
- g) foster a free exchange of ideas between themselves and their students in the classroom and allow students the freedom to take legitimate exception to the data, views, or methods presented;
- h) respect the confidentiality of documentary information about students;
- i) keep confidential any information about the academic performance of a student, unless release is authorized by the student, required by his/her instructional team, or requested by an administrative officer in accordance with the University policy on the release of information;
- j) explicitly acknowledge in written or oral presentations any indebtedness to student research or assistance;

k) not obtain any improper personal advantage from a student or student work; and,

l) academic staff members shall not retaliate against a student who has filed a complaint, whether the complaint was substantiated or unsubstantiated.

8. Academic staff members shall not cancel, miss, terminate or shorten scheduled instruction except for good reason. Whenever a scheduled period of instruction is cancelled, the academic staff member shall:

- a) inform the class at the earliest possible time;
- b) inform the administrative head of his/her academic unit; and,
- c) where possible, ensure that appropriate substitution or make-up instruction is provided.

9. Academic staff members who provide instruction shall comply with the schedules and formats for reporting student grades, as established by departments and the Registrar’s Office. Where such grades are reviewed by departmental committees, instructors should be available for the duration of the committees’ work. An instructor who learns of an error, which if corrected would raise an assigned grade, should correct it without requiring the student affected to appeal his/her grade.

10. Academic staff members shall adhere to the relevant University, faculty/ school, and/or departmental policy regarding professor-course evaluation.

B. Collective Responsibilities

1. Through their faculty/school and department councils, academic staff members should review program and course descriptions periodically to ensure that the material to be presented is current and appropriate and that the calendar information is clear and accurate.

2. The following material must be kept on file in faculty/school or departmental general offices and made available to students:

- a) University, faculty/school or departmental regulations regarding class attendance and penalties, if any, for non-compliance;
- b) The information described in Section 4 under “Discharge of Responsibilities, A – Individual Responsibilities”, that is provided in writing to the class by the academic staff member for each course section;
- c) University, faculty/school, and/or departmental regulations and procedures, if any, regarding the evaluation of professors and courses by students;
- d) University, faculty/school, and/or departmental policy regarding student access to final examination scripts;
- e) University policy on student discipline;
- f) University, faculty/school, and departmental procedures regarding grade appeals;
- g) University policy on the responsibilities of academic staff with regard to students; and,
- h) University policy regarding sexual harassment.

3. Where necessitated by large class sizes or other circumstances, academic units shall ensure that course instructors and/or designated substitutes are available for individual consultation with students for a reasonable amount of time on a known and posted basis.

V. Cautionary Notice

Students are reminded that the initiation of a frivolous or vexatious complaint may result in disciplinary action being taken against them by the University.

This Policy is available online at: http://umanitoba.ca/admin/governance/governing_documents/students/280.htm

SECTION 2: Policy on Respectful Work and Learning Environment

1.0 Reason for Policy

- a) To support a climate of respect in the workplace and in the learning environment where individuals or groups of individuals are free from harassment and discrimination.
- b) The issue of workplace safety and health with respect to a workplace harassment prevention policy is governed by provincial legislation and more specifically Manitoba Workplace Safety and Health Regulation #217. This Regulation identifies certain responsibilities for employers and employees in this regard. A policy on workplace harassment is required.

2.0 Policy Statement

2.1 The University of Manitoba supports equity, diversity and the dignity of all people. The University promotes equity in our learning programs and employment and in the conduct of the University's affairs.

2.2 The University recognizes the following:

- (a) a richly diverse society in Manitoba, as well as beyond;
- (b) a duty to act in a manner consistent with existing legislation regarding human rights;
- (c) a commitment to academic freedom and freedom of thought, inquiry, and expression among its members which may result in respectful disagreements regarding beliefs or principles.

2.3 Each individual has the right to participate, learn, and work in an environment that promotes equal opportunities and prohibits discriminatory practices.

2.4 The University of Manitoba does not condone behaviour that is likely to undermine the dignity, self-esteem or productivity of any of its members and prohibits any form of discrimination or harassment whether it occurs on University property or in conjunction with University-related activities. Therefore, the University of Manitoba is committed to an inclusive and respectful work and learning environment, free from:

- (a) discrimination or harassment as prohibited in the Manitoba Human Rights Code;
- (b) sexual harassment; and
- (c) personal harassment.

2.5 These types of discrimination or harassment are defined in the Procedures document which relates to this Policy.

2.6 The University of Manitoba and all members of the University community, particularly those in leadership roles, share the responsibility of establishing and maintaining a climate of respect within this community and to address any situations in which respect is lacking.

2.7 Harassment and discrimination violate an individual's human rights and run contrary to the University's fundamental values. The University of Manitoba will act promptly and efficiently to deal with these behaviours. It will endeavour to ensure that individuals who believe that they have been subjected to harassment or discrimination are able to express concerns and register complaints without fear of retaliation or reprisal. The University will exercise care to protect and respect the rights of both the complainant and the respondent.

2.8 The University of Manitoba will establish mechanisms to give effect to this Policy including:

- (a) the appointment of an equity services advisor whose duties shall include the investigation of informal complaints and the provision of advice and assistance to staff members, students and administrative officers in connection with concerns and complaints;
- (b) the appointment of one or more investigation officer(s) whose duties shall include the investigation of formal complaints and the provision of advice and assistance to staff members, students and administrative officers in connection with concerns and complaints;
- (c) training for staff related to harassment and discrimination;
- (d) the University of Manitoba will establish and implement educational programs designed to enhance awareness of the Respectful Work and Learning Environment Policy and procedures relating to it.

2.9 Each year a report will be prepared by Equity Services and made available to the University community concerning the number, type and disposition of cases and on educational and other activities related to the Policy.

2.10 While the University of Manitoba supports the informal resolution of problems associated with such behaviour, it considers harassment and discrimination in all its forms to be serious offences. Normally the President shall delegate authority to the Vice-President (Administration) to take disciplinary action, where appropriate, against individuals who have violated this Policy.

2.11 Discipline may range from a reprimand to dismissal or expulsion. Where Collective Agreement provisions require that the President obtain the approval of the Board of Governors for a suspension or dismissal, the finding of the Vice-President (Administration) shall be referred to the President in the form of a recommendation for action.

2.12 The Workplace Safety and Health Regulation #217 requires that every harassment prevention policy contain the following statements:

- (a) every employee is entitled to work free of harassment;

- (b) the employer must ensure, so far as it is reasonably practicable, that no worker is subject to harassment in the workplace;

- (c) the employer will take corrective action respecting any person under the employer's direction who subjects a worker to harassment;

- (d) the employer will not disclose the name of the complainant or an alleged harasser or the circumstances related to the complainant to any person except where disclosure is:

- i) necessary to investigate the complaint or take corrective action with respect to the complaint; or
- ii) required by law;

- (e) a worker has the right to file a complaint with the Manitoba Human Rights Commission;

- (f) the employer's harassment prevention policy is not intended to discourage or prevent the complainant from exercising any other legal rights pursuant to any other law.

2.13 Workplace Safety and Health Regulation #217 defines "harassment" as "any objectionable conduct, comment or display by a person that

- (a) is directed at a worker in a workplace;

- (b) is made on the basis of race, creed, religion, colour, sex, sexual orientation, gender-determined characteristics, political belief, political association or political activity, marital status, family status, source of income, disability, physical size or weight, age, nationality, ancestry or place of origin, and

- (c) creates a risk to the health of the worker.

This Policy is available online at:

http://umanitoba.ca/admin/governance/governing_documents/community/230.htm

SECTION 3: Accessibility Policy for Students with Disabilities

Reason for Policy

1.1 The University of Manitoba strives to ensure an accessible learning and working environment and is thereby committed to providing reasonable accommodation of the needs of persons with documented disabilities.

1.2 The purpose of this policy is to support an accessible learning environment where students with disabilities, who are admitted to the University of Manitoba, can gain access to all programs for which they are academically qualified.

2.0 Policy Statement

2.1 General

The University shall endeavour to foster, create, and maintain an accessible campus and provide other supports and services to students with disabilities.

2.1.1 The University of Manitoba will use reasonable efforts to ensure that students with disabilities are considered for admission to programs for which they are academically qualified; and have full and safe access to the educational process and learning environment (including but not limited to classes, laboratories, and workshops), the University campus, and University facilities and services.

2.1.2 The University will use reasonable efforts to offer reasonable accommodations in the delivery of academic programs and services to students with disabilities.

2.2 The Disability Services (DS) office is the centralized service for the University of Manitoba community. DS provides a focus for activity and expertise regarding disability-related accommodations within the University, and for liaison with outside organizations regarding accessibility issues, and programs and services for students with disabilities at the University of Manitoba. In providing accommodations, the DS office will:

- 2.2.1 request and evaluate appropriate medical documentation from students requesting assistance from DS and assign appropriate services to meet the needs of each student by adapting services, courses, and programs as feasible;

- 2.2.2 ensure that the University's criteria for academic excellence will not be compromised; and

- 2.2.3 inform the University community about the services available to students with disabilities through the DS office, and seek to ensure that such services are delivered in ways that promote equity, recognizing that performance is not inferior merely because it is different.

2.3 The University is responsible for maintaining the confidentiality of disability related information under The Freedom of Information and Protection of Privacy Act (Manitoba) and The Personal Health Information Act (Manitoba), including limiting the distribution of that information to only those parties that require the information to determine appropriate accommodation.

- 2.4 The University expects that student, instructors and support staff will share the responsibility for the delivery of reasonable accommodation.
- 2.5 The University will foster a supportive University community by working to inform and educate community members about issues related to disabilities.
- 2.6 Students requesting accommodations are responsible to initiate contact with the DS office and make the nature of their disability and/or their needs known in a timely fashion. Where possible, students are requested to declare their needs to DS staff before or at the time they register for, or are admitted into, a program.

This Policy is available online at: http://umanitoba.ca/admin/governance/governing_documents/students/281.htm .

SECTION 4: Disclosure and Security of Student Academic Records

The University and its constituent units have a clear obligation to the student and to society concerning the disclosure and security of information about a student's academic record. All student records will be handled in accordance with *The Freedom of Information and Protection of Privacy Act (Manitoba) (FIPPA)* and the *Personal Health Information Act (Manitoba) (PHIA)* as appropriate. Students who have questions on this matter should contact the Registrar's Office or the FIPPA Office.

SECTION 5: Language Usage Guidelines

The University of Manitoba, as an institution of higher learning, has a commitment to high standards in all communications, both written and oral as well as a prominent role in promoting desirable social change. As an employer, it is especially sensitive to the fair treatment of individuals and groups. The University of Manitoba therefore follows guidelines which are designed to avoid communicating in a manner that reinforces questionable attitudes and assumptions about people and sex roles. Often the problem is one of word choices which may be interpreted as biased, discriminatory, or demeaning, even though they were not intended to be. These guidelines will assist administrators in choosing words which are accurate, clear, and free from bias.

Guidelines

Sexism in communications may be divided into two conceptually different categories:

1. Problems of designation, and
2. Problems of evaluation.

I. Problems of Designation

In the case of sexism, long-established cultural practice can exert a powerful, insidious influence over even the most conscientious person. Nouns, pronouns, and adjectives that designate persons can be chosen to eliminate, or at least to minimize, the possibility of ambiguity in sex identity or sex role. In the following examples, problems of designation are divided into two sub-categories: ambiguity of referent, where it is unclear whether the communicator means one or both sexes, and stereotyping, where the communication conveys unsupported or biased connotations about sex roles and identity.

Problems of Evaluation

By definition, communications should be free of implied or irrelevant evaluation of the sexes.

Difficulties may derive from the habitual use of clichés or familiar expressions such as "man and wife." The use of "man and wife" together implies differences in the freedom and activities of each. "Husband and wife" are parallel, "man and wife" are not. In the examples that follow, problems of evaluation, like problems of designation, are divided into ambiguity of referent and stereotyping.

Problems of Designation

Ambiguity of Referent:

The **student** is usually the best judge of the value of his counselling.

Choices might include deleting the referent "his," changing to a plural subject (Students are...value of the counselling service **they** receive), or rephrase (The best judge of the value of counselling is usually the student).

Man or **mankind** (people, human beings, etc.) the average **man** (average person, people in general), **manpower** (workforce, personnel, human resources).

Stereotyping:

Research scientists often neglect their **wives** and **children**.

a) Acknowledge that women as well as men are research scientists (Research scientists often...neglect their **families**).

b) Mothering (noun substitute - parenting, nurturing).

c) **Woman** doctor, **male** nurse, **lady** lawyer. (delete sex description unless necessary to the discussion, then use **female** doctor, **female** lawyer).

II. Problems of Evaluation

A. Ambiguity of Referent:

1. The authors acknowledge the assistance of **Mrs. John Smith**. (Use given names in acknowledgements, e.g., Ms., Miss or Mrs. Jane Smith).

B. Stereotyping

1. men and **girls**. (Use parallel terms - men and women, girls and boys, unless specifically wishing to denote adult and child relationship).

2. **woman** driver. (Specify only if necessary and then use female driver).

3. Staff members and their **wives**. (Staff members and their **spouses/friends/guests**).

4. The **girls** in the office. (noun substituted - secretaries, staff, office assistants).

NOTE: A more detailed list of examples of the sexist use of language can be obtained by contacting the Office of the President.

This Policy is available online at: http://umanitoba.ca/admin/governance/governing_documents/staff/312.htm

SECTION 6: Conflict of Interest Between Evaluators and Students Due to Close Personal Relationships

1.0 Reason for Policy

The purpose of this policy is to ensure that the relationship between an evaluator and the person being evaluated is and is seen to be impartial.

2.0 Policy Statement

2.1 Definitions

2.1.1 An evaluator includes any person who participates, whether at first instance or on appeal, in the process of admitting or selecting a student to a course or program, determination of a student's progress or academic standing, or the receipt by a student of a prize, award or university financial support.

2.1.2 A conflict of interest means a close personal relationship between an evaluator and a student or applicant, or between evaluators, that gives rise to a reasonable apprehension of bias and, in any event, such relationships shall include that of:

- a) parent/child;
- b) spouses;
- c) grandparent/grandchild;
- d) siblings;
- e) in-laws; or
- f) persons living in the same dwelling unit.

2.2 Procedures

2.2.1 Responsibility for avoiding the conflict of interest rests with the evaluator. In cases of uncertainty, the evaluator shall and the student may refer the matter for determination to the department head (or dean/director, as appropriate). The decision of the department head is subject to review by the dean/director of the academic unit.

2.2.2 Where there is a conflict of interest, the evaluator shall immediately withdraw from participation and shall inform the student concerned and the head or dean/director, as appropriate.

- a) Where alternative sections or electives exist, the alternative must be taken, unless the dean/director concerned determines that this will create an undue hardship for the student.
- b) Where the dean/director has exercised discretion under 2.2.2(a) or where no alternatives exist to compulsory courses, the dean/director shall ensure fair evaluation by having another suitably qualified evaluator review the submitted material or hear the oral presentations. Where practicable, the evaluator shall not participate in setting the examination or other evaluation method.

2.2.3 Where the dean or director has a conflict of interest, the president shall name a replacement to act in the matter.

2.2.4 In the case of failure to observe these regulations, staff members will be subject to the discipline procedures provided by the appropriate collective agreement or personnel policy of the University.

This Policy is available online at: http://umanitoba.ca/admin/governance/governing_documents/students/277.htm .

SECTION 7: Other Policies of Interest to Students

Campus Alcohol Policy

1.0 Reason for Policy

This policy is a general statement and guideline, setting out the University's requirement for strict compliance with the Liquor Control Act (Manitoba), as well as any rules and regulations, and any successor or replacement rules and regulations, at all events and facilities at which alcohol is available. This policy is further to the Liquor Control Act (Manitoba), as well as any rules and regulations and directives issues pursuant to the Act (The "MLCC rules and regulations").

2.0 Policy Statement

2.1 Alcohol abuse is a serious health problem and can lead to conduct that may endanger the safety of individuals and result in damage to property

PART TWO:

Students are expected to conduct themselves responsibly with due regard for the rights of others and to maintain a high level of personal and academic integrity. Students who transgress these standards, whether expressed in policy or implied in generally accepted codes of conduct, can expect disciplinary action. Penalties arising from disciplinary actions may include fines, withholding of student privileges, suspension or expulsion from programs, or some other action specific to the situation. Penalties may also affect student eligibility to continue in their programs or to graduate.

The following are some of the policies and regulations relating to student discipline and behaviour.

SECTION 1: Student Discipline Bylaw

1.0 Reason for Bylaw

The Student Discipline Bylaw and related Procedures provide guidance to those individuals charged with administering disciplinary action ("Disciplinary Authority") while, at the same time, outlining the prohibited conduct and the right of appeal.

2.0 Rule/Principle

2.1 As members of the University Community, students have an obligation to act with academic integrity and in a fair and reasonable manner towards their peers, faculty, staff, administration and the physical property of the University. Academic integrity and personal conduct, both on-campus and off-campus in university-sanctioned activities, are critical elements in achieving these obligations.

2.2 Students will be subject to disciplinary action under this bylaw, for the following matters regardless of whether such behaviour is covered by other

both on and off the University of Manitoba Fort Garry and Bannatyne Campuses (the "Campuses"). This in turn may result in legal claims involving the University and others. The purpose of this policy is to explicitly establish the general means by which alcohol abuse on the Campuses can be reduced, and to the extent possible, eliminated.

2.2 The University shall meet the policy's objective by:

2.2.1 Offering an alcohol education and awareness program within the scope of programs offered by or through Student Affairs;

2.2.2 Maintaining University guidelines with respect to the serving and consumption of alcohol on the Campuses;

2.2.3 Requiring that events and facilities at which alcohol is served on the Campuses (the "events and facilities") be managed effectively, and in accordance with the University's policy and procedures and Manitoba Liquor Control Commission rules and regulations; and this policy applies broadly, and covers all events and facilities on the Campuses.

This policy is available online at: http://umanitoba.ca/admin/governance/governing_documents/community/253.htm .

Parking Regulations

All members of the University community and persons attending on property, owned and occupied or under the charge or control of the University, including roadways (the "University property") are required to familiarize themselves and comply with the Regulations.

The Regulations are in addition to any by-laws of the City of Winnipeg and any legislation and regulations of the Province of Manitoba regulating the operation or use of motor vehicles or regulating the crossing of or walking upon roadways by pedestrians.

A complete copy of the University Parking Regulations is available online at:

http://umanitoba.ca/admin/governance/governing_documents/community/255.htm . and

http://umanitoba.ca/admin/governance/governing_documents/community/256.htm

University governing documents; (bylaws, policies, procedures and regulations).

2.2.1 Academic dishonestly including, but not limited to:

- (a) academic/scientific fraud;
- (b) cheating on exams or tests;
- (c) contravention of academic regulations;
- (d) re-submitting own previous course work as new work;
- (e) examination personation;
- (f) inappropriate collaboration; and
- (g) plagiarism (i.e., passing off the thoughts, writings and work of another person as one's own).

2.2.2 Inappropriate behaviour including, but not limited to:

- (a) abuse of computer privileges;
- (b) alcohol and substance abuse;
- (c) breach of residence hall regulations;
- (d) disorderly, violent or threatening behaviour;
- (e) false or misleading information made for any purpose including information in connection with:
 - i) application for admission;
 - ii) application for awards;
 - iii) medical certificates;
 - iv) letters of permission;
 - v) transfer of credits; and
 - vi) transcript/student records matters;
- (f) harassment and unlawful discrimination;
- (g) indecent exposure;
- (h) theft;
- (i) unprofessional conduct; and

(j) vandalism.

2.3 The specific jurisdiction for each of the Disciplinary Authorities is set out in "Table 1: Jurisdiction of Disciplinary Authorities" ("Table 1"). For the purposes of this document and the related Procedures document, references to Faculty/School will include University 1 and Dean/Director will include the Director of University 1.

2.4 The specific disciplinary actions available for each Disciplinary Authority are set out in "Table 2: Disciplinary Actions Available to Disciplinary Authorities" ("Table 2").

2.5 Disciplinary Authorities having the closest connection with the particular alleged disciplinary matter are encouraged whenever possible and appropriate to resolve student disciplinary matters informally in the first instance.

2.6 Students who make complaints or appeals which are found by the Disciplinary Authority to be frivolous or made for an improper purpose, may be subject to disciplinary action.

2.7 If the disciplinary matter relates to a criminal offence, the Disciplinary Authority shall provide relevant information to Campus Security Services for potential follow-up by the appropriate policing authority.

2.8 Students have a right to appeal disciplinary actions made by a Disciplinary Authority excluding the decisions of the University Discipline Committee ("UDC") which are final decisions.

2.9 Students are advised that the Disciplinary Authority to whom an appeal has been made may impose a more severe disciplinary action than previously recommended by a lower disciplinary body should the hearing panel, after reviewing the disciplinary evidence presented by all parties, consider the original disciplinary action insufficient.

2.10 Student are afforded the right to representation when dealing with disciplinary matters in the first instance and with respect to appeals; and both are subject to the limitations set out in the related Procedures.

2.11 No disciplinary action shall be implemented until the time for appeal has elapsed or until the Student has waived in writing the right to appeal, whichever occurs first. The only exceptions to this rule shall be:

- (a) where the disciplinary action would be entered on the academic records of the Student, the Registrar shall be notified by the Disciplinary Authority implementing such disciplinary action, and shall not issue any academic transcripts until the appeal has been disposed of;
- (b) where the disciplinary action relating to academic dishonesty or academic fraud may result in a change to the Student's transcript, the Registrar shall be notified by the Disciplinary Authority implementing such disciplinary action, and shall not issue any transcripts until the appeal has been disposed of;
- (c) where changes in the Student's courses and/or program are directly related to the matter under disciplinary consideration, such changes shall not be permitted; and
- (d) where the disciplinary action if not implemented, the safety of members of the University Community would be compromised.

Students may request information from their faculty or school offices, the Office of Student Advocacy, or the Office of the University Secretary.

The bylaw is available online at: http://umanitoba.ca/admin/governance/governing_documents/students/868.htm

SECTION 2: Inappropriate or Disruptive Student Behaviour

1.0 Reason for Policy

In the event of a student or students exhibiting inappropriate or disruptive behaviour, the following policy can be implemented.

2.0 Policy Statement

2.1 General

Although this policy is directed to dealing with students who exhibit inappropriate or disruptive behaviour, there are some general statements which should be made:

2.1.1 The vast majority of students will complete their academic life at the University acting appropriately and without causing disruptions to their fel-

low students or to the University. This policy is not directed towards individual students who have a mental illness, provided their behaviour is neither inappropriate nor disruptive.

A staff member may notice that an individual student is exhibiting debilitating stress, even though he/she is not acting disruptively. In that case, the observation should be addressed with the student and, if appropriate, the student should be referred for voluntary counselling.

2.1.2 "In appropriate or disruptive behaviour is behaviour which persistently interferes with the academic or administrative activities of the University (and/or) which inhibits the ability of other students to learn and of instructors to teach." – Amanda, G. "Dealing with the Disruptive College Student: Some Theoretical and Practical Consideration", *College Health*, April 1986.

Such behaviours would include but would not be limited to the following:

- a) threats to the physical safety of the individuals or others;
- b) verbal threats to or abuse of students or University personnel;
- c) recurring and wilful damage of University property;
- d) inappropriate or disruptive behaviour as a result of misuse of drugs or alcohol on University property; and
- e) actions which habitually interfere with the learning environment or requires the inordinate time and attention of faculty and staff.

2.1.3 Where the individual students act inappropriately or disruptively:

- a) The majority of such students will accept personal responsibility for their inappropriate or disruptive behaviour, and will accept appropriate referral for voluntary counselling. For the most part, staff members need only use the "Normal Procedure for Dealing with Inappropriate or Disruptive Behaviour" set out below.
- b) Information and input received from professionals in the mental health field and professional practitioners at the University would suggest that the numbers of such students who do not accept personal responsibility or appropriate voluntary counselling are small. Where a student to whom this policy should apply identified by a staff member, he/she will use part 2 of the "Normal Procedure"; and if appropriate in more extreme cases involving physical or mental harm, he/she should use the "Procedure for More Extreme Behaviour".
- c) Where an officer(s) of the University believes that a student is inappropriately involving more than one of the various service and administration offices of the University, he/she shall request the Vice-Provost (Student Affairs) to initiate a staff conference to facilitate communication and problem resolution.
- d) Information regarding an acute problem of inappropriate or disruptive behaviour which is disclosed during the student application process, should be referred to the Director of Admissions or the Dean of Graduate Studies as appropriate. If the information is of serious concern to the respective Director of Admissions or the Dean of Graduate Studies, he/she may seek the advice of the University Legal Counsel and may initiate a student conference.

2.2. Normal Procedure for Dealing with Inappropriate Behaviour

When a student acts inappropriately or disruptively, staff members should, where appropriate:

2.2.1 Make timely voluntary counselling referrals through existing support services at the University. Such services include:

Counselling Service
Psychological Service Centre,
University Health Services
Faculty (of Medicine) Counselling Services.

2.2.2 Use the existing Student Discipline Bylaw and other policies, rules and regulations where additional action is necessary to deal with inappropriate or disruptive behaviour or students.

2.3 Procedure for More Extreme Behaviour

2.3.1 If a staff member is of the opinion that a student is exhibiting a behaviour of a nature of quality that likely will result in:

- a) Serious harm to student,
 - b) Serious harm to another person, or
 - c) Substantial deterioration of the student's health;
- The staff member shall, in addition to using the "Normal Procedure", immediately refer the matter to his/her respective Dean, Director, or Administrative Unit Head.

2.3.2 If the respective Dean, Director, or Administrative Unit Head is of the same opinion, he/she shall:

- a) Advise the student to seek professional help; and
- b) Contact the Director of University Health Services if the student refuses to voluntarily seek professional help. The Director of University Health Services or designate shall follow mental health legislation and regulations when determining whether or not involuntary psychiatric assessment is advisable.
- c) In addition to the foregoing procedure, the Campus Police should be contacted immediately if it is deemed necessary for the protection of the student, other persons, or property. It should also be noted that, subject to the Student Discipline Bylaw, the President may at any time make an order restricting or prohibiting access by a student to any University property.

This policy is available online at: http://umanitoba.ca/admin/governance/governing_documents/students/279.htm .

VIOLENT OR THREATENING BEHAVIOUR

1.0 Reason for Policy

The purpose of this Policy is to state clearly the University's refusal to tolerate violence in the workplace and on the University campus and to describe possible consequences of such action. It is believed that the Policy and the supporting Procedures represent a significant move towards the prevention of violence, as well as the management of a violent episode.

The issue of safety and health in the workplace with respect to violence is governed by provincial legislation and more specifically The Workplace Safety and Health Act (Manitoba) – Regulation #217/2006 (the Regulation). The Regulation identifies certain responsibilities for employers and employees in this regard. A policy on violence in the workplace is required.

2.0 Policy Statement

The University of Manitoba is committed to creating and maintaining a safe, positive and productive learning and working environment. Therefore, the University will not tolerate violent or threatening behaviour. Individuals who are found to have engaged in activities prohibited under this Policy will be subject to disciplinary action which may result in termination of employment, expulsion from educational programs, a ban from university property, and any other remedies the University may be entitled to at law or otherwise.

2.1 Definitions and Interpretations

- (a) Intimidation is defined as conduct or harassment that disrupts the work or learning environment and/or results in a reasonable fear for personal safety;
- (b) External Parties includes contractors providing services to the University, visitors to the University or other external organizations operating within the University community;
- (c) Student is defined as any person registered as a student with the University of Manitoba;
- (d) Threats include verbal and/or physical actions that create fear or apprehension of bodily harm;
- (e) Violence is defined as the attempted or actual exercise of physical force against a person and any threatening statement or behaviour that gives a person reasonable cause to believe that physical force will be used against the person;

(f) Violent or Threatening Behaviour is behaviour that includes a combination of, or all of, the behaviour defined above as "Intimidation, Threats and Violence".

(g) Worker(s) includes:

- i) any person who is employed by the University, to perform a service whether for gain or reward, or hope of gain or reward or not;
- ii) any person who works or performs services in a Workplace which is owned or operated by the University;
- iii) any person undergoing training or serving an apprenticeship at the University; and
- iv) any individual described in the Procedure entitled "Employee Organizations and Employment Groups".

(h) Workplace means any building, site, workshop, structure, mobile vehicle, or any other premises or location whether indoors or outdoors in which one or more Worker(s) or self employed persons are engaged in work or have worked for the University;

(i) Any references to legislation, committees or units within the University in this Policy shall be deemed to include successor or substitute legislation, committees or units, in their place thereof.

2.2 The following statements must be included in this Policy as a requirement of Regulation #217. The University, as an employer,

- (a) must ensure, so far as it is practicable, that no worker is subjected to violence in the Workplace;
- (b) will take corrective action respecting any person under the employer's direction who subjects a Worker to Violence;
- (c) will not disclose the name of a complainant to any person except where disclosure is
 - i) necessary in order to investigate the complaint;
 - ii) required in order to take corrective action in response to the complaint, or
 - iii) required by law.
- (d) By approving this Policy, does not intend to discourage or prevent the complainant from exercising any other legal rights pursuant to any other law.

This policy is available online at: http://umanitoba.ca/admin/governance/governing_documents/community/669.htm

SECTION 3: Hold Status

Students will be placed on "Hold Status" if they incur any type of outstanding obligation (either financial or otherwise) to the university or its associated faculties, schools, colleges or administrative units.

Some typical reasons for holds are:

- Outstanding fees or other unpaid university fees
 - Outstanding library books and/or fines
 - Parking fines
 - Outstanding transcripts or documents required from other institutions
 - Students records pending disciplinary action.
- No administrative or academic services will be provided to students on Hold Status until the specific obligations have been met.

Students who have not cleared their Hold Status from previous registrations will not be permitted to register again until the hold has been cleared or permission to register has been obtained from the Office of the Vice-President (Administration).

General Academic Regulations and Requirements

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SECTION 1: Introduction

This chapter contains the regulations and requirements that apply to all students, regardless of their faculty or school.

Each faculty and school has its own supplementary regulations and requirements. These are published in the faculty or school chapters of this

Calendar. Some faculties and schools also have additional regulations and requirements governing their programs; these are available from their general offices.

It is the responsibility of each student to be familiar with the academic regulations and requirements of the University of Manitoba in general and of the specific academic regulations and requirements of their faculty or school of registration. Accordingly, students are asked to seek the advice of advisors in faculty and school general offices whenever there is any question concerning how specific regulations apply to their situations.

SECTION 2: Residence and Written English and Mathematics Requirements

2.1 Residence Requirements for Graduation

Each faculty and school recommends to the Senate the number of credit hours each student must complete in order to graduate from its programs. Senate also requires each student to complete a minimum number of credit hours at the University of Manitoba – this is called the “residence requirement.”

Unless otherwise stated in faculty and school chapters, the minimum residence requirement of the University of Manitoba is the work normally associated with one year in the case of programs of three years’ duration, and two years for programs of four years’ duration. Some faculties and schools may have additional residence requirements specified in their program regulations. However, in all cases, the residence requirement is assessed following an appraisal of the educational record of the student applying to transfer credits from another institution or applying to earn credits elsewhere on a letter of permission. The residence requirement is not reduced for students whose “challenge for credit” results in a passing grade.

2.2 University Written English and Mathematics Requirement for Undergraduate Students

All students are required to complete, within the first 60 credit hours of their programs, a minimum of one three credit hour course with significant content in written English, and a minimum of one three credit hour course with significant content in mathematics. Some degree programs have designated specific Written English and mathematics courses to fulfil this requirement. See the program descriptions in the faculty and school chapters of this *Calendar* for details.

Exemptions to the Written English and Mathematics Requirement:

- All students with completed baccalaureate degrees and who transfer into any program to which these requirements apply.
- Registered Nurses entering the Bachelor of Nursing Program for Registered Nurses.
- Students admitted before the 1997-98 Regular Session.
- Written English exemption only: Students transferring from Collège universitaire de Saint-Boniface who have completed a written French requirement (at the college before transferring to the University of Manitoba will be deemed to have met the written English requirement.

2.3 List of Approved Written English and Mathematics Courses

A complete list of all courses which satisfy the university written English and mathematics requirement is provided below. (On the web, students may search Course Attributes for courses that satisfy the written English and Mathematics requirements).

Written English Courses

AGRI 2030	Technical Communications (3)
ANTH 1520	Critical Cultural Anthropology (3)
ANTH 2360	Ethnohistory of Sub-Saharan Africa (B) (3)
ARTS 1110	Introduction to University (3)
ASIA 1420	Asian Civilization to 1500 (3)
ASIA 1430	Asian Civilization from 1500 (3)
CDN 1130	Introduction to Canadian Studies (6)
CATH 1190	Introduction to Catholic Studies (3)
CATH 2010	Literature and Catholic Culture 1 (3)
CATH 2020	Literature and Catholic Culture 2 (3)
ECON 2270	European Economic History (6)
ECON 2580	Economics of the European Union (3)
ENGL 0930	English Composition (3)
ENGL 0940	Writing about Literature (3)
ENGL 1XXX	All English courses at the 1000 level
ENGL 2XXX	All English courses at the 2000 level
ENGL 3XXX	All English courses at the 3000 level
ENGL 4XXX	All English courses at the 4000 level
FORS 2000	Introductory Forensic Science
GEOG 3480	Canadian Problems (A) (3)
GEOG 3510	Agricultural Geography (6)
GEOG 3580	Landforms (6)
GEOL 1410	Natural Disasters and Global Warming (3)
GEOL 3130	Communication Methods in the Geological Sciences (3)
GPE 2700	Perspectives on Global Political Economy (3)
GRMN 2120	Introduction to German Culture 1 (3)
GRMN 2130	Introduction to German Culture 2 (3)
HIST 1XXX	All History courses at 1000 level
HIST 2XXX	All History courses at 2000 level
HMEC 1030	Human Ecology: Perspectives and Communication (3)
HYGN 1340	Communication (2) and
HYGN 1350	Community Health (4) and
HYGN 1240	Pre-clinical and Clinical Dental Hygiene (9)
LABR 1290	Working for a Living (3)
LABR 2300	Workers, Employers, and the State (3)
LABR 4510	Labour Studies Field Placement Seminar (3)
LAW 1470	Legal Methods (5)
LAW 2570	Introduction to Advocacy (4)
NATV 1200	The Native Peoples of Canada (6)
NATV 1220	The Native Peoples of Canada Part 1 (3)
NATV 1240	The Native Peoples of Canada Part 2 (3)
NATV 2020	The Métis of Canada (3)
PHIL 2150	Mind and Body (3)
PHIL 2610	The History and Philosophy of Science (6)
PHIL 2790	Moral Philosophy (6)
PHIL 3220	Feminist Philosophy (3)
POLS 1500	Introduction to Politics (6)
POLS 2000	Introduction to Comparative Politics (6)
POLS 2040	Introduction to International Relations (6)
POLS 2070	Introduction to Canadian Government (6)
POLS 2510	Great Political Thinkers (6)
PSYC 2500	Elements of Ethology (3)
REHB 1520	Principles of Occupational Therapy (4)
RLGN 1320	Introduction to World Religions (6)
RLGN 1420	Ethics in World Religions (3)
RLGN 1440	Evil in World Religions
RLGN 2160	Introduction to Hebrew Scriptures (3)
RLGN 2170	Introduction to New Testament (3)
RLGN 2590	Religion and Social Issues (3)
RLGN 2770	Contemporary Judaism (3)
RLGN 3280	Hasidism (3)
RLGN 2760	Rabbinic Judaism (3)
RUSN 2280	Russian Culture 1 (3)
RUSN 2290	Russian Culture 2 (3)
RUSN 2350	Russian Women's Writing From the 1950's to the Present Day (3)

RUSN 2740	Literature and Revolution (6)
RUSN 2750	Contemporary Russian Literature and Film (3)
RUSN 3770	Tolstoy (3)
RUSN 3980	Women and Russian Literature (3)
SOC 3350	Feminism and Sociological Theory (3)
UKRN 2590	Ukrainian Literature & Film (3)
UKRN 3970	Women and Ukrainian Literature (3)
WOMN 1500	Introduction to Women's and Gender Studies in the Humanities (3)
WOMN 1600	Introduction to Women's and Gender Studies in the Social Sciences (3)
WOMN 2560	Women, Science and Technology (3)

Mathematics Courses

FA 1020	Math in Art (3)
GEOG 3680	Research Methods in Geography (6)
MATH 1XXX	All Mathematics courses at the 1000 level
MATH 2XXX	All Mathematics courses at the 2000 level
MATH 3XXX	All Mathematics courses at the 3000 level
MATH 4XXX	All Mathematics courses at the 4000 level
MUSC 3230	Acoustics of Music (3)
PHYS 1020	General Physics 1 (3)
PHYS 1030	General Physics 2 (3)
PSYC 2260	Introduction to Research Methods (3)
PSYC 2300	Advanced General Psychology (6)
REHB 2460	Statistics (3)
SOC 2290	Introduction to Research Methods (6)
STAT 1XXX	All Statistics courses at the 1000 level
STAT 2XXX	All Statistics courses at the 2000 level
STAT 3XXX	All Statistics courses at the 3000 level
STAT 4XXX	All Statistics courses at the 4000 level

SECTION 3: Course Identification

3.1 Credit Hours (Cr.Hrs.)

Each faculty and school develops courses for its degree credit programs, subject to Senate approval, and assigns a credit hour value to each course.

The credit hours for a course are expressed as a number associated with the course which indicates its relative weight. There is a correlation between class hours and credit hours (i.e., 6 credit hours = 3 hours a week, two terms; and 3 credit hours = 3 hours a week, one term).

For the purposes of registration, courses taught over two terms have been divided into two parts. Students registering for term spanning courses will receive one grade for the course and only when the second part is completed. Check the *Registration Guide* for registration instructions.

3.2 Prerequisite and Corequisite Courses

Prerequisite: If a course is prerequisite for a second course, the prerequisite must be met in order to begin the second course. To determine whether or not a course has a prerequisite, see the course descriptions in this *Calendar*. Normally, a minimum grade of "C" is required in all courses listed as prerequisites, except as otherwise noted in the course descriptions.

For some courses, the prerequisite may be completed before registering for the second course or may be taken concurrently with the second course. To determine if a course may be taken concurrently, see the course descriptions in this *Calendar*.

Corequisite: If a first course is a corequisite for a second course, the first course **must** be completed in the same term as the second course. To determine if a course has a corequisite, see the course descriptions in this *Calendar*.

Where the sequence in which courses are taken is important, one course is stipulated as being prerequisite to another (e.g., Mathematics 1 may be prerequisite to Mathematics 2). Unless otherwise specified in the regulations of any faculty or school, the prerequisite requirement is met if at least a passing grade (D) is earned in the course. If the course is failed, permission *may* be granted to repeat it concurrently with the course for which it

is prerequisite. Some prerequisite courses may be taken concurrently. Check the course description for specific information.

Where a course is specified as a corequisite course, it must be taken at the same time as (or prior) to the course requiring it as a corequisite.

3.3 Course Numbers

First Two to Four Characters

The two, three or four characters in every course number are a shortened version of the subject of the course.

Last Four Digits

At the University of Manitoba the last four digits of the course number reflect the level of contact with the subject.

For example:

ECON 1200 Principles of Economics Cr.Hrs. 6

ECON is the code for Economics.

1200 indicates that it is an introductory or entry level course.

If the course requires a laboratory, this will be shown following the credit hours immediately following the title.

For example:

BIOL 3242 Biodiversity: Vascular Flora of Manitoba Cr.Hrs. 3 (Lab Required)

The 2000, 3000, 4000 course numbers indicate the second, third, and fourth levels of university contact with a subject.

Numbers in the 5000 range are normally associated with pre-Master's work or courses in the Post Baccalaureate Diploma and the Post-Graduate Medical Education programs.

Courses numbered 6000-8000 are graduate courses of the Faculty of Graduate Studies.

Course numbers in the 9000 series are used to identify courses taken at the University of Winnipeg by students in the University of Manitoba/University of Winnipeg Joint Master's Programs. The 9000 numbers do not indicate the level of the course taken (see *Graduate Calendar* or *University of Winnipeg Calendar*).

In most cases, some correlation exists between the course number and a student's year of study; that is, students in the third year of a program will generally carry course loads comprised primarily of 3000-level courses.

3.4 Other Course Information

Courses with numbers that end in 0 or an even number are taught in English usually on the Fort Garry or Bannatyne campuses.

Courses with numbers that end in odd numbers are taught in French at College Universitaire de Saint-Boniface.

SECTION 4: Grades and Grade Point Average Calculation

Final grades in most courses are expressed as letters, ranging from D, the lowest passing grade, to A+ the highest. Each letter grade has an assigned numerical value which is used to calculate grade point averages.

Some courses are graded on a pass/fail basis and because no numerical value is assigned to these courses, they do not affect grade point averages. Courses graded in this way are clearly identified in course descriptions and program outlines.

4.1 The Letter Grade System

Letter Grade	Grade Point Value	
A+	4.5	Exceptional
A	4.0	Excellent
B+	3.5	Very Good
B	3.0	Good
C+	2.5	Satisfactory
C	2.0	Adequate
D	1.0	Marginal
F	0	Failure
P		Pass
S		Standing

The grade of "D" is regarded as marginal in most courses by all faculties and schools. It contributes to decreasing a term, degree or cumulative Grade Point Average to less than 2.0. The course in which "D" standing is obtained need not be repeated except by probationary students in certain faculties or where a minimum grade of "C" is required in a prerequisite subject or to meet degree requirements. Courses graded "D" may be repeated for the purpose of improving a GPA. Students in doubt as to the status of their record should consult an advisor in their faculty or school.

For minimum grade levels, especially as they affect progression requirements, see the faculty or school regulations or consult an advisor.

4.2 Calculation of Grade Point Average

Quality Points

The quality points for a course are the product of the credit hours for the course and the grade point obtained by the student; e.g., 3 credit hours with a grade of "B" (3.0 points) = 3 credit hours x 3.0 = 9.0 quality points.

Quality Point Total

The quality point total is the sum of quality points accumulated as students proceed through their program of studies.

Grade Point Average (GPA)

The grade point average (GPA) is the quality point total divided by the total number of credit hours.

Cumulative Grade Point Average

The Cumulative GPA is the quality point total divided by the total number of credit hours attempted at the University of Manitoba and courses transferred from other institutions.

Degree Grade Point Average

The Degree grade point average is the Quality Point total divided by the total number of credit hours attempted at the University of Manitoba and courses transferred from other institutions for courses that are acceptable for credit in the current faculty or school.

Term Grade Point Average

The Term GPA is calculated on the basis of all final grades received in the term (eg. Fall, Winter, or Summer terms).

Repeated Courses

When a course has been repeated, the last grade achieved is that which will be used in the calculation of the GPA. (Students are normally permitted to repeat the same or equivalent course once). Admissions criteria and eligibility rules may vary by faculty with respect to inclusion and calculation of grades for repeated courses.

NOTE: Information on credit hours, courses, prerequisites and corequisites, is found in Appendix B of this chapter, entitled Course Identification.

4.3 Academic Honours

Students qualify for the Dean's Honour List when they achieve qualifying grade point averages as specified in the faculty and school chapters of this *Calendar* or in program regulations.

In addition, outstanding academic achievement will qualify students for other honours and awards. These include the University Gold Medal which is awarded at graduation in each faculty or school to the student with the most outstanding academic record; program medals which are awarded by faculties and schools to the best student graduating from a specific program; graduation "with distinction," which is recorded on the transcripts of all students who attain a qualifying grade point average; and other medals and prizes that are specific to programs or disciplines.

SECTION 5: Academic Evaluation

5.1 Methods of Evaluation

Within the first week of lectures, instructors must inform the class of the method of evaluation to be used in each course. See the Responsibilities of Academic Staff to Students Policy, in the chapter University Policies. In departments where a course is offered in more than one section, the department offering the course endeavours to provide instruction so that all sections cover similar topics and that all students achieve a similar level of competency in the topic. However, there will be differences in evaluation as well as in teaching style, readings and assignments from one section to another. Students may contact the department for additional information before registration.

5.1.1 Credit for Term Work

In subjects involving written examinations, laboratories, and term assignments, a student may be required to pass each component separately. If no final examination is scheduled in a course, the student's final grade will be determined on the basis of the method of evaluation as announced in the first week of lectures.

If credit is not given for term work, the student's final grade will be determined entirely by the results of the final written examination. Where the final grade is determined from the results of both term work and final examinations, the method of computing the final grade will be as announced within the first week of classes. Should a student write a deferred examination, term grades earned will normally be taken into account as set out in the immediately preceding paragraph.

5.1.2 Incomplete term work

A student who is unable to complete the term work prescribed in a course may apply to the instructor prior to the end of lectures for an incomplete grade and time extension for work completion. It is understood that the student is to write the final examination if one is scheduled for the course.

Taking into account the results of the final examination, the value of the term work completed, and the extent of the incomplete term work, the instructor shall calculate the temporary grade using a zero value for incomplete work. In no case will the satisfaction of the incomplete requirements cause a grade to be lowered.

The following maximum time extensions are allowed: August 1, for courses terminated in April; December 1, for courses terminated between May and August; April 1, for courses terminated in December. If a final grade is not reported within one month of the extension deadline, the letter "I" will be dropped, and the grade will remain as awarded. The student's opportunity to improve the grade will have lapsed.

5.1.3 Repeating a Course

Subject to faculty or school regulations, required courses graded "F" or "D" must be repeated, usually at the next opportunity. Elective courses graded "F" may either be repeated or another elective substituted. All electives in a program must be approved by the faculty or school.

When a course has been repeated, the last grade achieved is that which will be calculated in the GPA.

5.1.4 Probation and Academic Suspension

Failure to meet minimum levels of performance as specified in the regulations of the faculty or school will result in a student being placed either on probation or academic suspension in accordance with the faculty or school regulations.

A student's status is determined, following final examinations, at the end of each term (Fall, Winter or Summer terms) or at the end of an academic session as specified in faculty regulations. A student placed on probation is advised to discuss his/her program prior to the next registration with a representative of the dean or director to determine which courses, if any, should be repeated.

A student placed on academic suspension will normally be permitted to apply for re-entry to the faculty or school after one year has elapsed, but reinstatement is not automatic and individual faculty or school regulations must always be consulted.

While on suspension, students are not normally admissible to another faculty or school.

5.1.5 Release of Grades

Grades will be posted on the Aurora Student website when received. This may be a few days after classes for some courses and up to a few weeks after final examinations for others.

Students may access their grades through Aurora Student. Click on [Enrolment and Academic Records](#), [Student Records](#), [Final Grades](#).

5.2 Examinations

5.2.1 Examination Schedules

For most faculties/schools, final examinations are conducted in December for Fall Term courses; and in April/May for Winter Term and Fall/Winter Term courses. The Academic Schedule of the University, located at the front of this book, should be consulted for the exact time periods. A Preliminary Examination Timetable is posted approximately one month after the beginning of the term. The Final Examination Timetable, which contains the exact times and locations for each course and section, is posted by the Registrar's Office approximately six to eight weeks prior to each examination period. The examination timetable is available on the Registrar's Office Website (umanitoba.ca/registrar). **Students must remain available until all examination and test obligations have been fulfilled.**

5.2.2 Examination General Regulations

Any test(s) which have an aggregate value of more than 20% of the total value of the course may not be scheduled to take place during the 14 calendar days ending with the last day of classes in the term during the Fall/Winter Sessions as defined in the *Calendar*, or during the last two classes of Summer Evening and the last three classes of Summer terms.

No project or assignment may be announced during the periods outlined above, unless contained in the information required to be provided to all students during the first week of classes (See the Responsibilities of Academic Staff to Students in the chapter on Policies and Guidelines of the University).

5.2.3 Final Examinations

No final examinations or term or take home examinations shall be scheduled to occur prior to the examination periods as described in the *Calendar* except with the expressed consent of the deans and directors involved.

The weight of each question shall be clearly indicated on the examination paper.

The name of the instructor or the examination committee shall be clearly indicated on the examination paper

Students (with the exception of students auditing courses) are required to write all final examinations. Those who absent themselves without an acceptable reason will receive a grade classification of "NP" accompanied by a letter grade based on term work completed for the course using a zero value for incomplete term work and for the final examination. If no credit for term work is involved, a grade of "F" will be assigned. Under certain conditions a student may apply for a deferred examination; see Deferred Examinations.

Examinations are scheduled at the end of each term of registration.

Students are not permitted to leave an examination within the first 30 minutes and any student arriving more than 30 minutes after the commencement, but before the end, of a final examination scheduled by the Registrar's Office, might not be permitted to write that examination on the authority of the chief invigilator of the examination room.

Provided fairness is guaranteed beforehand, miniature electronic calculators shall be allowed during examinations, with the consent of the department.

Students are not permitted to bring in any unauthorized materials to an examination. This includes, but is not limited to, calculators, books, notes, or any electronic device capable of wireless communication and/or storing information (e.g. translator, cell phone, pager, PDA, MP3 units, etc.). However, students may bring in such material or devices when permission has been given by the instructor and/or the department or faculty.

The use of audio visual supports (including, but not limited to overhead or slide projectors, and audio/visual tape players) to display examination or test questions shall be prohibited except where arrangements have been made to display all questions simultaneously for the entire examination/

test period or in courses where time limited identification is a legitimate and specified part of the examination/test process.

Answers to examination questions shall not be posted prior to the conclusion of the examination.

Final grades must be posted by faculties and schools (identifying students by student number only) as soon as the grades have been approved by the faculty/school/department (as appropriate) and have been submitted to the Registrar's Office. (This policy is under review).

5.2.4 Student Access to Final Examinations

In order to allow proper feedback, students shall have an opportunity to read their own final examination script and any comments written on it prior to the deadline for a formal grade appeal, but only in the presence of the instructor or a department-appointed staff member.

5.2.5 Special Examination - Religious Reasons

A student who, because of religious obligations, is unable to write a final examination when scheduled, shall be given an opportunity to write a special examination. The student is required to give reasonable notice (approximately three weeks) to the head of the department concerned prior to the examination series and to present evidence concerning the religious obligations involved.

5.2.6 Deferred Examinations

Policies and procedures with respect to deferred examinations are currently under review. Pending approval of Senate, revised policies will be published on the university website. Check the Registrar's Office website (umanitoba.ca/registrar) or the online Calendar after July 2010. Students who miss a final examination and wish to apply for a deferred writing must apply to advising office of their faculty or school. University 1 students must contact the U1 Student Help Centre.

5.2.7 Supplemental Examinations

A limited number of faculties and schools permit a supplemental examination when a student has failed a course or failed to achieve a satisfactory result. Please refer to the section of the Calendar for your faculty or school for its policy on supplemental examinations. Where a faculty's or school's regulations permit supplemental examinations, students are normally notified of this privilege on their grade statements or by their faculty or school following publication of the grades. Students who are granted supplemental privileges are normally required to sit the examination within 30 working days from the end of the examination series in which the supplemental grade was received unless the progression rules of a faculty or school require the successful completion of an entire academic year before a student is eligible to proceed into the next. In this case, students are obliged to sit the examination at the next ensuing examination period.

The passing grade in a supplemental examination must be at least "C." Students are normally required to carry a full-time program in order to be eligible. Accordingly, students who are granted incomplete or deferred status may not be eligible. A student may only write a supplemental once in any course; otherwise the course must be repeated.

Students are advised to check with faculty or school offices or consult an advisor as to specific regulations that may apply.

To write a supplemental examination an application must be made to the office of the dean or director and the appropriate fee paid. The application form will be forwarded to the Registrar's Office and the supplemental grade will be submitted following completion of the examination.

5.2.8 Special Supervision of Off-Campus Examinations

Students who have been given permission to write deferred or supplemental examinations off-campus may apply to the Registrar's Office to write at an approved centre outside of Winnipeg.

5.2.9 Examinations: Personations

A student who arranges for another individual to undertake or write any nature of examination for and on his/her behalf, as well as the individual who undertakes or writes the examination, will be subject to discipline under the university's Student Discipline Bylaw, which could lead to suspension or expulsion from the university. In addition, the Canadian Criminal Code treats the personation of a candidate at a competitive or qualifying examination held at a university as an offence punishable by summary conviction. Section 362 of the code provides:

Personation at Examination

362. Every one who falsely, with intent to gain advantage for him/herself or some other person, personates a candidate at a competitive or qualifying examination held under the authority of law or in connection with a university, college or school or who knowingly avails him/herself of the results of such personation is guilty of an offence punishable on summary conviction. 1953- 54,c.51, s.347.

Both the personator and the individual who avails him/herself of the personation could be found guilty. Summary conviction could result in a fine being levied or up to two years of imprisonment.

5.3 Other Forms of Earning Degree Credit

5.3.1 Letter of Permission for Transfer of Credit

Students in degree programs at this university may take courses at other recognized colleges or universities for transfer of credit provided such courses are approved at least one month prior to the commencement of classes at the other institution by the faculty or school in which they are currently registered. The approval is subject to individual faculty/school regulations and is granted in the form of a Letter of Permission. The student must obtain a Letter of Permission whether or not the course/s being taken are for transfer of credit to the University of Manitoba. Failure to obtain a Letter of Permission may have serious academic implications.

To obtain a Letter of Permission, application must be made to the Registrar's Office as early as possible and at least one month prior to when required at the other institution.

Each application must be accompanied by the appropriate fee. The fees are for each application and a separate application is required for each session and institution regardless of the number of courses being considered. Students planning to seek permission to take courses elsewhere for transfer of credit to the University of Manitoba are cautioned to check the current *Calendar* for the residence and degree requirements of the degree programs in which they are enrolled.

Transferred courses will be given assigned credit hour values and grades. The transferred grade will be included in the student's degree and cumulative GPA.

5.3.2 Challenge for Credit

The purpose of Challenge for Credit is to provide students of the university with some means of obtaining academic credit in University of Manitoba courses (not otherwise obtainable as a transfer of credit from other institutions) for practical training and experience, or reading and study previously completed. Students who have registered to challenge would normally not attend classes or laboratories. Courses which have previously been taken at the University of Manitoba may not be challenged for credit.

To be eligible to challenge for credit a student must first be admitted to a faculty or school of the University of Manitoba. Eligible students will be required to demonstrate their competence in the courses which they are challenging for credit. Where formal, written examinations are required, these will be generally scheduled during the regular examination sessions in April/May, June, August, or December.

For information regarding requirements, procedures, applications and fees a student should contact the office of the faculty or school in which the student is enrolled, or in the case of new students, the faculty or school to which the new student has been admitted.

5.3.3 Transfer of Credit Between Programs within the University of Manitoba

When students transfer credits into their programs from another faculty or school within the University of Manitoba, the credit hour value used by the faculty or school offering the course is used. That is, there can only be one credit weight designated for a course with a particular course number.

SECTION 6: Appeals of Grades

6.1 Appeals of Grades Received for Term Work

The appeal of term work returned or made available to students before the last day of classes shall be subject to the policies and procedures established by faculty or school councils.

Students may formally appeal a grade received for term work provided that the matter has been discussed with the instructor in the first instance in an attempt to resolve the issue without the need of formal appeal. Term work grades normally may be appealed up to ten working days after the grades for the term work have been made available to the student.

Students may obtain the form "Application for Appealing a Grade Given for Term Work" from the general office of the department which offered the course. The fee which is charged for each appealed term work grade will be refunded for any grade which is changed as a result of the appeal.

6.2 Appeal of Final Grades

If a student has good reason to believe a mistake has been made in the assessment of the original grade, an appeal of the assigned grade may be made. A student may enter an appeal, through the Registrar's Office, for assessment of one or more grades following the posting of grades by the faculty/school/department. Grades are released by the Registrar's Office as they are received from faculties and schools. A student wishing to make a final grade appeal on a first term course grade must do so within 15 working days of the first day of classes for second term. For second term courses and full courses, the appeal must be made 15 working days following the Victoria Day Holiday.

Students wishing to appeal grades should contact the Registrar's Office to make application. The deadlines for grade appeals fall 15 working days from the first day of second term courses and 15 working days from the Victoria Day Holiday. For 2010-2011, these dates are as follows:

Appeal of Fall Term Courses: on or before January 26, 2011

Appeal of Winter Term and Full Courses: on or before June 14, 2011

For more information, including fees, please consult umanitoba.ca/registrar.

The fee which is charged for each appealed grade will be refunded for any grade which is changed. It should be noted that an appealed grade may not be lowered. Appeal forms may be obtained from the Registrar's Office. Students should note that the deadline for appeal of assigned grades will not be extended for students who are on "hold status" nor will official grades be released by the Registrar's Office until the "hold" has been cleared. (This policy is under review).

6.3 Academic Appeals

With the exception of decisions on admissions or disciplinary matters, all academic appeals from decisions of faculty or school appeals committees at the University of Manitoba or by the Comité d'appels at Collège universitaire de Saint-Boniface shall be heard by the Senate Appeals Committee regardless of the institute of registration of the student concerned.

The complete terms of reference for the Senate Committee on Appeals as well as an Appeal Form may be obtained from the Office of the University Secretary, 312 Administration Building or Student Advocacy/Student Resource Services, 519 University Centre.

SECTION 7: Attendance and Withdrawal

7.1 Attendance at Class and Debarment

Regular attendance is expected of all students in all courses.

An instructor may initiate procedures to debar a student from attending classes and from final examinations and/or from receiving credit where unexcused absences exceed those permitted by the faculty or school regulations.

A student may be debarred from class, laboratories, and examinations by action of the dean/director for persistent non-attendance, failure to produce assignments to the satisfaction of the instructor, and/or unsafe clinical practice or practicum. Students so debarred will have failed that course.

7.2 Withdrawal from Courses and Programs

7.2.1 Voluntary Withdrawal

The registration revision period extends two weeks from the first day of classes in both Fall and Winter terms. Courses dropped during this period shall not be regarded as withdrawals and shall not be recorded on official

transcripts or student histories. The revision period is prorated for Summer terms and for parts of term.

After the registration revision period ends, voluntary withdrawals (VWs) will be recorded on official transcripts and student histories.

The following dates are deadlines for voluntary withdrawals:

- The Voluntary Withdrawal deadline shall be the 48th teaching day in both Fall and Winter term for those half-courses taught over the whole of each term;
- The Voluntary Withdrawal deadline for full-courses taught over both Fall and Winter term shall be the 48th teaching day of the Winter term; and
- The Voluntary Withdrawal deadline for full-and-half courses taught during Summer terms or during some other special schedule shall be calculated in a similar manner using a pro-rated number of teaching days.

The exact Voluntary Withdrawal dates that apply to courses offered in the current academic session are published in the Academic Schedule at the front of this *Calendar*.

7.2.2 Authorized Withdrawal

Subject to the provision of satisfactory documentation to the faculty of registration, Authorized Withdrawals (AWs) may be permitted on medical or compassionate grounds.

7.2.3 Required Withdrawal from Professional Programs

Senate, at the request of some faculties and schools, has approved bylaws granting them the authority to require a student to withdraw on the basis of unsuitability for the practice of the profession to which the program of study leads.

This right may be exercised at any time throughout the academic year or following the results of examinations at the end of every year.

This right to require a student to withdraw prevails notwithstanding any other provisions in the academic regulations of the particular faculty or school regarding eligibility to proceed or repeat.

Where Senate has approved such a bylaw, that fact is indicated in the *Calendar* chapter for that faculty or school. A copy of the professional unsuitability bylaw may be obtained from the general office of the faculty or school.

SECTION 8: Academic Integrity

8.1 Plagiarism and Cheating

Plagiarism or any other form of cheating in examinations, term tests or academic work is subject to serious academic penalty (e.g. suspension or expulsion from the faculty or university). Cheating in examinations or tests may take the form of copying from another student or bringing unauthorized materials into the exam room (e.g., crib notes, pagers or cell phones). Exam cheating can also include exam impersonation. (Please see Section 4.2.8 on Exam Personation). A student found guilty of contributing to cheating in examinations or term assignments is also subject to serious academic penalty.

To plagiarize is to take ideas or words of another person and pass them off as one's own. In short, it is stealing something intangible rather than an object. Plagiarism applies to any written work, in traditional or electronic format, as well as orally or verbally presented work. Obviously it is not necessary to state the source of well known or easily verifiable facts, but students are expected to appropriately acknowledge the sources of ideas and expressions they use in their written work, whether quoted directly or paraphrased. This applies to diagrams, statistical tables and the like, as well as to written material, and materials or information from Internet sources.

To provide adequate and correct documentation is not only an indication of academic honesty but is also a courtesy which enables the reader to consult these sources with ease. Failure to provide appropriate citations constitutes plagiarism. It will also be considered plagiarism and/or cheating if a student submits a term paper written in whole or in part by someone other than him/herself, or copies the answer or answers of another student in any test, examination, or take-home assignment.

Working with other students on assignments, laboratory work, take-home tests, or on-line tests, when this is not permitted by the instructor, can con-

stitute Inappropriate Collaboration and may be subject to penalty under the Student Discipline By-Law.

An assignment which is prepared and submitted for one course should not be used for a different course. This is called “duplicate submission” and represents a form of cheating because course requirements are expected to be fulfilled through original work for each course.

When in doubt about any practice, ask your professor or instructor.

The Student Advocacy Office, 519 University Centre, 474-7423, is a resource available to students dealing with Academic Integrity matters.

SECTION 9: Graduation and Convocation

9.1 Graduation

Students may graduate from the University of Manitoba in May, October, and February of each year. (Convocation ceremonies are held in May and October only).

Students are eligible to graduate when they have completed all of the requirements for their degree program in accordance with the regulations described in the *Undergraduate Calendar* and the regulations available from the general offices of their faculties and schools.

It is the responsibility of each student to be familiar with the graduation requirements of the program in which they are enrolled. Consultation with academic advisors is advised to ensure that graduation requirements are met.

Please refer to the Registrar’s Office website (umanitoba.ca/registrar; click on Graduation and Convocation for answers to frequently asked questions about Graduation).

9.2 Application for Graduation

Every candidate for a degree, diploma or certificate must make formal application at the beginning of the session in which he/she expects to complete graduation requirements.

Application is to be made through Aurora Student. (Log into [Aurora Student](#); click [Enrolment and Academic Records](#), then [Declarations](#), then [Declare Graduation Date](#)).

Deadline to Apply for Fall 2010 Graduation: July 29, 2010

Deadline to Apply for February 2011 Graduation: September 22, 2010

Deadline to Apply for Spring 2011 Graduation: January 18, 2011

9.3 Changing a Graduation Date

If you need to change your graduation date after you have made your declaration, you must contact the general office of your faculty or school as soon as possible.

9.4 Receipt of Information about Graduation

After you have declared your graduation, you will be sent a series of e-mails requesting you to verify your full legal name, asking you about your attendance at convocation, providing convocation information, and so on. **It is imperative that you activate your University of Manitoba e-mail account and check it regularly.**

9.5 Convocation

Convocation ceremonies are held in May and October of each year. Correspondence with students who declare intention to graduate will be by email. Please be sure you have claimed your University of Manitoba computer account.

February graduates are included in the May ceremonies.

Graduating students are encouraged to attend with their families and friends because it is the one ceremonial occasion that marks the successful conclusion of their program of studies.

All prospective graduating students who apply for graduation will be asked to confirm by email their intention to attend Convocation.

Complete details of the time, location, and ceremony arrangements will be included in the material sent by email from the Convocation Office in the Office of Registrar.

Students who, for any reason, do not attend Convocation will receive their degrees in absentia.

The Registrar’s Office will hold unclaimed parchments for a maximum of twelve months after graduation when any unclaimed parchments will be destroyed. These will include those not given at Convocation, those that were to be picked up in person but not claimed, those that were mailed but returned to the Registrar’s Office by the postal outlet or courier depot, those that were not issued due to a financial hold on a student’s records, and those that were reprinted immediately after convocation due to corrections.

It is critical that you update your address, phone number and email through Aurora whenever changes occur. Note that any changes made with the Alumni Association are not reflected in your University of Manitoba student records.

If you do not receive your parchment, it is your responsibility to follow up with the Registrar’s Office within a twelve-month period. Any requests for parchments after this time will be processed as replacements; there is a fee charged for replacement parchments.

9.5.1 Academic Dress

Academic gowns, hoods, and caps are provided by the university as part of the Convocation arrangements.

9.5.2 Convocation Information

Information on Convocation may be obtained from the Registrar’s Office, 400 University Centre.

SECTION 10: Personal Information

You may make changes to your personal information by accessing Aurora Student and then selecting [Personal Information](#).

10.1 Mailing Address

In order to receive University mail, it is essential that you to provide the Registrar’s Office with your current address. All mail will be directed to the address you provide.

10.2 Change of Name

If you have changed your name since you first registered, official evidence of the name change (such as a marriage certificate) must be submitted to the Registrar’s Office. If you are unable to submit your name change documentation before registration, register under your former name, and then submit your name change information to the Registrar’s Office after registration.

The University of Manitoba uses your full legal name on its records, transcripts, and on graduation documents. Abbreviated or anglicized names should not be used unless they have been legalized with documentation.

Academic Guide

Faculty of Graduate Studies

Regulations, Policies and Procedures

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The Faculty of Graduate Studies academic guide contains all the rules and policies pertaining to the Faculty of Graduate Studies. Adherence to these rules is of utmost importance for the effective functioning/operation of programs and for guiding and monitoring the progress of students. The integrity of the process is at stake. The major goal of this guide is to prevent potential problems that may affect the completion of a student’s program. It is the responsibility of students and the unit offering a graduate program to read and follow the policies contained herein.

All regulations as laid out in the Faculty of Graduate Studies Academic Guide are subject to revision by the appropriate bodies of the Faculty of Graduate Studies. This compendium is presented as the most recent set of regulations as a guideline for students and staff. Regulations may vary from one department or program to another. Individual departments may have additional regulations that supplement these general regulations. All such supplementary procedures and regulations must be approved as specified by the By-Laws of the Faculty of Graduate Studies, be published and available to students, and kept on file in the Faculty of Graduate Studies Office.

For those programs that are administered through a Faculty (as opposed to a Department) the term “Department” should be substituted by “Unit” within this document (i.e. Department Head becomes Unit Head.)

Section 1: Application, Admission, and Registration Policies

1.1 Application and Admission Procedures

The application (and all required documentation) is to be submitted directly to the Faculty of Graduate Studies. **Applicants should contact the department to which they are applying for the procedures, requirements and departmental application deadlines in effect.**

Steps:

1. A completed official application for admission form must be submitted, together with the application fee and supporting documentation, to the Faculty of Graduate Studies. Until such time as an application is complete it will not be considered.

NOTE: International students need to pay special attention to the appropriate requirements with respect to transcripts (see application form for details).

2. Applications are subsequently reviewed by the unit offering the program who will decide whether the applicant meets the unit’s criteria which include but are not limited to space, facilities, and advisors.

3. Notification of recommended/rejected applications are sent to the Faculty of Graduate Studies who check that the applicant meets the eligibility requirements of the Faculty of Graduate Studies. The Faculty of Graduate Studies notifies applicants of their acceptance or rejection.

Deadlines for Recommended Applications (from Departments to the Faculty of Graduate Studies)

The following are the deadlines for receipt by the Faculty of Graduate Studies Office for recommendations from graduate departments.

Session	Start Date	Canadian/US	International
FALL	September	July 1	April 1
WINTER	January	November 1	August 1
SUMMER (May Start)	May	March 1	December 1
SUMMER (July start)	July	May 1	February 1

IMPORTANT: Applicants are required to submit the application and documentation to the Faculty of Graduate Studies for an earlier date than is listed above. Applicants are advised to confirm the deadline of the department to which the application is being made. Contact information for each department can be found at http://umanitoba.ca/faculties/graduate_studies/admissions/index.html

The deadlines are meant to accommodate the needs of students in securing appropriate documentation. Late applications may be considered for the next available start date.

Application Fee

This fee must accompany all admission applications:

Canadian/Permanent Residents - \$100.00 (CDN)

International Applicants - \$100.00 (CDN)

Transcripts:

Applicants must arrange for official transcripts from all post-secondary institutions attended to be sent to the University of Manitoba. **Applicants must ensure that the original transcripts bearing the university seal or attested copies are sent directly from their issuing university to the Faculty of Graduate Studies.** In cases where the transcript does/will not clearly state that a degree has been conferred, an official degree certificate is required to accompany the transcript. It is important that the transcript(s) be sent so as to arrive as soon as possible to coincide with the arrival of the application.

Transcripts: International

Where academic records from a country other than Canada are produced in a language other than English the applicant must arrange for the submission of official literal translations of all records. To be official, original language documents and English translations must arrive together in envelopes which have been sealed and endorsed by the issuing institution.

Transcripts: University of Manitoba

University of Manitoba students may request student histories (unofficial academic records) to be mailed directly to the Faculty of Graduate Studies free of charge. Some departments require official transcripts which may be obtained from the Registrar's Office, 400 University Centre (Please allow at least two weeks for delivery).

Proficiency in English

A successfully completed English Language Proficiency Test from the approved list is required of all applicants unless they have received a high school diploma or university degree from Canada or one of the countries listed on the [English Language Proficiency Test Exemption List](#) (see next section). If applicable, this score is required as a basis for admission and applicants will NOT be accepted subject to receipt of an acceptable score. Documented proof of either of the above must be submitted with the application for admission. **Please note:** scores more than two years old are not acceptable.

Thresholds required for successful completion are indicated in parentheses.*

University of Michigan English Language Examination Assessment Battery MELAB (80%)

Test of English as a Foreign Language TOEFL– Paper-based test (550); Internet based -iBT (80)

Canadian Test of English for Scholars and Teachers CanTEST (band 4.5 in listening and reading and band 4.0 in writing and oral interview)

International English Language Testing System IELTS (6.5)

Academic English Program for University and College Entrance AEPUCE (65%)

Canadian Academic English Language Assessment (CAEL) (60 overall and 60 on each subset)

Note:

1. In addition, Foreign language students may be asked by the Department to complete the CanTEST prior to or following registration in the Faculty of Graduate Studies and, if need be, the Department may recommend remedial measures in language skills based on the results of the CanTEST.

*2. Some departments may require a specific test or test scores greater than those indicated above.

English Language Proficiency Test Exemption List**

Applicants holding secondary school diplomas and/or university degrees from the following countries are exempt from the English Language Proficiency Test requirement:

Australia	Nigeria
Belize	Puerto Rico
English Speaking West Indies	Singapore
Canada	South Africa
Guyana	United Kingdom
Ireland	U.S.A.
Kenya	Zambia
Lesotho	Zimbabwe
New Zealand	

** An updated list of additional countries exempt from the English Language Proficiency Test can be found at umanitoba.ca/faculties/graduate_studies/admissions/english_exemption_list.htm

Letters of Recommendation

Letters of Recommendation forms are available in the Faculty of Graduate Studies Office, 500 University Centre or on the web:

umanitoba.ca/faculties/graduate_studies/media/letter_of_reference.pdf

Two letters of recommendation must be sent to the Faculty of Graduate Studies in individually sealed envelopes with the referee's signature across the closing flap of the envelope. Applicants should check with the department to which they are applying as some departments require more than two Letters of Recommendation on a departmentally approved form.

Admission Tests

Some departments require admissions tests, such as the Graduate Record Examination (GRE) or the Graduate Management Aptitude Test (GMAT). These requirements are listed in the Supplementary Regulations of the par-

ticular department, and if required, the scores must be submitted at the time of application.

Entrance Requirements

The minimum standard for acceptance into any category in the Faculty of Graduate Studies is a 3.0 Grade Point Average (GPA) or equivalent in the last two previous years of full time university study (60 credit hours).

Note: This is the minimum requirement of the Faculty of Graduate Studies and departments may have higher standards and additional criteria.

Eligibility of University of Manitoba Staff Members

A staff member at the University above the rank of Lecturer or Instructor II is not eligible to register for a higher degree in the department in which the appointment is held.

1.2 Registration Procedures

Undergraduate students are not allowed to register in graduate courses; that is, admission to the Faculty of Graduate Studies is a condition for registration in courses at the 600/6000 level and above.

All graduate students must initially register in the term specified in their letter of acceptance as specified in the Academic Schedule of the Graduate Calendar. Any student not registering within one term of acceptance will be required to re-apply for admission. In exceptional circumstances and with prior approval from the Department, a student may defer registration for up to one term following acceptance into the Faculty of Graduate Studies. In the case of International students, admission may be deferred, with prior approval from the Department, for up to one year following acceptance.

All programs must be approved by the head of the major department or designate. Approval to take courses from departments outside the major department must be obtained from the outside department.

The approval or denial of admission and registration to two programs rests solely with the faculties/units concerned. The approval/denial must be submitted to the Faculty of Graduate Studies prior to the student's admission/registration.

Where a student does register in two programs the student must declare themselves as part-time in at least one of the programs. Students should note that completing a graduate program as a part-time student will affect their eligibility for the University of Manitoba Graduate Fellowship and may limit other funding possibilities.

Re-Registration

Any student whose program of study extends over more than one year must re-register for September of each succeeding year of his/her program until a degree is obtained (or in the case of Pre-Master's students their program is completed). **Failure to re-register will result in the termination of the student's graduate status.** A student who has been discontinued and would like to be considered for continuation in a program must re-apply for admission. The re-registration requirement does not apply to, Occasional students, or students on an Exceptional or Parental Leave of Absence, (please refer to the "Leave of Absence" section of this Guide).

Note: Registration is not complete until fee payment or fee payment arrangements have been made with the Comptroller in writing prior to the fee payment deadline dates. The notation 'Discontinued Graduate Program' will be placed on the academic record of any graduate student who has failed to maintain continuous registration.

Registration Revisions

For designated periods subsequent to registration, approved revisions and transfers may be made. It is required that students adhere to dates and deadlines as published in the Academic Schedule of the Graduate Academic Calendar.

Note: Graduate students are not allowed to withdraw from courses without written permission from their Department head on recommendation from their advisor/advisory committee approving the program change. The notation "student discontinued program" will be placed on the academic record of any graduate student who has withdrawn from courses without such approval.

Western Deans' Agreement

This agreement was established in 1974 as an expression of co-operation and mutual support among universities offering Graduate programs in western Canada. Its primary purpose is the reciprocal enrichment of grad-

uate programs throughout western Canada. This agreement is not intended to preclude other agreements between participating institutions.

1. The Western Deans' Agreement provides an automatic tuition fee waiver for visiting students. Graduate students paying normal required tuition fees to their home institution will not pay tuition fees to the host institution.

2. Students may be required to pay student, activity, application, or other ancillary fees to the host institution, according to general policies in effect at the host institution. Wherever possible, these fees will also be waived.

3. Students will qualify for the fee waiver if they:

a) present the "Authorization Form: Western Deans' Agreement" signed by the Dean or designate and the Department Head or Graduate Advisor of a participating Western institution specifying the courses to be taken for credit toward a graduate degree program at their home institution; b) are in good standing in a graduate program at the home institution;

c) have paid all current and back fees at the home institution.

4. Students must meet all requirements as prescribed by the host university's regulations, deadlines, class capacities, and course prerequisites.

5. Registration is possible in courses at both the graduate and undergraduate levels, and in credit courses offered through distance education or other means. To be eligible, courses must be an integral part of the applicants' graduate degree program. Fee waiver is not permitted for audit or non-credit courses.

6. Students must have the Authorization Form approved by the relevant Department Head and the Faculty of Graduate Studies at the host institution at least two weeks prior to the commencement of the course(s) requested. The fee waiver is not available retroactively.

7. Students are subject to regulations of the home institution governing credit for the courses to be undertaken. As a condition of registration at the host institution, students will arrange for official transcripts from the host institution to be sent to the home institution confirming successful completion of courses selected.

8. Students must send confirmation of registration and notice of any change to the graduate Records Office of the home institution at the time of registration or course change is completed.

9. Students may not claim fee waivers under the terms of this Agreement for a period of more than 12 months total.

10. Each institution has its own regulations regarding the maximum number of transfer credits permitted in a given degree program.

Participating Universities

Athabasca University
University of Alberta
Brandon University
University of British Columbia
British Columbia Institute of Technology
University of Calgary
Concordia University
College of Alberta
University of Lethbridge
University of Manitoba
University of Northern British Columbia
University of Regina
Royal Roads University
University of Saskatchewan
Simon Fraser University
University of Victoria
University of Winnipeg

1.3 Course Classifications

General Classifications

Students who register through Aurora Student Information System (Aurora Student) must also have prior approval of the Department Head or designate. Students registering through Aurora Student should add only those courses that are a Major course in their program. Courses with Auxiliary "X", Audit "A", or Occasional "O" status (see below) must be added by the department.

X Auxiliary course: Course is not a major requirement of the program but is required by the student's advisor. **'

A Audit course: Course is not taken for credit. No grade is recorded.

O Occasional course: Course is not a requirement of the program.

**Extra courses which are not actually part of the Master's or Ph.D. program but which are specified and required by the student's advisor, may be classified as X (Auxiliary) and the grade will not be included in the degree GPA which appears on the transcript. However, X course grades may be used in the calculation of the GPA for continuation in the program and a minimum grade requirement may be required for X coursework by the Department. (Please consult the Departmental supplemental regulations.) Additionally, X courses are used in the calculation of the GPA for the purposes of Admission and Awards. (NOTE: The University of Manitoba Graduate Fellowship (UMGF) and International Graduate Student Scholarship (IGSS) use X courses in the calculation of the GPA.) The student's advisor and head of the unit must determine if there is a valid need for the registration in courses under the X classification. A maximum of 12 credit hours under the X course classification is permitted while registered in a given program.

Note: Changes in course classifications are regarded as course/program changes and may not be made without approval (refer to the "Registration Revision" section of this Guide.) or after the deadline dates for course changes as indicated in the Academic Schedule of the *Calendar*.

Continuing Courses (CO)

For those graduate level courses (600/6000, 700/7000, 800/8000) which are being taken by students enrolled in the Faculty of Graduate Studies and which continue beyond the normal academic term, the instructor shall recommend that a mark classification of "CO" be used until such time as a final grade can be established. If the course is not completed by August 31, the student must re-register for the course(s).

Graduate Level Courses (600/6000, 700/7000, 800/8000) which extend beyond normal academic term must be denoted as such in this *Calendar*.

In the absence of an assigned mark of "CO", the student may receive mark of "F" in that term.

Note:

1. A CO will normally not be permitted longer than twelve months.

2. In exceptional circumstances, where a CO grade is requested for a second twelve months, at the time the CO grade is submitted on the examination register the instructor and Department head must also submit the "Recommendation for Continuing Status of a Course" form stating the reason for the CO and the deadline by which the course must be completed.

Incomplete Courses

The student who is unable to complete the term work prescribed in a course may apply to the instructor prior to the end of lectures for consideration of a grade classification of "Incomplete". It is understood that the student is to write the final examination if one is scheduled for the course.

Taking into account the results of the final examination, the value of the term work completed, and the extent of the incomplete term work, the instructor shall calculate the temporary grade using a zero value for incomplete work.

Normally, the following maximum extensions are allowed:

For courses terminated in April, August 1st
For courses terminated in August, December 1st
For courses terminated in December, April 1st

If a final grade is not reported within one month of the extension deadline, the letter "I" will be dropped and the grade will remain as awarded. The student will no longer have an opportunity to improve the grade. In no case will the satisfaction of the incomplete requirements result in a lower grade being awarded.

1.4 Student Status/Categories of Students

Full-Time And Part-Time Students

A student is considered to be full-time if the student is planning to carry the normal academic load of the department during the registration period. Graduate students who do not meet the criteria specified for full-time students should complete the form "Request for Part Time Status."

This form must be approved by the department head and advisor and submitted to the Faculty of Graduate Studies prior to registration.

Pre-Master's Or Qualifying Students

In specific cases where the academic background of the student is judged to be insufficient for the given program in a unit, the department may recommend that the student be admitted to a pre-Master's program of study. The pre-Master's program is designed to bring the student's standing to approximately the level of an Honours graduate in the major department, and to provide any necessary prerequisites for courses.

Occasional Students

A student wishing to take graduate courses with no intention of applying those toward an advanced degree at the University of Manitoba is classed as an occasional student. Occasional students must meet the same degree and grade point average entrance requirements as regular graduate students and must write final examinations in the courses taken (unless audited), but will not receive credit toward a degree. In special circumstances, an occasional student may apply for permission to proceed to a degree program and also apply for transfer, for credit, of courses taken in the occasional category.

Note:

1 Transfer of courses from the "occasional category" to a degree program is not automatic: request for advance credit may be made within the first year of a degree program.

2. Fees paid by a student while registered as an occasional student are not transferable, at a later date, to a degree program.

3. Registration in the occasional student category can be for no more than one academic year without reapplication.

4. Graduate level course work must be taken while registered as an occasional student.

Joint Masters (With The University of Winnipeg)

The University of Manitoba and the University of Winnipeg offer three joint Master's programs in History, Religion, and Public Administration. The University of Manitoba Faculty of Graduate Studies is responsible for the administration of the joint programs and students complete the regular University of Manitoba application and registration forms. Students taking Pre-Master's qualifying work for these programs register at the University where the courses are being taken.

Visiting Students

Visiting students are students who are registered at another institution who are taking one or more courses at the University of Manitoba on a Letter of Permission from their home university.

Provisional (Admission)

A new student is allowed provisional status in a program for up to one term from the time of registration. Registration for additional terms in that program will not be permitted until the provision is cleared. Provisional registration may be for such reasons as missing or incomplete documentation, lack of complete or appropriate academic background, etc.

SECTION 2: Academic Performance: General

Students are ultimately responsible for ensuring that they meet degree and program requirements. The advisor (co-advisor), advisory committee and the department must ensure that each student follows the guidelines and meets the program requirements. The Faculty of Graduate Studies performs a final check of program requirements for each student just prior to graduation. Students are cautioned, therefore, to check all regulations with respect to the degree requirements. Failure to meet all the requirements will result in failure to graduate.

Any student re-registering in the period between receiving unsatisfactory grades and a decision by the Faculty of Graduate Studies on a deficiency does so at his/her own risk.

Departments may make recommendations with regard to the regulations concerning minimum academic performance; however, enforcement of academic regulations rests with the Faculty of Graduate Studies. The following procedures apply to recommendations made by departments:

The department is responsible for informing the Faculty of Graduate Studies when a student's performance is unsatisfactory in research or course

work and the department must describe any recommended remedial action(s).

The department must notify the student of the deficiency and of their recommendation.

If the student fails to satisfy any remedial action recommended, the student will be required to withdraw from the program.

Note:

When a graduate student is required to withdraw from a program of study, the notation on the academic record will be: "Required to withdraw": Voluntary withdrawal from a program is not permitted once the grades have been declared and indicate that the student has failed to achieve the required minimum.

Departmental recommendations will supersede student requests for voluntary withdrawal.

A student who has been required to withdraw from a graduate program at The University of Manitoba may be permitted to enrol in another graduate program only if the application for admission is approved by the Dean of Graduate Studies or designate.

Academic Performance

Student progress shall be reported at least annually to the Faculty of Graduate Studies on the "Progress Report Form". Students who fail to maintain satisfactory performance may be required to withdraw on the recommendation by the Department head to the Dean of Graduate Studies.

Performance in Course Work

A minimum degree grade point average (GPA) of 3.0 with no grade below C+ must be maintained for continuance in the Faculty of Graduate Studies. Departments may specify, in their supplementary regulations, standards that are higher than those of the Faculty of Graduate Studies. Students who fail to maintain the specified grades will be required to withdraw unless a departmental remedial recommendation (as outlined below) is approved by the Dean of Graduate Studies.

A student may be permitted to remove deficiencies in grades by repeating the course or taking an equivalent substitute course only once for each course to a maximum of 6 credit hours of course-work. If a course is repeated or replaced, the highest grade obtained will be used in the determination of the degree grade point average.

Note:

In exceptional circumstances, the major department may appeal to the Faculty of Graduate Studies for approval of remedial recommendation(s) falling outside those prescribed above.

Students receiving a grade of C or less in more than 6 credit hours of coursework are required to withdraw.

In general, supplemental exams are not permitted to students in the Master's or Ph.D. program.

All actions taken administratively are to be reported, in summary form to the Faculty of Graduate Studies Executive Committee.

SECTION 3: General Regulations: Pre-Master's

Admission and Requirements

Graduates of bachelor degree programs with a minimum grade point average (GPA) of 3.0 in the last two full years of university study will be considered for admission to a pre-Master's program. These are the minimum requirements of the Faculty of Graduate Studies. Departments may specify higher or additional criteria. **Admission to a pre-Master's program does not guarantee future admission to a Master's program.** As the Pre-Master's program of study is intended to bring a student's background up to the equivalent of the required 4-year degree, departments should assign to students, as part of their Pre-Master's program of study, an appropriate number of applicable upper level (300/3000 or 400/4000) undergraduate courses. In exceptional circumstances and upon prior approval by the Graduate Dean, 700/7000 level courses may be considered for inclusion in the Pre-Master's program of study for those students who hold a 4 year degree. Courses taken as part of the pre-Master's program may not be transferred to a Master's program at a later date.

Academic Performance

1. The department head or designate is responsible for assigning the courses and monitoring the progress of each student.
2. A minimum degree grade point average of 3.0 with no grade below C+ must be maintained for continuance in pre-Master's study. Students who fail to maintain this standing will be required to withdraw unless a departmental remedial recommendation (as below) is approved by the Dean of Graduate Studies.
3. Students deficient in 6 hours of credit or less may be permitted to write a supplemental examination (when offered) in courses in which a grade of C or less was obtained.
4. Students deficient in 6 hours of credit or less with a grade of C, D, or F in a course or courses may be permitted, if the overall average is C or better, to write one supplemental examination in each course (when offered), to repeat the courses, or to take equivalent substitute courses.

Note: In exceptional circumstances, when a student is deficient in more than 6 credit hours, the student may be permitted to repeat the pre-Master's year or to write supplemental examinations (when offered) or to substitute equivalent course work in order to make up the deficiencies.

A student may be permitted to repeat the pre-Master's year only once, and to remove deficiencies in grades by writing supplemental examination or repeating courses only once for each course to a maximum of 9 credit hours of course work.

If a course is repeated or a supplemental examination is written, the highest grade obtained in that course will be used in the determination of the degree GPA.

The degree GPA is cumulative in a pre-Master's program if more than one year is required to complete the course requirements.

All action taken administratively is to be reported in summary form to the Faculty of Graduate Studies Executive Committee.

SECTION 4: General Regulations: Master's

Diploma Programs:

The regulations for the Master's program shall also prevail for diploma programs. Students should also consult the department supplemental regulations regarding diploma programs.

Individual departments may have additional regulations that supplement these general regulations. All such supplementary procedures and regulations must be approved as specified by the By-Laws of the Faculty of Graduate Studies, be published and available to students, and kept on file in the Faculty of Graduate Studies Office.

Admission

Students who are eligible to be considered for direct admission to a program of study leading to the Master's degree include:

Graduates of four-year undergraduate degree programs (or equivalent) from

- a. Canadian institutions empowered by law to grant degrees; or
- b. Colleges and universities outside Canada which are officially recognized by The Faculty of Graduate Studies.

Graduates from first-cycle Bologna compliant degrees.

Students who have completed the pre-Master's program from the University of Manitoba or from

- a. Canadian institutions empowered by law to grant degrees; or
- b. Colleges and universities outside Canada which are officially recognized by The Faculty of Graduate Studies.

All students applying for a Master's degree program must have attained a minimum GPA of 3.0 in the last two full years (60 credit hours) of study. This includes those applying for direct admission and those entering from a pre-Master's program. Students who meet the minimum requirements for admission to the Faculty of Graduate Studies are not guaranteed admission.

The pre-Master's program is designed to bring the student's standing to the approximate level of an Honours graduate in the major department, and to

provide the student with any necessary prerequisites for courses to be taken in the Master's program.

In specific cases where the academic background of the student is judged to be insufficient for the given program in a unit, the department may recommend that the student be admitted to a pre-Master's program of study.

Student's Advisor/Co-Advisor

Each Master's student should have an advisor upon entry into the program, and must have one assigned no later than one term following registration. The advisor is approved by the Department head, must be a member of the Faculty of Graduate Studies, be active in research, have expertise in a discipline related to the student's program, and hold at least a Master's degree or equivalent. Any exceptions or special circumstances must be recommended by the Head of the major department and approved by the Dean of the Faculty of Graduate Studies. It is the responsibility of the Department head to determine whether faculty members meet these criteria, and also to report on equivalency as necessary. In special circumstances, an advisor and co-advisor upon approval of the department head may advise a student.* The advisor and co-advisor must be members of the Faculty of Graduate Studies. (Refer to *Membership* in the document *Governance of the Faculty of Graduate Studies*,.)

The advisor will advise the student on a program of study, direct research, and supervise the thesis or practicum work. In departments where the choice of thesis/practicum topic and thesis/practicum advisor are postponed for some time after a student's entry into the program, the Department head shall appoint a faculty member to advise the student in the interim period before the regular advisor is assigned or chosen.

***Note:** When an advisor and co-advisor are assigned, together they shall fulfill the role of the advisor (that is, neither shall fulfill any other advisory or examining committee membership requirements). The co-advisors will usually be identified together at the beginning of a student's program. However, in some circumstances the need for a co-advisor may arise midway through a student's program. In all instances the Faculty of Graduate Studies must be informed of the co-assignment. Both co-advisors' signatures are required on all documents where the advisor's signature is required.

Advisory Committee (Master's)

In those Departments that specify that a Master's advisory committee is required, the committee must consist of at least one person who holds a primary appointment from within the major department. Additional specifications regarding the advisory committee are found in the departmental supplemental regulations.

Program Requirements

All students must complete one of the following programs of study for the Master's degree (unless otherwise specified in the approved departmental supplemental regulations):

Thesis/Practicum Route:

A minimum of 12 credit hours of course work plus a thesis or practicum. The minimum must include at least 6 credit hours at the 700/7000 level with the balance of the coursework at the 300/3000 level or above. A maximum of 24 credit hours of coursework is allowed toward the thesis/practicum based Master's program.*

Comprehensive Examination Route:

A minimum of 24 credit hours of course work and comprehensive examination(s). The minimum must include at least 12 credit hours at the 700/7000 level or above with the balance of the coursework at the 300/3000 level or above, or, in exceptional circumstances and upon approval of the Dean of Graduate Studies, the 200/2000 level. A maximum of 48 credit hours of coursework is allowed toward the comprehensive examination based Master's program.*

*Unless professional accreditation requirements or existing supplemental regulations indicate otherwise.

Notes:

The program of study is determined by the major department and may include requirements in addition to those specified above. All departmental supplemental regulations require prior approval of the Faculty of Graduate Studies.

For historical reasons, the following thesis/practicum based programs are subject to the same min/max credit hour restrictions as for the comprehensive-based Master's: Master of Nursing, Master of Architecture, Master of

City Planning, Master of Landscape Architecture, Master of Natural Resource Management.

Language Reading Requirements

Some departments specify a language requirement for the Master's degree. Students are advised to check departmental supplemental regulations regarding this requirement.

Advance Credit

Advance credit for courses completed prior to admission to a Master's program will be considered on an individual basis. The student's major department makes the request to the Faculty of Graduate Studies by completion of the "Recommendation for Advance Credit (Transfer of Courses)" form.

Note:

Application for advance credit must be made within the first year of the program (see Lapse of Credit of Courses in this section).

No more than half of the required course work for the program can be given advance credit.

A course may not be used for credit toward more than one degree, diploma or certificate.

For thesis/practicum-oriented programs the student must complete the thesis/practicum at The University of Manitoba.

For the comprehensive examination route, the student must complete the comprehensive examination(s) at the University of Manitoba.

Regardless of the extent of advance credit received, all students are required to pay the program fee.

Transfer Credit

Courses within a program of study may be taken elsewhere and transferred for credit at The University of Manitoba. Courses must be approved for transfer to the program of study by the major department and the Faculty of Graduate Studies before the student may register for them. This permission is granted in the form of a Letter of Permission, which may be obtained by making application to the Registrar's Office.

Transfer credit (courses taken at other universities while registered in a program at the University of Manitoba) is granted as follows: For Master's students, transfer credit must not exceed 50% of the minimum credit hours of coursework required for the program.

Note: Students seeking a Master's degree from The University of Manitoba must complete at least 50% of their required program coursework at The University of Manitoba.

Minimum Time Requirement

The minimum time for students in the Master's program is equivalent to two terms. Most departments require more than this.

Maximum Time Limits

The maximum time allowed for the completion of the Master's degree except where indicated in specific units is as follows:

Note: Each department may have supplementary regulations for maximum time limits.

2 years: Master of Laws, Master of Fine Art

3 years: Master of Occupational Therapy (accelerated program).

4 years: Master of Physician Assistant Studies

6 years: Master of Business Administration, Master of Public Administration, Master of Education, Master of Nursing, Master of Social Work and Master of Engineering.

5 years: All other Master's degree and diplomas

Recommendations for extensions of time to complete the degree will be considered on an individual basis and must be approved by the Dean of Graduate Studies at least four months prior to expiration of the respective maximum time limit.

Note: A student who has not completed the degree requirements within the time limit or within the time limit of the extension (see also sections: "Extension of Time to Complete Program of Study" and "Leave of Absence") will be required to withdraw from the Faculty of Graduate Studies and the notation on the student record will be "Required to withdraw: time to complete program expired".

Lapse of Credit of Courses

Courses completed more than eight years prior to the date of awarding of a degree may not normally be used for credit toward that degree.

Academic Performance

Student progress shall be reported at least annually to the Faculty of Graduate Studies on the "Progress Report Form". Students who fail to maintain satisfactory performance may be required to withdraw on the recommendation by the Department head, to the Dean of Graduate Studies.

Performance in course-work

A minimum degree grade point average of 3.0 with no grade below C+ must be maintained for continuance in the Master's program. Students who fail to maintain this standing will be required to withdraw unless the Dean of Graduate Studies approves a departmental remedial recommendation (refer to the section: Academic Performance – General).

Performance not related to Course Work

Students are required to demonstrate satisfactory academic performance in areas not related to performance in courses, such as attendance at or participation in course lectures, seminars and in laboratories and progress in research, thesis or practicum. **The specific nature of satisfactory academic performance is outlined in the departmental Supplementary Regulations and must be reported to the Faculty of Graduate Studies on the "Progress Report Form"**. Students who fail to maintain satisfactory performance may be required to withdraw on the recommendation of the department head to the Dean of Graduate Studies.

Course or Program Changes

Students are not permitted to change their program of study, including withdrawal from individual courses, without the approval of their advisor and/or advisory committee and Department head. Withdrawal from courses or changes of course category without such approval will result in the student being required to withdraw from the Faculty of Graduate Studies.

Deadlines For Graduation

The final requirements of the degree, in the form of the final report on the thesis/practicum (and the corrected copies of the thesis/practicum); comprehensive examination; or M. Eng. Project, must be submitted to the Faculty of Graduate Studies Office by the appropriate deadline. For those programs that do not have a culminating exercise (thesis/practicum/comprehensive examination/M.Eng. project) the unit must forward potential graduate names to the FGS by the deadline. The deadline for each of the graduation dates is published in the Academic Schedule of the Graduate Calendar. Extensions to these deadlines will be considered in exceptional circumstances only.

Academic Requirement for Graduation

A cumulative degree grade point average of 3.0 or greater is required in those courses that constitute the program of study for graduation in the Faculty of Graduate Studies.

Comprehensive Examination

The regulations governing comprehensive examinations, where required, are specified in the supplementary regulations of the major department. No student may sit for those examinations more than twice. The results of the comprehensive examinations shall be submitted to the Faculty of Graduate Studies on the appropriate form in the terms 'approved' or 'not approved'

Note: Any student who receives "not approved" on the comprehensive examination twice will be required to withdraw from the Faculty of Graduate Studies.

Thesis Proposal/Practicum Plan

Each student is required to develop a thesis proposal/practicum plan in his or her chosen field of study. Normally, the thesis is developed under the mentorship of the advisor/co-advisor. The advisor/advisory committee/department head/grad chair must formally approve the thesis proposal. (Each department may have specific guidelines regarding the thesis proposal). Research involving human or animal subjects requires ethical approval prior to initiation of research. Please refer to the appropriate ethics review committee.

4.1 Thesis and Practicum Regulations

General

Students must demonstrate their mastery of the field and that they are fully conversant with the relevant literature through their thesis.

Practicum versus thesis:

While the practicum differs from the thesis in its emphasis on the application of theory, it is similar in scope, span, and rigor. The weight of work required for the practicum is equal to that required for the Master's thesis. In general, the practicum takes the form of an exercise in the practical application of knowledge and skill. It usually involves the careful definition of a problem, the application of appropriate knowledge and skills to the problem, and a report of the results in a manner suitable for evaluation by an examining committee. The requirements are specified by the departments concerned.

Style and format:

The thesis/practicum must be written according to a standard style acknowledged by a particular field of study and recommended by the major department, be lucid and well-written, and be reasonably free from typographical and other errors.

Copies of the thesis/practicum must be submitted in good, clear type. As long as all copies are clearly legible, the thesis/practicum may be reproduced by a method that is presented in the "Thesis Guidelines Booklet" which is available in the Faculty of Graduate Studies and also available on the web: umanitoba.ca/graduate_studies. Minimum paper weight is 16 lb. Bond or equivalent; minimum left margin is 3.8 cm (1.5 inches), other margins are 2.5 cm (1 inch). Wherever possible, these margins should be adhered to for illustrative materials. **A thesis guideline booklet is available from the Faculty of Graduate Studies Office for additional information.**

Deadlines and Details for submissions of final copies:

The Academic Schedule in the Graduate Calendar should be consulted regarding dates by which theses/practica must be submitted.

Following the approval of the thesis/practicum by the examining committee and the completion of any revisions required by that committee, the thesis, and where applicable, the practicum, must be submitted to the Faculty of Graduate Studies as follows:

One single-sided paper copy in unbound form, enclosed in an envelope or folder; and

One digital version submitted as an e-thesis at the MSpace website:

<https://mspace.lib.umanitoba.ca/index.jsp>

The e-thesis is the official copy. Students are encouraged to review the e-thesis submission requirements prior to creating a digital version. Electronic multimedia files or accompanying files that are part of an e-thesis should be posted to MSpace as separate files.

The paper copy will become a circulating copy. Multi-media material on a CD-ROM may accompany the paper copy. Where possible, the contents of the official electronic version should be replicated in the paper copy.

Both digital and paper copies of the thesis/practicum are required for the University Library and remain the property of the University of Manitoba.

4.2 Thesis/Practicum Examination Procedures

Examining Committee

The student's advisor will recommend a suggested thesis/practicum examining committee to the Department head for approval, which shall then be reported to the Faculty of Graduate Studies Office on the "Master's Thesis/practicum Title and Appointment of Examiners" form. The committee must consist of a minimum of three examiners. At least two examiners must be members of the Faculty of Graduate Studies. One examiner must hold a primary appointment from within the major department and one examiner must be external to the department. All examiners must be deemed qualified by the Department Head and willing to serve.

Note: The external member should be considered arm's length to the department. While the definition of "arm's length" is left to the discretion of the department, be advised that justification may be required by the Faculty of Graduate Studies for this selection.

Distribution and Examination

The head of the major department will arrange for the distribution of the thesis/practicum to the examiners and will notify the Faculty of Graduate Studies Office at the time that the thesis/practicum has been distributed for examination. It is the duty of all examiners to read the thesis/practicum and report on its merits according to the following categories:

Acceptable without modification or with minor revision(s)

Acceptable subject to modification and/or revision(s)

Not acceptable

Note:

1. The examining process should be completed within one month of distribution of the thesis/practicum.

2. A student has the right to an examination of the thesis/practicum if he/she believes it is ready for examination.

Oral Examination

Normally, students must pass an oral examination on the subject of the thesis/practicum and matters relating thereto. The form of the oral examination will be as prescribed by the Supplementary Regulations of the major department. The oral examination shall be open to all members of the University of Manitoba community except in exceptional cases. The oral examination may be closed, for example, when the results of the thesis/practicum research must be kept confidential for a period of time. In such cases, the examining committee and Department head shall recommend such action to the Dean of Graduate Studies who shall then approve that the final examination be closed to all but the examining committee and the Dean of Graduate Studies (or designate).

Final Approval/Rejection

Following completion of the examination of the thesis/practicum, examiners will consider the oral examination and the written thesis/practicum to determine the nature of and procedures for approval of any revisions that will be required prior to submission to the Faculty of Graduate Studies. The advisor is normally responsible for ensuring that revisions are completed according to the instructions from the examining committee. The Faculty of Graduate Studies will accept the thesis/practicum only when it is submitted with a signed statement from the advisor that the required revision has been completed.

Note: A student whose Master's thesis or practicum has been rejected twice will be required to withdraw.

Final Report

The judgement of the examiners shall be reported to the Faculty of Graduate Studies in the qualitative terms "approved" or "not approved". Such verdicts must be unanimous, and each examiner must indicate, by his/her signature, concurrence with the verdict. Anything less than unanimity shall be considered a failure. In the case of a failure for the thesis/practicum at the Master's level a detailed written report will be prepared by the Chair and submitted to the Faculty of Graduate Studies, who will make the report available to the candidate and advisor.

The candidate will be recommended for the Master's degree upon the receipt by the Faculty of Graduate Studies of favorable results of the thesis or practicum committee and when the corrected copies of the thesis or practicum are submitted to the Faculty of Graduate Studies, assuming all other program requirements have been met.

4.3 Publication and Circulation of Thesis/Practicum

Every graduate student registering in a thesis/practicum Master's program at The University of Manitoba shall be advised that, as a condition of being awarded the degree, he/she will be required to grant a license of partial copyright to the University and to the Library and Archives Canada for any thesis or practicum submitted as part of their degree program.

Note: This license makes the thesis/practicum available for further research only. Publication for commercial purposes remains the sole right of the author.

The forms and conditions pertaining to these license agreements are available at the Faculty of Graduate Studies Office. Note that this and other related regulations may give rise to important questions of law, and students may need additional legal advice on the copyright laws of Canada and/or other countries. Students who wish to obtain legal advice concerning their subsequent rights are advised to do so prior to signing the agreements. Signing of the license agreements is normally done after the contents of the thesis/practicum have been delineated and the importance of copyright and/or patents fully comprehended.

Publication in the above manner does not preclude further publication of the thesis or practicum report or any part of it in a journal or in a book. In such cases, an acknowledgement that the work was originally part of a thesis or practicum at The University of Manitoba should be included.

Notes:

Copyright – Copyright in theses and practica is protected in international copyright law. A copyright symbol © or (c) is incorporated on a page containing statements of permission to microfilm and to lend copies of the thesis or practicum. After completion, this page should be inserted in the thesis/practicum immediately following the title page. Blank copies of this page are available from the Faculty of Graduate Studies Office.

Patents –Refer to the section “Policy of Withholding Theses Pending Patent Applications” in this Guide.

Restriction of theses or practica for publication – In exceptional cases, not covered by the regulation concerning patents, where adequate cause can be shown to delay publication, the student may request the Dean of Graduate Studies to restrict access, for a period up to one year after submission, of the digital and unbound paper versions of a thesis or practicum submitted to The University of Manitoba. The Dean, in consultation with the student’s advisor, shall determine for what period, if any, access will be so restricted.

Library and Archives Canada – A microfiche of the thesis is forwarded to the Library and Archives Canada and is listed in a monthly and annual national bibliography, ‘Canadiana’, which is published by the National Library.

SECTION 5: General Regulations: Ph.D.

FOR FACULTY-BASED PH.D PROGRAMS, THE DEAN OR DESIGNATE IS THE DE FACTO DEPARTMENT HEAD.

The degree of Doctor of Philosophy is granted only upon evidence of general proficiency and of distinctive attainment in a special field. In particular, a recognized ability for independent investigation must be demonstrated by the candidate in a thesis which embodies original research or creative scholarship and is presented with a high degree of literary skill. It is a research degree and is never conferred solely as a result of coursework study.

These general regulations apply to all students in all departments. Individual departments may have procedures and regulations that supplement these general regulations. All such procedures and regulations must be consistent with these general regulations, approved as specified by the By-Laws of the Faculty of Graduate Studies, published and available to students, and kept on file in the Faculty of Graduate Studies Office.

Admission

Normally, a Master’s degree or equivalent from a recognized university and a cumulative GPA of 3.0 or equivalent in the last two previous years of full time university study (60 credit hours) is the minimum requirement for admission to the Ph.D. program. With special recommendation of the department concerned (please see below), applicants with an honours Bachelor’s degree may be considered for entry to Ph.D. study.

Direct Admission from the Bachelor’s Honours or equivalent

Students to be considered for admission to a Ph.D. program directly from the honours Bachelor’s degree or equivalent must be outstanding in their academic background (GPA well above 3.0 in the last two full years of undergraduate study). Once admitted, these students must complete at least 24 credit hours of course work and will be assessed Ph.D. fees for 3 years.

Transfer from the Master’s to the Ph.D. program

Students who have not completed a Master’s program may transfer to the Ph.D. program within the same department upon recommendation to the Faculty of Graduate Studies by the student’s major department. The recommendation must be made within 24 months of the student’s commencement of the Master’s program. The coursework completed in the Master’s program would normally become a part of the Ph.D. program, and the number of years spent in the Master’s program would be counted as years in the Ph.D. program. Students must complete at least 24 credit hours of coursework. If the transfer occurs within 12 months of the initial registration in the Master’s program, the student will be assessed Ph.D. fees for 3 years. If the transfer occurs after 12 months, the student will be assessed Ph.D. program fees for 2 years (as they will have already paid fees for the Master’s program). Students are cautioned that such transfers may impact on the University of Manitoba Graduate Fellowship duration. The request to transfer from the Master’s to the Ph.D. program must be submitted to the Faculty of Graduate Studies at least one month prior to the term for which the student intends to commence the Ph.D. program. The following are required when making the request: The “Application for Admission” form

(and application fee); “Ph.D. Selection Committee Report” form, and; in the case where the student does not hold a Master’s degree, a memo from the Department Head.

Note: Where a student with a Master’s degree or equivalent is initially admitted and registered in a Master’s program, that student may be transferred to the Ph.D. program within the same department on recommendation from the student’s advisor and Department head, provided the recommendation is made at the time of admission to the Master’s Program (i.e. “Possible transfer to Ph.D. Program within 12 months”) and the follow up transfer recommendation occurs within 12 months of the initial registration in the Master’s program. In such a case, the application fee is waived and fees assessed towards the Master’s program will be deducted from the full 2 years of Ph.D. program fees.

Provisional Admission to the Ph.D.

Students nearing completion of the Master’s degree may be accepted provisionally to the Ph.D. program for a 12 month period (commencing with the first registration in the Ph.D. program). Further registration in the Ph.D. program is contingent upon completion of all requirements of the Master’s degree within the 12 months.

Note: Students must maintain continuous registration in their Master’s program until completion. Students will require assistance from the Department or the Faculty of Graduate Studies to complete dual registration in the Master’s and Ph.D. program simultaneously.

Selection Committee

Upon receipt of an application, the head of the major department will appoint a selection committee of at least three persons to evaluate the student’s qualifications and report on his/her suitability for Ph.D. study. In making admission decisions, departments may also consider such things as the availability of facilities and financial assistance. If acceptance is recommended by the selection committee and approved by the head of the department and the Dean of Graduate Studies, the Faculty of Graduate Studies sends a letter of acceptance to the applicant.

Student’s Advisor/Co-Advisor

Every Ph.D. student must have an advisor, appointed by the Department head, whose duties will be to advise the student on a program and courses, direct research, and supervise thesis work. The advisor must be a member of the Faculty of Graduate Studies, be active in research, have expertise in a discipline related to the student’s program and hold a Ph.D. or equivalent. In special circumstances, an advisor and co-advisor, upon approval of the department head may advise a student.* The co-advisor must be a member of the Faculty of Graduate Studies. It is the responsibility of the Department head to determine whether faculty members meet these criteria, and to report on equivalency as necessary.

The student’s advisor also acts as a channel of communication to the student’s advisory committee, the major department, and the Faculty of Graduate Studies. Usually the student and the advisor choose to work together by mutual agreement. In departments where the choice of thesis topic advisor are postponed for some time after entry into the program, the Department head or the selection committee shall appoint a faculty member to advise the student as to the rules and regulations and on a program and course requirements in the interim period not to exceed eighteen months before a permanent advisor is chosen.

***Note:** When an advisor and co-advisor are assigned, together they shall fulfill the role of the advisor (that is, neither shall fulfill any other advisory or examining committee membership requirements). The co-advisors will usually be identified together at the beginning of a student’s program. However, in some circumstances the need for a co-advisor may arise midway through a student’s program. In all instances the Faculty of Graduate Studies must be informed of the co-assignment. Both co-advisors’ signatures are required on all documents where the advisor’s signature is required.

Program of Study

As soon as possible but no later than 24 months after a student has commenced the program, the student’s program of study, which includes information about the minimum time for completion of the degree, course work to be taken, foreign language requirement, and the research area in which the thesis will be done, should be forwarded to the Faculty of Graduate Studies. The program of study and any changes thereto must be approved by the student’s advisor, and the advisory committee and the head of the major department. The approval of the student’s advisor and the head of the major department are sufficient for registration.

Advisory Committee

The Head of the major department is responsible for the establishment of an advisory committee for each Ph.D. student. The advisory committee must consist of a minimum of three members of the Faculty of Graduate Studies, one of whom must hold a primary appointment from within the major department and one of whom must hold a primary appointment outside the major department. Committees may include one guest member who has expertise in a related discipline but is not a member of the Faculty of Graduate Studies. The membership of the committee, including the advisor, as well as any changes to it, must be approved by the Dean of Graduate Studies. The advisor is the Chair of the advisory committee.

Responsibilities of the committee are to approve the program of study and thesis proposal and to exercise general supervision over the student's work throughout the Ph.D. program. The committee should meet with the student periodically (and must meet with the student at least once a year) to review the student's progress and to report this progress to the Faculty of Graduate Studies (through the Head of the major department). (In the situation where a Ph.D. Advisory Committee or responsible individual(s) would not normally be established until the candidacy exam is completed then at least one responsible individual will meet with the student.) If there is evidence of unsatisfactory performance, the student may be required to withdraw.

Program Requirements

All students must complete one of the following programs of study for the Ph.D. degree (unless otherwise specified in the approved departmental supplemental regulations): Where admission to the Ph.D. is directly from a Master's Degree, a minimum of 12 credit hours at the 700/7000 level or higher plus a thesis is required. Any further coursework beyond the minimum 12 credit hours at the 700/7000 level must be at the 300/3000 level or above. For those students who hold a Master's degree, a maximum of 24 credit hours of course work is allowed toward the Ph.D. program.*

Where admission to the Ph.D. is directly from an Honours Bachelor Degree or equivalent, a minimum of 24 credit hours plus a thesis is required. The coursework must include a minimum of 18 credit hours at the 700/7000 level or higher with the balance of the coursework at the 300/3000 level or above. For those students who do not hold a Masters degree, a maximum of 48 credit hours of course work is allowed toward the Ph.D. program.*

*Unless professional accreditation requirements and supplemental regulations indicate otherwise.

NOTE: The program of study is determined by the major department and may include requirements in addition to those specified above. All departmental supplemental regulations require prior approval of the Faculty of Graduate Studies.

Language Reading Requirements

Some departments specify a language requirement for the Ph.D. degree. Students are advised to check departmental supplemental regulations regarding this requirement.

Advance Credit

Advance credit for courses completed prior to admission to a Ph.D. program will be considered on an individual basis. The student's major department makes the request to the Faculty of Graduate Studies by completion of the "Recommendation for Advance Credit (Transfer of Courses)" form.

Note:

1. Application for advance credit must be made within the first year of the program (see Lapse of Credit of Courses in this section).
2. No more than half of the required course work for the program can be given advance credit from exterior institutions.
3. A course may not be used for credit toward more than one degree, diploma or certificate.
4. The student must register at the University of Manitoba for one academic year as a full-time student and must also complete the thesis at The University of Manitoba.
5. Regardless of the extent of advanced credit received, all students are required to pay the program fee.

Transfer Credit

Courses within a program of study may be taken elsewhere and transferred for credit at The University of Manitoba, but all such courses must be ap-

proved for transfer to the program of study by the major department and the Faculty of Graduate Studies before the student may register for them. This permission is granted in the form of a Letter of Permission which may be obtained by making application to the Registrar's Office.

Transfer credit (courses taken at other universities while registered in a program at the University of Manitoba) is to be granted as follows: For Ph.D. students transfer credit must not exceed 50% of the minimum credit hours of coursework required.

Note: Students seeking a Ph.D. degree from The University of Manitoba must complete at least 50% of their required program coursework at The University of Manitoba.

Minimum Time Limit

The minimum time requirement for the program of study for the degree will normally be two years of study beyond the level of the Master's degree, or three years beyond the level of a Bachelor's degree. The student may be permitted to spend one of these years in an approved program of research or study elsewhere. Such permission must be approved by the Dean of Graduate Studies on the recommendation of the student's advisory committee.

Maximum Time Limit

A student's candidature shall lapse if he/she fails to complete the degree within seven years following initial registration in the Ph.D. program. For those students who transfer from the Master's to the Ph.D., years spent in the Master's program are counted as years in the Ph.D. program. Recommendations for extensions of time to complete the degree will be considered on an individual basis and must be approved by the Dean of Graduate Studies.

Note: A student who has not completed the degree requirements within the time limit or within the time limit of the extension (see also sections "Extension of Time to Complete Program of Study" and "Leave of Absence") will be required to withdraw from the Faculty of Graduate Studies and the notation on the student record will be "Required to withdraw: Time to complete program expired".

Residence Requirement

Two residence periods at the University of Manitoba devoted to full-time graduate study, subsequent to admission into the Ph.D. Program, are required of all students. (For the purposes of the Residence Requirement one residence period is Fall Term, Winter Term or Summer Term (May – August) combined.) The student shall be geographically available to visit the campus regularly during these residence periods.

Note: The purpose of the residency is to ensure that Ph.D. students have an opportunity to work within the stimulating environment provided by contact with a cohort of dedicated peers and professors in a chosen field of study, and also to enhance the breadth and depth of their graduate experience by being part of a broader university culture.

Note: Students may not retain the status of full-time while employed full-time without prior permission of the Dean of the Faculty of Graduate Studies and recommendation from the major department.

Lapse of Credit of Courses

Courses completed more than eight years prior to the date of awarding of a degree may not normally be used for credit toward that degree.

Academic Performance

Student progress shall be reported at least annually to the Faculty of Graduate Studies on the "Progress Report Form". Students who fail to maintain satisfactory performance may be required to withdraw on the recommendation by the Department head, upon receiving input from the advisory committee, to the Dean of Graduate Studies.

Performance in course-work

A minimum degree grade point average of 3.0 with no grade below C+ must be maintained for continuance in the Ph.D. program. Students who fail to maintain this standing will be required to withdraw unless the Dean of Graduate Studies approves a departmental remedial recommendation (refer to the section: Academic Performance – General).

Performance not related to course work

Students may also be required to withdraw from their Ph.D. program for reasons of unsatisfactory performance other than those related to failing grades. These include, but are not restricted to, such things as unsatisfactory attendance and lack of progress in research and/or thesis.

The student's advisory committee will make a recommendation for required withdrawal to the Department head. The Department head will then recommend to the Dean of the Faculty of Graduate Studies that the student be required to withdraw for reasons of unsatisfactory academic performance.

Course or Program Changes

Students are not permitted to change their program of study, including withdrawal from individual courses, without the approval of their advisor and/or advisory committee and Department head. Withdrawal from courses or changes of course category without such approval will result in the student being required to withdraw from the Faculty of Graduate Studies.

Deadlines for Graduation

The final requirements of the degree, in the form of the final report on the thesis (and the corrected copies of the thesis must be submitted to the Faculty of Graduate Studies Office by the appropriate deadline. The deadline for each of the graduation dates is published in the Academic Schedule of the Graduate Calendar. Extensions to these deadlines will be considered in exceptional circumstances only.

Academic Requirement for Graduation

A cumulative degree grade point average of 3.0 or greater is required in those courses that constitute the program of study for graduation in the Faculty of Graduate Studies.

Candidacy Examination

While the format and content of the Candidacy Exam will vary from unit to unit, the purposes of the Candidacy Exam in doctoral programs is to determine the student's competence in the discipline with respect to understanding and absorbing a broad spectrum of material, and then researching, identifying, analysing, synthesizing, and communicating ideas about that material in depth.

At the time specified by the advisory committee, normally within the first two years of the Ph.D. program but in no case later than one year prior to expected graduation, the student must take the formal candidacy examination. The format of the candidacy examination may vary with the department.

1. The examination is conducted according to a procedure established by the major department and approved by the Guidelines and Policy Committee of the Faculty of Graduate Studies.

2. This exercise is independent from the Thesis Proposal exercise.

3. The examination procedure must be made known to the students.

4. The Dean of Graduate Studies must be informed whether the candidate has passed or failed the candidacy examination (on the "Report on Ph.D. Candidacy Examination" form).

5. Students must be provided with feedback on their performance and access to the reasons for the pass/fail.

6. A pass decision of the examiners must be unanimous.

7. Any student who fails the candidacy examination twice will be required to withdraw from the Faculty of Graduate Studies.

8. On successful completion of this examination, the student will be considered a candidate for the Ph.D. degree.

Thesis Proposal

The proposed thesis research must be approved by the advisory committee and, if appropriate, by the Research Ethics Review Committee before the work has begun on the thesis research or project. The recommendation for the thesis research to proceed shall be reported to the Faculty of Graduate Studies on the "Master's/Ph.D. Progress Report" form.

A written thesis proposal must contain the research planned for the program and must be approved by the advisory committee. In order to approve the proposal the whole committee must meet as a committee. Approval of the completed thesis proposal must be documented and forwarded to the Faculty of Graduate Studies on the Progress Report Form within 24 months of the student's initial registration in the program. Some departments may have specific procedures in place for approval of thesis proposals and students are advised to consult their departmental office. This exercise is independent from the Candidacy Examination exercise.

5.1 Thesis Regulations: Ph.D.

General

An essential feature of Ph.D. study is the candidate's demonstration of competence to complete a research project and present the findings. **The thesis must constitute a distinct contribution to knowledge in the major field of study and the material must be of sufficient merit to be, in the judgement of the examiners, acceptable for publication.**

Style and format:

The Thesis must be written according to a standard style acknowledged by the particular field of study and recommended by the major department, be lucid and well-written, and be reasonably free from typographical and other errors.

Copies of the thesis must be submitted in good, clear type. As long as all copies are clearly legible, the thesis may be reproduced by any method acceptable to the Faculty of Graduate Studies. Minimum paper weight is 16 lb. Bond or equivalent; minimum left margin is 3.8 cm (1.5 inches), other margins are 2.5 cm (one inch). Wherever possible, these margins should be adhered to for illustrative materials. A thesis guideline booklet is available from the Graduate Studies for additional information.

Policies and procedures for the inclusion of published papers within the doctoral theses are governed by the supplementary regulations of individual departments. The following are the general policies and procedures of the Faculty of Graduate Studies:

-The candidate's specific contribution to each paper (in case of multiple-authored papers) must be clearly indicated.

-An abstract, full introduction, and conclusions must be included;

-Where more than one manuscript is included, connecting text and common abstracts, introduction, and conclusions must be included.

-There must be adherence to all other requirements as outlined in Thesis Guidelines.

Deadlines and Details for submission of final copies:

The Academic Schedule in the Graduate Calendar should be consulted regarding dates by which theses must be submitted.

Following the approval of the thesis by the examining committee and the completion of any revisions required by that committee, the thesis must be submitted to the Faculty of Graduate Studies as follows:

One single-sided paper copy in unbound form, enclosed in an envelope or folder; and

One digital version submitted as an e-thesis at the MSpace website:

<https://mspace.lib.umanitoba.ca/index.jsp>

The e-thesis is the official copy. Students are encouraged to review the e-thesis submission requirements prior to creating a digital version. Electronic multimedia files or accompanying files that are part of an e-thesis should be posted to MSpace as separate files.

The paper copy will become a circulating copy. Multi-media material on a CD-ROM may accompany the paper copy. Where possible, the contents of the official electronic version should be replicated in the paper copy.

Both digital and paper copies of the thesis are required for the University Library and remain the property of the University of Manitoba.

5.2 Thesis Examination Procedures

Final Examination For The Ph.D. Degree

Once the thesis along with the "Ph.D. Thesis Title and Appointment of Examiners" form is submitted to the Faculty of Graduate Studies, the final examination for the Ph.D. degree proceeds in two stages:

1. Examination of the candidate's thesis. Prior to the examination of the thesis, the advisor shall furnish a written statement that, in his/her opinion, the thesis is (or is not) ready to be examined by completing the "Ph.D. Thesis Title and Appointment of Examiners" form.

2. Oral examination of the candidate on the subject of the thesis and any matters relating thereto.

Note: A candidate has the right to an examination of the thesis if he/she believes it is ready for examination.

A thesis may not be formally submitted for examination more than twice.

Formation of the Examining Committee

University of Manitoba (Internal) Examiners:

The advisory committee chair, in consultation with committee members, will recommend to the head of the major department the names of at least three internal thesis examiners, to be forwarded to the Dean of Graduate Studies for approval. These names shall include the student's advisor and two other persons, one of whom must hold a primary appointment within the major department and one of whom must hold a primary appointment outside the major department. All internal examiners must be members of the Faculty of Graduate Studies. In normal circumstances these internal examiners will be members of the student's advisory committee.

External examiner:

A distinguished scholar with particular experience in the field of the thesis research shall be chosen as the external examiner. The student's advisory committee shall make the selection, and the advisor should then make an informal inquiry as to the prospective external examiner's willingness to serve. If so, a nomination is then made by the head of the major department to the Dean of Graduate Studies. The external examiner must be from outside The University of Manitoba and the Dean of Graduate Studies makes the formal invitation to the external examiner.

Note: The external examiner should: hold a Ph.D.; hold an appointment with a recognized university or be a recognized scholar in their field; have no affiliation with the student or the advisor. The external must be considered at arm's length to the department and the University of Manitoba. While the definition of "arm's length" is left to the discretion of the department, be advised that justification may be required by the Faculty of Graduate Studies for this selection.

Changes in the examining committee:

The Dean of Graduate Studies must also approve changes in the membership of the examining committee. No changes shall be made in the examining committee after the thesis is distributed by the Faculty of Graduate Studies to the committee for examination.

Note: Should the thesis not be submitted for examination within 12 months after the appointment of the examining committee, the committee appointment will lapse and a new appointment shall be necessary.

Distribution of the Thesis For Examination

Sufficient copies for distribution to each member of the examining committee must be submitted to the Faculty of Graduate Studies Office in unbound form, with each set enclosed in a separate envelope or folder. Each copy must be prefaced by an abstract of the thesis which includes the title, the author's name, and a brief summary of the results. It must be in a form acceptable to the student's advisor.

Note: It is the responsibility of the Faculty of Graduate Studies to distribute the thesis to all of the examiners.

Responsibilities of the Examiners

Internal Examiners:

Each internal examiner (except the candidate's advisor), within one month of the receipt of the thesis, shall submit to the Dean of Graduate Studies a written report (with a copy to the head of the major department) giving an evaluation of the thesis, noting its merits, deficiencies (if any) and, if appropriate, revisions. The report shall contain a statement as to whether or not the student may now proceed to the oral examination. The thesis shall be placed into one of the following categories:

1. The thesis represents a distinct contribution to the candidate's field of research and it is acceptable as it stands (or with minor revisions to either content, structure, or writing style. (The thesis has **not** received final approval, but the candidate **may proceed** to their oral examination).
2. The thesis has merit since it makes a contribution to the candidate's field; however, there are research-related concerns that have the potential to be dispelled in the oral examination. The structure and writing are acceptable or require only minor revisions. (The thesis has **not** received final approval, but the candidate **may proceed** to their oral examination).
3. The thesis has some merit, but it is not acceptable in its current state since it requires major revisions to one or more of its core components, viz., research content, structure, and writing style. (The candidate has **failed** attempt and cannot proceed to the oral examination.)

4. The thesis is unacceptable with respect to its core components, viz., research content, structure, and writing style. (The candidate has **failed** attempt and cannot proceed to the oral examination.)

Note:

1. The placing of the thesis into category (1) or (2) above does not mean that the thesis has received final approval.
2. The placing of the thesis into either category (3) or (4) constitutes a failure.

External Examiners:

The Dean of the Faculty of Graduate Studies will request the external examiner to give a detailed report on the merits and deficiencies of the thesis as well as an overall evaluation. The external examiner shall be asked to report on his/her findings in the same categories as those used by the internal examiners. The advisor and the student must submit a declaration to the Faculty of Graduate Studies that neither party has performed collaborative research work with the external examiner within the last five years.

The external examiner is requested to present the report to the Dean of Graduate Studies within one month of the receipt of the thesis. Adequate time must be allowed for the transmission of the thesis and the receipt of the report.

The attendance of the external examiner at the candidate's oral examination is encouraged, but is not required.

Note: If the external examiner is not going to be present at the examination, the Dean of the Faculty of Graduate Studies will request him/her to submit questions and the expected answers to the questions to be posed to the candidate at the time of the examination. Normally, the Chair of the Examining Committee will pose the questions to the candidate and the candidate will not receive the questions prior to the examination.

Approval For Advancement to the Oral Examination

The Faculty of Graduate Studies must receive all examiners' reports (internal and external) at least two weeks prior to the intended date of the oral examination.

Guidelines For Advancement to the Oral Examination

When considering the candidate's advancement to the final oral examination, the committee of internal examiners shall use the following guidelines:

1. If all the reports place the thesis in category (1) or (2), advancement to the oral examination shall be automatic. The Dean of Graduate Studies shall send copies of all category (1) or (2) reports to each of the internal thesis examiners and also to the student.
2. If one or more of the reports place the thesis in category (3) or (4), the Dean of Graduate Studies shall send copies of all the reports to each of the internal thesis examiners and the Department Head. Two copies of all the reports are sent to the Advisor who shall provide one copy to the student. The committee of internal examiners should strive to provide the advisor and the candidate with specific advice about the nature and scope of the revisions required and any other pertinent matters (such as the time that should elapse before the thesis will be accepted for reconsideration).
3. In the unlikely event that the internal examiners judge an unfavourable report by an external examiner to be unwarranted, they may recommend, through the head of the major department, that the Dean of Graduate Studies submit the thesis to a second external examiner.

Requirements Prior to Oral Examination

Scheduling

The examination will normally be held at either the University of Manitoba Fort Garry or Bannatyne Campus. Exceptions must have the unanimous agreement of all committee members. Normally, the oral examination shall be open to all members of The University of Manitoba community and shall be held at The University of Manitoba. In exceptional cases the final oral examination may be closed, for example when the results of the thesis research must be kept confidential for a period of time. In such cases, the advisory committee and Department head shall recommend such action to the Dean of Graduate Studies who may then approve that the final oral examination be closed to all but the examining committee and the Dean of Graduate Studies (or designate).

Student Information

At least two weeks prior to the oral examination, the student must submit to the Faculty of Graduate Studies the following information:

Biographical Data – outstanding points in career, awards, etc.

List of degrees obtained – where and when

List of the student's publications

The exact title of the thesis

An abstract of the thesis (not more than 350 words)

Note: The above documentation should be submitted in electronic form.

Notice of Examination

Except in the case of a closed examination and provided the information is received in sufficient time to meet publication deadlines, a notice of the student's oral examination will be posted on The University of Manitoba website. In addition, memoranda will be distributed by the Faculty of Graduate Studies Office to all members of the department concerned. Note that students and faculty members who are not members of the examining committee are invited and encouraged to attend oral examinations but are not permitted to participate in the formal questioning.

Oral Examination

A student must pass an oral examination on the subject of the thesis and matters relating thereto before he/she may obtain the Ph.D. degree. An oral examination committee consisting of not fewer than four persons shall conduct the examination. One of these shall be the Dean of Graduate Studies or his/her representative who shall be Chair. The other members shall normally be the thesis examiners.

Format of the Examination

The first part of the oral examination shall consist of an oral presentation by the candidate to include a summary of the salient points of the research within a time span of 25 to 30 minutes. This is followed by the questioning and examination of the candidate by the examination committee, that is normally about one and one-half hours but in no case longer than two hours.

The Chair may exercise discretion in inviting questions from guests.

Procedures For The Conduct of The Examination

Before the candidate and guests are admitted to the examination room, the Chair should discuss the examination procedures with the examiners.

The Chair will introduce the candidate and request him/her to give a concise (25 to 30 minutes) oral presentation of the thesis to include a summary of the problems studied, the results and the conclusions.

Following the presentation, the Chair will invite questions from each member of the examining committee, taking care to ensure that each examiner has approximately equal time for questions. Normally, the question period should not exceed one and one-half hours.

It is the responsibility of the Chair to pose questions raised by the external examiner (if not in attendance).

The Chair may exercise his/her discretion in allowing questions from guests following completion of the formal examination.

Note: Once assuming the role of Chair, s/he foregoes the right to comment on the merits of the thesis whether or not s/he is an expert in the field.

Decision of the committee:

Following completion of the formal examination, the candidate and spectators are required to withdraw from the examination room. The examiners will consider their report and will also determine the nature of and procedures for approval of any revisions that will be required prior to submission of the thesis. The committee may exercise its discretion on such matters as who must approve the required revisions, time limits for completion, the necessity for a second oral examination, and any other such matters. It shall be the responsibility of a designated member of the oral examination committee (normally the advisor) to ensure that all such revisions are completed before the copies of the unbound thesis are submitted to the Faculty of Graduate Studies Office for binding. The candidate will be recommended for the Ph.D. degree when the thesis, accompanied by a signed statement from the advisor that the required revisions are completed, is submitted to the Faculty of Graduate Studies, providing all other degree requirements have been satisfied.

Report of the committee:

The final judgement of the examiners on the thesis and the oral examination shall be reported to the Dean of Graduate Studies in the terms 'approved' or 'not approved'. An approved verdict must be unanimous, and each examiner must indicate, by his/her signature, concurrence with the verdict. In the case of a failure for the thesis at the Ph.D. level a detailed written report will be prepared by the Chair and made available to the candidate and also submitted to the Faculty of Graduate Studies.

Note: A student who receives a failure on either the thesis or the oral examination twice shall be required to withdraw from the Faculty of Graduate Studies.

5.3 Publication and Circulation of Theses

Every graduate student registering in a Ph.D. program at the University of Manitoba shall be advised that as a condition of being awarded the degree, he/she will be required:

1. To grant a license of partial copyright to the University and to the Library and Archives Canada for any thesis submitted as part of the degree program.

Note: This license makes the thesis available for further research only. Publication for commercial purposes remains the sole right of the author.

2. To provide a copy of the abstract for Dissertation Abstracts International and to authorize publication of the abstract in that publication. The forms and conditions pertaining to these license agreements are available at the Faculty of Graduate Studies Office. This and other related regulations may give rise to important questions of law and students may need additional legal advice on the copyright laws of Canada and/or other countries. Students who wish to obtain legal advice concerning their subsequent rights are advised to do so prior to signing the agreement. Signing the license agreements is normally done after the contents of the thesis have been delineated and the importance of copyright and/or patents fully comprehended. Publication in the above manner does not preclude further publication of the thesis or any part of it in a journal or in a book. In this case, acknowledgement should be made that the work was originally part of a thesis at The University of Manitoba.

Note:

Copyright - Copyright in theses and practica is protected in international copyright law. A copyright symbol © or (c) is incorporated on a page containing statements of permission to microfilm and to lend copies of the thesis or practicum. After completion, this page should be inserted in the thesis/practicum immediately following the title page. Blank copies of this page are available from the Faculty of Graduate Studies Office.

Patents – Refer to the section "Policy of Withholding Theses Pending Patent Applications" in this Guide.

Restriction of theses for publication - In exceptional cases not covered by the regulation concerning patents, where adequate cause can be shown to delay publication, the student may request the Dean of Graduate Studies to restrict access, for a period up to one year after submission, of the digital and unbound paper versions of a thesis submitted to The University of Manitoba. The Dean, in consultation with the student's advisor, shall determine for what period, if any, access will be so restricted.

Library and Archives Canada – A microfiche of the thesis is forwarded to the Library and Archives Canada and is listed in a monthly and annual national bibliography, 'Canadiana', which is published by the National Library.

SECTION 6: Policy of Withholding Theses Pending Patent Applications

In 1970 the Board of Governors and Senate approved a policy on accepting research grants from outside agencies. This policy defined the right of agencies to defer release of information and thus ensure freedom of publications for research findings of University personnel. Occasionally, the University may also wish to restrict the release of a thesis pending patent application. This policy statement parallels the previous one in that it defines the right of the University to defer the release of a thesis and thus ensures freedom of publication for the research findings of a graduate student.

This situation may arise in two circumstances which are defined below and both of which are governed by the same set of regulations.

When a research project is known to contain patentable items as defined in the research contract, then it is the responsibility of the advisor to give written information of the restrictions on publication to the student prior to the start of the thesis research. If the student agrees to carry out the research, then the regulations given below will apply.

Where a patentable item is found during the course of research, then the advisor and the student may make application for patent rights through the University Patent Committee, and the following regulations will apply concerning the release of the thesis.

Regulations Concerning Release of a Thesis During Application and Negotiation For Patents

The Dean of Graduate Studies will receive the approved thesis and copies of it as required by the Faculty regulations. On written joint request of the advisor and the student, the Dean will keep the thesis and copies of it in his/her office for a period up to one year.

For further information, reference should be made to the thesis copyright license.

SECTION 7: Extension of Time to Complete Program of Study

All requests for extensions will normally be dealt with administratively and reported, in summary form, to the Executive Committee of Graduate Studies for information. Requests for an extension are reviewed by the Faculty of Graduate Studies on a case by case basis. The extension time requested must closely reflect the time required to complete the program. More than one extension period may be considered, but the total time for all extensions will not normally exceed two years. Requests for extension must be accompanied by a realistic timeline that has been agreed upon by the student and supervisor and endorsed by the Dept. Head. Students granted extensions may be asked to enrol full-time during the period of the extension and may also be required to meet contingencies or carry out remedial work to be associated with the extension. The student must complete the 'request for extension form' and submit it to his/her major department for recommendation to the Faculty of Graduate Studies at least four months prior to the deadline date for completion of program requirements.

SECTION 8: Leave of Absence

Regular Leave

A Regular Leave is intended to allow students to meet family, travel or employment responsibilities or plans and circumstances not covered by the Parental or Medical/Compassionate leaves. At the request of a graduate student, the Head of the student's department may recommend to the Dean of Graduate Studies that a student be granted a leave of absence for a period of time not to exceed one year. While on leave of absence, a student would not be expected to maintain study and/or thesis research work. Students on Regular Leave of Absences will be required to maintain continuous registration and pay the appropriate Continuing Fee. If a student has Program Tuition Fees (as opposed to Continuing Fees) owing at the time of the granting of the Leave, the Tuition Fees will be deferred until the student returns from leave, however, the Continuing Fee will be levied. * A Regular Leave of Absence status does not extend the time limits as outlined in the Faculty regulations.

***Program Fees:** The Continuing Fee in effect at the time of the granting of the leave will be levied. However, if the student returns from leave in January, the normal tuition Fee will be levied less the Continuing Fee already paid.

Exceptional Leave

In exceptional circumstances for medical or compassionate reasons (e.g. the need to care for an ailing relative), at the request of the graduate student, the Head of the student's department may recommend to the Dean of Graduate Studies that a student be granted an exceptional leave of absence for a period of time not to exceed one year. While on leave of absence for exceptional reasons, a student is not permitted to maintain study and/or thesis research work, would not be required to maintain continuous registration, nor pay tuition fees. In addition, the leave period would not be included in the time period allowed for the completion of the degree.

This leave is not intended to cover circumstances related to travel, employment or other financial concerns.

Fees: Students are not expected to pay fees for the term in which they have been granted an exceptional leave. Upon return from the exceptional leave students will be assessed fees as determined by the Registrar's Office.

Parental Leave

A graduate student who is bearing a child or who has primary responsibility of the care of an infant or young child immediately following a birth or adoption of a child is eligible for parental leave. The request should be made through the student's department, normally for a leave of four to twelve months. Leaves of other duration will be considered on an individual basis. Where possible, students doing course work should coordinate their requests with the beginning of an academic term. While on leave of absence for parental reasons, a student is not permitted to maintain study and/or thesis research work. The leave period is not included in the time period allowed for completion of the degree.

Fees: Students are not expected to pay fees for the term in which they have been granted an exceptional leave. Upon return from the exceptional leave students will be assessed fees as determined by the Registrar's Office.

Note: At the time of approval of an application for leave, the procedures for the return of the student to the department at the completion of the leave must be stipulated.

Awards and Leave of Absence

Students granted exceptional or parental leave would retain the full value of a University of Manitoba Graduate Fellowship or other award whose terms and conditions are established by the Faculty of Graduate Studies. Such an award will be suspended at the onset of the leave and reinstated at the termination of the leave period (4 to 12 months) provided that the student returns to full time study at that time.

Note: Other awards will be paid according to the conditions established by the donor or granting agency.

Graduate Student Vacation Entitlement

Students are entitled to three weeks vacation throughout a 12-month period.

SECTION 9: Appeals – Procedures And Guidelines

General

Students who disagree with a decision have access to the appeal routes as laid out by the various Faculty of Graduate Studies and University of Manitoba appeal processes.

There are several areas of appeal which are open to graduate students: academic; discipline; admission; and administration (e.g. Fee appeals). You may refer to this section of the Faculty of Graduate Studies Academic Guide and the University of Manitoba Governing Documents (http://umanitoba.ca/admin/governance/governing_documents/index.html).

The Executive Committee of the Faculty of Graduate Studies, through its Appeal Panel by delegation from the Faculty of Graduate Studies Council, is empowered to deal with student appeals from departmental recommendations or Faculty of Graduate Studies actions, provided the departmental appeal process has dealt with the matter. These student appeals should be directed to the Dean of Graduate Studies. A decision of the Faculty of Graduate Studies Appeal Panel is appealable only to the Senate Committee on Appeals.

For students registered in Joint Master's Programs (University of Manitoba and University of Winnipeg) there is a different process for handling appeals and academic dishonesty cases than for University of Manitoba students in regular programs (not Joint Programs). This process is outlined in the Joint Master's Program Governing Documents.

Academic Appeals

In terms of qualifying examinations, candidacy examinations, thesis examinations, and any other academic matters, departments make recommendations for action to the Faculty of Graduate Studies. In the first instance, any appeal of a department's recommended action should be handled through the departmental appeal process, which is outlined in the department's supplementary regulations. Appeals stemming from departmental actions on academic matters (e.g., failure in a course) will be heard by the

Faculty of Graduate Studies Appeal Panel only after they have been dealt with by the appropriate departmental-level appeal process. The Appeal Panel will handle an appeal of Faculty of Graduate Studies actions.

These student appeals should be directed to the Dean of the Faculty of Graduate Studies within the appropriate timelines. A decision of the Appeal Panel is appealable only to the Senate Committee on Appeals (see University of Manitoba Governing Documents: Students: Policy: Academic Appeals Procedures and Guidelines).

Consideration of an Academic Appeal

The hearing panel shall consider an appeal:

Only if the grounds for the appeal stem from an examining committee or departmental action and only after an appeal has been heard by the body responsible for appeals in the department concerned (unless the action being appealed is one taken by the Faculty of Graduate Studies). This is understood to include decisions taken by individuals or committees acting in the name of a department of the Faculty of Graduate Studies and also to the supplementary regulations pertinent to a department's operation which have been approved by the Faculty of Graduate Studies;

If there is some evidence that a department or faculty regulation has been unfairly or improperly applied;

There is apparent conflict between Faculty of Graduate Studies' policy and a department regulation; and/or

Other circumstances that warrant special consideration.

Note: It shall be the responsibility of the appellant to indicate clearly and specifically the grounds warranting consideration of the appeal.

When a hearing panel determines that there are insufficient grounds to proceed with an appeal hearing it shall report its reasons to the Dean of Graduate Studies.

Academic Appeal Deadlines

General: An appeal of action taken by any department or administrative unit, committee, administrator or faculty member within the Faculty of Graduate Studies must be sent by the student to the Dean of Graduate Studies within 15 working days of the date when the student was informed in writing of the action to be appealed.

Appeal of Term Work: Students are encouraged to discuss matters relating to grading of term work with their instructor in the first instance. Further appeals of grades on academic term work shall be directed, by the appellant, to the department responsible for the course within 10 working days after the grades for term work have been communicated to students. Following receipt of the appropriate appeal form and evidence of payment of the refundable appeal fee, the department shall consider the appeal and provide a decision within 15 working days.

Appeals To Senate: As per the University of Manitoba Governing Documents: Students: Policy: Appeals Procedures and Guidelines (Procedures: 4.), "Appeals to the Senate Committee on Appeals shall be filed with the University Secretary within twenty (20) working days after the mailing of the notice of decision from which the appeal is made. The Chair of the Senate Committee on Appeals shall have discretion to extend this deadline if he/she determines that there are special circumstances which justify or excuse the delay."

Discipline Appeals

The specific jurisdiction of each of the Disciplinary Authorities is outlined in: University of Manitoba Governing Documents: Students: Bylaw: Student Discipline. See 2.3.3: Table 1: Jurisdiction of Disciplinary Authorities.

When the appeal is against a disciplinary decision made by the Faculty of Graduate Studies, the appeal routes and procedures as outlined in the following shall prevail: University of Manitoba Governing Documents: Students: Procedures: Student Discipline.

If the appeal is from a decision of the Dean of the Faculty of Graduate Studies the appeal statement shall be delivered to the Dean of the Faculty of Graduate Studies on behalf of the Local Discipline Committee (L.D.C.)

If the appeal is from a decision of the L.D.C., the official statement shall be delivered to the Secretary of the University Discipline Committee (U.D.C.) with a copy to the Dean of the Faculty of Graduate Studies.

Discipline Appeal Deadlines:

If a student wishes to appeal a decision to any group or body, the notice of appeal must be delivered in writing to the appropriate person(s) **within five working days** of the student being notified of the decision from which the student intends to appeal.

Appeal of Violation/Penalty:

As per section 2.7.2 of the University of Manitoba Governing Documents: Students: Procedures: Student Discipline,

The Student shall clearly indicate in the notice of appeal whether they are appealing the decision on:

- (a) the finding of facts;
- (b) the disposition determined by the disciplinary authority; or
- (c) both (a) and (b).

Limitations on Appeal Rights

Students who disagree with a decision have access to the appeal routes as laid out by the various Faculty of Graduate Studies and University of Manitoba appeal procedures. Student appeals may be limited by the scope of the inquiry available at each level and category of appeal, as well as the time limitations for submission of appeals.

A further limitation is that the Faculty of Graduate Studies rules and regulations, established to uphold the academic rigour of the University of Manitoba, are generally not subject to appeal unless an appeal route is otherwise stipulated. In situations where no appeal route is available, a student may make a written request to the Dean.

Procedures

Academic:

All appeals shall be submitted in written form to the Dean of Graduate Studies. The Dean may, on consideration, attempt first to reach an informal solution. If that is judged by the Dean to be inappropriate or unfeasible, a hearing panel will be formed. Hearings shall be held in closed session unless at least one party requests an open hearing and all parties to the appeal agree to the request.

The Dean shall inform the appropriate Department head of the nature of the appeal, forward a copy of the student's written submission, and request a written response to the appeal within **ten working days**. A hearing panel will be struck and a meeting set by the Dean of Graduate Studies as soon as possible after receipt of the written response from the department.

The appellant shall receive, through the Dean of Graduate Studies, the response of the department at least one week prior to the date set for the hearing of the appeal. Notices of the hearing shall be sent by the Dean of Graduate Studies to the individuals affected, giving the specific time and place for a hearing.

All documentation that the hearing panel will consider shall be made available through the Dean of Graduate Studies Office to both the student and the Department Head in advance of the meeting. No additional materials may be presented at the time of the hearing. In the case where a request is made to submit additional materials, the Chair shall postpone the hearing and allow no more than **ten working days** for the other party to respond to the new materials.

Each petitioner and appropriate Department head (or delegate) shall have the right to appear before the hearing panel and to call witnesses that he/she wishes to appear before the panel. It is the responsibility of the party calling witnesses to ensure that the witnesses are informed of the date and time of the hearing. The Dean of Graduate Studies shall be notified not less than four working days prior to the hearing of the names of all witnesses that are to be called.

The student shall be advised by the Dean of Graduate Studies of the right to appear in person or to be represented by the Student Advocate or a fellow student or other full-time member of the University community not receiving payment for appearing, or working for legal aid. In addition, if the student wishes, one member of his/her immediate family, and a lawyer, may be present, but only as observers who do not participate. At least four working days prior to the hearing, the Dean of Graduate Studies must be notified of any persons to be accompanying the appellant.

Both appellant (and/or representative) and Department head (and/or representative) are entitled to cross-examination of any and all witnesses.

All members of a hearing panel shall participate in all of the deliberations essential for the determination of the matter in dispute. If, in the course of

hearing an appeal, a member is not present at the commencement of the hearing or a member cannot continue, the panel may elect to proceed in the absence of that member. If more than one member is not present at the commencement or cannot continue, the hearing panel must adjourn.

As a first item of business in dealing with any appeal, the hearing panel shall consider (in closed session):

Whether there are sufficient grounds to proceed with the appeal hearing, any requests it has received to hold an open session, and if so, determine what parts of the hearing shall be open.

Normally the appellant and the Department head and/or their representatives will be present during the presentation of the other's case. During the hearing, the appellant or the Department head may request a change in the open or closed nature of the hearing, at which time the hearing panel shall determine its procedures.

The hearing panel may request the appellant or any other parties to appear or provide additional information in a particular case before reaching a decision.

All parts of the meeting required to deliberate or determine resolution of the appeal shall be held in camera.

The Dean of Graduate Studies shall inform, in writing, the appellant and the Department head concerned of the disposition of the appeal, the reasons for the decision, and of whatever action may result. The further right of appeal to the Senate Committee on Appeals should be indicated, along with any appropriate time limits.

Disqualification:

Any member of the Appeal Panel shall be disqualified from hearing an appeal who: Is a faculty member or a student in the Department (School or Faculty) in which the appellant is registered; or Was, as an individual, or as a member of a committee or board, responsible for making the decision being appealed.

Other Appeals

Discipline:

Please refer to University of Manitoba Governing Documents: Students: Procedures: Student Discipline

Admission Appeals:

Please refer to University of Manitoba Governing Documents: Students: Policy: Admission Appeals Procedures and Guidelines.

Fee Appeals:

Please refer to the Registrar's Office webpage on fee appeals: <http://umanitoba.ca/student/records/fees/830.htm>. To initiate the Fee Appeal procedure, the student completes a Fee Appeals form, available online or in the Registrar's Office, 400 University Centre.

Assistance with Appeals

The Office of Student Advocacy, 519 University Centre, provides information and assistance to students regarding all appeal processes.

Facilities, Services and Resources

The following is a list of selected facilities, services and resources which includes contact information for each of the University's colleges.

Aboriginal Student Centre

Office: 121 Aboriginal House

Telephone: (204) 474 8850 **Fax:** (204) 275 3142

E-mail: asc@cc.umanitoba.ca

Website: umanitoba.ca/student/asc/

- Academic Assistance to Aboriginal students
- tutorial referrals
- advocacy
- cultural support
- Elder-In-Residence
- traditional teachings, sharing circles,
- annual Traditional Graduation Powwow
- emotional/personal support
- Aboriginal Student Lounge
- financial information
- recreational, political and cultural events

Aboriginal Student Association

Telephone: (204) 474-8396

Email: UMASA2010@gmail.com

Website: umanitoba.ca/student/umasa

- a service group fully funded by the University of Manitoba Students' Union

Admissions Office

424 University Centre

Telephone: (204) 474 8808 **North America Toll Free:** (800) 224 7713

Fax: (204) 474 7554

E-mail: admissions@umanitoba.ca

Website: umanitoba.ca/student/admissions

- Application Information
- Admission Requirements

Answers Information

1st floor University Centre

Telephone: (204) 474 8211

- information on nearly everything on campus
- Ticketmaster outlet: tickets to most campus and off-campus events
- transit post-secondary discounted bus passes
- free phones and sales of long distance phone cards
- campus lost and found

Book Exchange

Archives Book Exchange

107 Helen Glass Centre

Telephone: (204) 474-6511

- used textbooks sale and exchange

Book Store

Fort Garry Campus

Store Hours Information Line: (204) 474 8178

Telephone: (204) 474 8321 **Toll Free in Canada:** (800) 310 3331

Fax: (204) 474 7555

Website: umanitoba.ca/bookstore

Bannatyne Campus

Telephone: (204) 789 3601

Fax: (204) 789 3901 **Toll Free Fax:** (800) 361 2005

- owned and operated by the University of Manitoba
- textbooks, reference books, special orders, computers and software, art supplies, stationery, crested clothing, and giftware
- Computers on Campus, located at both stores
- Lists of required textbooks and course materials are available in August so that course materials may be purchased before classes begin. The Book Store also "buys back" reconfirmed textbooks for cash.
- Mail order service is also provided by writing, phoning, or faxing the Book Store

Chaplains' Association

Fax: (204) 275 8098

Email: Ken_Stupak@umanitoba.ca

Website: umanitoba.ca/student/resource/chaplains

- offers support to all students regardless of religion

Chaplains' Secretary	102 Y University Centre	(204) 474 8721
Jewish	149 University Centre	(204) 474 9325
Lutheran	102 D University Centre	(204) 474 8386
Mennonite	102 E University Centre	(204) 474 9691
Pentecostal	102 X University Centre	(204) 474 8389

Colleges

St. Andrew's College

General Office

29 Dysart Road, Winnipeg, MB R3T 2M7

Telephone: (204) 474-8895

Fax: (204) 474-7624

Email: St_Andrews@umanitoba.ca

Website: umanitoba.ca/colleges/st_andrews

St John's College

General Office

92 Dysart Road, Winnipeg MB R3T 2M5

Telephone: (204) 474 8531

Manitoba Toll Free: 1 800 432 1960 ext. 8531

Fax: (204) 474 7610

Email: Stjohns_College@umanitoba.ca

Website: umanitoba.ca/colleges/st_johns

Student Council Office (room 126): (204) 474 9583

St. Paul's College

General Office

70 Dysart Road, Winnipeg, MB R3T 2M6

Telephone: (204) 474-8575

Fax: (204) 474-7620

Email: stpauls@umanitoba.ca

Website: umanitoba.ca/stpauls

Student Council Office: (204) 474-9262

University College

General Office

203-220 Dysart Road, Winnipeg MB R3T 2M8

Telephone: (204) 474 9751

Fax: (204) 261-0021

Email: ucsecr@cc.manitoba.ca
Website: umanitoba.ca/colleges/uc/

St. Boniface College/Le Collège universitaire de Saint-Boniface

General Office

200 Cathedrale Avenue, Winnipeg, MB R2H 0H7

Registrar's Office Telephone: (204) 235-4408

Email: registrar@ustboniface.mb.ca

Website: www.cusb.ca

Counselling and Career Centre

Fort Garry Campus: 474 University Centre

Telephone: (204) 474 8592

Bannatyne Campus: S207 Medical Services Building

Telephone: (204) 789 3857

Website: umanitoba.ca/student/counselling OR
umanitoba.ca/student/employment

- individual counselling, group programs, crisis management, consultation and assessment
- career planning and counselling
- career mentor program
- employment advising
- job postings
- support for students intending to/or already participating in co-op education/internship programs

Digital Copy Centre

118 University Centre

Fax: (204)261-9384

- offers high speed, high quality printing and photocopying, as well as a wide range of finishing services
- lowest printing costs on campus
- self-serve copiers and printers are available 24 hours daily

Disability Services

520 University Centre

Telephone: (204) 474 9251 **Fax:** (204) 275 8098

TTY: (204) 474 6269

Email: disability_services@umanitoba.ca

Website: umanitoba.ca/student/resource/disability_services

- provides support and advocacy for students with disabilities of all kinds: hearing, learning, injury-related, mental health, medical, physical or visual.
- on-campus, in-class and test/exam accommodations
- on campus transportation, American Sign Language/English interpretation, note-takers, extended time for tests/exams and email notification to instructors about accommodations

English Language Centre

520 University Centre

Telephone: (204) 474 9251

Fax: (204) 275-8098

Email: elc@umanitoba.ca

Website: umanitoba.ca/elc

- English Language Instruction for International Students

Financial Aid and Awards

422 University Centre

Telephone: (204) 474 9531 **Fax:** (204) 474 7543

E-mail: awards@umanitoba.ca

Website: umanitoba.ca/student/fin_awards

- information about scholarships, bursaries, prizes
- student aid
- emergency loans
- the food bank

Food Services

207 Pembina Hall

Telephone: (204) 474 9916 **Fax:** (204) 474 7538

- operated by ARAMARK Canada
- cafeterias, canteens and national branded franchises are located throughout the Fort Garry and Bannatyne Campuses

Health Service

104 University Centre

Telephone: (204) 474 8411; **Fax:** (204) 474 7573

Website: umanitoba.ca/student/health

- accessible by all currently registered University of Manitoba students
- physicians and a visiting consultant psychiatrist
- an after hours on-call telephone service for urgent matters
- an on-site laboratory
- travel health advice and required immunizations

Homestay Program

520 University Centre

Telephone: (204) 474-6809 or (204) 474-8701

Website: umanitoba.ca/student/elc/homestay/index

- an opportunity for a visiting international student to live in a Canadian home while studying at our university
(See also International Centre for Students)

Housing and Student Life

Residence (On-Campus Accommodation)

101 Arthur V. Mauro Residence

Telephone: (204)474-9922 or **Toll Free:**1-800-859-8737

Fax: (204) 474-7662

Email: residence@umanitoba.ca

Website: umanitoba.ca/student/housing/on-campus_living

- six residences on the University's Fort Garry provide accommodation for 1260 students

Lists of off-campus accommodations are maintained at UMSU Living

108A University Centre

Phone: (204) 474-9717

Website: umanitoba.ca/student/housing/off-campus_living

Summer Accommodation

Telephone: (204) 480-1415

Fax: (204) 474-7662

Email: Summer_Accommodations@umanitoba.ca

Website: umanitoba.ca/student/housing/summer_accommodations

- Rooms can be leased for the Summer –early May to mid-August

Office of Student Life

Telephone: (204) 474-6637

Email: student_life@umanitoba.ca

Website: umanitoba.ca/student/housing/studentlife

- ongoing training and development of student leaders in the campus and residence community
- Parents Orientation
- Service Study Tours

International Centre for Students (ICS)

541 University Centre

Telephone: (204) 474 8501 **Fax:** (204) 474 7562

Website: umanitoba.ca/student/ics

- facilitates international learning experiences
- supports international students
- facilitates student exchanges and internships
- delivers cross-cultural programs
- student exchange programs
- World W.I.S.E. Resource Centre (Work, Internship, Study, Exchange)
- social and recreational events
- ICS Lounge: The ICS Lounge and outdoor patio
- Student Advocacy and Resource Services

(See also Homestay Program)

Libraries

General Office

Libraries – Director’s Office, 156 Elizabeth Dafoe Library

Telephone: (204) 474 9881

Recorded hours for all Libraries: 474 9770

Website: umanitoba.ca/libraries/

E-mail: karen_adams@umanitoba.ca

- Online catalogue, called BISON
- Document delivery
- Photocopying facilities
- Laser printing

Locations:

Albert D. Cohen Library (Management)

208 Drake Centre; Phone: (204) 474 8440

Architecture and Fine Arts Library

John A. Russell Building; Phone: (204) 474 9216

Archives & Special Collections

331 Dafoe Library; telephone: (204) 474 9986

Carolyn Sifton-Helene Fuld Library

409 Taché Avenue; telephone (204) 237 2807

Concordia Hospital Library

Room 308, 1095 Concordia Ave., R2K 3S8; telephone (204) 661 7163

Donald W. Craik Engineering Library

351 Engineering Building; telephone: (204) 474 6360

Elizabeth Dafoe Library

25 Chancellors Circle, telephone: (204) 474 9544

E.K. Williams Law Library

401 Robson Hall; telephone: (204) 474 9995

Eckhardt-Gramatté Music Library

223/4 Music Building; telephone (204) 474 9567

Father Harold Drake Library

119 St. Paul's College; telephone: (204) 474 8585

Bill Larson Library (Grace General Hospital)

300 Booth Drive, R3J 3M7; telephone (204) 837 0127

J.W. Crane Memorial Library

Deer Lodge Centre, 2109 Portage Ave., R3J 0L3; telephone (204) 831 2107

Misericordia Health Centre Library

99 Cornish Ave., R3C 1A2; telephone (204) 788 8109

Neil John Maclean Health Sciences Library

Brodie Centre, Bannatyne Campus; telephone: (204) 789 3464

Ombudsman

406 University Centre

Telephone: (204) 474 8439 **Fax:** (204) 474 7526

Email: Evelyn_Bernstein@umanitoba.ca

Website: umanitoba.ca/staff/ombudsman

- the Ombudsman is a designated neutral person who provides confidential and informal assistance for resolving university-related concerns
- independent of the University’s formal administrative structure
- has power to investigate and make recommendations to resolve problems and improve University policies and procedures

Parking Services

Welcome Centre, 423 University Crescent

Telephone: (204) 474 9483

Fax: (204) 474-7658

Website: umanitoba.ca/parking

- 3400 parking spaces are available for purchase by students
- parkade, meters, pay and display and ticket-dispenser areas supply an additional 1,600 spaces

- Motorcycles are accommodated in two convenient locations.
- Commuter and Resident parking permits can be purchased online by credit card
- Fort Garry Campus wide Shuttle service available from September to April

Peers: Students Helping Students

150 University Centre

Telephone: (204) 474 6696 **Fax:** (204) 269 1299

E-mail: peer@umsu.ca

Website: umanitoba.ca/student/peers

- provides support to fellow students on any academic, health or personal concern.

PlayCare Centre

109 University College

Telephone: (204) 474 6949 **Fax:** (204) 261 0021

Email: childsm@cc.umanitoba.ca

Website: umanitoba.ca/student/resource/playcare

- licensed as a full-time daycare for children between 2 and 5 years of age and for ages 6-12 on school in-service days

Recreation Services

145 Frank Kennedy Centre

Telephone: (204) 474 6100 **Fax:** (204) 474 7503

Websites: www.bisonactiveliving.ca OR www.bisonactiveliving.ca

- wide variety of recreation facilities Intramurals and Sports Clubs
- Intramural sports
- adult recreation instructional programs
- fitness assessment, counselling, programming and fitness leadership development
- children’s camps

Registrar’s Office

400 University Centre

Telephone: (204) 474 9420 **Toll Free North America** (877) 474 9420

Fax: (204) 275 2589

Website: umanitoba.ca/registrar

- registration information
- address and name changes
- application and information for graduation
- application for Letters of Permission
- Convocation ceremonies
- fee assessment (charges and refunds), and fee appeals
- examinations fee appeals
- final grade reporting
- graduation parchment replacement
- international student health insurance,
- student photo ID cards
- transcripts
- T2202A education tax forms.

Sports (Bison Sports)

Telephone: (204) 474 9611 or (204) 474 9234

Address: 124 Frank Kennedy Physical Education Centre.

Website: www.gobisons.ca

- member of Canada West Universities Athletic Association
- regional association within Canadian Interuniversity Sport (CIS).
- Bison teams include basketball, football, golf, cross country, hockey, soccer, swimming, track and field, and volleyball

Student Advocacy

519 University Centre

Telephone: (204) 474 7423

Fax: (204) 474 7567

Email: student_advocacy@umanitoba.ca

Website: umanitoba.ca/student/advocacy

- assists students in the resolution of conflicts arising from actions or decisions taken by the University.
- offers workshops and orientations to students, staff and faculty
- resources on academic dishonesty, incivility, final grade appeal, term work grade appeal, student conduct

University of Manitoba Students' Union (UMSU)

101 University Centre

Telephone: (204) 474-6822

Fax: (204) 269-1299

Email: umsu@umsu.ca

Website: umsu.ca

The university-wide representative body for undergraduate students at the University of Manitoba

- Advocates on behalf of students to University administration and to all levels of government
- Organizes many informational and entertaining student-focused events throughout the year
- Offers a collection of services to help students save money and enhance their campus experience
- UMSU is Local 103 of the Canadian Federation of Students (CFS), a provincial and national organization that provides representation and cost-saving services for its members.

Aboriginal Students' Association (UMASA)

Telephone: 204-474-8396

Email: umasa2010@gmail.com

Website: umasa.wordpress.com

Rainbow Pride Mosaic (RPM)

195 Helen Glass Centre

Telephone: 204-474-7439

Email: rpm@umsu.ca

Web: rpm.umsu.ca

Womyn's Centre

190 Helen Glass Centre

Telephone: 204-474-6897

Email: uofm_womyn@hotmail.com

Website: womynscentre.umsu.ca

Graduate Research Units and Facilities

Academic Computing and Networking

Academic Computing and Networking (ACN) provides general purpose computing facilities for all University of Manitoba students. Students may use the computing facilities for assigned coursework, research or for preparing papers.

There are ACN facilities located throughout the university, including Architecture II, Dafoe Library, Engineering, Machray Hall, Human Ecology, St. Paul's College, St. John's College and Continuing Education Complex. Each facility has a different mix of equipment selected to meet the planned course requirements of the requesting faculties. Most include access to networked Unix servers and workstations, and terminals to access the IBM mainframe and electronic library catalogue. Various facilities also offer networked DOS and/or Macintosh microcomputers with wordprocessing and other software, and dot-matrix printers. Many areas are open 24 hours.

Brochures and users guides can be obtained from ACN to introduce students to the facilities. Orientations are also available. Individual professors may provide information tailored to the particular needs of their students.

Some specialized hardware and software aids for disabilities are available in most computer areas. These include image enlargement programs, and optical character scanning with voice synthesis. Most facilities are wheelchair accessible.

All students are eligible for UNIX and IBM mainframe computer accounts at no charge. Instructions on how to set up a computer account are provided in the *Registration Guide*, or from the ACN Account Office, 629 Engineering Building, 204 474 9788. The advisors at the Computer Accounts Office also offer general assistance and advice on microcomputing problems. For further information on access to computer facilities, contact the advisors at 204 474 8600, 629 Engineering Building.

Other computer and engineering facilities:

Applied Electromagnetics Facilities

Biomedical Engineering Facilities

Communications and Signal Processing Facilities

Computers and Microelectronics Facilities

Electrical Energy Systems Facilities

Electrical Materials and Devices Facilities

For information on the above facilities, see the Department of Electrical and Computer Engineering section.

Agriculture Canada Research Station

The offices and laboratories of the Winnipeg Research Station of Agriculture Canada are located on the Fort Garry Campus. Agriculture Canada also operates a field station adjacent to the university's own Glenlea Research Station, about 20 km south of the city. Station scientists, many of whom hold the positions of adjunct or honorary research professors, cooperate with various departments, particularly Agricultural Engineering, Animal Science, Botany, Entomology and Plant Science in the conduct of research and in the training of graduate students.

Centre for Architectural Structures and Technology (CAST)

The Centre for Architectural Structures and Technology (C.A.S.T.) seeks new boundaries for architectural thought, design, and building technology. This search embraces both the poetic and technical dimensions of architecture through physical explorations of materials, the study of natural law, and the free play of imagination. CAST is housed in a specially designed 5,600 square foot laboratory building located between the Faculties of Architecture, Engineering and the School of Fine Arts. Current research is exploring two areas investigation: flexible fabric formwork for concrete structures, and experimental uses of digital fabrication in architecture.

Centre for Earth Observation Science (CEOS)

Director: D. Barber, PhD, Canada Research Chair in Arctic System Science

CEOS was established as a centre of the University of Manitoba in 1994. The centre is a focal point for teaching and research in the application of earth observation technologies (geographic information systems, remote sensing, computer cartography, numerical modelling etc) to the study of

earth system science. Student research focuses on specific aspects of the interactions of the atmosphere, biosphere, hydrosphere, and lithosphere, at scales ranging from the micro to the planetary. Its philosophy in both teaching and research is to develop an understanding of the Earth as a system, and in particular the role which humans play in these planetary processes.

CEOS is structured as an interdisciplinary centre through the partnering arrangements with the university departments of Electrical Engineering, Soil Science, Statistics, Botany, Biology, Physics and Applied Mathematics. External partners include Manitoba Natural Resources, the Canadian Wheat Board, Parks Canada, Fisheries and Oceans, Manitoba Hydro, among others, as well as those with national and international affiliations such as the Canadian Ice Services, Environment Canada, Canada Centre for Remote Sensing, Canadian Space Agency, National Air and Space Administration, the Canadian International Development Agency. CEOS has unique research equipment for atmospheric and oceanic research including a research icebreaker, scatterometers, radiometers, mass, gas and energy flux instrumentation, doppler sodars, and water vapour profiling radiometers.

Centre for Higher Education Research and Development

Director: N. Levine

Established in 1987, CHERD is Canada's leading institute dedicated to higher education research and to the continuing professional education of faculty and administrators in post-secondary education. To this end, the centre is committed to an interdisciplinary collaborative program in Canada and around the world of regional, national and international courses, seminars, symposia, research projects, and publications. This work is supported by a national and international network of program associates, and through collaborative partnerships with such bodies as AUCC, CAUBO, CIDA, UNESCO, CSSHE, COHERE, the World Bank, the Association of African Universities, the Association of Indian Universities, and the Inter-American Organization for Higher Education.

CHERD's training and development activities stimulate research and scholarship within the areas of teaching and learning, and management. The goal of the teaching and learning programs is to help post-secondary teachers understand how they can most effectively assist their students' academic development. Various aspects of higher education instruction, including curriculum design and pedagogy, are examined in relation to students' ability to think and perform competently within their fields of study. Research in the management area has focused on evaluating the immediate and long-term effectiveness of training programs for post-secondary administrators from across the province, nation and world. Through an annual series of research grants to faculty members CHERD catalyses research on higher education within the University of Manitoba.

Within CHERD, University Teaching Services (UTS) and the Instructional Development Program (IDP) provide a wide range of programs to enhance teaching and learning at the University of Manitoba. Of particular interest to graduate students are professional development opportunities such as teaching assistant workshops, the Certification in Higher Education program, and the professional development series for graduate students.

Centre on Aging

Director: V. Menec, PhD

The Centre on Aging is a university-wide interdisciplinary research centre established in 1982 with a mandate to serve as a focal point for the conduct and integration of basic and applied research on aging at the university and in the province; to encourage and stimulate those peripherally involved in the area to become more intensely involved; and, to attract others into the field of aging.

The Centre has an established national and international reputation for research excellence in aging and brings together researchers from various disciplines to conduct research and to disseminate information on all aspects of aging. The experiences of aging individuals and the dynamics of an aging society are investigated using rigorous scientific standards. Taking a lifespan perspective, Centre Research Affiliates are studying people's beliefs and behaviours in a variety of areas to increase knowledge, undertaking evaluation research for use by government and other organizations to assess their programs and policies, and exploring factors that contribute to

the health and quality of life that enhance independence in later life. Community representatives contribute to all projects and serve on various committees.

The Centre is well-known for its highly successful outreach activities such as: the annual Spring Research Symposium, public lectures, and newsletter; academic presentations and publications; annual Research Forum/Graduate Student Research Day to discuss current research issues, identify colleagues with similar interests, provide students with an opportunity to present their research in conference poster format and get feedback; research findings broadly distributed to policy makers, practitioners, and seniors; and, strong linkages with various government departments and community organizations.

Although the Centre on Aging is not a teaching unit, gerontological education is, and always has been, an important component of the Centre. The Centre on Aging coordinates the Graduate Specialization in Aging, which allows graduate students from any discipline to concentrate their studies in aging; graduate students are involved in many of the research projects at the Centre; and a graduate student e-mail list provides information to students regarding seminars, funding, calls for papers, conferences, and employment opportunities. Each year the Centre on Aging awards three scholarships to students pursuing studies in aging at the University of Manitoba: the Centre on Aging Betty Havens Memorial Graduate Fellowship, the Jack MacDonell Scholarship for Research in Aging, and the Esther and Samuel Milnot Scholarship. In addition, the Centre also adjudicates the Alzheimer Society of Manitoba Graduate Fellowships.

For more information on the Centre on Aging and its research program, visit the Centre's Website at umanitoba.ca/centres/aging

Delta Marsh Field Station

Director: L. G. Goldsborough, PhD

The Delta Marsh Field Station, located on the southern shore of Lake Manitoba adjacent to Delta Marsh, one of the largest coastal wetlands in North America, is available for year-round teaching and research. A variety of habitats, including lake, lakeshore, forested ridge, marsh, marginal prairie, and forested parkland give excellent opportunities for research in biological, physical, environmental, ecological, social, and natural sciences. Fully-equipped teaching and research laboratories, meeting rooms, reference library, plant and animal study collections, computers, and residence accommodation exist for up to 65 persons. With dramatic sunsets, abundant wildlife, and star-filled night skies, the station is a tranquil year-round setting for inspiration and creation. A newly constructed residence offers private rooms with full climate control, individual washrooms, and desk space in each unit, to support scholars from all academic disciplines. Inquiries should be made to the station office: 474-9297 (Winnipeg), 857-8637 (Portage la Prairie) or 866-770-5372 (toll-free in Canada). Further information is also posted on the station's web site: umanitoba.ca/delta_marsh/

Freshwater Institute

The Freshwater Institute, is a major national laboratory of the federal government's Department of Fisheries and Oceans and is located on the Fort Garry campus. Cooperative graduate programs are supervised under the university's Aquatic Biology Research Unit.

Geological Sciences Field Station (Star Lake)

This field station is located on Star Lake in southeastern Manitoba. It is in the Precambrian Shield just north of the Trans-Canada Highway, near the Manitoba-Ontario boundary. The station is equipped for teaching and has residence accommodation for up to 30 students. For further information, contact the Department of Geological Sciences.

Glenlea Research Station

Director: Laurie Connor, PhD

The Glenlea Research Station is located approximately 20 km south of the university's Fort Garry Campus and was established in 1964. The station is operated by the Faculty of Agricultural and Food Science with financial support from Manitoba Agriculture and the University of Manitoba. The station provides the Faculty of Agricultural and Food Sciences with facilities and services necessary for its research and teaching programs. There are approximately 500 hectares of land, a dairy unit with 50 milking cows, a swine unit with 140 sows, and feedlot facilities for beef cattle research. The departments of Biosystems Engineering, Animal Science, Entomology,

Plant Science and Soil Science are involved in research projects at the Glenlea Research Station. The Station is an official meteorological recording site, providing information to Environment Canada.

The Department of Physics and Astronomy operates an observatory and the Avian Behaviour Laboratory of the Department of Psychology is also located there.

The Department of Geological Sciences, in conjunction with Energy, Mines, and Resources (Canada) and the Geological Survey of Canada, operates a geomagnetic observatory at the Glenlea Research Station. This observatory is one of 12 stations which make up the Canadian Magnetic Observatory Network. Data are available for research and can be obtained in several formats from the Geological Survey of Canada.

Also located at Glenlea is a Wildlife Rehabilitation Centre operated by the Manitoba Wildlife Rehabilitation Organization. This centre provides care, treatment and rehabilitation of injured and orphaned wildlife throughout Manitoba and fosters understanding of wildlife preservation through public education and other programs.

Health, Leisure and Human Performance Research Institute

Director: P. Gardiner, PhD

The HLHP Research Institute was established in 1992 in the Faculty of Kinesiology and Recreation Management (formerly the Faculty of Physical Education and Recreation Studies). The objective of the Institute is to facilitate, conduct, and disseminate research of the highest quality in the areas of human movement and leisure behaviour in order to contribute to an enhanced understanding of health and human performance.

The Institute has a wide network of researchers, many nationally and internationally recognized scholars, who pursue research at the forefront of their inter-related fields of health, leisure, and human performance. The five general areas of research within the Institute are: health and wellness; lifespan and disability; exercise and environmental medicine; leisure and tourism; and sport and human performance.

The Institute has collaborative relationships with organizations such as Parks Canada; Manitoba Culture, Heritage, Tourism and Sport; Sport Manitoba, and the Canadian Sport Centre, which provide important financial support for several Institute researchers. Institute researchers also hold grants from many provincial and national research granting bodies (e.g., CIHR, MRC, NSERC, SSHRC).

In addition, the Institute supports several initiatives to encourage scholarly activity in the areas of health, leisure, and human performance. In particular there is the visiting distinguished scholar program, small research grants, research fellowships and support for graduate students in the form of costs to present at conferences, data sets for secondary analysis, and research assistantships.

Institute for the Humanities

Director: David S. Churchill, PhD

UMIH was established in 1990 to foster research and scholarship in the Humanities at the University of Manitoba, to promote cross-disciplinary research in the Humanities, and to help obtain external funding for Humanities research. The Institute addresses the needs and interests of researchers in a broad range of subjects including literature and languages, film and visual culture, philosophy, history, and religion, and also the literary, philosophical, theological, and historical aspects of the social and physical sciences, mathematics, the arts, and professional studies. UMIH is located within the Faculty of Arts but is intended to serve the entire Humanities constituency in the University and the general community. The Institute is accordingly committed to community outreach through programs and lecture series for the general public.

ISIS Canada

ISIS Canada Research Network was established in 1995 to provide civil engineers with smarter ways to build, repair and monitor structures using high-strength, non-corroding, fibre reinforced polymers (FRPs) and fibre optic sensors (FOSs). It was created by the federal Networks of Centres of Excellence (NCE) program and encompasses 15 universities, 33 Project Leaders (principal researchers), 276 researchers, 92 associated organizations, and 36 multidisciplinary demonstration projects. The Administration Centre headquarters for ISIS Canada is at the University of Manitoba.

Language Centre

The University of Manitoba Language Resource Centre was established in 1998 as a joint venture between the Faculty of Arts and the English Language Studies Program of Extended Education. The Centre supports all foreign language departments by providing access to instructional technology for language and culture study. It provides students and faculty with facilities and services for traditional language laboratory work as well as for foreign language video and computer based activities.

The Centre provides up to date technology for foreign/second language education. It offers leadership and technological expertise to support excellence in foreign and second language learning and teaching as well as the study of culture. In addition, it serves as a support mechanism for faculty in developing new pedagogical knowledge through creative technological endeavours. In its capacity as a recognized TOEFL testing site, administers the TOEFL test on behalf the English Language Studies Program.

Manitoba Institute of Cell Biology

The Institute of Cell Biology is a basic molecular cell biology research institute. The group consists of 12 senior scientists with research programs in: transcriptional regulation; Signal transduction; programmed cell death; oncogenes and suppressor genes; wound healing and inflammation; chemotherapeutic drug action and resistance; genomic stability and, immune function.

The institute is housed in the Manitoba Cancer Centre adjacent to the Faculty of Medicine. The resident senior scientists represent seven university departments and constitute a unique milieu in which expertise from different research disciplines can interact in the study of molecular and genetic mechanisms. The centre's members also participate in the teaching programs of their departments. Research opportunities exist for postdoctoral and graduate students under the joint auspices of cell biology and participating university departments; programs leading to a M.Sc. or Ph.D. degree are available.

Natural Resources Institute

Director: C. Emdad Haque, PhD

The Natural Resources Institute was established in 1968 with a threefold purpose: to teach management skills leading to a graduate degree of Master of Natural Resources Management (M.N.R.M.); to conduct applied research on resource problems; and to provide a forum for examining problems in resource use.

The teaching of the institute is centred on a two-year program leading to the degree of M.N.R.M. Coursework consists of a core of courses within the Institute and additional work in related departments of the university. A total of 30 hours, and the preparation of a thesis is required. Further details are given in Section 12.

The teaching, research and analytical work of the Institute are closely coordinated and designed to provide the students with preparation for immediate engagement in management problems at a high level. There is an active publication program involving the results of student and faculty research. Members of the university outside the Institute as well as colleagues from all levels of government, industry and non-governmental organizations are active in the work of the institute.

Solomon Sinclair Farm Management Institute

Director: Brian Oleson, PhD

The Solomon Sinclair Farm Management Institute was established in 1985. Its purpose is to provide the coordination, research and services needed by managers of new agricultural information which is generated by governments, universities and industry. This is accomplished by conducting information seminars and by promoting the transfer of technology through developing and distributing information to farm and agribusiness managers.

Taiga Biological Station

The Taiga Biological Station is situated east of Lake Winnipeg and provides facilities for graduate students interested in boreal ecology, mammalogy, and wildlife biology. The field station is supported by the Taiga Biological Research Trust and various research agencies. Interest in graduate studies should be directed after July 1, 2007 to the Graduate Secretary Department of Biological Sciences. Interest in information about the Taiga Biological Station and its facilities should be directed to Dr. W.O. Pruitt, (Senior Scholar) Department of Zoology.

Transport Institute

Director: Paul D. Larson, Ph.D.

The Transport Institute was established in 1984, as successor to the Centre for Transportation Studies, established in 1966 as the first formal transport research unit at a Canadian university. Its purpose is threefold: to stimulate and coordinate research in transportation, logistics and supply chain management (SCM) at the University of Manitoba; to meet educational requirements of the transportation and logistics industry; and to conduct an outreach program of analysis and information sharing for the community. This mandate is acted upon through funded research; development of courses; and presentations, seminars, and conferences, e.g. the annual Supply Chain Connections conference. The Institute maintains a staff of research associates, and draws on the research skills of SCM faculty members and graduate students.

The Institute offers a Certificate in Logistics (C.Log.), comprised of a series of courses recognized by the Canadian Institute of Traffic and Transportation (CITT). In addition, the SCM Department is under contract to develop the content for the new Purchasing Management Association of Canada (PMAC) Certified Professional Purchaser (C.P.P.) program.

Traditionally, transportation research at the University of Manitoba has focused on the grain industry. Other research areas include: rail transportation, e.g. intermodal container traffic; road transportation, e.g. transborder trucking; and air transportation. Since 2005, as a unit within the Asper School of Business SCM Department, the Transport Institute has been moving toward greater breadth. This broader outlook is reflected in the Supply Chain Connections conference, a shipper (i.e. user of logistics services) survey in 2006, a large study on Manitoba food supply during a pandemic, and a workshop on Manitoba's position and role in the Asia-Pacific Gateway.

Whiteshell Research Establishment Atomic Energy of Canada Limited

An experimental nuclear reactor and major atomic energy research facility is located at Pinawa, some 30 km from Winnipeg. Close cooperation is maintained with the university for joint research programs.

Faculty of Graduate Studies

Awards Information

Awards Officer: Marcia Labiuk
500 University Centre
Telephone: (204) 474-9836
Fax: (204) 474-7553
E-mail: Marcia_Labiuk@umanitoba.ca

Graduate students seeking information on scholarships, bursaries, prizes and loans should consult with the Awards Officer in the Faculty of Graduate Studies.

Award Programs

The following awards are offered through the Faculty of Graduate Studies, which lists the value and deadline to submit applications. A complete listing of awards is on the web: umanitoba.ca/graduate_studies/awards

Please note that awards information is subject to changes. The most up to date information can be found on our website.

(CIHR) Canadian Institutes of Health Research

(www.cihr.ca)

\$ 17,500 CGS Master's

Consult department/unit for their deadline in November

(NSERC) Natural Sciences and Engineering Research Council (www.nserc.ca)

Doctoral Prize

\$10,000 plus a framed citation and a silver medal

Consult department for departmental deadline in September

Postgraduate Scholarship (PGS)

\$17,300 Master's (PGS M)

\$21,000 Ph.D. (PGS D)

Canada Graduate Scholarship (CGS)

\$17,500 Masters (CGSM)

\$35,000 Doctoral (CGSD)

Consult department for departmental deadline in September

Industrial Postgraduate Scholarship

No Deadline to apply.

(SSHRC) Social Sciences and Humanities Research Council (www.sshrc.ca)

\$17,500 Master's

\$20,000 Ph.D.

\$35,000 CGS Doctoral

Consult department/unit for their specific deadline in October

Vanier Canada Graduate Scholarships

<http://www.vanier.gc.ca/hp-pa-eng.shtml>

\$50,000 Ph.D.

Deadline to be determined. Please check with Awards Office for details.

Trudeau Scholars Programme (www.trudeaufoundation.ca)

\$35,000 Ph.D. Mid November

Manitoba Graduate Scholarship

\$15,000 for Master's

\$7,500 for PhD (Top up to UMGF)

Students must apply for the UMGF to be considered for the Manitoba Graduate Scholarship

University of Manitoba Graduate Fellowship

\$12,000 for Master's

\$16,000 for Ph.D.

Consult department/unit for their specific deadline in December

Graduate Studies Programs

Section 1: Agribusiness and Agricultural Economics

General Office

353 – 66 Dafoe Road (Agricultural and Food Sciences Building)

Telephone: (204) 474-9259

Fax: (204) 261-7251

E-mail: AgBus_GradStudies@umanitoba.ca

Website: umanitoba.ca/afs/agribusiness

Head: Brian T. Oleson

Graduate Chair: Barry T. Coyle

Graduate Studies Assistant: Judy Powell

Academic Staff

Senior Scholar

Tyrchniewicz, E.W., B.S.A. (Manitoba), M.Sc., Ph.D. (Purdue), P.Ag.

Professors

Boyd, M.S., B.A. (Seattle Pacific), M.A. (Washington State), Ph.D. (Purdue);

Coyle, B.T., B.A. (California-Berkeley), B.Sc., M.Sc. (British Columbia),

Ph.D. (Maryland); **Oleson,** B.T., B.A., M.A. (Manitoba), Ph.D. (Minnesota),

P.Ag.

Associate Professors

Brewin, D.G., B.Sc. (Alberta), M.Sc. (Saskatchewan), Ph.D. (Pennsylvania

State); **Carlberg,** J.G., B.Comm., B.A.(Hons), M.Sc. (Saskatchewan), Ph.D.

(Oklahoma State); **Johnson,** G.V., B.S., M.S., M.A., Ph.D. (Wisconsin).

Assistant Professors

Cardwell, R.T., B.A.(Hons) (Saskatchewan), M.A. (British Columbia), Ph.D.

(Saskatchewan); **Frank,** J.M., B.Ag.Eng. (Buenos Aires), M.S. (Cornell),

M.S., Ph.D. (Illinois); **Lawley,** C.D., B.Comm., M.Sc. (Saskatchewan),

Ph.D. (Maryland); **Mattos,** F.L., B.A., M.S. (Sao Paulo), Ph.D. (Illinois).

Program Information

The Department of Agribusiness and Agricultural Economics offers graduate instruction leading to the M.Sc. degree. The Ph.D. program is offered through the Economics Department, with students electing an Agricultural Economics field of specialization. The purpose of graduate training in Agribusiness and Agricultural Economics is to develop competence in solving real world problems relating to food production, policy, risk management, marketing, finance, international trade, resources, international development, agribusiness management, and the environment.

Students undertaking graduate studies in Agribusiness and Agricultural Economics may specialize in one of the above areas of research.

Research Facilities

The department has excellent computer facilities, support staff and offices for graduate students.

M.Sc. in Agribusiness and Agricultural Economics

Admission

Applicants must possess the equivalent of the B.Sc. degree in Agribusiness or a four-year degree from the University of Manitoba, or any other degree which provides an equally strong basis for a graduate program in the department. If the applicant has deficiencies of more than 12 credit hours, a requirement may be to successfully complete a pre-Master's program before being admitted to a regular graduate program. Please contact the Department for details.

The following courses, or their equivalents, are prerequisites to the graduate program and indicate the scope and level of training required for admission:

1) MATH 1310 Matrices for Management and Social Sciences (or any equivalent course in linear algebra, e.g. MATH 1300)

and

MATH 1520 Introductory Calculus for Management and Social Sciences (or any equivalent course in calculus, e.g. MATH 1500)

(or the former MATH 1680 Mathematics for Agriculture and Related Sciences)

2) Microeconomic Analysis 1 (ECON 2450 regular or ECON 2700 Honours)

3) Macroeconomic Analysis 1 (ECON 2470 regular or ECON 2800 Honours)

4) Introduction to Econometrics (e.g. ABIZ 3080)

The following courses are not a requirement, but may be recommended:

Microeconomic Analysis 2 (ECON 2460 regular or ECON 3700 Honours)

Macroeconomic Analysis 2 (ECON 2480 regular or ECON 3800 Honours)

Intermediate Econometrics (e.g. ABIZ 4120)

ECON 6040 Survey of Mathematical Topics for Economics is highly recommended, and will normally be taken in late summer/early fall at the beginning of the Graduate program.

Application Deadlines

The Department of Agribusiness and Agricultural Economics allows students to begin their M.Sc. program on either 1 September or 1 January. For admission for each of these start dates, Canadian and U.S. students should send their applications with complete supporting documents to the Faculty of Graduate Studies by June 1 or October 1 respectively. International students should send their applications with complete supporting documents to the Faculty of Graduate Studies by March 1 or July 1 respectively.

Program Requirements

Two programs of study are available:

Program 1:

The thesis option entails a minimum of 18 credit hours consisting of:

Courses	Credit Hours
Microeconomics, normally ECON 7722 (or the former ECON 7720), or ABIZ 7100 plus ABIZ 7940*	3-6
Quantitative Methods, which could include approved courses in Econometrics, Management Science or Statistics	3
*Electives prescribed by major advisor in consultation with the student, normally at 7000 level	9-12
Total Credit Hours	18

*With the major advisor's permission, ECON 3700 may be used in conjunction with either ABIZ 7100 or ABIZ 7940 to meet the Microeconomics requirement. Another 12 units of electives are required if just ECON 7722 is chosen (and 9 units of electives are required if one of the other combinations is chosen).

Every candidate must complete an acceptable thesis and pass an oral examination based primarily on the thesis.

All students in the M.Sc. thesis program are required to present two graduate seminars open to the public. The first presentation shall be on the thesis proposal paper. The second presentation will be on their completed research.

Program 2

The comprehensive option normally entails a minimum of 27 credit hours consisting of:

Courses	Credit Hours
Microeconomics, normally ECON 7722 (or the former ECON 7720), or ABIZ 7100 plus ABIZ 7940*	3-6
Quantitative Methods, which could include approved courses in Econometrics, Management Science or Statistics	3
*Electives prescribed by major advisor in consultation with the student, normally at 7000 level	18-21
Total Credit Hours	27

*With the major advisor's permission, ECON 3700 may be used in conjunction with either ABIZ 7100 or ABIZ 7940 to meet the Microeconomics requirement. Another 21 units of electives are required if just ECON 7722 is chosen (and 18 units of electives are required if one of the other combinations is chosen).

In addition to the coursework for the comprehensive option, one research paper will be assigned, supervised, and evaluated by a committee of three, consisting of two members from the Department of Agribusiness and Agricultural Economics and one member from outside the Department, with the student's advisor acting as chair. Upon satisfactory completion of all the coursework and the research paper, the student must pass a comprehensive oral examination. The student will be held responsible in the comprehensive oral examination for knowledge and understanding of the questions relating to the student's program of study and the research paper.

Specialization in business management in agriculture is available under the comprehensive option for a selected number of qualified students. These students are required to take at least 12 units of courses within the Asper School of Business/Faculty of Management at the 6000 or 7000 level.

Second language reading requirement: none
Expected time to graduation: two years

Ph.D. in Economics with a research specialization in Agribusiness and Agricultural Economics*

*A Ph.D. is offered by the Department of Economics with the cooperation of the Department of Agribusiness and Agricultural Economics, with students electing an Agricultural Economics field of specialization.

Admission

1) Except as provided in 2) below, applicants for admission to the Ph.D. program must have completed the entrance requirements and the program requirements of an M.A. degree in Economics or Agricultural Economics equivalent to that awarded by the University of Manitoba.

2) In exceptional cases, applications may be considered from students who have completed an Honours degree in Economics or Agricultural Economics equivalent to that awarded by the University of Manitoba. In such cases, the applicant will be required to fulfil, in addition to the requirements below, all course work requirements for the M.A. degree by comprehensive examination option.

Application Deadlines

Students intending to begin a Ph.D. in Economics with a research specialization in Agricultural Economics will begin their program in the fall. Please note that the Department of Economics does not normally accept students in the January session, as the required Math and Theory courses start in the fall. Canadian and U.S. students should send their applications with complete supporting documents to the Faculty of Graduate Studies by May 1. International students should send their applications with complete supporting documents to the Faculty of Graduate Studies by January 15.

Field in Agricultural Economics

Students electing a research specialization in Agricultural Economics are required to complete the Agricultural Economics field examination, as one of the two required fields of concentration. Other students in Economics may also take this exam.

The following courses are recommended in preparing for this exam: Advanced Agricultural Marketing (ABIZ 7100) and Production Economics (ABIZ 7940). Students are also advised to complete a graduate course in econometrics. In addition a set of extra readings (on seminal applications of marketing and production theory in agriculture) will be made available by the Department Graduate Advisory Committee (DGAC) in Agribusiness and Agricultural Economics to students intending to write this field.

If either of the recommended courses has not been offered during the student's Ph.D. program, then a brief directed studies course under Agricultural Economics (AE) supervision will be arranged to assist the student in the subject area. DGAC will choose members of AE to grade the examinations (both written and oral).

Second language reading requirement: none
Expected time to graduation: four years

Not all courses are offered every year. Please check the Aurora catalogue to find out when a course is offered.

https://aurora.umanitoba.ca/banprod/bwckctlg.p_disp_dyn_ctlg

Course Descriptions

ABIZ 7100 Advanced Agricultural Marketing Cr.Hrs.3 Critical evaluation of micro-theory vis-a-vis technical and economic structure of plants; theory of location in relation to time, form, and space. Also offered as ECON 7900 by the Department of Economics.

ABIZ 7110 Attributes of Market Organization Cr.Hrs.3 Analysis of agricultural market structure, conduct and performance of processing industries.

ABIZ 7140 Resource Efficiency and Allocation in Agriculture Cr.Hrs.3 Seminar on research issues in production economics related to technological change, risk and uncertainty, management and firm growth.

ABIZ 7230 Agricultural Market Regulation Cr.Hrs.3 A review of economic theories of regulation and their application in agricultural marketing. Analysis of specific regulation in agricultural markets.

ABIZ 7240 Research in Agricultural Marketing Cr.Hrs.3 Advanced economic theory and quantitative techniques relevant to agricultural marketing. Topics include model building, market demand and supply, market regulation, and review of literature on marketing research.

ABIZ 7250 Econometric Models and Methods Cr.Hrs.3 Logical foundation of econometrics, model building, econometric methods and problems encountered in specification, estimation, verification, and prediction.

ABIZ 7270 Research Methodology Cr.Hrs.3 Critical discussion of scientific methodology and the scientific status of agricultural economics. Discussion of methodological issues as they relate to the research process in agricultural economics.

ABIZ 7300 Topics in Agricultural Economics Cr.Hrs.3 Application of economic analysis to contemporary problems in agriculture.

ABIZ 7310 Agricultural Economic Development Cr.Hrs.3 Theory and policy of agricultural development in underdeveloped countries: problems of stimulating growth in agriculture and evaluation of alternative approaches to economic development of agriculture. *Prerequisite:* consent of instructor.

ABIZ 7330 Transportation Economics and Research Cr.Hrs.3 Rate determination and cost analysis for different modes of transportation; transportation issues in Canadian agriculture; and research techniques in transportation problems. *Prerequisite:* consent of instructor.

ABIZ 7350 Regional Development Cr.Hrs.3 Review policy, goals, theories, methods and applications relevant to analyzing Canadian and developing country rural development, regional economic growth and project evaluation.

ABIZ 7360 Current Issues in Policies Relating to Agriculture Cr.Hrs.3 Seminar dealing with current issues in policies relating to agriculture.

ABIZ 7370 Concepts of Agribusiness Cr.Hrs.3 Analysis of interrelationships within agricultural sector and between agricultural and nonagricultural sectors.

ABIZ 7380 Agricultural Policy Cr.Hrs.3 Bearing of economic theory on agricultural policy: relevance of allocative efficiency, distributive equity and other criteria, and economic evaluation of alternative policies.

ABIZ 7390 Applied Optimization Cr.Hrs.3 Application of linear and non-linear programming techniques to Agricultural Economics research. Emphasis on interpretation of conditions which ensure optimality for programming techniques. *Prerequisites:* ABIZ 2520 (or 061.252) or MSCI 2150 (or 164.215) or 027.215.

ABIZ 7400 Forecasting and Simulation Models Cr.Hrs.3 Application of simulation modelling to characterizing and predicting the behaviour of complex systems (ecological, engineering and economic). Foundations of simulation and statistical approaches to analysis are emphasized.

ABIZ 7410 Agricultural Finance Cr.Hrs.3 Analysis of financial structure and goal criteria of agricultural firms, analysis of financial markets and institutions, evaluation and application of techniques in risk analysis, investment analysis, financial analysis, and growth and evaluation models.

ABIZ 7420 Advanced Seminar in Agricultural Trade and Economic Development Cr.Hrs.3 Critical examination of current issues in agricultural trade and economic development. *Prerequisite:* the former 061.728, ABIZ 7310 (or 061.731), or ABIZ 7630 (or 061.763).

ABIZ 7430 Advanced Theory of Resource Economics Cr.Hrs.3 Economic theory of the development and management of natural resources. Application of capital theory, investment theory, the theory of externalities and decision-making theories to resource utilization and management. A strong background in microeconomics is required. Also offered as ECON 7430 by the Department of Economics.

ABIZ 7440 Renewable Resource Economics Cr.Hrs.3 A research seminar in applied economic analysis of the development and management of renewable natural resources, concentrating on specific topics and policy issues in water resources, agriculture, environmental quality, forestry, fisheries, game, outdoor recreation and other renewable resources. Also offered as ECON 7440 by the Department of Economics.

ABIZ 7450 Non-Renewable Resource Economics Cr.Hrs.3 A research seminar in applied economic analysis of the development and management of non-renewable resources, concentrating on specific topics and policy issues in energy and mineral resources. Also offered as ECON 7450 by the Department of Economics.

ABIZ 7460 Research Management Cr.Hrs.3 Application of research management

concepts in agriculture and the resource sectors. Research definitions and methodology; the macro environment in relation to research (social and grantor priorities, economic and institutional constraints, institution and project (micro) level priorities, objectives, budgeting, time and personnel management, performance assessment): proposal and report writing; project evaluation.

ABIZ 7630 Theory of International Trade Cr.Hrs.3 Theories of trade flow; trade and income distribution; economic growth and changes in trade flows; instruments of trade intervention; international labour and capital movements; and economic integration. Also offered as ECON 7630 by the Department of Economics. Students may

not hold with the former 061.728.

ABIZ 7940 Production Economics Cr.Hrs.3 Development of static microeconomic theories of the firm, functional forms, aggregation issues, productivity analysis, risk and uncertainty, and an introduction to dynamics. The following are emphasized; a rigorous treatment of the models using duality; a critical understanding of the limitations and possibilities for generalizing the models; and relevance of the models for empirical research, especially in agriculture. Also offered as ECON 7940 by the Department of Economics. Students may not hold credit with the former 018.793 or 061.713.

Section 2: Animal Science

Head: M.L. Connor

General Office: 201 Animal Science Building

Telephone: (204) 474 9383

Fax: (204) 474 7628

E-mail: animal_science@umanitoba.ca

Website: umanitoba.ca/afs/animal_science

Academic Staff

Dean Emeritus

Elliot, J.I., B.S.A. (Toronto), M.Sc., Ph.D. (Alberta), F.A.I.C.

Professors Emeriti

Guenter, W., B.S.A., M.Sc. (Manitoba), Ph.D. (North Dakota State); **Kondra, P.A.,** B.S.A., M.Sc. (Manitoba), Ph.D. (Minnesota); **Marquardt, R.R.,** B.S.A. (Saskatchewan), M.Sc. (Alberta), Ph.D. (Washington State); **Parker, R.J.,** B.Sc. (Glasgow), M.S.A. (Toronto), Ph.D. (Michigan State), Dip. Agr. (Reading); **Seale, M.E.,** B.Sc. (Alberta), M.Sc., Ph.D. (Minnesota), F.A.I.C.; **Stringam, E.W.,** B.Sc., M.Sc. (Alberta), Ph.D. (Minnesota), F.A.I.C.

Professors

Connor, M.L., B.Sc.(Agr.) (Guelph), M.Sc., Ph.D. (Manitoba); **House, J.D.,** B.Sc., Ph.D. (Guelph); **O, K.,** B.Sc. (China), M.Sc., Ph.D., (Manitoba); **Wittenberg, K.M.,** B.S.A., M.Sc., Ph.D. (Manitoba).

Associate Professors

Crow, G.H., B.Sc.(Agr.), M.Sc. (Guelph), Ph.D. (Saskatchewan); **Kebreab, E.,** B.Sc. (Asmara), M.Sc., Ph.D. (Reading); **Krause, D.O.,** B.Sc. (South Africa), M.Sc., Ph.D. (Illinois); **Nyachoti, C.M.,** B.Sc. Agric.(Kenya), M.Sc., Ph.D. (Guelph); **Ominski, K.H.,** B.Sc., Ph.D. (Manitoba); **Plaizier, J.C.B.,** B.Sc., M.Sc. (Wageningen), Ph.D. (Guelph); **Slominski, B.A.,** M.Sc., Ph.D. (Glasztyń).

Assistant Professors

Rodriguez-Lecompte, J.C. DVM (Caldas), M.Sc. (Pontifical Javeriana), Ph.D. (AVC-PEI).

Adjunct Professors

McAllister, T.A., B.Sc., M.Sc. (Alberta), Ph.D. (Guelph); **Shrestha, J.N.B.,** B.V.Sc. and A.H. (India), M.Sc., Ph.D. (Minnesota).

Program Information

The department offers graduate programs leading to the M.Sc. and Ph.D. degrees in behaviour, genetics, nutrition or physiology of farm animals. Research programs serve the animal industries by the application of basic sciences to current problems in the industry. Advanced training in the Department of Animal Science prepares M.Sc. and Ph.D. graduates for positions in animal industry organizations, government and academic institutions.

Graduate programs in the Department of Animal Science may encompass a range of activities, and students should expect to receive experience in laboratory analysis, experimental design and analysis, and work with animals, depending on the research project. Research programs will frequently involve collaborative work with other Departments at the University of Manitoba, or with industry or government partners. The Department also participates in the Inter-departmental Ph.D. program in Food and Nutritional Sciences. There is a strong international orientation to graduate studies in the Department of Animal Science since many students are from outside Canada.

Fields of Research

Research conducted in the Department of Animal Science includes: basic and applied nutrition, including functional feeds; gut microbiology; molecular biology; physiology, behaviour and health; functional foods; animal production systems; and genetics. Experimental species include cattle (beef and dairy), poultry (chickens, turkeys, duck, geese), sheep, swine, laboratory animals (mice, rats, rabbits) and wildlife animals. Studies may involve feed and food safety and toxicology. Research activities in the Department of Animal Science are supported with funds from a variety of government organizations including the National Sciences and Engineering Research Council (NSERC), national and international industry bodies, as well as Provincial commodity groups.

Research Facilities

Extensive facilities for all animal and poultry research are available. The Animal Science Building contains spacious and well-equipped laboratories, classrooms and graduate student offices. New animal research facilities are available on campus for all species. Research programs in dairy cattle, beef cattle and swine also utilize facilities at the 525 hectare Glenlea Research station, located 23 km from campus which includes the National Centre for Livestock and the Environment.

M.Sc. in Animal Science

Admission

Applicants normally require a Bachelor of Science in Agriculture degree with a major in Animal Science: however students with other degrees (e.g., B.Sc. Honours or General) may be accepted. In these latter instances students, depending on their academic background, may be required to complete a pre-Master's program or to register for courses additional to those normally required in the Master's program. Please contact the Department for details.

Application Deadlines

Students may begin their program on either September 1, January 1, May 1 or July 1. For admission on each of these start dates, Canadian and U.S. students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than four (4) months before the intended start date. International students should send their applications with complete supporting documentation to the Faculty of Graduate Studies for screening so that the department may receive the application no less than seven (7) months before the intended start date.

Program Requirements

Program A:

Coursework and Thesis Requirements

- A minimum of 12 credit hours of coursework in addition to ANSC 7140.
- A minimum of 6 credit hours at 700/7000 level in the major subject.
- A minimum of 3 credit hours in an ancillary subject.
- Thesis and oral examination.

Program B:

Coursework and Comprehensive Examination Requirements

- A minimum of 30 credit hours in coursework, in addition to ANSC 7140.
- 12-18 credit hours in the major subject at the 700/7000 level.
- 6-12 credit hours in an ancillary subject(s).
- Comprehensive examination.

Second language requirement: none

Expected time to graduation: two years

Ph.D. in Animal Science

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Students may begin their program on either September 1, January 1, May 1 or July 1. For admission on each of these start dates, Canadian and U.S. students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than four (4) months before the intended start date. International students should send their applications with complete supporting documentation to the Faculty of Graduate Studies for screening so that the department may receive the application no less than seven (7) months before the intended start date.

Program Requirements

Minimum Program requirements are outlined in the Graduate Studies Regulations Section of this Calendar.

In addition, Ph.D. students must take ANSC 7390 "Advanced Animal Science Seminar".

Interdepartmental Ph.D. Program

Requirements for the Interdepartmental Ph.D. program in Food and Nutritional Sciences are given in the section entitled "Interdisciplinary Programs and Courses" (Section 34.2).

Second language reading requirement: none

Expected time to graduation: three years if continuing from an M.Sc. program

Course Descriptions

ANSC 7140 Animal Science Seminar Cr.Hrs.3 Reports and discussions on current problems and investigational work with mammals and poultry. This course is graded pass/fail.

ANSC 7220 Genetic Principles of Animal Improvement Cr.Hrs.3 Designed for the development of a framework of theory for the study of the genetics of populations. Changing gene frequency. Genetic and environmental subdivision of the phenotypic variance. Principles of selection. *Prerequisite:* ANSC 3500 or the former 035.310 or equivalent.

ANSC 7360 Advanced Reproductive Physiology, Male Cr.Hrs.3 A lecture-seminar course on sexual function and testicular physiology in males of livestock species; environmental factors influencing reproductive efficiency; recent developments in semen preservation and artificial insemination.

ANSC 7370 Advanced Reproductive Physiology, Female Cr.Hrs.3 A lecture-seminar on current topics related to female reproduction in the livestock species.

ANSC 7380 Endocrine Control of Animal Metabolism Cr.Hrs.3 A lecture-seminar course on current topics concerning the control of physiological processes of importance in domestic animal species.

ANSC 7390 Advanced Animal Science Seminar Cr.Hrs.3 Ph.D. Candidates are expected to complete a grant application form, review and critique current literature, and present a seminar on current research topics. This course is graded pass/fail.

ANSC 7400 Quantitative Genetics in Animal Science Cr.Hrs.3 A study of advanced techniques used in animal breeding research, their theoretical basis, analysis and in-

terpretation. Case studies in the student's area of interest will be examined. *Prerequisite:* ANSC 7220 or its equivalent.

ANSC 7440 Protein Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the fields of protein nutrition and metabolism, pertinent to mammalian physiology. Also offered as HNSC 7440 by the Department of Human Nutritional Sciences. Not to be held with the former 035.735.

ANSC 7450 Energy and Carbohydrate Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of energy/carbohydrate nutrition and metabolism, pertinent to mammalian physiology. Also offered as HNSC 7450 by the Department of Human Nutritional Sciences. Not to be held with the former 035.717.

ANSC 7460 Lipid Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of lipid nutrition and metabolism, pertinent to mammalian physiology. Also offered as HNSC 7460 by the Department of Human Nutritional Sciences.

ANSC 7470 Vitamin Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of vitamin nutrition and metabolism, pertinent to mammalian physiology. Also offered as HNSC 7470 by the Department of Human Nutritional Sciences. Not to be held with the former 035.734.

ANSC 7480 Mineral and Trace Element Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of mineral nutrition and metabolism, pertinent to mammalian physiology. Also offered as HNSC 7480 by the Department of Human Nutritional Sciences. Not to be held with the former 035.734.

ANSC 7490 Phytochemical Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of phytochemical nutrition and metabolism, pertinent to mammalian physiology. Also offered as HNSC 7490 by the Department of Human Nutritional Sciences.

ANSC 7500 Methodology in Agricultural and Food Sciences Cr.Hrs.3 The application of experimental techniques and procedures to agricultural and food sciences research. Recording, processing, interpretation, and critical appraisal of experimental data.

ANSC 7510 Special Topics in Animal Nutrition Cr.Hrs.3 Students will be required to investigate and report on a nutrition problem in a species other than that of their thesis research. Projects may be avian, bovine, ovine, swine or laboratory animal species.

ANSC 7520 Special Topics in Animal Improvement Cr.Hrs.3 Assigned readings, papers and discussions specific problems in animal genetics. Analysis of original data may be required.

ANSC 7530 Special Topics in Animal Physiology Cr.Hrs.3 Students will investigate a minor research problem in an area of physiology other than that in which the major is being taken. Problems areas may include: digestion, environment, renal function or reproduction.

ANSC 7540 Advanced Applied Animal Nutrition Cr.Hrs.3 An advanced study of the theoretical and applied aspects of monogastric and ruminant nutrition. A laboratory component will provide training in current techniques in feed analyses and computer modeling.

ANSC 7550 Special Topics in Animal Behaviour and Welfare Cr.Hrs.3 Assigned readings, papers and discussions on specific issues in animal behaviour. A short behavioural experiment may be required.

ANSC 7560 Mathematical Modeling of Agricultural Systems Cr.Hrs.3 Lectures and computer based laboratory exercises will be used to discuss various aspects of model development focusing on mechanistic (compartmental analysis), growth functions and an introduction to linear programming. Construction of a simulation model may be required. Not to be held with ANSC. 4240 Mathematical Modeling of Biological Systems. *Prerequisite:* MATH 1500 or MATH 1520

Section 3: Anthropology

Head: Susan E. Frohlick

General Office: 435 Fletcher Argue Bldg.

Telephone: (204) 474 9361

Fax: (204) 474 7600

E-mail: um-anthro@cc.umanitoba.ca

Website: umanitoba.ca/faculties/arts/departments/anthropology/

Academic Staff

Professor Emeritus

Weist, R.E., B.A. (Tabor College), M.A., Ph.D. (Oregon)

Senior Scholars

Chodkiewicz, J-L., L.-És-L. (Sorbonne), Ph.D. (Columbia);

Koolage, W.W., Jr., A.B. (Dartmouth), M.A., Ph.D. (North Carolina); **Shay, C.T.,** B.A., M.A., Ph.D. (Minnesota).

Professors

Greenfield, H.J., B.A., M.A., Ph.D. (CUNY); **Judd, E.R.,** B.A.(Hons.) (Queen's), M.A., Ph.D. (UBC), Diploma (Beijing Language Institute and Fudan U, Shanghai), F.R.S.C.; **Monks, G.G.,** B.A., M.A. (Victoria), Ph.D. (UBC); **Szathmáry, E.J.E.,** C.M., B.A. (Hons.), Ph.D., LL.D. (Toronto), D.Sc. (Western Ontario), D.Litt.S. (St. Michael's College), LL.D. (York), LL.D. (McMaster), F.R.S.C.

Associate Professors

Buddle-Crowe, K.A., B.A. (Concordia), M.A. (Western Ontario), Ph.D. (McMaster); **Burke, S.D.A.,** B.Sc., M.Sc., Ph.D. (Toronto); **Frohlick, S.E.,** B.A., M.A. (Simon Fraser), Ph.D. (York); **Hoppa, R.D.,** B.Sc. (Toronto), M.Sc. (Sheffield/Bradford), Ph.D. (McMaster); **Pentland, D.H.,** B.A. (Hons) (Manitoba), M.A., Ph.D. (Toronto); **Schwimmer, B.E.,** B.A. (St. John's, MD), M.A. (SUNY Binghamton), Ph.D. (Stanford); **Stymeist, D.H.,** B.A. (Wayne State), M.A., Ph.D. (Toronto).

Assistant Professors

Fournier, A., B.A. (McGill), M.Sc. (Montreal), M.A., Ph.D. (Johns Hopkins); **Johnson, D.S.**, B.A. (Toronto), M.A., Ph.D. (Guelph); **Li, F.G.**, B.A. (Hons) (Toronto), M.A. (Simon Fraser), Ph.D. (California - Davis); **Milne, S.B.**, B.A.(Hons) (Waterloo), M.A. (Trent), Ph.D. (McMaster).

Adjunct Professors

Brown, J.S.H., A.B. (Brown), A.M. (Harvard), Ph.D. (Chicago); **Bruce, S.G.**, B.N., M.A., Ph.D. (Manitoba); **Fayek, M.**, B.Sc. (Hons.) (Carleton), Ph.D. (Saskatchewan); **Fulford, G.**, B.A. (Trent), B.A.A. (Ryerson), M.A. (Western), Ph.D. (McMaster); **Gagnon, D.**, Baccalauriat, Ma^{tr}rise, Docteur (Laval); **Hamilton, J.S.**, B.A. (Brandon), M.A. (Alberta), Ph.D. (Simon Fraser); **Larcombe, L.A.**, B.A. (Hons.) (Winnipeg), M.A., Ph.D. (Manitoba); **Pettipas, K.**, B.A., M.A., Ph.D. (Manitoba); **Ristock, J.L.**, B.A. (Hons) (Manitoba), M.A. (Guelph), Ph.D. (Toronto); **Silcox, M.T.**, B.Sc. (Toronto), Ph.D. (Johns Hopkins); **Syms, E.L.**, B.A., M.A. (Manitoba), Ph.D. (Alberta).

Program Information

The department offers programs leading to the Master of Arts and the Doctor of Philosophy degrees. There are 40-50 graduate students in the department.

Graduates work in universities and colleges as professors or specialists, in the Foreign Service, in health related institutions, in museums, in education, in government heritage positions, for the International Development Research Centre, and in counselling for Native municipal boards. Others have chosen to be free-lance anthropologists; some have incorporated their own successful companies.

Fields of Research

The department's research focus, and consequent graduate training and undergraduate teaching emphasis, lies in the following:

Sociocultural Anthropology: Culture and political economy, cultural production, ecology, migration, global political economy, gender and development, symbolic anthropology, media, tourism, kinship, nationalism, education, youth culture, conflict, sexuality, and applied anthropology. Aboriginal Canada, Canada, India, South America, West Africa, China, Eastern Europe and the former Soviet Union.

Archaeology: Theory, analytic methods, environmental archaeology, zooarchaeology, lithics, settlement patterns, domestication, hunter/fisher/gatherers, historic and fur trade archaeology. Western and Northern Canada, Eastern Europe, South Africa, Near East.

Biological Anthropology: Skeletal biology, medical anthropology, demography, palaeodemography, historical epidemiology, palaeopathology, growth and development, infectious disease, reproductive behaviour, 3D imaging, gender and health, colonialism and health.

Research Facilities

The Department of Anthropology is located in the Arts Faculty Complex. Laboratory facilities for archaeology and physical anthropology, the C. Thomas Shay Archaeobotanical Collection and the Bioanthropology Digital Image Analysis Laboratory, housed in the Duff Roblin Building, permit advanced study and research. Computer facilities are housed in the department and the Anthropology Laboratory. The University Library system has a collection of anthropological material, including the Human Relations Area Files. The department has a specialized publication series (UMAP). Faculty and students also use the Provincial Archives, the Hudson's Bay Company Archives, and the Manitoba Museum.

M.A. in Anthropology

Admission

In addition to the minimum admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, an advanced (four year) degree in Anthropology is the normal preparation for the M.A. program. Students with a different background will normally take a year of pre-M.A. studies consisting of up to 18 hours of courses from the undergraduate, and especially the Advanced, curriculum.

Admission Deadlines

Canadian/U.S. and international students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 9 months prior to their intended start date.

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, students must complete a minimum number of 18 credit hours of graduate coursework, including at least 12 credit hours of Anthropology courses at the 700/7000 level. Finally students must submit an acceptable thesis and pass a thesis oral examination.

Second Language Reading Requirement: None

Expected Time to Graduate: 2 Years

Ph.D. in Anthropology

Admission

All requirements for the M.A. degree must be completed. Preference will be given to applicants who have demonstrated independent research competence at the Master of Arts level.

Admission Deadlines

Canadian/U.S. and international students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 9 months prior to their intended start date.

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, students must complete 18 credit hours above the M.A. level, including at least 15 credit hours of Anthropology courses at the 700/7000 level.

Second language requirement: yes

Expected time to graduation: 4 years

Course Descriptions

General

ANTH 7630 History of Anthropological Theory Cr.Hrs.3 A broad overview of the history of anthropological theory and method from the 18th century to World War II. Focus on British and American developments in the context of the rise of industrialization and imperialism.

ANTH 7640 Contemporary Anthropological Theory Cr.Hrs.3 Investigation, comparison and evaluation of contemporary approaches to culture theory in the areas of symbolism, social organization and ecology.

ANTH 7650 Applied Anthropology Cr.Hrs.3 Investigation of major case studies, research methodologies, intervention strategies, and substantive areas of application in applied anthropology. Topical emphases such as economic development, health care delivery, resettlement schemes, will reflect the interests of the instructor.

ANTH 7940 Graduate Reading and Research 1 Cr.Hrs.3 Reading and research. As the course content will vary from year to year, students may take this course more than once for credit.

ANTH 7950 Graduate Reading and Research 2 Cr.Hrs.3 Reading and research. As the course content will vary from year to year, students may take this course more than once for credit.

Cultural Anthropology

ANTH 7040 Seminar in Ethnography of Power Systems Cr.Hrs.3 Comparative study of a particular theme or problem in political anthropology.

ANTH 7050 Seminar in the Anthropology of Religion Cr.Hrs.3 An intensive analysis of religion as a cultural subsystem, dealing comparatively with ideologies, rituals, and ceremonies and the various anthropological theories put forward to explain religious behaviour.

ANTH 7070 Seminar in the Anthropology of Illness Cr.Hrs.3 Selected topics in the study of cultural factors involved in health/illness, with emphasis upon a particular cultural system. As the course content will vary from year to year, students may take this course more than once for credit.

ANTH 7130 Cultural Ecology Cr.Hrs.3 An examination of the systematic nature of culture and its interrelationships with natural environmental factors.

ANTH 7140 Ethnographic Research Methods Cr.Hrs.3 Approaches and techniques in field research.

ANTH 7800 Seminar in Ethnohistory Cr.Hrs.3 A critical examination of methods and theories appropriate for ethnohistorical analysis of socio-cultural phenomena, with selected case studies.

ANTH 7810 Seminar in Culture Change Cr.Hrs.3 Focuses on theoretical investigation of social and cultural changes in cross cultural perspective. Includes treatment of evolutionist, ecological, acculturation and Marxist approaches.

ANTH 7820 Ethnology of a Selected Area Cr.Hrs.3 Comparative and theoretical investigation of the social and cultural institutions of a particular cultural region. The area selected will depend upon the interests of the instructor. As the course content

will vary from year to year, students may take this course more than once for credit.

ANTH 7830 Social Organization Cr.Hrs.3 Selected theories of social organization in cross cultural perspective. Subject matter may include kinship, age grading, territorial groupings, social stratification or ethnicity.

ANTH 7900 Problems in Ethnological Research Cr.Hrs.3 Problems in ethnological research. As the course content will vary from year to year, students may take this course more than once for credit.

Archaeology

ANTH 7350 Prehistoric Human Ecology Cr.Hrs.3 Data and techniques involved in the reconstruction of past environments, with special emphasis on the influences of environment on prehistoric cultural development.

ANTH 7380 Archaeological Laboratory Techniques Cr.Hrs.3 Laboratory techniques for analysis and presentation of archaeological data.

ANTH 7400 Seminar in the Archaeology of a Selected Area Cr.Hrs.3 An intensive survey of the archaeology of a major region or culture area of the world. Content will vary according to the interests of the instructor. As the course content will vary from year to year, students may take this course more than once for credit.

ANTH 7410 Seminar in Selected Topics in Archaeology Cr.Hrs.3 The seminars will consist of an intensive examination of major methodological, analytical and interpretive issues in current archaeological research. Content will vary according to the interests of the instructor. As the course content will vary from year to year, students may take this course more than once for credit.

ANTH 7430 Archaeological Interpretive Methods Cr.Hrs.3 This course is an intensive seminar on major methodological issues in archaeological analysis and interpretation.

ANTH 7440 Archaeological Theory Cr.Hrs.3 Archaeological theory as seen from historical and contemporary perspectives.

ANTH 7450 Cultural Resource Management Cr.Hrs.3 An intensive examination of archaeological cultural resource management. Emphasis will be placed on current Canadian CRM issues and on practical applications of concepts and methods.

ANTH 7460 Advanced Faunal Analysis in Archaeology Cr.Hrs.3 The course will cover the major theoretical, methodological, and practical issues in the analysis of archaeological faunal remains. Topics are addressed through lectures, demonstrations, and laboratory exercises. *Prerequisite:* ANTH 3990 or written consent of instructor.

Physical Anthropology

ANTH 7720 Seminar in Human Adaptability Cr.Hrs.3 An intensive study of human population biology in diverse environments inhabited by human populations. Emphasis on selected examples of cultural adaptability as a specifically human mechanism for dissipating stress on the biological system.

ANTH 7740 Medical Anthropology I Cr.Hrs.3 An examination of the interrelationships between human ecology, human biology, and public health. Genetic and environmental factors in human disease. Design and implementation of field studies in the investigation of human disease. Methods of detection, ascertainment, and analysis of human population pathology.

ANTH 7750 Medical Anthropology II Cr.Hrs.3 Population structure and environment in human genetic disease. Comparative consideration of genetic pathology of New and Old World populations.

ANTH 7790 Advanced Topics in Human Skeletal Biology Cr.Hrs.3 Analysis of metric and nonmetric morphological skeletal variation in human populations, with emphasis on the cultural and physical environment. Exemplary problems are drawn from the literature as well as from current research.

ANTH 7930 Special Problems in Human Biology Cr.Hrs.3 Special problems in Human Biology. As the course content will vary from year to year, students may take this course more than once for credit.

Section 4: Applied Health Sciences

Multi-unit Ph.D.

Director: Dr. Phillip Gardiner, Ph.D.

Program Assistant: Janis McGonigle

General Office: Health, Leisure and Human Performance Research Institute, 307 Max Bell

Telephone: (204) 474-7493

Fax: (204) 261-4802

E-mail: ahs_phd@umanitoba.ca

Website: http://umanitoba.ca/graduate_studies/programs/phd/app_hlth_sci/index.htm

Academic Staff

Faculty of Human Ecology

Family Social Sciences

Dean & Professor Emeritus

Berry, R.E., B.H.E. (UBC), M.S. (Pennsylvania State), Ph.D. (Purdue).

Professors

Brownridge, D.A., B.A. (Brandon), M.A., Ph.D. (Manitoba); Durrant, J.E., B.A., M.A., Ph.D. (Windsor); Mills, R.S.L., B.A. (Concordia), M.A. (Memorial), Ph.D. (Toronto).

Associate Professors

Duncan, K.A., B.S.H.Ec. (Saskatchewan), M.S., Ph.D. (Ohio State); Piotrowski, C.C., B.A., M.A. (Waterloo), Ph.D. (Pennsylvania State).

Assistant Professors

Eni, R., B.A., M.Sc., Ph.D. (Manitoba); Mignone, J.J., Lic. Psic. (Salvador), M.H.S.A. (Alberta), Ph.D. (Manitoba); Robles, W., B.A. (Brazil), M.A., Ph.D. (Guelph); Roger, K.S., B.A. (Manitoba), M.Ed. (Ontario), Ph.D. (Toronto); Shoostari, S., B.Sc., M.S.P.H. (Tehran U), Ph.D., (Manitoba).

Human Nutritional Sciences

Professors

Aukema, H.M., B.Sc., M.Sc., Ph.D. (Guelph); Eskin, N.A.M., B.Sc., Ph.D. (Birmingham); Friel, J.K., B.Sc. (Loyola), M.Sc. (Saskatchewan), Ph.D. (Guelph); House, J.D., B.Sc., Ph.D. (Guelph); Jones, P.H., B.Sc., M.Sc. (British Columbia), Ph.D. (Toronto); Sevenhuysen, G.P., B.Sc., Ph.D. (London); Taylor, C.G., B.H.Ecol. (Manitoba), Ph.D. (Guelph).

Associate Professors

Aluko, R.E., B.Sc. (Lagos, Nigeria), M.Sc. (ABU Zaria, Nigeria), Ph.D. (Guelph); Moghadasian, M.H., D.V.M. (Shiraz University, Iran), M.Sc., Ph.D. (British Columbia).

Assistant Professors

Aliani, M. Eng. Dipl. (France), Ph.D. (Queen's UK); Eck, P.K., Dipl., Ph.D. (Giessen University- Germany); Lengyel, C., B.Sc. (Alberta), Ph.D. (Saskatchewan); Myrie, S. B., B.Sc., B.Sc., M.Sc. (Alberta), Ph.D. (Newfoundland); Slater, J., B.S.H.Ec. (Saskatchewan), M.Sc., Ph.D. (Manitoba); Suh, M., B.Sc., M.Sc. (Korea), Ph.D. (Alberta); Thiyam, U., M.Sc. (IIT-Kharagpur, India), Ph.D. (University of Kiel, Germany).

Textile Sciences

Associate Professors

Feltham, T., B.Sc., M.B.A. (Montana), Ph.D. (Queen's); Horne, L., B.Sc. (H.Ec.), M.Sc. (Alberta), Ph.D. (Iowa State).

Assistant Professor

Liu, S., B.Sc., M.Sc. (China Textile University), Ph.D. (UC Davis); Rahman, M., B.Sc. (Dhaka), B. Ed. (Winnipeg), Ph.D. (Leeds); Zhong, W., B.Sc., Ph. D. (China Textile University).

Faculty of Kinesiology and Recreation Management

Professors

Alexander, M.J.L., B.P.E. (UBC), M.Sc. (Washington), Ph.D. (Alberta); Campbell, M., B.A., M.A. (Manitoba), Ph.D. (Waterloo); Gardiner, P.F., B.P.H.E., M.P.E. (Windsor), Ph.D. (Alberta); Giesbrecht, G., B.P.E., M.P.E., Ph.D. (Manitoba); Halas, J., B.P.E. (Manitoba), M.Sc. (Ottawa), Ph.D. (Alberta); Hrycaiko, D.W., B.P.E., Cert.Ed. (Manitoba), M.P.E., Ph.D. (Alberta); MacKay, K., B.A. (Acadia), M.Sc. (Texas A and M), Ph.D. (Illinois); Mactavish, J., B.P.E. (UBC), M.Sc. (Manitoba), Ph.D. (Minnesota); Porter, M.M., B.P.H.E. (Laurentian), M.Sc. (Toronto); Ph.D. (Western Ontario); Ready, A.E., B.A. (Hons.), M.A. (Western Ontario), Ph.D. (Alberta); Watkinson, E.J., B.P.E., B.A. (McMaster), M.A. (Western Ontario), Ph.D. (Michigan).

Associate Professors

Butcher, J., B.P.E., Cert. Ed. (Manitoba), M.Sc. (Dalhousie), Ph.D. (Alberta).

Assistant Professors

Duhamel, T., B.Sc., M.Sc., Ph.D. (Waterloo); Field, R., B.A., M.B.A. (Queen's), M.A., Ph.D. (Toronto); Strachan, L., B.P.E., B.Ed. (Manitoba), M.He. (Windsor), Ph.D. (Queen's); Teetzel, S., B.Sc., M.A., Ph.D. (West-

ern Ontario); **Van Winkle**, C.M., B.R.S., M.A. (Manitoba), Ph.D. (Clemson).

Adjunct Professor

Kerr, R., B.Sc., Ph.D. (Oregon), Cert.Ed. (Exeter), Dip.P.E. (Saint Luke's College); **McGavock**, J., B.P.E. (Manitoba), M.A. (McGill), Ph.D. (Alberta).

Faculty of Nursing

Professors

Crooks, D., B.Sc.N. (Toronto), M.Sc.N. (Western Ontario), D.N.Sc. (State U of New York); **Degner**, L.F., B.N. (Manitoba), M.A. (Washington), Ph.D. (Michigan); **Heaman**, M., B.N., M.N., Ph.D. (Manitoba); **Woodgate**, R., B.N., M.N., Ph.D. (Manitoba).

Associate Professors

Ateah, C.A., B.N. (Manitoba), M.Ed. (Alberta), Ph.D. (Manitoba); **Chernomas**, W., B.Sc. (Bridgeport), M.A. (New York), Ph.D. (Maryland); **Clarke**, D.E., B.Sc., B.N., M.A., Ph.D. (Manitoba); **Diehl-Jones**, W., B.Sc. (Brandon), M.Sc., Ph.D. (Manitoba), B.Sc.N. (Western Ontario); **Guse**, L.W., B.N., M.N., Ph.D. (Manitoba); **Hack**, T., B.Comm., B.Sc., M.A., Ph.D. (Manitoba); **Lobchuk**, M., B.N., M.N., Ph.D. (Manitoba); **McClement**, S., B.Sc.N. (Victoria), M.N., Ph.D. (Manitoba); **McMillan**, D., B.A., B.Sc.N. (Queens), M.N., (Manitoba), Ph.D., (Washington); **Sawatzky**, J.V., B.N., M.N., Ph.D. (Manitoba); **Scanlan**, J., B.N., M.Ed., Ph.D. (Manitoba).

Assistant Professors

Cohen, B.E., B.A., B.N., M.Sc., Ph.D. (Manitoba); **Edwards**, M., B.Sc. (Waterloo), B.N., M.N., (Manitoba), Ph.D. (Toronto); **Martin**, D., B.N., M.N. (Manitoba), Ph.D. (British Columbia); **Mordoch**, E., B.N., M.N. (Manitoba), Ph.D. (British Columbia); **Schultz**, A., B.Sc.N., M.N. (Victoria), Ph.D. (British Columbia); **Scrubby**, L.S., B.N. (McGill), M.S. (Minnesota), Ph.D. (Manitoba); **Temple**, B.A., B.N. (Brandon), M.N. (Manitoba), Ph.D. (British Columbia).

Adjunct Professors

Fallis, W., B.Sc.N. (Windsor), M.N. (Manitoba), Ph.D. (Washington); **Fraser**, D., B.N., M.N. (Manitoba); **Hamelin**, K., M.N. (Manitoba), B.A. (Winnipeg); **Hawranik**, P., B.N., M.N., Ph.D. (Manitoba); **Katz**, A., B.N. M.N., Ph.D. (Manitoba); **Shapiro**, C. B.N., M.N. (Manitoba); **Sword**, W.A., B.Sc.N, M.Sc. (McMaster), Ph.D. (Guelph).

School of Medical Rehabilitation

Professor Emeritus

Cooper, J.E., Dip. P. and O.T. (Toronto), B.O.T., M.Sc., Ph.D. (Manitoba).

Professors

Etcheverry, E., Dip O.T., B.O.T., M.Ed., Ph.D. (Manitoba); **Pasterkamp**, H., MD (Lubeck), FRCPC.

Associate Professors

Collins, D., B.Sc.(O.T.) (Queen's), M.Sc. (Manitoba); **Kriellaars**, D., B.P.E. (Manitoba), M.Sc. (Dalhousie), Ph.D. (Manitoba); **MacNeil**, B.J., B.Sc.(P.T.) (Dalhousie), Ph.D. (Waterloo); **Shay**, B., BMR (P.T.) (Manitoba), BA (Winnipeg), MPT (Manitoba), Ph.D. (Manitoba); **Swinamer**, J., B.P.T. (Manitoba), M.S.A.(Health) (Central Michigan); **Szturm**, T.J., B.Sc.(P.T.) (Western), Ph.D. (Manitoba).

Assistant Professors

Barclay-Goddard, R., B.M.R.(P.T.) (Manitoba), M.H.Sc. (McMaster), Ph.D. (Manitoba); **Friesen**, M., Dip.O.T. (Alberta), B.O.T., M.Ed., Ph.D. (Manitoba); **Giesbrecht**, E., B.S.W., B.M.R.(O.T.), M.Sc. (Manitoba); **Leclair**, L., B.A. (Manitoba), B.H.Sc.(O.T.) (McMaster), M.Sc. (Manitoba); **Lee**, C.E., B.Sc.(P.T.) (Alberta), Ph.D. (Texas Woman's); **Quanbury**, A., B.Sc. (Queen's), M.A.Sc. (Toronto); **Restall**, G., BMR (O.T.) (Manitoba), M.Sc. (Alberta); **Ripat**, J., BMR (O.T.), M.Sc. (Manitoba); **Sullivan**, T., B.Sc. (O.T.) (Western Ontario), M.A. (Columbia); **Weinberg**, L., Certificate in Gerontology, B.P.T., M.Sc., Ph.D. (Manitoba); **Wener**, P., B.M.R. (O.T.), M.Ed. (Manitoba).

Program Description

This program is a multi-unit, research-based Ph.D. in Applied Health Sciences. The four participating academic units are: Human Ecology, Kinesiology and Recreation Management, Nursing, and Medical Rehabilitation. The program offered is a unique and timely Ph.D. program, which includes the treatment and discussion at a graduate level of applied health science as a multi-dimensional entity, while at the same time allows for individualized high-quality health science research with an individual researcher,

or small group of researchers. The program combines the strengths of the in-depth discipline specific learning needed to prepare Ph.D. graduates, with the benefits of collaborative learning with students and faculty in other disciplines. In particular, knowledge commonly used by several disciplines can be explored and critiqued as sources of theoretical and practical knowledge. The participation of faculty and students from several disciplines in the exploration and use of knowledge will enhance students' capacity for critical appraisal of the sources and uses of knowledge.

Admission

Applicants must meet the University of Manitoba Graduate Studies general regulations for admission.

Applicants must possess a research-based Master's degree in a discipline or profession consistent with Applied Health Sciences. Applications from other disciplines will be considered on a case-by-case basis.

Prior to admission to the Ph.D. program, applicants will be required to specify his/her area of research interest, and to have corresponded with (an) eligible Ph.D. advisor(s) (member of the Faculty of Graduate Studies), who is (are) a faculty member of one of the four participating units, and who is (are) willing to accept them into the program.

Elements taken into consideration in determining the acceptance of the applicant into the program: grade-point average in Master's courses, previous courses taken, specific research interest of the applicant, student's rationale for choosing to apply to this program as opposed to a uni-discipline degree, current profile of students in the program, research funding and facilities availability through the proposed advisor(s) for the proposed research, and financial support for the applicant.

No admission tests are required for this program.

Application Procedures

Applications (and all required documentation) must be submitted directly to the Faculty of Graduate Studies, University of Manitoba, 500 University Centre, Winnipeg, MB R3T 2N2.

A completed application will include:

- a completed Faculty of Graduate Studies official application for admission form, together with the application fee and supporting documentation.
- a list of academic awards, publications and/or any research or other relevant experience.
- at least two letters of recommendation, including one from the student's intended Ph.D. advisor(s), attesting to the suitability of the candidate for Ph.D. studies in this program, and agreeing to accept them should they be admitted into the program; and one from the student's Master's degree advisor. One additional letter of recommendation may also be appended.
- a letter explaining the student's rationale for choosing to apply to this program.
- a Supervisor Data form to be completed by the intended Ph.D. advisor providing information such as grant support, supervisory record, publication record, etc. This form should be submitted directly to Ms. Janis McGonigle, AHS Program Assistant, Health, Leisure and Human Performance Research Institute, University of Manitoba, 307 Max Bell, Winnipeg, MB R3T 2N2

It is the applicant's responsibility to ensure that all required documentation is received by the department in advance of the deadline.

Incomplete applications will not be considered.

Application Deadlines

Applications (Canadian/US/International) will be accepted up to and including March 1 of each year. Applications will normally be accepted for the regular session only (September start-date). Applications for a January start-date will be considered on a case-by-case basis.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar.

The course-work requirement will consist of a minimum of twelve credits of 7000-level course-work consisting of at least three credits from any two of the four partners (6 credits).

Students will also be required to take the course "AHS 7000: Research and Practice in Applied Health Sciences", a lecture/seminar course in which

faculty members from the four academic partners will participate (3 credits).

The remaining three credit hours can be chosen from a combination of graduate courses from the four partners or from other faculties outside the four participating Faculties/Schools that offer graduate courses related to applied health sciences (3 credits).

Students in the program will also be required to take part in a monthly seminar in Applied Health Sciences with mandatory attendance for the first two years of their program (Year 1: AHS 7002 Seminar I in Applied Health Sciences; Year 2: AHS 7004 Seminar II in Applied Health Sciences), as well as yearly research-related activities (poster day, oral presentation day) involving student presentations. The monthly seminars will consist of an admixture of presenters from the University of Manitoba and from outside, with the focus on applied health science issues. Poster and oral presentations will involve directed research projects, research proposals, and applied health sciences issues.

Students will be expected to complete a candidacy exam, consisting of an oral and written component, normally before the end of the second year of their program. The student must pass the written and oral phases of the exam to be considered a candidate for the Ph.D. degree.

The student's thesis research proposal must be approved by the Advisory Committee normally before the end of the 2nd year after admission to the program. The research proposal, in the form of a document outlining the

rationale and background for the study, specific objectives, and methods and procedures will be presented by the candidate in an oral format. Following the oral presentation, the candidate will defend their proposal.

The research program, culminating in the preparation and defense of a doctoral thesis, will be conducted according to the regulations of the Faculty of Graduate Studies of the University of Manitoba.

Second language reading requirement: None

Expected time to graduation: Four years

Course Descriptions

AHS 7000 Research and Practice in Applied Health Sciences Cr.Hrs.3 The objective is to promote in students advanced knowledge, skills, and abilities needed to evaluate and conduct multidisciplinary, applied health research. This course is theoretical in nature and will require a high level of independence and participation by students.

AHS 7002 Seminar I Applied Health Sciences Cr.Hrs. A monthly interdisciplinary seminar on current issues in applied health sciences, involving presentation by students, faculty, and invited speakers from inside and outside the University of Manitoba. Attendance and participation are required for AHS students during the first year of their doctoral program.

AHS 7004 Seminar II Applied Health Sciences Cr.Hrs. A monthly interdisciplinary seminar on current issues in applied health sciences, involving presentation by students, faculty, and invited speakers from inside and outside the University of Manitoba. Attendance and participation are required for AHS students during the second year of their doctoral program.

Section 5: Architecture

For information regarding programs offered by the following units:

City Planning
Design and Planning Ph.D.
Interior Design
Landscape Architecture

Please see the table of contents for page numbers.

Head and Graduate Chair: N.J. Chard

General Office: 201 Russell Building

Telephone: (204) 474 9458

Fax: (204) 474 7532

E-mail: architecture@umanitoba.ca

Website: umanitoba.ca/architecture/arch

Academic Staff

Professor Emeritus

Macdonald, R.I., Dip. Arch.Tech. (Ryerson), B.Arch. (Manitoba), F.R.A.I.C.

Professors

Chard, N.J., B.A.(Hons), Dip.Arch. (Oxford Brookes), M.A. (N. London) A.R.B.; **Enns, H.**, Dip.Arch.Tech. (RRCC), B.E.S., M.Arch. (Manitoba).

Associate Professors

Aquino, E., B.Arch. (San Paulo), M.F.A. (Concordia), C.R.E.A.; **Epp, E.**, B.E.S., M.Land.Arch. (Manitoba), M.Arch. (McGill), M.R.A.I.C.; **Fantuzzi, F.**, B. Arch. (Carleton), M. Arch. (Cranbrook); **Fuglem, T.**, B.Arch. (Carleton), M.Arch. (McGill). **Harrop, P.**, Dip.Des. (Ottawa), B.Arch. (Carleton), M.Arch. (McGill), M.A.A.; **Subotincic, N.**, B.Arch. (Carleton), M.Arch. (McGill); **West, M.**, B.Arch. (Cooper Union), M.Arch. (Carleton).

Assistant Professor

Coar, L., B.S. Architectural Engineering, B.S. Civil Engineering (Drexel), M.Arch (Berkeley); **Landrum, L.**, B.Arch. (Carleton), M.Arch (McGill), Registered Architect (New York).

Adjunct Professors

Coppinger, A, B.E.S., M.Arch. (Manitoba), M.A.A., MRAIC, LEED®AP; **Glor, R.**, B.Env.Des., M.Arch. (Manitoba); **Minuk, N.**, B.A., M.Arch. (Manitoba); **Sampson, P.**, B.Arch (Toronto), B.A.(Hons) (McGill), M.A.A.; **Shanski, K.**, B.A. (Queen's), B.E.D., M.Arch. (Manitoba), M.A.A.

Application Deadline

January 15 for all Canadian/US and International applicants.

September admissions only.

Introduction

Architecture deals with a complex intertwining of artistic, social, cultural and practical concerns. The M.Arch. program provides students with the opportunity to learn the tools to synthesize these issues and develop the conceptual, practical and formal skills to take command of the subject. Much of the study is research based with an emphasis on structured learning through finding out, rather than prescriptive instruction. The program offers a diverse range of research areas and offers a choice of studios and seminars for M.Arch. students. All of our highly motivated professors are engaged in active research and/or practice. Rather than having an emphasis on either the conceptual or practical side of architecture, our program concentrates on the relationship between the two, with many studios undertaking various forms of critical making as part of their teaching. Many of the studios run study trips abroad.

The department offers a lively environment to study the subject with diverse studios, history and theory seminars as well as innovative and engaging technology courses. An international array of lecturers augments the internal lecture program. The series combines world famous architects, artists and designers with emerging young talents. The Faculty of Architecture also runs an exceptional exhibition program.

Program Information

There are two main routes for entry:

1. Students with a previous undergraduate architecture or environmental design degree can apply for direct entry.

2. The Faculty of Architecture offers an Architecture Masters Preparation Program (AMP – previously known as the Architecture Pre-Masters Program) for students who have a recognised first degree in either a non-design or a design-related field of study and wish to apply to the Master in Architecture Program. These students may apply and be admitted through the AMP Program to the Department of Architecture Option in Environmental Design where they will be enrolled in the Environmental Design Program: Architecture Option. There are two different streams available:

Stream One: Architecture Masters Preparation 1 (AMP 1 – two years of study) For those who have little or no formal design education and have a recognised undergraduate first degree (or are currently enrolled in the final year of a degree program) who wish to apply to the Master in Architecture Program. Upon successful completion of all of the requirements for this two-year program, students will be eligible to receive an Environmental Design degree.

Stream Two: Architecture Masters Preparation 2 (AMP 2 – one year of study) For those who already have an undergraduate design degree (or are currently enrolled in the final year of a design degree program) in an allied design field such as interior design, landscape architecture or for those who have an architecture technical applied degree, and wish to apply to the Master in Architecture Program. These students may be considered on a case-by-case basis for placement into the Environmental Design: Year 4 Architecture Option, but will be ineligible to receive the Environmental Design degree.

All students who wish to apply to either of the Architecture Masters Preparation Program streams above, must have graduated from a recognized university with a minimum grade point average of 3.0 or equivalent in the last 60 hours of study of their first degree, and must be able to provide proof of English language proficiency (if applicable).

Please refer to the following for a full information and application package for the AMP program:

<http://umanitoba.ca/faculties/architecture/programs/architecture/admissionspackage.html>

Please refer to the Department of Architecture website for the 2010-2011 Graduate Calendar entry.

<http://umanitoba.ca/faculties/architecture>

Research Facility

The Centre for Architectural Structures and Technology is an architectural research laboratory that embraces both the poetic and technical dimensions of architectural design. The work of C.A.S.T. seeks new boundaries for creative thought, design, and building technology. We do this work through physical explorations of materials, tools and building methods, the study of natural law, and the free play of imagination.

<http://umanitoba.ca/faculties/architecture/cast/>

Ph.D.

A Ph.D. in Design and Planning is offered.

<http://umanitoba.ca/faculties/architecture/programs/Phd/index.html>

Accreditation

Our graduate program received a full six-year accreditation in 2009.

In Canada, all provincial associations recommend a degree from an accredited professional degree program as a prerequisite for licensure. The Canadian Architectural Certification Board (CACB), which is the sole agency authorized to accredit Canadian professional degree programmes in architecture, recognizes two types of accredited degrees: the Bachelor of Architecture and the Master of Architecture. A programme may be granted a six-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards. Masters degree programs may consist of a pre-professional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise

an accredited professional education. However, the pre-professional degree is not, by itself, recognized as an accredited degree.

Course Descriptions

Department Courses

ARCH 7000 Advanced Technology Topics I Cr.Hrs.1.5 One five-week seminar and/or project-based topics offering in-depth study of advanced building systems, technology, and methods. Options are grounded in faculty research and build upon foundation technology courses. Some topics may be deemed mandatory at the department's discretion. Topics may be taken in the fall and/or winter terms.

ARCH 7010 Advanced Technology Topics 2 Cr.Hrs.1.5 One five-week seminar and/or project-based topics offering in-depth study of advanced building systems, technology, and methods. Options are grounded in faculty research and build upon foundation technology courses. Some topics may be deemed mandatory at the department's discretion. Topics may be taken in the fall and/or winter terms.

ARCH 7020 Research Topics: History and Theory 1 Cr.Hrs.1.5 One five-week lecture, seminar and/or project-based topics offering an in-depth study of an historical and/or theoretical subject. Options are grounded in faculty research and build upon foundation history/theory courses. Some topics may be deemed mandatory at the department's discretion. Topics may be taken in the fall and/or winter terms.

ARCH 7030 Research Topics: History and Theory 2 Cr.Hrs.1.5 One five-week lecture, seminar and/or project-based topics offering an in-depth study of an historical and/or theoretical subject. Options are grounded in faculty research and build upon foundation history/theory courses. Some topics may be deemed mandatory at the department's discretion. Topics may be taken in the fall and/or winter terms.

ARCH 7040 Professional Practice Cr.Hrs.3 Is concerned with the duties and responsibilities of an architectural practice; its divisions, office organization and administration, in Manitoba and Canada. The lectures relate in scope and standard to current models of practice and their requirements, including issues of building economics and construction cost control.

ARCH 7050 Arch Studio 5 and Comprehensive Program Report Cr.Hrs.9 Develop design explorations and seek to clarify relations between architectural criteria and the urban/natural environments in national or international contexts. Conceptual, programmatic, material, technological, economic, and political principles and systems employed are to be evident in the Comp. Prog Report.

ARCH 7060 Arch Studio 6 Cr.Hrs.9 The previous term's investigations are further developed into a comprehensive architectural design proposal. The thorough integration of design and programming criteria, with building and environmental systems and assemblies are examined.

ARCH 7070 Design Research Studio Cr.Hrs.9 This final design studio involves concerted research and design explorations of an individually defined subject of inquiry, within a selected studio thematic focus. These investigations are intended to prepare students for their final Design Thesis.

ARCH 7080 Technology Thesis Report Cr.Hrs.3 Technology Thesis Report is an advanced project-based course done in conjunction with the Design Thesis project. The report is related to an individual student's design thesis topic, focusing on specific aspects of technology and applied tech. research. Advisor supervision and external engineering consultancy or agreed equivalent is required.

ARCH 7350 Legal Aspects of Architectural Practice Cr.Hrs.3 Discusses the importance of the knowledge of law as it relates to professional practice of architecture, including a discussion of the historical development of legal responsibilities of a practicing professional generally and of architects specifically. There is also discussion of trends in the development of professional responsibility and liability.

Section 6: Biochemistry and Medical Genetics

Head: Dr. L. Simard

Graduate Program Assistant: Mrs. T. Sarkar

General Office: 336 Basic Medical Sciences Building
745 Bannatyne, Winnipeg, MB, R3E 0J9

Telephone: (204) 789 3593

Fax: (204) 789 3900

E-mail: bmg@umanitoba.ca

Website: umanitoba.ca/medicine/biochem/

Academic Staff

Professors Emeriti

Blanchaer, M., B.A.(Hons.), M.D., C.M. (Queen's); **Dakshinamurti**, K., B.Sc. (Madras), M.Sc., Ph.D. (Rajputna), F.R.S.C. (UK); **Stevens**, F., Licentiate (Ghent), Ph.D. (California), D.Sc. (Belgium); **Yamada**, E., B.Sc.(Hons.) (Western Ontario), M.Sc. (McGill), Ph.D. (Western Ontario)

Senior Scholar

Evans, J., B.Sc. (Birmingham), Ph.D. (Leicester), F.C.C.M.G.; **Jacobs**, H., M.D. (Freiburg), Ph.D. (Marburg)

Professors

Arthur, G., B.Sc.(Hons.) (Ghana), Ph.D. (Leeds); **Bhullar**, R., B.Sc. (McMaster), Ph.D. (Manitoba) **Chodirker**, B., M.D., M.Sc. (Manitoba), F.R.C.P.C., F.C.C.M.G.; **Choy**, P., B.Sc. (McGill), M.Sc., Ph.D. (North Dakota); **Chudley**, A., M.D. (Manitoba), F.R.C.P.C., F.C.C.M.G.; **Davie**, J., B.Sc.(Hons.), Ph.D. (British Columbia); **Gibson**, S., B.Sc. (Carleton), Ph.D. (Toronto); **Greenberg**, C., B.Sc.(Hons.), M.D., C.M. (McGill), F.R.C.P.C., F.C.C.M.G.; **Hatch**, G., B.Sc. (Winnipeg), M.Sc. (Saskatchewan), Ph.D. (Manitoba); **Mai**, S., B.Sc., M.Sc., M.A. (Cologne), Ph.D. (Karlsruhe); **Mowat**, M., B.Sc. (York), Ph.D. (Alberta); **Murphy**, L., B.Sc.(Hons.), Ph.D. (Sydney); **Reed**, M., B.A., B.Sc., M.D. (Manitoba), F.R.C.P.(C); **Simard**, L., B.Sc. (McGill), Ph.D. (Toronto); **Szathmari**, E., C.M., B.A. (Hons.), Ph.D., (Toronto), LL.D. (Toronto) (hc), D.Sc. (Western Ontario) (hc), D.Litt.S. (St. Michael's College) (hc), LL.D. (York) (hc), LL.D. (McMaster) (hc) F.R.S.C.; **Triggs-Raine**, B., B.Sc., Ph.D. (Manitoba); **Wilkins**, J., B.Sc., M.Sc. (Waterloo), Ph.D.

(Manitoba); **Wrogemann**, K., M.D. (Marburg), Ph.D. (Manitoba); **Zelinski**, T. B.Sc., M.Sc., Ph.D. (Manitoba)

Associate Professors

Amara, F., B.Sc.(Hons.), Ph.D. (Ulster); **Dawson**, A., B.Sc.(Hons.), M.Sc. (Queen's), Ph.D. (Western Ontario), F.C.C.M.G.; **Dembinski**, T., B.Sc.(Hons.) (St. Andrews), M.Sc. (Leeds), Ph.D. (Wales); **Eisenstat**, D., B.Sc., M.D. (Toronto), M.A. (U.C.S.F.), F.R.C.P.C., F.A.A.P.; **Gietz**, R., B.Sc. (Guelph), Ph.D. (Alberta); **Hicks**, G., B.Sc., Ph.D. (Manitoba); **Leygue**, E., M.Sc. (Paul Sabatier), D.E.A., Ph.D. (P & M Currie); **MacRae**, A., B.Sc. (Toronto), M.Sc. (Guelph), Ph.D. (London, UK), D. Clin. Chem. (Toronto), F.C.A.C.B.; **Marshall**, A., B.Sc.(Hons.) (Saskatchewan), Ph.D.(Toronto); **Mesaeli**, N., B.Sc., M.Sc. (Kuwait), Ph.D. (Manitoba); **Thorlacius**, L., B.Sc.(Hons.) (Manitoba), Ph.D. (Washington), F.C.A.C.B.; **Valdimarsson**, G., B.Sc., M.Sc. (Manitoba), Ph.D. (Western Ontario); **Wigle**, J., B.Sc.(Hons.) (Queen's), Ph.D. (Ottawa); **Williams**, G., B.Sc.(Hons.), D.P. (Sussex), M.D. (Manitoba), F.R.C.P.C.; **Wirtzfeld**, D., B.A., B.Sc., M.D., (Calgary), F.R.C.S.C., F.A.C.S.

Assistant Professors

Dalton, J., B.Sc.(Hons.), M.Sc., Ph.D. (Manitoba); **Ding**, H., M.D. (Shanghai), Ph.D. (Leuven); **Elliott**, A., B.Sc.(Hons.) (Queen's), M.Sc. (Cincinnati), Ph.D. (Manitoba); **Marles**, S., M.D. (Alberta), F.R.C.P.C., F.C.C.M.G.; **McManus**, K., B.Sc. (Hons.), M.Sc. (Manitoba), Ph.D. (Alberta); **Merz**, D., B.Sc.(Hons.), Ph.D. (McGill); **Mhanni**, A., M.B., Ch.B. (Libya), Ph.D. (Manitoba), F.R.C.P.C., F.C.C.M.G.; **Parry**, D., Ph.D. (Memorial); **Pind**, S., B.Sc.(Hons.) (Queen's), Ph.D. (Toronto); **Rastegar**, M., B.Sc., M.Sc., (Tehran), D.E.A., Ph.D. (Louvain); **Spriggs**, E., B.Sc.(Hons.) (Manitoba), M.Sc., Ph.D. (Calgary); **Xing**, M. B.Sc., M.Sc. (China), Ph.D. (California)

Lecturers

Bocangel, P., B.Sc. (Peru), M.Sc. (Manitoba); **Burnett**, S., B.Sc., M.Sc. (Manitoba); **Chin**, S., B.Sc.(Hons.) (Brandon), M.Sc. (Manitoba), C.C.G.C.; **Hartley**, J. B.Sc.(Guelph), M.Sc. (Chicago)

Adjunct Professors

Civetta, A., Licenciado (Buenos Aires), Ph.D. (McMaster); **Craig**, D., B.Sc. (Mount Allison), Ph.D. (Dalhousie); **Franck**, J., B.Sc. (Alberta), Ph.D. (Dalhousie); **Kupriyanov**, V., M.Sc., Ph.D., D.Sc. (Moscow); **Rampitsch**, C., B.Sc.(Hons.), M.Sc. (Witwatersrand), Ph.D. (U.B.C.); **Vanderwel**, D., B.Sc.(Hons.) (Victoria), Ph.D. (Simon Fraser);

Program Information

The Department of Biochemistry and Medical Genetics is the result of a merger of the Department of Human Genetics and the Department of Biochemistry and Molecular Biology in June 1999.

Fields of Research

Faculty members are involved in a wide range of research projects in biochemistry and genetics. Supervised research is available in the following areas: apoptosis; lipoproteins and lipidoses; chromatin structure and function; membranes; clinical genetics; metabolic disease; dysmorphology; molecular cytogenetics; functional genomics; molecular basis of cancer and genetic diseases; gene expression; molecular genetics; gene mapping and recombinant DNA; phospholipid metabolism; genetic and molecular epidemiology; protein structure, function, and targeting; genetics of special populations; signal transduction; hormone and growth factor action / receptors; and spectroscopy in biodiagnostics and regenerative medicine.

These areas of study are related specifically to certain diseases including atherosclerosis, androgen resistance syndrome, heart failure, cancer, muscular dystrophy, inborn errors of metabolism, diabetes, hypertension, Alzheimer's disease, cystic fibrosis and congenital malformations.

Research Facilities

Faculty members of the department are housed in several locations -at the Bannatyne and Fort Garry campuses, and in affiliated research institutes. The department is well equipped for studies in both biochemistry and genetics. State of the art computer, transgenic, imaging, and cytogenetic analysis facilities are available in the department or its affiliated centres.

This department does not require the GRE or the GMAT admissions tests.

http://umanitoba.ca/faculties/medicine/units/biochem/media/Biochemistry_2009-04.pdf

Pre-M.Sc. in Biochemistry and Medical Genetics

Entrance Requirements

A minimum three-year bachelor's degree with a 3.5 GPA (4.5 scale), or equivalent, in the previous 60 credit hours of university study, or equivalent (normally 2 years). In addition, during this period there should be no grade less than C+ in any biochemistry, genetics, or life science course deemed relevant to the proposed course of study.

M.Sc. in Biochemistry and Medical Genetics

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Entrance Requirements

The applicant must have an appropriate background in biochemistry, genetics, or a closely related subject area, with a minimum 3.5 GPA (4.5 scale), or equivalent, in the previous 60 credit hours of university study, or equivalent (normally 2 years). In addition, during this period there should be no grade less than C+ in any biochemistry, genetics, or life science course deemed relevant to the proposed course of study.

Admission will depend upon the availability of a Faculty Member to supervise the student and resources to support the student's research.

In rare cases, applicants with GPA's lower than 3.5 may be admitted to this department, based upon individual circumstances and the support of their prospective advisors. Students in this situation should consult with their prospective advisor and the Chair of the Graduate Student Admissions Committee.

Program Requirements

Program Requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Second language reading requirement: none

Expected time to graduate: 2 – 3 years

Ph.D. in Biochemistry and Medical Genetics

Admission

1) A thesis-based Master's degree (of at least 2 years in duration), or equivalent, in biochemistry, genetics, or a closely related field, from a Canadian university is required for direct admission to the Ph.D. program. In addition, a cumulative GPA of 3.5 (4.5 scale), or equivalent, in the courses taken during the Master's program is required.

Generally, there is no direct entry into the Ph.D. program for students with Master's degrees from non-Canadian universities. Applications will be assessed by the admissions committee on an individual basis; in most cases students with Master's degrees from international universities are admitted into the Master's program in this department. They may subsequently request for a transfer into the Ph.D. program, if eligible, based on the procedures outlined in Section 59.

2) Admission will also depend upon the availability and willingness of a Faculty Member to supervise the student and resources to support the student's research

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Second language requirement: none

Expected time to graduation: 4 – 5 years

Direct entry from the Bachelor's degree to the Ph.D. degree in this department would only occur in exceptional circumstances. Prospective students would be expected to have extensive research experience, in addition to an outstanding academic background, to be considered for this route. Once admitted, these students must complete at least 18 credit hours of course work in addition to their thesis research.

Transfer to a Ph.D. program:

Students registered for a Master's degree who has made excellent progress over the first ~ 20 months in their program may be considered for transfer

to the Ph.D. program. The transfer process, as outlined in the BMG Graduate Student Academic Guide, must be completed within 24 months of the student's commencement in the Master's program.

Such transfer will be considered only when:

1. Both the student and the advisor request, in writing, that the student transfers to the Ph.D. program. This request should be made to the Chair of the Graduate Student Affairs Committee.
2. At least 12 credit hours of course work, exclusive of the mandatory 'Research Seminar' course, have been successfully completed (GPA > 3.5).
3. The student is able to demonstrate a high potential for success in the Ph.D. program. This will be shown by their research and course work accomplishments to date, as well as their ability to communicate and defend their findings and future plans in both a written and an oral format, as outlined in the BMG Graduate Student Academic Guide.

The Transfer to Ph.D. examining committee will consist of the student's advisory committee and the Chair of the Graduate Student Affairs Committee, or his/her designate, as Chair.

A student can request transfer from the Master's to the Ph.D. program only once. Students who do not transfer may apply to the Ph.D. program after completing their Master's program.

NOTE: Admissions are considered on a case-by-case basis by the Graduate Student Admissions Committee and are based upon transcripts, English proficiency (if required), letters of recommendation, and evidence that the applicant's Master's program was thesis based. Prospective students must have a thesis advisor before they will be considered for admission to the department.

Course Descriptions

BGEN 7000 Research Seminar M.Sc. Cr.Hrs.1 Consists of presentations of the student's current research. For Master's students only.

BGEN 7020 Proteins Cr.Hrs.3 (Formerly 137.702) Three hours per week, one term. Purification, bioinformatics, characterization, expression, structure, folding and engineering of proteins.

BGEN 7030 Enzymology Cr.Hrs.3 (Formerly 137.703) Two hours per week, one term. Kinetics and mechanisms of action of enzymes.

BGEN 7040 Seminars in Human Genetics Cr.Hrs.3 (Formerly 137.704) Current research topics in human genetics. A term paper and oral presentation will be required of each student.

BGEN 7070 Special Topics in Human Genetics Cr.Hrs.3 (Formerly 137.707) An assignment, tutorial and discussions course taken only through consultation with the head of the department. The topics will vary depending upon students' needs and interests, and may include specialized topics not available in regular course offerings.

Section 7: Biological Sciences

Head: J.E. Anderson

General Office: Z320 Duff Roblin Building 121 Machray Hall

Telephone: (204) 474 9245

Fax: (204) 474 7604

E-mail: janders@cc.umanitoba.ca

Website: umanitoba.ca/science/biological_sciences

Academic Staff – BIOLOGICAL SCIENCES

Distinguished Professor Emeritus

Eales, J.G., B.A.(Hons.) (Oxford), M.Sc., Ph.D. (UBC), F.R.S.C.

Professors Emeriti

Shay, J.M., O.C., B.Sc. (Hons.) (London), M.Sc., Ph.D. (Manitoba); **Reid, J.,** B.Sc. (Hons), M.Sc. (McMaster), Ph.D. (Toronto).

Senior Scholars

Dick, T.A., B.Sc. (Toronto), M.Sc. (New Brunswick), Ph.D. (Toronto), Canada Northern Chair; **Graham, L.C.,** B.Sc.(Hons.), M.Sc. (Alberta), Ph.D. (Tulane); **MacArthur, R.A.,** B.Sc. (Hons.), M.Sc. (Alberta), Ph.D. (Manitoba); **Pruitt, W.O., Jr.,** B.S. (Maryland), M.A., Ph.D. (Michigan); **Punter, D.,** M.A., Ph.D. (Cambridge); **Stewart, K.W.,** B.Sc. (Colorado), M.Sc. (Miami), Ph.D. (UBC); **VanCaesele, L.** B.Sc., M.Sc., Ph.D. (Manitoba) **Ward, F.J.,**

BGEN 7090 Principles and Practice of Human Genetics Cr.Hrs.3 (Formerly 137.709) Lectures, tutorials and assignments designed to review major topics in human genetics and give practical experience in the analysis and interpretation of human genetics data and critical review of published work.

BGEN 7120 Laboratory Methods in Human and Medical Genetics Cr.Hrs.3 (Formerly 137.712) A seminar and assignment course covering an outline of the methods currently in use in human and medical genetic diagnostic and research laboratories. The principles of cell culture, cytogenetic, molecular and biochemical genetic techniques that are used in the diagnosis of human genetic disease and the study of human variation will be reviewed. Students will undertake a practical assignment and write a report. *Prerequisite:* BGEN 7090 or consent of instructor.

BGEN 7130 Genetic Epidemiology of Human Populations Cr.Hrs.3 (Formerly 137.713) Lectures, tutorials and assignments to evaluate the etiology, distribution and control of disease in groups of relatives and inherited causes of disease in population. *Prerequisite:* BGEN 7090 or consent of instructor.

BGEN 7140 Clinical Genetics Cr.Hrs.3 (Formerly 137.714) Focus is on clinical application and principles of single gene, multifactorial and teratogenic causes of disease. Students will learn by use of reading assignments, tutorials, computer-assisted diagnostic tools and firsthand experience in genetics clinics. Major term paper required. One term. *Prerequisite:* BGEN 7090 or consent of instructor.

BGEN 7160 Theory and Practice of Genetic Counselling Cr.Hrs.3 (Formerly 137.716) Review of general theoretical and practical aspects of genetic counselling. Students will be instructed in interviewing techniques. Case presentations will be reviewed and opportunities to observe and partake in genetic counselling will be provided. Term paper. *Prerequisite:* BGEN 7090 or consent of instructor.

BGEN 7180 Clinical and Molecular Cytogenetics Cr.Hrs.3 (Formerly 137.718) Cytogenetic methodology; chromosome architecture; karyotype interpretation; indications for referral; chromosome syndromes and anomalies; prenatal diagnosis; chromosomal basis of oncogenesis; flow cytometry; immunogenetics; fluorescent in situ hybridization; the application of molecular technology to chromosome analysis. *Prerequisite:* BGEN 7090 or consent of instructor.

BGEN 7200 Topics in Biochemistry 1 Cr.Hrs.3 (Formerly 137.720) Advanced study and reading on two topics chosen by the course director in consultation with the student's supervisor. Topics include but are not limited to Neurochemistry, Lipids, Carbohydrates, Biomembranes, Inborn Errors, Cytoskeleton Proteins.

BGEN 7210 Topics in Biochemistry 2 Cr.Hrs.3 (Formerly 137.721) Advanced study and reading on two topics chosen by the course director in consultation with the student's supervisor. Topics include but are not limited to Neurochemistry, Lipids, Carbohydrates, Biomembranes, Inborn Errors, Cytoskeleton Proteins.

BGEN 7220 Research Seminar Cr.Hrs.1 (Formerly 137.722) A one credit pass/fail course. Consists of presentations of the student's current research.

BGEN 7250 Gene Expression Cr.Hrs.3 (Formerly 137.725) Three hours per week, one term Chromatin structure. Structure and function of sequence-specified DNA-binding proteins. Control of transcription.

BGEN 7260 Cellular and Molecular Biochemistry Cr.Hrs.3 (Formerly 137.726) Three hours per week, one term. Recent research advances on the study of cellular components, assembly and organization of plasma membrane components, cell signalling, and cell cycle.

BGEN 8000 Research Seminar Ph.D. Cr.Hrs.1 Consists of presentations of the student's current research. For Ph.D. students only.

B.A.(Hons.), M.A. (UBC), Ph.D. (Cornell); **Wiens, T.J.,** B.A. (Hons.), M.A. (Saskatchewan), Ph.D. (Pennsylvania).

Professors

Anderson, J.E., B.Sc. (UBC), B.Sc. Medicine (Manitoba), Ph.D. (Manitoba); **Booth, J.T.,** B.A. (Eastern College), M.S. (Ohio), Ph.D. (UBC); **Dick, T.A.,** B.Sc. (Toronto), M.Sc. (New Brunswick), Ph.D. (Toronto), Canada Northern Chair; **Ford, B.A.,** B.Sc. (Hons.) (Trent), Ph.D. (Toronto); **Hann, B.J.,** B.Sc.(Hons.), M.Sc. (Waterloo), Ph.D. (Indiana); **Hare, J.F.,** B.Sc., M.Sc. (Toronto), Ph.D. (Alberta); **Huebner, E.,** B.Sc.(Hons.) (Alberta), Ph.D. (Massachusetts); **Kenkel, N.C.,** B.Sc. (Hons.), M.Sc. (UBC), Ph.D. (Western); **Riewe, R.R.,** B.S., M.S. (Wayne State), Ph.D. (Manitoba); **Robinson, G.G.C.,** B.Sc. (Hons.) (St. Andrew's), Ph.D. (UBC); **Sealy, S.G.,** B.Sc. (Alberta), M.Sc. (UBC), M.Sc., Ph.D. (Michigan).

Associate Professors

Anderson, W.G., B.Sc., Ph.D. (St. Andrews); **Campbell, K.L.,** B.Sc. (Hons.), Ph.D. (Manitoba); **Gillis, D.M.,** B.Sc. (Dalhousie), M.Sc. (McGill), Ph.D. (Simon Fraser); **Goldsbrough, L.G.,** B.Sc., Ph.D. (Manitoba); **Graham, L.C.,** B.Sc.(Hons.), M.Sc. (Alberta), Ph.D. (Tulane); **Markham, J.H.,** B.Sc.(Hons.) (Guelph), B.Ed. (Dalhousie), Ph.D. (UBC); **Marcus, J.M.,** B.A. (Cornell), M.Phil. (Cambridge), Ph.D. (Duke); **Piercey-Normore, M.D.** B.Sc. (Gen.), B.Sc. (Hons.), M.Sc., Ph.D. (Memorial); **Renault, S.,** B.Sc., M.Sc., Ph.D. (Poitiers); **Sumner, M.J.,** B.Sc. (Hons.), M.Sc. (Alberta), Ph.D.

(Manitoba); **Valdimarsson**, G., B.Sc., M.Sc. (Manitoba), Ph.D. (Western); **Waterman**, J.M., B.Sc. (Hons., Guelph), M.Sc. (Alberta), Ph.D. (Minnesota).

Assistant Professors

Belmonte, M.F., B.Sc., M.Sc. (Calgary), Ph.D. (Manitoba); **Davoren**, G.K., B.Sc., M.Sc. (Victoria), Ph.D. (Memorial); **Docker**, M.F., B.Sc., Ph.D. (Guelph); **Fry**, W.M., B.Sc. (Hons.), Ph.D. (Memorial); **Markham**, J.H., B.Sc. (Hons.) (Guelph), B.Ed. (Dalhousie), Ph.D. (UBC); **Roth**, J.D., B.A., B.S. (Hons.) (Kansas), Ph.D. (Minnesota); **Schroeder**, D. B.Sc., Ph.D. (Calgary); **Weihrauch**, D., Diplom, Ph.D. (Hamburg); **Whyard**, S., B.Sc., Ph.D. (Queen's); **Worley**, A.C., B.Sc. (Victoria), M.Sc. (Calgary), Ph.D. (Toronto).

Cross-Appointees

Diehl-Jones, W.L., B.Sc. (Nursing), M.Sc. (Zool.), Ph.D. (Manitoba), Associate Professor

Adjunct Professors

Abrahams, M.V., B.Sc. (Western), M.Sc. (Queen's), Ph.D. (Simon Fraser); **Artuso**, C., BA. (Hons.) (Leeds), MA. (Manitoba), Ph.D. (Manitoba); **Blanchfield**, P., B.Sc. (Hons.) (Waterloo), Ph.D. (York); **Fedek**, G. B.Sc., M.Sc. (Saskatchewan), Ph.D. (Manitoba); **Ferguson**, S.H., B.Sc. (Guelph), M.Sc. (Victoria), Ph.D. (Saskatchewan); **Flannigan**, M. B.Sc. (Manitoba), M.Sc. (Colorado State), Ph.D. (Cambridge); **Gilbert**, J.A., B.Sc. (Hons.), M.Sc., Ph.D. (Manitoba); **Grandepre**, L. B.Sc., M.Sc., Ph.D. (Montréal); **Haber**, S., B.Sc., M.Sc. (Manitoba), Ph.D. (Illinois); Jordan, M., B.Sc. (Guelph), M.Sc. (Manitoba), Ph.D. (Saskatchewan); **Malley**, D.F., B.Sc., M.Sc. (UBC), Ph.D. (Michigan); **McCallum**, B., B.S.A., M.Sc. (Manitoba), Ph.D. (Minnesota); **McGonigle**, T., B.Sc. (Hons) (Sussex), Ph.D. (York); **Mooi**, R.D., B.Sc., Ph.D. (Toronto); **Murkin**, H., B.Sc. (Manitoba), M.Sc., (McGill), Ph.D. (Utah State); **Palace**, V., B.Sc., M.Sc., Ph.D., (Manitoba); **Park**, A., B.Sc. (Simon Fraser), M.Sc., Ph.D. (Manitoba); **Peake**, S.J., B.Sc. (Guelph), M.Sc. (Waterloo), Ph.D. (Simon Fraser); **Reist**, J., M.Sc. (Alberta), Ph.D. (Toronto); **Staniforth**, R., B.Sc. (Hons.) (North Wales), Ph.D. (Western); **Tardif**, J., B.Sc., Ph.D. (Quebec); **Thomas**, J., (Reading), M.Sc., Ph.D. (Manitoba); **Turner**, M.A., B.Sc. (Carl.), M.Sc., Ph.D. (Manitoba); **Tallman**, R., B.Sc. (Hons.), M.Sc. (Manitoba, Ph.D. (UBC); **Wang**, G., B.Sc., M.Sc. (Nanjing), Ph.D. (UBC); **Westwood**, A.R., B.Sc., M.Sc. (Manitoba), Ph.D. (Guelph); **Wilmshurst**, J., B.Sc., M.Sc. (Western), Ph.D. (Guelph).

Instructors

McLeese, J.M., B.Sc., M.Sc., Ph.D. (Ottawa) (Senior Instructor); **Narayansingh**, T.G., B.Sc., M.Sc. (Zool.), (Senior Instructor); **Scott**, K.G.-E., B.Sc. (Hons.) (Calgary), Ph.D. (Calgary) (Instructor II); **Shaw**, M., B.Sc., M.Sc. (Manitoba), (Senior Instructor); **Stacey**, J.E., B.Sc. (Hons.), M.Sc. (Memorial) (Instructor I); **Waters**, I., B.A., B.Sc. (Ag.), M.Sc. (Ag.), Ph.D. (Manitoba) (Senior Instructor).

Program Information

BIOLOGICAL SCIENCES

The department offers graduate training leading to Master of Science (M.Sc.) and Doctor of Philosophy (Ph.D.) degrees in a broad range of biological disciplines in both field and laboratory research. Programs in the biological sciences represent a unique concentration of expertise in whole-organisms, and a wide range of research in ecological, environmental, evolutionary, physiological, cellular and molecular sciences.

Expertise in the major plant, animal, and fungal groups in grassland and boreal forest ecosystems are represented in the department: cell and developmental biology, biotechnology, molecular biology and genetics, ecology and conservation biology, vascular and nonvascular plants, fungal and algal biology, physiology, systematics, evolutionary and coevolutionary biology, animal modelling, aquatic biology and aquatic organisms, fisheries, behavioural ecology, parasitology, and muscle biology.

Graduates are equipped to embark on a career in botany, zoology and related fields, including environmental science, natural resource management, agriculture and forestry, fisheries and wildlife management, and biomedical sciences. Former students are successfully employed in research, teaching or administrative positions in academic, industrial or governmental settings, as biological consultants and in biomedical agencies in Canada and around the world.

The department is able to foster an informal atmosphere with good interaction between faculty and graduate students. Students are often successful in Commonwealth, NSERC, CIHR, Faculty of Science, and University of Manitoba Graduate Fellowship and Scholarship competitions.

Fields of Research

The Department of Biological Sciences was formed in July 2007 by merging former Departments of Botany and Zoology and with the Biology Teaching Program. Students registered under regulations of the former departments may continue with programs of graduate studies in Zoology and Botany, or they may transfer to students who registered after January 1, 2009, will follow the new regulations of the Department of Biological Sciences, which will become effective September 1, 2009. All students registering in the graduate program after September 1, 2009 must register under the new Department of Biological Sciences program.

Ecology, Evolution and Fisheries:

Fleet dynamics, fisheries management, fish population dynamics, interaction between behaviour and population processes; emphasis on quantitative analysis, mathematical and simulation modelling based upon historical data and field work when appropriate.

Wetland foodweb structure and dynamics, invertebrate grazer-algal interactions; Cladocera ecology, palaeoecology of communities in the littoral zone of lakes, systematics and evolution.

Collaborative multi-species, multi-scale ecosystem examination of search strategies of seabirds for fish; spawning habitat selection by a keystone forage fish.

Molecular systematics, biogeography, and conservation genetics of fish (particularly lampreys and salmonids) and other aquatic organisms (microsporean parasites and dreissenid mussels).

Circumpolar Aboriginal peoples and their domestic economies, hunting and trapping, land use, land claims, and impacts of northern development on their lifestyles.

Evolution of hemoglobin oxygen affinity in mammals in relation to exploitation of aquatic, northern, and subtropical habitats; molecular evolution of beta-globin gene cluster in eutherian mammals; mammalian molecular phylogenetics.

Ecosystem structure and function in freshwater wetlands: ecophysiology and ecotoxicology of benthic and planktonic algae, and aquatic macrophytes; paleolimnology.

Fungal ecology in aquatic and terrestrial ecosystems: saprotrophs and nutrient release, fungi in forest ecosystems.

Economic botany: native plant products and special (non-timber) forest products, and the role of fungal secondary compounds in nature.

Conservation ecology: habitat fragmentation, plant dispersal, effects of disturbance on biodiversity, ecological knowledge and ecosystem management, restoration of plant communities.

Evolutionary biology of plants and fungi: pollination biology, plant-plant interactions and plant-fungal interactions, co-evolution, phylogeny and molecular evolution.

Systematics: molecular, morphological, and phytogeographic studies of flowering plants, conifers, ferns and allies, bryophytes, algae, and fungi.

Applied and theoretical population and community ecology of forest and grassland ecosystems: mathematical and statistical ecology, ecological modelling.

Behavioural Ecology:

Comparative and experimental studies addressing factors that contribute to the evolution and maintenance of sociality, and the roles that communication and cognitive abilities play in social species (particularly ground-dwelling squirrels and slave-making ants).

Behavioural and evolutionary interactions between the parasitic cowbirds and their passerine hosts. Cowbird selection of host nests; host quality; nest defence; host tolerance of parasitism; nest placement; consequences of parasitism.

Physiology:

Metabolic, thermal and respiratory physiology of moles and shrews.

Thermal biology, diving physiology and bioenergetics of northern semi-aquatic mammals, mainly muskrat and beaver; physiological problems encountered during swimming and diving in cold water; seasonal bioenergetics and nutritional studies of these species.

Endocrine regulation of salt and water balance in fish, particularly the physiological actions of the rennin-angiotensin system, natriuretic peptides and neurohypophysial peptides on cardiovascular, renal and extra-renal function.

Stress physiology in forest ecosystems: plant adaptation to salts, pollutants and anthropogenic disturbance (mining, forestry).

Neurophysiology; regulation of ion channel proteins and electrical activity in neurons of the mammalian central nervous system; neurobiological control of food intake.

Transport physiology; mechanisms of osmoregulatory NaCl transports (salt and water balance) and nitrogen excretion in invertebrates and lower vertebrates; physiologic and molecular responses to ammonia stress.

Parasitology:

Comparative immunology of fish and mammals, particularly mucosal immunity. Host-parasite interactions, including transmission of fish parasites and the role of host immune responses in protection and regulation of parasite populations.

Host-parasite relationships of metazoan parasites of invertebrates. Life history strategies of free-living triclad flatworms. Zoogeography and community ecology of Unionidae.

Cell and Developmental Biology:

Oogenesis, early development and cell differentiation in invertebrates. Origin and fate of germ cells. Cellular mechanisms that regulate oogenesis and the establishment of polarity.

The roles of the cytoskeleton, bioelectrical properties and ions in oogenesis and development using an array of microscopical and electrophysiological techniques.

Early development in zebrafish, specifically the genes and gene interactions involved in early developmental decision-making processes. Genetic control of vertebrate (mainly zebrafish) embryonic development. Gap junction mediated intercellular communication: structure and post-translational modifications of the constituent connexin proteins, the role of specific connexins in the embryonic development of zebrafish, control of connexin gene expression.

Cellular mechanisms directing the formation of tissues and organs, using molecular, cellular, morphological and physiological techniques.

Molecular genetic control of reproduction in insects, with emphasis on mosquitoes; molecular basis of sex determination and sexual differentiation in invertebrates.

Role of RNA interference and microRNAs in regulating gene expression and development. Role of transposable elements as sources of genetic variation and mutation.

Cellular mechanisms directing the normal and pathological physiology of muscular dystrophy and age-related atrophy, muscle satellite cell activation, and impact of disease and regeneration on tissue and animal structure and function including testing of potential treatment modalities, using molecular, cellular, biochemical, morphological, and functional assays.

Plant biotechnology: applied bioremediation, genetic signaling and development, molecular techniques and ecology, plant structural imaging and analysis, proteomics, systematics and genomics, ultrastructural microscopy and microtechniques.

Developmental anatomy and cytology of plant reproductive systems: cytochemistry and ultrastructure

Research facilities

The Department has facilities in the Buller Building, the Duff Roblin Building, and a new "Biological Sciences Building" which was the former Pharmacy Building, on the Fort Garry Campus including an extensive, modern, nationally and internationally recognized herbarium collection (WIN) consisting of a vascular plant collection and a cryptogamic collection. The Department also has special facilities for animal sciences research including a large animal colony for small terrestrial and aquatic animals. Both animal housing and plant growth facilities are operated by trained technical staff with experience and expertise to support research and teaching.

Facilities include greenhouses and growth chambers; a scanning-transmission electron microscope; plant tissue, fungal and algal culturing facilities; research areas fully equipped for study of plant development, ecophysiol-

ogy and plant interactions; modern instrumentation for molecular, genetics and evolutionary biology studies; interference, fluorescence and transmission electron microscopes; tissue culture; cellular biology investigations; patch-clamping facilities; digital image analysis equipment; quantitative biology; and ecological analysis computerized facilities.

Field station facilities are provided at the Delta Marsh Field Station which provides year-round research facilities and accommodation for biological research in the 17,000 hectare Delta Marsh on the southern shore of Lake Manitoba. Other field station facilities are available to faculty members and their graduate students at Star Lake (Whiteshell Provincial Park), Taiga Biological Station (Wallace Lake), the Experimental Lakes Area (NW Ontario) and the Churchill Northern Studies Centre. The location of the facilities permits work on a variety of prairie, marsh and woodland habitats and on a wide spectrum of inland lakes and rivers, as well as Arctic tundra and marine habitat along the coast of Hudson Bay. The University Field Station, fully equipped with living accommodations and laboratory space, is 80 km away at Delta Marsh on the south shore of Lake Manitoba. Additional field studies are conducted from the Taiga Biological Station on the Canadian Shield, 240 km north east of Winnipeg, and at the Experimental Lakes Area near Kenora, Ontario, in conjunction with the Freshwater Institute, Winnipeg. Broad collaborations with other scientists within and external to the University of Manitoba further enrich the access to training facilities for faculty and graduate students.

Pamphlets giving details of graduate studies in botany, zoology programs, (pending integration into a single Biological Sciences program) and a Graduate Students' Information Booklet containing supplementary regulations and other information are available from the Department of Biological Sciences general office and the website. Program requirements are listed separately on the website, pending that integration.

M.Sc.

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. If a student applies with a three-year general B.Sc. degree or equivalent, a pre-Master's program must be taken which will be individually prescribed. Students with a four-year major or honours degree apply for direct entry into the M.Sc. program. If a student applies with a three-year general B.Sc. degree or equivalent, additional courses and/or a pre-Master's program must be taken to be equivalent to the required four-year degree. Application Deadlines: Applications must be received in the Faculty of Graduate Studies by the following dates.

Session Start Date Canadian/US International Regular September June 1
March 1 Winter January October 1 July 1 Spring May February 1 November
1 Summer July April 1 January 1

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The program requires completion of a research thesis and course work consisting of a minimum of one core course and one or two additional BIOL 700/7000 courses and one or two ancillary courses, suitable to the candidate's research program from other departments or from BIOL 400/4000 courses. Study and research will extend to a minimum of twelve months. All students must submit a research-based thesis and defend it orally. Please see the department website for supplementary regulations for each of the former departments and for those of the new department the Department of Biological Sciences.

Second language reading requirement: none

Expected time to graduate: two years

Ph.D.

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Candidates normally have completed a M.Sc. degree before entering the Ph.D. program; however under certain circumstances transfer from a M.Sc. to Ph.D. program and entry into the Ph.D. without a M.Sc. is possible. Individual qualifications other than these will be considered.

Applications must be received in the Faculty of Graduate Studies by the following dates:

Session Start Date Canadian/US International Regular September June 1 March 1 Winter January October 1 July 1 Spring May February 1 November 1 Summer July April 1 January 1

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Please see the department website for supplementary regulations for each of the former departments and for those of the new department Department of Biological Sciences.

Second language requirement: none

Expected time to graduation: three four years

Course Descriptions

BIOL 7070 Advanced Parasitology Cr.Hrs.6 (Formerly ZOO 7070) The methods of descriptive and experimental parasitology are considered in lectures, seminars, and laboratories and related to contemporary parasitological problems. Prerequisite: BIOL 3270 (the former ZOO 3460) or consent of instructor.

BIOL 7100 Core Skills in Biological Sciences Research Cr.Hrs.3 Learning skills for a career in scientific research in Biological Sciences including: using the scientific method, applying for NSERC funding, maintaining a CV, abstract writing, ethics in research, research protocols and biosafety and biohazards, statistical designs and their assumptions, literature searching, critical thinking, critiquing the scientific literature, making teaching and research presentations. Not to be held with Methodology of Research ANAT7090.

BIOL 7130 Ichthyology Cr.Hrs.6 (Formerly ZOO 7130) This course deals with the biology of fishes, their identification and classification. Prerequisites: BIOL 2210 (ZOO 2320) or ZOO 2500.

BIOL 7140 Advanced Physiology Cr.Hrs.6 (Formerly ZOO 7140) A study in depth of topics selected from the physiological research interests of the department.

BIOL 7150 Selected Topics in Avian Biology Cr.Hrs.6 Seminars, assigned projects and discussions designed to familiarize advanced students with topics of current interest in avian biology. Prerequisite: ZOO 4240 or consent of the instructor. (Formerly ZOO 7150)

BIOL 7160 Animal Ecology Cr.Hrs.6 (Formerly ZOO 7160) Detailed examination of special ecological subjects and assignments of special research projects.

BIOL 7220 Critical Thinking in Biological Sciences Cr.Hrs.3 A core graduate level course within the Ph.D. program designed to stimulate discussion and thought in key areas applicable to the student's research discipline.

BIOL 7230 Advanced Topics in Zoology Cr.Hrs.6 (Formerly ZOO 7230) A seminar on current research topics in Zoology.

BIOL 7240 Wetland Ecology Cr.Hrs.6 (Formerly BOTN 7240) A study of marsh, bog, and fen communities, with emphasis on their history, soil-plant relationships, and species distribution. Field work at the Delta Marsh Field Station and nearby bog and fen sites will be an integral part of the course.

BIOL 7270 Problems in Evolution Cr.Hrs.3 (Formerly ZOO 7270) Lectures, seminars, and research in selected topics of biological evolution with emphasis on selection mechanisms.

BIOL 7300 Advanced Embryology Cr.Hrs.6 (Formerly ZOO 7300) A detailed course in primary and secondary inductive processes during organogenesis, growth regulatory mechanisms, and experimental techniques. Prerequisites: Introductory Developmental Biology or Embryology or equivalent course.

BIOL 7310 Selected Topics of Animal Behaviour Cr.Hrs.6 (Formerly ZOO 7310) Assigned projects, seminars, and discussions designed to familiarize advanced students with topics of current interest in animal behaviour. Prerequisite: ZOO 4480 or consent of instructor.

BIOL 7320 Nematology Cr.Hrs.6 (Formerly ZOO 7320) Lectures cover the morphology, taxonomy, physiology, and ecology of the nematodes. Laboratories concentrate on techniques of identification and culture. Prerequisite: BIOL 2200 or the former ZOO 2600.

BIOL 7340 Problems in Developmental Zoology 1 Cr.Hrs.3 (Formerly ZOO 7340) A seminar and lecture course dealing with current advances in the field of zoology.

BIOL 7350 Problems in Developmental Zoology 2 Cr.Hrs.3 (Formerly ZOO 7350) A seminar and lecture course dealing with current advances in the field of zoology.

BIOL 7360 Problems in Biological Statistics Cr.Hrs.3 (Formerly ZOO 7360) The course discusses statistical problems and techniques which specifically apply to biological research. Laboratory exercises will be based primarily on examples from field research. Prerequisite: STAT 3130 or the consent of instructor.

BIOL 7370 Special Topics in Algal Ecology Cr.Hrs.6 (Formerly BOTN 7370) Directed study and project(s) in selected aspects of the ecology of freshwater phytoplankton, periphyton and metaphyton.

BIOL 7380 Advanced Limnology Cr.Hrs.6 (Formerly ZOO 7380) The biological productivity of lakes. A seminar and tutorial course given with the help and cooperation of scientists in the Freshwater Institute and the Department of Biological Sciences. Prerequisite: BIOL 3370 or the former ZOO 3500 or equivalent.

BIOL 7390 Advanced Mammalogy Cr.Hrs.6 (Formerly ZOO 7390) Lectures and seminars on mammals, their evolution, physiology, and ecology.

BIOL 7400 Biological Resource Management I Cr.Hrs.3 (Formerly ZOO 7400) A survey of the principles of ecology in relation to renewable resources, with emphasis on ecosystem concept, ecological homeostasis, and energy flow. Open to students of the Natural Resources Institute or by consent of instructor. Students registered in BIOL 7400 may be required to pay a portion of costs associated with field trips. For details contact the Department of Biological Sciences.

BIOL 7410 Special Topics in Botany Cr.Hrs.3 (Formerly BOTN 7410) An assignment and conference course. A detailed study of some specialized topics in Botany.

BIOL 7412 Biological Resource Management II Cr.Hrs.3 (Formerly ZOO 7410) Examination of natural resource management practices, in discussions with resource managers. Open to students in the Natural Resources Institute or by consent of instructor. Prerequisite: BIOL 7400 or the former ZOO 7400. Students registered in BIOL 7412 may be required to pay a portion of costs associated with field trips. For details contact the Department of Biological Sciences.

BIOL 7460 Molecular Biology for Plants and Fungi Cr.Hrs.3 (Formerly BOTN 7460) Techniques for the collection, culturing and preservation of plants and fungi. Extraction, diagnostic and recombinant DNA Theory for nucleic acids in plants and fungi, Bioinformatics, analysis and interpretation of biological data.

BIOL 7470 Plant Molecular Development Cr.Hrs.3 (Formerly BOTN 7470) Analysis of plant development at the molecular level. Recent advances in model systems will be highlighted including seedling, root, shoot and flower development as well as environmental responses. Prerequisite: permission of the department. Offered in alternate years.

BIOL 7480 Plant Stress Physiology Cr.Hrs.3 (Formerly BOTN 7480) Current topics on plant responses to environmental stress at the physiological and biochemical levels. Laboratory will consist of supervised projects in the above areas. Offered in alternate years. Prerequisite: permission of the department, BIOL 3452 (BOTN 3010) or PLNT 3500, and CHEM 2370 (MBIO 2370) or CHEM 2780 (MBIO 2780).

BIOL 7490 Advanced Plant Ecology Cr.Hrs.3 (Formerly BOTN 7490) Examines the ecology of interactions between plants and their biotic environment. Students are expected to critically examine new developments in these fields.

BIOL 7500 Fungal Symbiosis Cr.Hrs.3 (Formerly BOTN 7500) Lectures, seminars, and assigned readings discussing a diversity of fungal interactions with plants, protists, insects and other fungi. Emphasis will be on the evolution of fungal systems ranging from mutualism to parasitism.

BIOL 7510 Microtechniques in Plant Biology Cr.Hrs.3 (Formerly BOTN 7510) Techniques for the preparation and microscopic examination of components of plant and fungal tissues and cells. Offered in alternate years.

BIOL 7520 Plant Systematics Cr.Hrs.3 (Formerly BOTN 7520) Lectures and laboratory exercises examining the principles and methods of plant systematics. Emphasis will be placed on phonetic and cladistic techniques and the sources of data used in plant systematics research.

BIOL 7530 Molecular Biology Techniques for Eukaryotes Cr. Hrs. 3. A techniques-intensive course focusing on the understanding of molecular biology techniques, trouble-shooting problems, writing reproducible Materials and Methods for publications, accurate recording of procedures in lab journals, and bioinformatics exercises. Not to be held with the former 001.742 or 001.746 or BOTN 7460.

BIOL 7540 Methods for Analysing Biological Data Cr. Hrs. 3. A survey of methods and approaches for analysing biological and environmental data containing many variables, suitable for graduate students. Offered in alternate years. Not to be held with BOTN 4650, BOTN 7440 or BIOL 4312.

Section 8: Biosystems Engineering

General Office

E2-376 EITC (Engineering Building)

Telephone: (204) 474-6033

Fax: (204) 474-7512

E-mail: headbio@ms.umanitoba.ca

Website: umanitoba.ca/faculties/engineering/departments/biosystems/

Head: D. (Danny) Mann

Graduate Chair: Y. (Ying) Chen

Administrative Assistant: D. (Debby) Watson

Academic Staff

Dean Emeritus

Laliberte, G.E., B.E., M.Sc. (Manitoba), Ph.D. (Colorado State), P.Eng.

Professor Emeritus

Muir, W.E., B.E. (Saskatchewan), M.S. (Illinois), Ph.D. (Saskatchewan), P.Eng.

Professors

Britton, M.G., B.E. (Saskatchewan), M.Sc. (Manitoba), Ph.D. (Texas A&M), P.Eng.; **Cenkowski**, S., B.Sc., M.Sc. (Technical Univ., PL), Ph.D. (Agric. Univ., PL), Sc.D. (Agric. Univ.), P.Eng.; **Chen**, Y., B.Sc.(Jiamusi), M.Sc. (Beijing), Ph.D. (McGill), P.Eng.; **Jayas**, D.S., B.Sc. (G.B.Pant), M.Sc. (Manitoba), Ph.D. (Saskatchewan), P.Ag., P.Eng.; **Mann**, D.D., B.Sc., M.Sc., Ph.D. (Manitoba), P.Eng.; **Sri Ranjan**, R., B.Sc. (Peradeniya), M.Sc., Ph.D. (Colorado State), P.Eng.; **Zhang**, Q., B.Sc. (Hefei Polytechnical), M.S., Ph.D. (Pennsylvania State), P.Eng.

Associate Professors

Cicek, N., B.Sc. (Turkey), M.Sc., Ph.D. (Cincinnati), P.Eng.; **Dick**, K.J., B.Sc., M.Sc., Ph.D. (Manitoba), P.Eng.; **Levin**, D.B., B.E.S. (Waterloo), M.Sc. (Guelph), Ph.D. (McGill); **Paliwal**, J., B.Sc. (G.B.Pant), M.Sc., Ph.D. (Manitoba), P.Eng.

Assistant Professors

Morrison, J., B.Eng., B.Sc.(Hon.) (McMaster), M.C.S., Ph.D. (Carleton), EIT

Adjunct Professors

Berlin, A., B.Sc., M.Sc., Ph.D. (Moscow); **Goertzen**, A.L., B.Sc. (Hon.) (Manitoba), M.S., Ph.D. (California); **Hewko**, M., B.Sc., M.Eng. (Saskatchewan); **Ingram**, S.A., B.A. (Hon.) (Winnipeg), M.Ed. (Manitoba), Ph.D. (Toronto); **Karunakaran**, C., B.Sc., (Tamilnadu Agric, India), M.Sc., Ph.D. (Manitoba); **Lague**, C., B.Sc.A., M.Sc. (Laval), Ph.D. (California); **Lin**, F., B.S. (Beijing), M.S. (California State), Ph.D. (California); **McLaughlin**, N., B.Sc.(Eng.) (Guelph), M.Sc. (Saskatchewan), Ph.D. (Cornell); **White**, N.D.G., B.Sc., M.Sc. (Guelph), Ph.D. (Manitoba).

Program Information

The Department of Biosystems Engineering offers graduate programs leading to M.Sc., M.Eng., and Ph.D. degrees. The graduate programs in the department focus on applications of engineering in biological systems. Strong emphasis is placed on assisting graduate students to gain a broad range of skills and experience in conducting interdisciplinary research, in understanding the interrelationships among physical and biological factors, and in written and oral communication.

Fields of Research

Environmental Engineering: Environmental impact assessments of agricultural and food production; biological reduction of wastewater; membrane bioreactor technology; management and utilization of agricultural and food processing wastes; management of livestock manure; biofiltration; environmental odours; protection and remediation of contaminated soil and groundwater; site preparation and selection.

Bio-Processing: Infrared processing of food; superheated steam drying; extraction technologies for complex oil/juice crops; modified atmosphere storage of meat, fruits, and vegetables; fast freezing of fruits; mathematical modelling of food systems; physical, thermal, and rheological properties of foods; water activities of foods; shelf-life, flow of bulk solids; bulk properties of grains and powders.

Biofuels: bioengineering for biofuels; bioreactors; anaerobic digestion of waste for biogas.

Biosensors: bioengineering of methods to detect and monitor biological materials (nucleic acids, proteins, lipids) and/or microorganisms (viruses, bacteria).

Post-Harvest Preservation of Grains: Grain storing and drying systems; computer simulation of stored-grain ecosystems; physical methods of controlling insects and micro-organisms; machine vision for automated handling and classification of grain; properties of grains and oilseeds; expert systems for managing stored products.

Bio-Imaging: Computer analysis of images for grading, orientation, and automation; near-infrared (NIR) spectroscopy; development and application of neural networks.

Power and Machinery: Harvesting and processing of new crops such as hemp; precision agriculture; guidance systems for agricultural machinery; ergonomics of agricultural machinery; assistive technologies for farmers with disabilities; tillage and seeding; soil-machine interaction; equipment for manure handling.

Soil and Water Engineering: Irrigation and drainage systems; flow and contaminant transport in porous media; soil-plant-water relations.

Light-Frame Structures: Structural aspects of light-frame buildings; use of wood and other structural materials; bulk solids storage structures (bins and silos).

Bio-Environment: Animal production environment; plant growth environment; energy conservation in animal and plant production; environments in buildings designed for biological processes.

Research Facilities

Departmental research facilities include: infrared treatment equipment; differential scanning calorimeter; texture analyser; superheated-steam drier; freeze drier; supercritical fluid extraction system, soil bin; tractor cab simulator; eye-tracking system; universal test machines; loading frames for structural testing of wood beams, columns, and trusses; facilities for studying flow through porous-media; electronic nose; olfactometer; and access to a university farm for research on both animal and crop production.

The Department has a 1400-m² state-of-the-art laboratory for research on stored-grain ecosystems. The facility includes: machine vision equipment; a soft x-ray unit; near-ambient, high temperature, infrared and microwave driers; a fan-testing unit; instrumentation for measuring loads in grain storage structures; equipment to measure physical, thermal, biological, and quality characteristics of grains and oilseeds; thermal disinfestation systems; environmental chambers; grain handling and cleaning equipment; and several grain bins.

An advanced Bioengineering for Biofuels laboratory is currently under construction. This facility will contain state-of-the-art equipment for advanced biotechnological analyses of DNA, RNA, and proteins, including quantification, separation, and visualization of nucleic acids and proteins.

M.Sc. in Biosystems Engineering

Admission

For admission into the M.Sc. program, applicants are normally required to hold a Bachelor's degree in Biosystems Engineering or equivalent from a recognized university. Candidates with degrees in related areas will be accepted at the discretion of the department head.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. A minimum of 18 credit hours of coursework is required, which should include: BIOE 7290; other courses in the 7000 series of Biosystems Engineering of not less than three hours of credit; and approved ancillary courses. In addition, a thesis must be submitted based on original research conducted by the student.

Master of Science students are required to spend at least one academic session in full-time resident graduate study. On recommendation of the department head, the residence requirement may be waived in special cases.

Second language reading requirement: none

Expected time to graduate: 18-24 months

M.Eng. in Biosystems Engineering

Admission

For admission into the M.Eng. program, applicants are normally required to hold a B.Sc.(Eng.) degree. Candidates with degrees in related areas will be accepted at the discretion of the department head.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. A min-

imum of 30 credit hours of coursework is required, which should include: a seminar course (BIOE 7290), six hours assigned to an approved project and report; and at least 12 credit hours of 7000 level courses offered by the Faculty of Engineering. An oral presentation of the project to a department examining committee is required.

Second language requirement: none

Expected time to graduate: 12-18 months

Ph.D. in Biosystems Engineering

Admission

Admission to the Ph.D. program normally requires a M.Sc. degree. Students making exceptional progress while enrolled in the M.Sc. program may be transferred to the Ph.D. program upon the consent of the department head and based on a recommendation from the student's advisor and the Biosystems Engineering Graduate Studies Committee which investigates the student's qualifications and suitability for Ph.D. study. In such cases, the program credit hour requirements shall be decided at the time of the transfer.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students are normally required to take a seminar course (BIOE 7270) and expected to meet a requirement of teaching and learning in post-secondary education. The teaching and learning requirement may be met by: completing the CHET program; or completing the teaching workshops in Teaching Techniques, and Course Construction and Organization (15 h each) plus other teaching workshops of at least 15 h duration; or completing teaching workshops of 45 h duration. Teaching workshops are offered each year by the University of Manitoba. The advisory committee for the student must approve the process which will be followed by the student to meet the teaching and learning requirement.

Second language requirement: none

Expected time to graduate: 3 - 4 years

Course Descriptions

BIOE 7040 Fluid Mechanics of Unsaturated Porous Solids Cr.Hrs.3 (Formerly 034.704) Statics and dynamics of two immiscible fluid phases occupying the voids of porous solids. Concepts include capillary pressure, bubbling pressure, saturation, intrinsic and relative permeability, pore-size distribution indices. *Prerequisite:* consent of instructor.

BIOE 7110 Grain Storage Cr.Hrs.3 (Formerly 034.711) A synthesis of major aspects of the storage of grain including: abiotic and biotic characteristics of stored grain bulks, regional variables, grain pressure theories, methods of controlling deterioration, and health hazards. *Prerequisite:* consent of instructor.

BIOE 7140 Advanced Irrigation and Drainage Cr.Hrs.3 (Formerly 034.714) Selected advanced problems and new developments in irrigation and drainage. Interrelationships between irrigation and drainage and the environment. *Prerequisite:* consent of instructor.

BIOE 7160 Instrumentation and Controls Cr.Hrs.3 (Formerly 034.716) For the non-engineering student. Transducers, circuits and instruments for measuring and recording physical quantities such as temperature, humidity, force, pressure, strain, sound, flow and nuclear radiation. Presentation and interpretation of data. *Prerequisite:* consent of instructor.

BIOE 7180 Bioprocessing Cr.Hrs.3 This course allows students with a background in either biological sciences or engineering to gain an understanding of biochemical engineering processes. Topics include production of biofuels, bioplastics, biopharmaceuticals, and processing technologies. This course is also offered in the Department of Microbiology as MBIO 7180. BIOE 7180 cannot be held with MBIO 7180.

BIOE 7200 Bulk Solids Storage and Handling Cr.Hrs.3 (Formerly 034.720) Fundamental characteristics of bulk solids, bulk solids flow during storage and handling, loads in bulk solids storage and handling systems, mechanical, pneumatic and hydraulic conveying of bulk solids, safety in storage and handling of bulk solids. *Prerequisite:* consent of instructor.

BIOE 7210 Numerical Modelling of Biosystems Cr.Hrs.3 (Formerly 034.721) Applications of numerical methods to the solution of problems dealing with biological systems: structure analysis, mechanical behaviour of biological materials, moisture sorption and desorption, cooling and heating of biological materials, and flow through saturated and unsaturated porous media. Solution of transient and non-linear problems. Use of commercial finite element packages for problem solving. *Prerequisite:* consent of instructor.

BIOE 7220 Advanced Machine Design Analysis for Biosystems Cr.Hrs.3 (Formerly 034.722) Analysis of machines for use in biosystems with respect to design and functional performance, in-field traction, operator safety and comfort, and energy source, transmission and application. Engineering analyses will be used to study biosystems machinery problems of current and future interest. *Prerequisite:* consent of instructor.

BIOE 7230 Advanced Topics on Light-Frame Buildings Cr.Hrs.3 (Formerly 034.723) Structural and environmental design and analysis of light-frame buildings. Topics include: loads in light-frame buildings; frame design; construction management; environmental control in light-frame buildings; and structure-environment interactions. *Prerequisite:* consent of instructor.

BIOE 7240 Special Problems in Biosystems Engineering Cr.Hrs.3 (Formerly 034.724) Advanced work in a specialized field involving engineering applications to biological systems. *Prerequisite:* consent of instructor.

BIOE 7250 Mechanical Behavior of Biological Materials Cr.Hrs.3 (Formerly 034.725) Elastic and inelastic behavior of biological materials under applied load. Emphasis on unprocessed and semi-processed food products. Use of mechanical behavior properties in the design of handling, storage, processing and sensing systems for food products. *Prerequisite:* consent of instructor.

BIOE 7260 Research Methods for Biosystems Engineers Cr.Hrs.3 (Formerly 034.726) Introduction to various research methods, including data acquisition and transmission, control systems, dimensional analysis, random signal analysis, experimental design, error analysis, stochastic modelling, fuzzy mathematics and expert systems. *Prerequisite:* consent of instructor.

BIOE 7270 Advanced Seminar in Biosystems Engineering Cr.Hrs.3 (Formerly 034.727) A series of seminars to be given by Ph.D. candidates on research topics of current interest in Biosystems Engineering. *Prerequisite:* consent of instructor.

BIOE 7280 Advanced Topics in Biosystems Engineering Cr.Hrs.3 (Formerly 034.728) An opportunity to extend, update or acquire specialized knowledge in particular area of interest. *Prerequisite:* consent of instructor.

BIOE 7290 Biosystems Engineering Seminar 1 Cr.Hrs.3 (Formerly 034.729) Oral and written presentation of engineering research is discussed. Students are expected to actively participate in weekly seminars and to present two seminars both orally and written.

BIOE 7300 Food Process Engineering Cr.Hrs.3 (Formerly 034.730) Food engineering concepts are presented using quantitative relationships that define the process. Various advanced methods of heating and processing foods are discussed and their mathematical and physical relationships described. Descriptive information of typical equipment assists students in utilizing engineering principles in design. *Prerequisite:* consent of instructor.

BIOE 7310 Materials Incorporation into Soil Cr.Hrs.3 (Formerly 034.731) Types and characteristics of agricultural materials; solid and liquid waste (including manure) incorporation; crop residue incorporations, seed placement; chemical incorporation; methods and equipment; performance evaluation; measurement technique.

BIOE 7320 Membrane Processes for Water and Waste Treatment Cr.Hrs.3 (Formerly 034.732) Principles of membrane filtration, classification, design and manufacture. Principle mechanisms of mass transport to the membrane surface and particle/solute rejection. Investigation of membrane bio-fouling and bio-film control strategies. Fundamentals of reverse osmosis, nano-, ultra-, and micro-filtration process design and operation. Practical applications of membranes in the area of water and wastewater treatment. Innovative and novel bio-reactor designs utilizing membrane filtration for environmental reclamation.

Section 9: Ma"trise en Études canadiennes

Head: Lise Gaboury-Diallo

General Office: Collège universitaire de Saint-Boniface, 200 ave de la Cathédrale, Winnipeg R2H 0H7

Telephone: (204) 237-1818, ext. 451

Fax: (204) 237-3240

E-mail: etcan@ustboniface.mb.ca

Website: <http://ustboniface.mb.ca/cusb/etcan/>

Academic Staff

Professors

Hèbert, Raymond M., B.A. (Phil. Lat.), M.A., Ph.D. (Manitoba), cert. tr.;
Gaboury-Diallo, Lise, B.A. (Phil. Lat.), M.A., Ph.D. (Paris IV, Sorbonne)

Assistant Professors

Angers, Maurice, sociology, Collège de Maisonneuve (Montréal)

Adjunct Professors

The program counts several adjunct professors from the University of Manitoba, the University of Calgary and the University of Saskatchewan.

Program Information

The "MaÓtrise en études canadiennes" is offered by the Collège de Saint-Boniface, an affiliated college of the University of Manitoba, in French only, and only via the Internet. Currently a total of 18 students are enrolled in the program, which was launched in 1999. Students are generally mid-career and are enrolled in the programme on a part-time basis, out of personal interest or for career enhancement. Graduates can pursue careers in the federal or provincial public service, in journalism, in the Foreign Service, or in the private sector; in addition, graduates of the programme may be admitted to doctoral programs, subject to program requirements.

Graduates of this program will receive a Master of Arts (in études canadiennes)

Admission

In addition to the minimum admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar,

students must have taken four (4) years of studies at the university level. A pre-M.A. program is not available at this time.

Admission Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 6 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 9 months prior to their intended start date.

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this *Calendar*, students must complete a minimum number of 18 credit hours of graduate coursework. In addition, students must submit an acceptable thesis and pass a thesis oral examination.

Language requirement: Reading and comprehension skills in both French and English; course work and the thesis may be written in either French or English, subject to availability of a bilingual instructor.

Expected time to graduate: 2 - 3 Years

Section 10: Cancer Control

Head and Graduate Chair: Judith Scanlan

General Office: 280 Helen Glass Centre for Nursing

Telephone: (204) 474 6216

Fax: (204) 474 7682

E-mail: nursing_grad@umanitoba.ca

Website: umanitoba.ca/nursing

Academic Staff

Distinguished

Chochinov, H.M., B.A. (Winnipeg), M.D., F.R.C.P.C., Ph.D. (Manitoba),
Degner, L.F., B.N. (Manitoba), M.A. (Washington), Ph.D. (Michigan)

Professors

Hassard, T., B.Sc., M.Sc., Ph.D. (Queen's, Belfast); **Woodgate**, R.L., B.N., M.N., Ph.D. (Manitoba)

Associate Professors

Hack, T.F., B.Comm. (Saskatchewan), B.Sc. (Calgary), M.A., Ph.D. (Manitoba); **Kliwer**, E., B.Sc., M.Sc. (Manitoba), Ph.D. (UBC); **Lobchuk**, M.M., B.N., M.N., Ph.D. (Manitoba); **McClement**, S.E., B.Sc.N. (Victoria), M.N. Ph.D. (Manitoba); **McMillan**, D., B.A., B.Sc.N. (Queens), M.N. (Manitoba), Ph.D. (Washington); **Menec**, V., B.A., M.A., Ph.D. (Manitoba); **Moffatt**, M., B.Sc., M.D. (Toronto), M.Sc. (McGill), F.R.C.P.C.; **Taback**, S., B.Sc., M.D. (Manitoba), F.R.C.P.C.(McGill); **Turner**, D., B.Sc. (Victoria), M.Sc. (Calgary), Ph.D. (Alberta).

Assistant Professors

Schultz, A., B.Sc.N., M.N. (Victoria), Ph.D.(UBC)

Adjunct Professor

Katz, A., B.N., M.N., Ph.D. (Manitoba)

Program Information

The Ph.D. in Cancer Control is offered by the Faculty of Nursing and the Department of Community Health Sciences, Faculty of Medicine. The goal of cancer control is to prevent cancer, cure cancer, and increase survival and quality of life for those who develop cancer, by converting the knowledge gained through research and evaluation into clinical and community interventions. This program addresses the pressing need in Canada for clinical and community health scientists in cancer control.

Fields of Research

Cancer care of individuals and families is an area of research excellence in the Faculty of Nursing. In 2000, the Canadian Health Services Research Foundation (CHSRF) and Canadian Institutes of Health Research (CIHR) awarded a Nursing Chair to Dr. Lesley Degner for her work in cancer control. The title of the Chair Program is "Development of Evidence-Based Nursing Practice in Cancer Care, Palliative Care, and Cancer Prevention" (umanitoba.ca/nursing/CHSRF-CIHR). Three other scientists in the Faculty

hold career awards from the National Cancer Institute of Canada (Drs. Hack, Lobchuk, and Woodgate). Current areas of research include: patient-health professional communication, clinical decision making, symptom management, family care giving, sleep and cancer, and several dimensions of palliative care and cancer prevention. Methodological expertise includes scaling of psychosocial variables and conducting randomized clinical trials of nursing and psychosocial interventions. Previous work has focused on breast, prostate, and lung cancer patients as well as children with cancer.

The cancer control focus in the Faculty of Nursing is complemented by the strong methodological expertise (biostatistics, clinical trials, meta-analysis) of faculty members in the Department of Community Health Sciences, as well as their substantive expertise in the fields of cancer epidemiology, palliative care, aboriginal health, child health and aging. Knowledge translation is a strong emphasis of the program. Significant community partners in delivering this Ph.D. program are the Winnipeg Regional Health Authority, CancerCare Manitoba, and the St. Boniface Hospital Research Foundation. International research partnerships exist with the Mayo Clinic in Rochester, Minnesota; the Karolinska Institute in Stockholm, Sweden; and the University of Manchester, England.

Student Funding

Students who are accepted to the Ph.D. in Cancer Control will receive tuition support in their first year from the CHSRF/CIHR/WRHA Chair Program. A stipend is available on application and acceptance from a multidisciplinary training program in which the Faculty of Nursing is participating: Psychosocial Oncology Research Training (PORT) Program (McGill University) (www.port.mcgill.ca/indextext.htm). Students are encouraged to obtain the PORT program details well in advance of application to the Ph.D. in Cancer Control to facilitate funding of their first year of studies. Thereafter, students are expected to apply for national funding in the form of doctoral studentships/fellowships from the National Cancer Institute of Canada and the Canadian Institutes of Health Research.

Ph.D. in Cancer Control

Admission

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this *Calendar*.

Applicants must possess:

- High academic standing in previous university work
- A Master's degree in nursing or a health-related discipline. The degree must be thesis-based, although evidence of an extensive publication and research background as an alternative to a thesis is acceptable, and
- An area of research interest in palliative care, cancer care, or cancer prevention which is supported by a Faculty of Nursing or a Department of Community Health Sciences advisor.

Application Deadlines

Students in the Faculty of Nursing normally begin their program on 1 September. Applications with complete supporting documentation are due in the Faculty of Graduate Studies by January 15th.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The program normally consists of twenty-one credit hours of coursework (fifteen from required courses, six credit hours from electives), a candidacy examination and a thesis. (In addition, fifteen credit hours of pre- or co-required courses or equivalent must have been completed before entering the program or in the first year).

Second language reading requirement: none

Maximum time to graduate: six years

Course Descriptions

Required Courses

NURS 7110 Readings in Selected Topics Cr.Hrs.3 An intensive readings course for graduate students in nursing. Topics may be selected within the general field of nursing to suit the special needs and research interests of students, for example, transcultural nursing, women's health, or palliative care. Students must have a faculty member agree to advise them before registering.

NURS 7160 Cancer Nursing Research Cr.Hrs.3 Focuses on recent advances in cancer nursing research with an emphasis on research methodologies, ethical concerns, and design issues pertinent to research with cancer populations. Approaches to utilization of research findings in clinical practice will be addressed. Offered on a rotating basis.

NURS 7320 Philosophy of Nursing Science Cr.Hrs.3 Advanced seminar to explore philosophies of science which have influenced the development of nursing knowledge. Nursing epistemological traditions are analysed and criticized as they relate to nursing theory development and research. The relationship between nursing science and practice is emphasized.

CHSC 7480 Biostatistics 2 Cr.Hrs.3 Techniques of research design and analysis for health scientists. Principles of experimental design. Clinical trial planning. Study size -determination. Analysis of variance for factorial and split plot experiments. Analysis of covariance. Multiple regression. Non-parametric hypothesis testing. Principles of survey design. Prerequisite: a minimum grade of "B" in CHSC 7470.

CHSC 7560 Epidemiology of Cancer Cr.Hrs.3 This course introduces the magnitudes, risk factors and prevention strategies of cancer. It focuses on current knowledge related to the etiology of cancer, medical interventions and potential for prevention. Prerequisite: a minimum grade of "B" in CHSC 7520.

And, one of:

GMGT 6030 Organization Theory and Behaviour Cr.Hrs.3 An examination of current theories of structure and behaviour as they apply to organizations in the public and private sector. Emphasis upon research findings and their application in manage-

ment situations.

GMGT 7440 Doctoral Seminar in Organizational Theory (Ph.D.) Cr.Hrs.3 The major goal of this course is to familiarize students with central schools of thought within organization theory. As with other theories in the social sciences, these schools of thought tend to be based on differing assumptions about the nature of the organizational world, the operation of causality, epistemology, and the role of human actors.

And, one of:

NURS 7210 Qualitative Research Methods in Nursing Cr.Hrs.3 Advances knowledge of qualitative methodology and the use of various qualitative research methods to understand phenomena of interest to nursing. Students are exposed to sampling strategies, qualitative data collection techniques, and processes associated with the analysis and interpretation of qualitative data. Specific qualitative research methods are explored in detail.

CHSC 7280 Advanced Biostatistics Cr.Hrs.3 Techniques for the analysis of complex health and medical data sets. Principles of statistical modelling. Multiple regression. Logistic regression. Survival analysis and proportional hazards regression. Multidimensional contingency tables and log linear models. Factor and cluster analysis. The utilization of statistical packages will be emphasized. Prerequisite: a minimum grade of "B+" in CHSC 7480 and permission of instructor.

CHSC 7360 Clinical Trials Cr.Hrs.3 The Randomized Clinical Trial is the only true experiment in clinical research. This course is intended to give students a detailed knowledge of the design and implementation of RCTs. Students will participate in a qualitative review of RCTs. Prerequisites: a minimum grade of "B" in CHSC 7520, CHSC 7470, CHSC 7480 or equivalents.

Pre- or co-Required Courses or Equivalent

NURS 7080 Special Topics in Nursing Research 2 Cr.Hrs.3 Seminar discussion of topics related to current issues and problems in the development, implementation, and evaluation of knowledge utilization programs in nursing practice. Required of all practicum students.

NURS 7220 Quantitative Research Methods in Nursing Cr.Hrs.3 Advances understanding of the ways in which quantitative approaches can be applied to solve nursing problems. The quantitative research process will be described including, literature review, conceptual frameworks in nursing, sampling, data collection strategies, analysis of research data and communicating results. Includes exploration of the status and development of nursing knowledge through quantitative research methods.

CHSC 7320 Organization and Financing of the Canadian Health Care System Cr.Hrs.3 Students will study the historical development and current structure of the Canadian health care system and relate its development to changes in social and political factors. The course provides an economic perspective on current policy issues in the organization, financing, and delivery of health care in Canada.

CHSC 7470 Biostatistics 1 Cr.Hrs.3 An introduction to statistical ideas and techniques for health sciences research. The description of data. Patterns in data, the normal, binomial and Poisson distributions. Principles of estimation. Principles of hypothesis testing. The major statistical tests (t tests, analysis of variance, chi squared tests, correlation and regression).

CHSC 7520 Principles of Epidemiology 1 Cr.Hrs.3 This course will introduce the basic concepts and methods of epidemiology, including the definition and measurement of health status and health determinants in populations, assessing health risks and inferring causation, and issues in the design and analysis of population health studies.

Section 11: Chemistry

Acting Head: P.H.M. Budzelaar

General Office: 360 Parker Building

Telephone: (204) 474 9321

Fax: (204) 474 7608

E-mail: Chemistry_Dept@umanitoba.ca

Website: umanitoba.ca/chemistry

Academic Staff

Professor Emeriti

Gesser, H.D., B.Sc. (Loyola), Ph.D. (McGill); **Jamieson, J.C.,** B.Sc. (Heriot Watt), Ph.D. (Aberdeen).

Senior Scholars

Charlton, J.L., B.Sc. (Hons.), Ph.D. (Western); **Chow, A.,** B.Sc., M.A., Ph.D. (Toronto); **Janzen, A.F.,** B.Sc. (Hons.) (McMaster), Ph.D. (Western); **Kruczynski, L.,** B.Sc. (Hons.), Ph.D. (Manitoba); **Queen, A.,** B.Sc. (Hons.), M.Sc., Ph.D. (Durham); **Westmore, J.B.,** B.Sc.(Hons.), Ph.D. (London).

Professors

Duckworth, H.W., B.Sc.(Hons.) (McMaster), Ph.D. (Yale); **Freund, M.S.,** B.S. (Florida Atlantic), Ph.D. (Florida), Canada Research Chair in Conducting Polymers and Electronic Materials; **Gough, K.M.,** B.Sc.(Hons.) (Loyola),

M.Sc., Ph.D. (Manitoba); **Hruska, F.E.,** B.Sc.(Hons.), M.Sc., Ph.D. (Manitoba); **Hultin, P.G.,** A.B. (Dartmouth), M.Sc., Ph.D. (Toronto); **Hunter, N.R.,** B.Sc., M.Sc. (Carleton), Ph.D. (New Brunswick); **O'Neil, J.D.J.,** B.Sc., Ph.D. (Toronto); **Perreault, H.,** B.Sc., M.Sc. (Montréal), Ph.D. (Dalhousie), Canada Research Chair in Bioanalytical Mass Spectrometry.

Associate Professors

Bieringer, M., Dipl.-Chem. (Duisburg), Ph.D. (McMaster); **Budzelaar, P.,** B.Sc., M.Sc., Ph.D. (Utrecht); **Cullen, J.M.,** B.Sc., M.Sc. (Windsor), M.Sc., Ph.D. (Guelph); **Hegmann, T.,** M.Sc., Ph.D. (Martin-Luther-Universität); **Kroeker, S.,** B.Sc. (Winnipeg), M.Sc. (Manitoba), Ph.D. (Dalhousie); **Schreckenbach, H.G.,** Dipl.-Phys. (Technische Universität Dresden), Ph.D. (Calgary); **Schweizer, F.,** Dipl.-Chem. (Freiburg), Ph.D. (Alberta); **Stetefeld, J.,** Dipl.-Chem. (Leipzig), Ph.D. (Max-Planck-Institut), Canada Research Chair in Structural Biology; **Wang, F.,** B.S. (Wuhan), Ph.D. (Peking).

Assistant Professors

Khajehpour, M., B.Sc. (Sharif), PhD (Missouri); **McKenna, S.A.,** B.Sc. (Queens), Ph.D. (Alberta); **Sorensen, J.L.,** B.Sc., M.Sc. (Saskatchewan), Ph.D. (Alberta); **van Wijngaarden, J.A.,** B.Sc. (Hons.), (Western), Ph.D. (Alberta).

Adjunct Professors

Ata, A. B.Sc. (Karachi), M.Sc. (U. Agriculture, Faisalabad), Ph.D. (Karachi); **Goltz**, D. B.Sc. (Laurentian), M.Sc., Ph.D. (Carleton); **Leonardi**, L., B.Sc., Ph.D. (McGill); **Quaroni**, L. M.Sc. (Università deli Studi Di Pavia), Ph.D. (Strathclyde); **WONG**, C.S., S.B., S.M., (Massachusetts), Ph.D. Minnesota; **Krokhin**, O.V. M.Sc. (Moscow State).

Program Information

A M.Sc. or Ph.D. in the chemical sciences provides a gateway to an exciting, challenging and frequently high-paying career. M.Sc. and Ph.D. chemists work in areas such as industrial research and development (particularly the pharmaceutical, energy, advanced materials and biotechnology sectors), medical research, environmental and pollution monitoring, and technical consulting. Ph.D. chemists and biochemists in academia have the opportunity both to teach and to pursue independent basic and applied research.

Graduate students work in close cooperation with faculty as they pursue their own thesis research projects. There are fascinating project opportunities available in the research groups within the department. Graduate courses are typically informal, and encourage small groups of students to discuss topics of current interest, in a supportive environment. The Department of Chemistry also hosts seminars throughout the year, bringing researchers from university and industrial laboratories in Winnipeg, across Canada, and abroad, to share their latest discoveries with students and faculty. The Armes Lectureship and Betts Lectureship programs provide for extended lecture series by world-renowned chemists, who are able to interact with faculty and graduate students during their visit to the department.

Graduates of the Chemistry M.Sc. and Ph.D. programs are currently employed in chemical companies, research institutes, government laboratories and agencies, and tenured academic positions. Some have even founded their own chemical companies! Alumni of the department's graduate program now work for companies such as Apotex Fermentation, Medisure, Novopharm Biotech, Philips Paints and Border Chemicals in Winnipeg, Biovail (Steinbach), Anormed (Richmond, BC), Allelix (Mississauga), Uniroyal (Guelph), and Genzyme (Cambridge MA). Several have undertaken additional training with prominent scientists at such places as the Scripps Institute, MIT, the Howard Hughes Medical Institute, and the universities of Alberta, British Columbia, Calgary, Montréal, Sherbrooke, and Toronto. Some have gone on to academic careers, at such universities as Alberta, Calgary, Cornell, Dalhousie, Guelph, Northern British Columbia, Queen's, Toronto, York, as well as Manitoba.

Fields of Research

Analytical Chemistry, Asymmetric Organic Synthesis, Biochemistry, Cell Biology, Chromatography, Environmental Chemistry, Inorganic Chemistry, Mass Spectrometry, Macromolecular Chemistry, Materials Science, Medicinal Chemistry, Natural Products Chemistry, NMR Spectroscopy, Organometallic Chemistry, Protein Structure and Dynamics, Synthetic Carbohydrate Chemistry, Theoretical Chemistry, Solid State Chemistry.

Research Facilities

The department has modern instrumentation and technical support for research and teaching. There is a full-time glassblower in the department who can produce specialized glassware as required. The University Libraries provide excellent on-line connections to scientific and medical databases and full-text access to major journals.

Computer facilities: campus-wide UNIX and NOVELL servers; Sunfire 6800 20-CPU high-performance computing installation; access to the Westgrid high-performance computing facilities; PC, Mac, UNIX and LINUX workstations in the department; a 14-node and 24-node Beowulf cluster constructed from 12 dual processor 2.8 GHz Xeon computers have been installed in the department.

NMR facilities: Bruker Avance300 and AMX 500 instruments, and a Varian INOVA 600 system; all are multi-nuclear and have pulsed field gradient capabilities; the AMX 500 and INOVA 600 are equipped for both liquid and solid-state work.

Mass Spectrometry: a two-sector high-resolution spectrometer with EI, CI and FAB sources, operational in positive and negative ion modes; a Quatro-LC triple quadrupole instrument equipped for electrospray ionization (ESI); a Bruker Biflex IV MALDI-TOF instrument for the analysis of large biomolecules; through the Physics department, Chemistry researchers have access to advanced experimental time-of-flight instruments.

Advanced Synthesis: A high throughput HPLC-MS-UV autopurification system (Waters) and a parallel organic synthesizer (quest).

The Ultra-Clean Trace Elements Laboratory (UCTEL): a metal-free class-1000 to Class 100 environment equipped with a PE Elan DRC II ICP-MS, a Waters non-metallic HPLC a CEM Mars V Microwave Digestion System, and a Tekran 2600 Mercury Analyzer.

Crystallography facilities: a high-resolution powder X-ray diffractometer with a high-temperature furnace. In addition the Department has access to single crystal diffractometers and cameras.

Thermal Analysis: a high-temperature thermal gravimetric/differential thermal analyzer (TGA/DTA) is available.

Spectroscopy facilities: a 15W argon laser with a 14018 double monochromator for Raman spectroscopy; a Fourier transform microwave spectrometer equipped with ion sources, Helmholtz coils and Stark plates.; an UV-Vis-NIR spectrophotometer (Varian Cary 5000), a coherent dye laser for intracavity photoacoustic spectroscopy; a Nicolet FT-IR system; a second Nicolet interferometer is equipped for solid-state FT-IR studies, and is also set up for Raman spectroscopy; a UV-vis diode array spectrophotometer; routine FT-IR and stopped flow equipment is also available.

Circular Dichroism Spectropolarimeter-Fluorometer: Our Jasco J-810 instrument is equipped with a computer-controlled Peltier device and circulating water bath for temperature control using both cylindrical and rectangular cells. The fluorescence accessory permits concurrent circular dichroism and fluorescence measurements between 163 and 900 nm.

Electrochemical facilities: a BAS 100A electrochemical workstation with rotating disk and controlled growth mercury drop electrode attachments; a CH Instruments 660 electrochemical workstation with a picoamp booster attachment for ultramicroelectrode measurements; a CH Instruments 400 electrochemical workstation with quartz crystal microbalance (QCM); a Solartron 1287 electrochemical interface and a 1255B frequency response analyzer for impedance measurements; and a Lecroy 9310A 400 MHz dual channel oscilloscope, a Stanford Research Systems SR560 amplifier and a Wavetek 182A function generator for fast scan cyclic voltammetry.

Surface and interfacial science facilities: a Kratos Axis Ultra high performance imaging x-ray photoelectron spectroscopy (XPS) instrument; a JEOL JAMP-9500F field emission Auger microprobe/scanning electron microscope (SEM); a JOEL JEM-2100F advanced field emission transmission electron microscope (TEM); a CAMECA IMS 7f magnetic sector secondary ion mass spectrometer (SIMS); a Digital Instruments Nanoscope IV with a Dimension 3100 SPM, a closed-loop SPM, a MultiMode SPM with multiple heads, a universal bipotentiostat, and an EnviroScope AFM; a ThermoNicolet Nexus 870 FT-IR with a polarization modulated infrared reflectance absorbance spectroscopy (PM-IRRAS) and attenuated total reflectance spectroscopy (ATR) modules; a Sentech SE400 ellipsometer; and a Ramé-Hart computerized contact angle goniometer.

Chromatography facilities: numerous HPLC systems; a preparative HPLC/MS system; a GPC system with light-scattering, refractive index, diode-array and electrochemical detectors.

Other equipment: A Differential Scanning Calorimeter with Intracooler and Ultramicrobalance (Perkin-Elmer DSC Diamond); a Spin Coater (Laurell Technologies); a Polarized Light Optical Microscope System with Heating/Cooling stage (Olympus/Linkam); a Dynamic Light Scattering Instrument for Particle Sizing (Microtrac Inc.); a Liquid Crystal Test-bed for testing electro-optical properties of LC-mixtures (LC Vision); a Pure-Water System; a Laminar Flow Clean-air workbench and an Ultrasonic Processor (Sonics).

Manitoba Chemical Analysis Lab (MCAL) A "state of art" chemical analysis facility (MCAL) is available in the Department of Chemistry. The laboratory offers a wide range of instrumentation for the analysis of biological, environmental and industrial samples. The facility is used for undergraduate used for undergraduate teaching laboratories and can be accessed by University researchers, graduate students and industry.

M.Sc. in Chemistry

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Potential M.Sc. students should explore the Chemistry Department website, prior to making formal application to the department of Chemistry. They are encouraged to submit the on-line information form found on the website. The following deadlines for receipt of complete application materials apply to potential students holding bachelors' degrees from Canadian and Non-Canadian universities.

Start Date	Canadian/U.S.	Non-Canadian	
Regular	(September)	June 1	March 1
Winter	(January)	October 1	July 1
Spring	(May)	February 1	November 1
Summer	(July)	April 1	January 1

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Colloquium: A weekly colloquium is given by members of staff, post-doctoral fellows, or invited lecturers. All graduate students and fourth-year Honours students are expected to attend the colloquia.

Second language reading requirement: none
Expected time to graduate: 2 years

Ph.D. in Chemistry

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Only students holding M.Sc. degrees from Canadian universities will be admitted directly into the Ph.D. program. Other students will be admitted as M.Sc. candidates, with the option to transfer into the Ph.D. program after 1 year of satisfactory studies.

Application Deadlines

Potential Ph.D. students should explore the Chemistry Department website, prior to making formal application to the department of Chemistry. They are encouraged to submit the on-line information form found on the website. The following deadlines for receipt of complete application materials apply to potential students holding bachelors' degrees from Canadian and Non-Canadian universities.

Start Date	Canadian	Non-Canadian	
Regular	(September)	June 1	March 1
Winter	(January)	October 1	July 1
Spring	(May)	February 1	November 1
Summer	(July)	April 1	January 1

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, a minimum of three years (including the year spent in M.Sc. work) is required for the Ph.D. degree. Actual time spent is usually somewhat longer.

Colloquium: A weekly colloquium is given by members of staff, post-doctoral fellows, or invited lecturers. All graduate students and fourth-year Honours students are expected to attend the colloquia.

Second language requirement: none
Expected time to graduation: 4-5 years (from 4 year B.Sc.); 3 years (from M.Sc.)

Course Descriptions

CHEM 7400 Topics in Biochemistry Cr.Hrs.3 (Formerly 002.740) A lecture and seminar course dealing with selected topics of current interest in biochemistry and molecular biology.

CHEM 7410 Spectroscopy and Molecular Structure Cr.Hrs.3 (Formerly 002.741) Applications of spectroscopic methods to chemical problems with emphasis on mass spectrometry and related techniques.

CHEM 7450 Topics in Organic Chemistry Cr.Hrs.3 (Formerly 002.745) A discussion of current and general topics related to novel and interesting areas of organic chemistry appearing in the current literature.

CHEM 7460 Topics in Synthetic Organic Chemistry Cr.Hrs.3 (Formerly 002.746) A course designed to acquaint students with specific methods of synthesis.

CHEM 7520 Topics in Physical Chemistry Cr.Hrs.3 (Formerly 002.752) The topics will vary, depending on student needs and interests; they may include, but will not be limited to the following: electrochemistry, surface chemistry, electrochemical kinetics, or other specialized topics not available in regular course offerings.

CHEM 7550 Design of Organic Synthesis Cr.Hrs.3 (Formerly 002.755) Conceptual methodology in the design of synthesis will be discussed with inclusion of computer-aided approaches. Examples from the current literature will be used to emphasize the conceptual aspects.

CHEM 7560 Organometallic Chemistry Cr.Hrs.3 (Formerly 002.756) Recent advances in synthetic and structural organometallic chemistry.

CHEM 7570 Recent Advances in Molecular Biochemistry Cr.Hrs.3 (Formerly 002.757) Selected topics from the recent literature on the structure and function of proteins and nucleic acids and their interactions.

CHEM 7580 Chemical Crystallography Cr.Hrs.3 (Formerly 002.758) Theory and practice of crystal structure analysis with emphasis on single crystal x-ray diffractometry; structure-activity relationships in small organic and inorganic compounds; introduction to protein and nucleic acid crystal structure analysis.

CHEM 7600 Topics in Inorganic Chemistry Cr.Hrs.3 (Formerly 002.760) Topics of current research interest in the area of inorganic chemistry including, but not limited to synthesis, structures, catalysis and reaction mechanisms.

CHEM 7700 Topics in Analytical Chemistry Cr.Hrs.3 (Formerly 002.770) Topics of current research interest in analytical chemistry including, but not limited to, mass spectrometry of large molecules, separation techniques, analysis of metals, surface analytical techniques, analysis of environmental samples, analysis of 'real' samples, and sampling techniques. *Prerequisites:* CHEM 4590 (or 002.347) or permission of instructor.

CHEM 7800 Topics in Theoretical Chemistry Cr.Hrs.3 (Formerly 002.780) Topics of current research interest in theoretical and computational chemistry from such areas as ab initio quantum chemistry, molecular simulations, nonlinear reaction dynamics, spectroscopy and statistical mechanics.

CHEM 7900 Seminar in Current Research Issues in Chemistry Cr.Hrs.3 Student-led seminars covering areas of interest to the faculty and students in the graduate Chemistry program, and current research issues in the field of Chemistry (including biochemistry, spectroscopy, organic chemistry, physical chemistry, organic synthesis, organometallic chemistry, inorganic chemistry, analytical chemistry and theoretical chemistry).

Section 12: City Planning

For information regarding programs offered by the following units:

Architecture

Design and Planning Ph.D.

Interior Design

Landscape Architecture

Please see the table of contents for page numbers.

Head and Graduate Chair: Milgrom, Richard

General Office: 201 Russell Building

Telephone: (204) 474 9458

Fax: (204) 474 7532

E-mail: cityplanning@umanitoba.ca

Website: umanitoba.ca/cityplanning

Academic Staff

Professor Emeritus

Carvalho, M., B.Arch. (Howard), M.C.P. (Pennsylvania), Ph.D. (Edinburgh), F.C.I.P.

Senior Scholar

Rotoff, B., B.Sc. (C.E.), M.C.P. (Manitoba), M.C.I.P.

Professors

Blake S., B.E.S. (Waterloo), M.Eng., D.Eng. (Tokyo), M.C.I.P.; **Bridgman, R.,** B.A., B.Music (Toronto), M.A., Ph.D. (York), M.C.I.P.; **Skelton, I.,** B.A., M.U.P., (McGill), Ph.D. (York), M.C.I.P.; **Witty, D.,** B.A. (Hons.), M.A. Urban & Reg. Plan. (Waterloo), Ph.D. (British Columbia), M.R.A.I.C., F.C.I.P.

Associate Professors

Milgrom, R., B.E.S. (Manitoba), M.Arch. (Pennsylvania), Ph.D. (York), M.A.A., M.C.I.P.; **van Vliet, D.,** B.A. (Fine Arts) (Saskatchewan), M.E.Des.

(Calgary), Ph.D. (UBC), M.C.I.P.; **Wight**, J. B., M.A. (Aberdeen), M.Sc. (Alberta), Ph.D. (Aberdeen), M.C.I.P.

Adjunct Professors

Carter, T., B.A. (Manitoba), M.A. (Saskatchewan), Ph.D. (Alberta); **Clayton**, A., B.Sc. (C.E.), M.Sc. (Saskatchewan), P.Eng.; **Couture**, G., B.E.S., M.C.P. (Manitoba), F.C.I.P.; **Distasio**, J., B.A. (Winnipeg), M.A., Ph.D. (Manitoba); **Dudley**, M., B.F.A. (Victoria), M.L.I.S. (Alberta), M.C.P. (Manitoba); **Elias**, A., B.A. (Victoria) M.B.A. (UBC) Ph.D (cand.UBC); **Johnson**, M., B.A. (Victoria), M.Sc. (London); **Leo** C., B.A. (Iowa), M.A., Ph.D. (Toronto); **Linton**, D., B.A.(Hons.) (Winnipeg), M.Arch. (Manitoba); **McFadyen**, L., B.H.Ec., M.C.P. (Manitoba), M.C.I.P.; **Platt**, J. B.A. (Manitoba), B.U.R.P. (Ryerson), Dip GISAP (Sanford Fleming), M.C.P. (Manitoba); **Sweatman**, E., B.A., M.C.P. (Manitoba); **Trottier**, J., B.Land.Arch. (Montreal), M.UrbanPlanning (McGill);

Program Information

The Department of City Planning is the oldest continuing planning school in Canada offering a program of studies leading to the Master of City Planning degree. The Program provides opportunities to develop and enhance skills, often in service learning situations involving local clients. Students come from varied academic backgrounds and the curriculum is structured to satisfy the requirements of professional accreditation and to foster expertise in selected fields of study. In collaboration with the Manitoba Professional Planners Institute, the program includes an internship of planning work. An optional mentoring program links the student with a volunteer from MPPI for discussions on career strategies or other matters.

The program is directed by four principles. The first, and the focus of the program, is the enhancement of the built and natural environments of cities and regions. The second principle, professionalism, is based on the understanding that students enter the program with the expectation of finding professional employment and of making their careers in planning or closely related fields. It leads to a focus on professional practice and responsibilities, and on the skills necessary to translate knowledge into effective action. The third principle is that planning is a multidimensional and multidisciplinary activity requiring highly transactive and collaborative outlooks and practices to advance strategies that are socially just and environmentally sustainable. The fourth principle is that scholarship constitutes a fundamental and lasting value for a planning career, and consequently there is emphasis on historical and theoretical aspects of development, research methods, clarity of critical thought and expression, and the relationships between planning thought and practice.

Fields of Research

Community development; community design and participatory methods
Gender issues in planning and design
Housing studies; homelessness; low-cost housing strategies
Planning practice; planning methods; integral praxis; placemaking
Planning with Aboriginal communities
Regional planning; city-regions; bioregionalism
Transportation planning
Urban ecology; sustainable planning; case studies of ecological innovation

Research Facilities

The Computer Aided Design Laboratory (CADLAB) is a major centre of research and hands on training offering cutting edge digital resources and an experienced complement of teaching and support staff. Extensive data bases provided by governmental and non-governmental sources are linked to GIS applications. The Architecture and Fine Arts Library, housed in the Russell Building, holds some 61,000 volumes dedicated to the planning, art and design disciplines represented in the University, including over 400 current periodicals. Over 100,000 35mm slides are available and electronic resources include networked bibliographic and full text resources. Studio space is provided in the Russell Building and Architecture 2, as well as occasionally on or near a study site.

Master of City Planning (M.C.P.)

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. For additional application procedures see the website.

The Department of City Planning allows students to begin their MCP program on either September 1st or, at the Department's discretion, January 1st.

For admission on these start dates, applications - with complete supporting documentation, should be sent to the Faculty of Graduate Studies by the following deadlines:

Start Date	Canadian/US	International
Regular - September	January 15th	December 1st
Winter - January	September 15th	n/a

Late applications may be considered if spaces become available after the main allocations.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar.

Degree Requirements:

Required Courses, 39 credit hours; Electives, 6 credit hours.

CITY 7030 Planning Theory 1 (3)

CITY 7350 Thesis/Practicum Preparation (0)

CITY 7410 Planning Design 1 (6)

CITY 7420 Planning Design 2 (6)

CITY 7460 Urban Ecology and Environmental Management (3)

OR

CITY 7070 Housing and Urban Revitalisation (3)

CITY 7310 Law and Local Government (3)

CITY 7340 Urban Development (3)

CITY 7470 Professional Planning Practice (3)

CITY 7430 Planning Design 3 (Urban Design) (6)

CITY 7440 Planning Design 4 (6)

GRAD 7000 Thesis (0)

OR

GRAD 7030 Practicum (0)

See website for elective courses currently offered by the department and any updated degree requirements. City Planning students detail their particular plans of study by choosing from the departmental offerings, from graduate courses within the Faculty in Architecture, Interior Design and Landscape Architecture, as well as from courses offered throughout the university.

Degree requirements: 45 credit hours total

Second language reading requirement: none

Expected time to graduation: two years

Course Descriptions

CITY 6010 Introduction to City Planning Cr.Hrs.6 (not offered this year) The historical, philosophical and ideological roots of Canadian city planning. Introduction to the basic tools of planning - land-use planning, the comprehensive plan, zoning and subdivision regulations. Discussions on the role of the planner. This course involves a field study visit of approximately one week's duration in another major centre.

CITY 7020 Planning Methods and Techniques II Cr.Hrs.3 A survey of quantitative and qualitative methods and techniques used in planning analysis and decision making including sampling survey, case study, contingency and spatial analysis as well as phenomenological and simulation techniques and methodologies.

CITY 7030 Planning Theory 1 Cr.Hrs.3 The principal ideas and ideals influencing planning thought and practice, ranging from rational comprehensive planning to theories of societal guidance, ethics and the human-environment interface.

CITY 7040 Planning Theory II Cr.Hrs.3 (not offered this year) Dominant influences in urban and regional planning thought in Canada. Topics covered include the Commission of Conservation, Public Health Legislation and the Urban Reform Movement.

CITY 7070 Housing and Urban Revitalization Cr.Hrs.3 Housing and urban revitalization in the Canadian context. Housing demand and supply, structure of the housing market, Canadian housing policy, affordability and other selected housing issues; processes and strategies related to urban decline and revitalization.

CITY 7080 Landscape and Conservation Cr.Hrs.3 (not offered this year) Applications of current theories in landscape ecology and conservation biology in the planning and management of public lands in urban and regional land use planning.

CITY 7160 Land Development Cr.Hrs.3 (not offered this year) Application of theories and techniques of urban land development, formulation of industrial policies and financial and political implications of land development.

CITY 7170 Transportation Cr.Hrs.3 (not offered this year) Transportation modes and systems: land, water, air. Traffic studies, planning principles, public issues and governmental policies.

CITY 7200 Urban Analysis Cr.Hrs.3 Theoretical framework for the dominant theories of urban structure, property and land-use relevant to city planning.

CITY 7270 Seminar in Regional Planning Cr.Hrs.3 (not offered this year) An explo-

ration of eco-regional planning drawing on concepts of city-states (or city-regions) and bioregionalism; including contemporary theme research, and a region-specific analysis to inform an understanding of regional planning's past, present and future.

CITY 7300 Urban Society Cr.Hrs.3 An interdisciplinary seminar on social policy and social planning in the contemporary urban setting. National, provincial and local contexts shaping the provision of welfare and well-being. Demonstration of selected social planning techniques. Application to current issues.

CITY 7310 Law and Local Government Cr.Hrs.3 Topics of common law, torts, real property, land use planning and control, expropriation, and local government, including some recent cases.

CITY 7340 Urban Development Cr.Hrs.3 The mechanics of urban development and its socio-economic implications and underlying political forces. Practical field experience is involved in the form of an internship.

CITY 7350 Thesis/Practicum Preparation Cr.Hrs.0 A preparatory course for students registered in thesis or practicum. Methods of constructing problems, formulating hypotheses, methods of investigation, sources of information, and appropriate form and content of thesis and/or practicum. This course is graded pass/fail.

CITY 7360 Development Process for Design Professions Cr.Hrs.3 (not offered this year) Introduction to the development process and method. Site selection and planning. Feasibility and case studies. The dynamics of development teams, including marketing strategies and management of completed projects. Joint public and private enterprises.

CITY 7370 Urban Design Cr.Hrs.3 (not offered this year) Theory and concepts of urban design from historical and contemporary perspectives. Urban design seen as (a) a multidisciplinary activity, (b) conscious three-dimensional design, and (c) process and public policy. Implementation and control techniques of urban design. Case studies.

CITY 7410 Planning Design 1 Cr.Hrs.6 Studio/workshop developing problem solving techniques and design skills in an area subject to environmental, social and economic change. Preparation of a planning report comprising of research and analysis, evaluation of feasible alternative strategies and designs, synthesis and recommenda-

tions for implementation. Case studies from planning journals and planning practice in cities and regions.

CITY 7420 Planning Design 2 Cr.Hrs.6 Studio/workshop building upon CITY 7410 as applied to an area of greater complexity, requiring the evaluation and integration of contributions from several planning-related disciplines. Selected projects emphasize both the multidisciplinary and interdisciplinary nature of planning, and in the resolutions of the problems posed. Case studies from planning journals and planning practice in cities and regions.

CITY 7430 Planning Design 3 (Urban Design) Cr.Hrs.6 The application of urban design theories and techniques to a large scale urban area of complex land uses and community development issues. The studio is also open to advanced students in architecture, landscape architecture and interior design and develops a broad approach to multi-disciplinary problem-solving design solutions.

CITY 7440 Planning Design 4 Cr.Hrs.6 Advanced planning design studio/workshop, experimental and innovative in approach and content, involving special techniques and skills. Studio may also be off-campus and/or focused on a special topic centered around a distinguished guest expert.

CITY 7450 Concepts in Sustainable Planning and Design Cr.Hrs.3 (not offered this year) Examination of the concepts and theories involved in the development of sustainability as a force in socio-economic and environmental decision-making. Explores the implications of sustainability for contemporary design and planning thought and practice.

CITY 7460 Urban Ecology and Environmental Management Cr.Hrs.3 Theoretical frameworks and theories in urban ecology and environmental management as they apply to municipal institutional frameworks and the role of environmental planning in urban and regional government.

CITY 7470 Professional Planning Practice Cr.Hrs.3 An examination of the professional practice and praxis of planning, presented in collaboration with the Manitoba Association of the Canadian Institute of Planners, emphasizing the practice aspects of planning processes, and the political, institutional and legal systems that direct and/or inform planning.

Section 13: Civil Engineering

Head: Dr. Peter Rasmussen, P.Eng. (204) 474-8212

Assoc. Head: Dr. James Blatz, P.Eng. (204) 474-9816

Admin. Assist: Donna Parkhurst (204) 474-8212

General Office: E1 - 386 Engineering
(204) 474-8596

(204) 474-7513 (fax)

Graduate Program Assistant: (204) 474-8596

E-mail: wenzoski@cc.umanitoba.ca

Website: umanitoba.ca/civil

Academic Staff

Professors Emeriti

Baracos, A., M.Sc.(C.E.) (Alberta), M.E.I.C., P.Eng.; **Graham, J.**, B.Sc.(C.E.), Ph.D., D.Sc. (Belfast), P.Eng.; **Lajtai, E.Z.**, B.A.Sc.(Geol.), M.A.Sc., Ph.D. (Toronto), P.Eng.; **Morris, G.A.**, M.Sc. (Manitoba), Ph.D. (Illinois), M.E.I.C., P.Eng.

Professors

Britton, M.G., B.E. (Saskatchewan), M.Sc. (Manitoba), Ph.D. (Texas A. & M.), P.Eng.; **Clayton, A.**, B.Sc.(C.E.), M.Sc. (Saskatchewan), P.Eng.; **Doering, J.C.**, B.Sc.(Hons.) (Queen's), Ph.D. (Dalhousie), P.Eng.; **Mufti, A.A.**, B.Eng. (Karachi), M.Eng., Ph.D. (McGill), P.Eng.; **Oleszkiewicz, J.A.**, M.Sc. (Wroclaw), M.Sc., Ph.D. (Vanderbilt), P.Eng.; **Polyzois, D.**, B.A.Sc., M.A.Sc., Ph.D.(C.E.) (Toronto), P.Eng.; **Rasmussen, P.F.**, M.Sc., Ph.D. (Denmark), P.Eng.; **Shah, A.H.**, B.E. (Poona), M.Sc. (Stanford), Ph.D. (Berkeley), P.Eng.; **Woodbury, A.D.**, B.Sc.(Geophys.), M.Sc. (Geol.), Ph.D. (UBC), P.Eng.

Associate Professors

Alfaro, M., B.Sc. (Philippines), M.Eng. (Thailand), Ph.D. (Saga, Japan), P.Eng.; **Blatz, J.A.**, B.Sc.(C.E.), Ph.D. (Manitoba), P.Eng.; **El-Salakawy, E.**, B.Sc. (CE), M.Sc. (Menoufia), Ph.D. (Menoufia/Waterloo), P.Eng.; **Gorczyca, B.**, M.Sc. (Poland), M.Sc., Ph.D. (Toronto), P.Eng.; **Montufar, I.J.**, B.Sc. (C.E.), M.Sc., Ph.D. (Manitoba), P.Eng.; **Rattanawangcharoen, N.**, B.Eng. (Chiang Mai), M.Sc. (Asian Inst. of Tech.), Ph.D. (Manitoba), P.Eng.; **Shalaby, A.**, B.Sc.(C.E.), M.Sc. (Cairo), Ph.D. (Carleton), P.Eng.; **Svecova, D.**, M.Sc. (Slovakia) M.Sc., Ph.D. (Carleton), P.Eng.

Assistant Professors

Clark, S.P., B.Sc. (C.E.), Ph.D. (Manitoba); **Stadnyk, T.A.** B.A. Sc. (C.E.) Ph.D., Waterloo, E.I.T. (Manitoba)

Senior Instructors

Frye, M.J., B.Sc., M.Sc., Ph.D. (Manitoba), P.Eng.

Adjunct Professors

Bakht, B., B.Sc. (India), M.Sc. (England), D.I.C. (Imperial Coll.), D. Sc. (London Coll.), P. Eng.; **Carson, R.**, B.Sc. M.Sc. (Manitoba); **Chandler, N.A.**, B.Sc., M.Sc., Ph.D. (Manitoba), P. Eng.; **El-Gohary, N.**, B.Sc. (Cairo), M.Sc. (Cairo), Ph.D. (Toronto); **Ferguson, G.**, B.Sc., Honours Geology (Waterloo), Ph.D., Civil Engineering (Manitoba); **Gheorghiu, C.**, PhD. (CE) Sherbrooke, MSc., (CE) Tokyo, Japan, BSc. (CE) Romania; **McCartney, D.M.**, B.Sc. (G.E.), M.Sc., Ph.D. (CE), (Manitoba); **Middleton, D.**, B.S., M.S. (Tennessee), Ph.D. (CE) (Texas A&M); **Newhook, J.**, BSc., (CE) (Nova Scotia) MSc., (Nova Scotia), PhD, (India); **Panu, U.**, B.Sc. (India), M.Sc., (Guelph), Ph.D. (Waterloo) P. Eng., (Ohio); **Snelgrove, K.**, B.Eng. (Memorial), M.A.Sc., Ph.D. (Waterloo), P. Eng.; **Stimpson, B.**, BSc. MSc, PhD., London England; **VanGulck, J.**, M.Sc. (W Ontario) PhD, (Queen's); **West, M.**, B. Arch. (New York), M. Arch. (Carleton);

Program Information

The Department of Civil Engineering offers programs of coursework and research leading to the Master of Science, Master of Engineering and Doctor of Philosophy in: environmental engineering; geotechnical engineering; structural engineering; transportation engineering and water resources engineering.

Research Facilities

Environmental Engineering Equipment and Facilities: The environmental engineering program and laboratory offer the latest in instruction and facilities for studying the physico-chemical and biological transformation of pollutants in water, wastewater and solid waste. In particular, the program aims at developing the principles of reactor and process engineering for the treatment of water, industrial and municipal wastewater and solid waste. State-of-the-art analytical equipment includes high performance liquid chromatographs with a variety of detectors, gas chromatographs, automated ion analyzers, atomic absorption spectrophotometer, carbon analyzer, microbial toxicity analyzer and others. Spacious laboratories allow for bench scale testing of various process conditions in four controlled temperature environmental chambers. Present research interests include biological nutrient removal, volatile acids fermentation, solid stream processing through aerobic and anaerobic digestion, co-digestion and co-composting of municipal and industrial solid waste, biodegradation of hazardous pollutants, treatment in cold climates, pesticide waste treatment; surface and

groundwater treatment processes, and upgrading of municipal and industrial treatment plants.

Geotechnical, Hydrogeology and Geoenvironmental Engineering Equipment and Facilities: Equipment in the geotechnical laboratories reflects the research interests of the department's staff in the engineering behaviour of a wide range of naturally occurring materials. In addition to the normal range of consolidation, direct shear and triaxial shear test facilities, specialized facilities have been provided for studies on swelling clays, at high pressures and temperatures, granular soils, and hard crystalline rocks.

The clay testing program involves stress-controlled tests to investigate the distinction between yielding and rupture in carefully sampled natural clays, and the effects of load duration and temperature on soil behaviour. Applications include estimating settlements of foundations, embankments, and tanks and the stability of slopes and excavation. Additional work involves the development of appropriate constitutive models for soil behaviour, and the measurement of hydraulic conductivities for retention structures.

An environmental chamber permits testing of soil samples under freezing conditions. A well-equipped geotechnical computing laboratory provides support for numerical analysis in soil mechanics, rock mechanics and hydrogeology. It also supports data presentation and report preparation in experimental programs. In rock mechanics, equipment is available for performing tests for Brazilian tension, flexure, uniaxial compression, triaxial compression, static fatigue, creep in both tension and compression, and the double torsion test used in fracture mechanics. Present research interests concentrate on the relationship between crack growth, stress level and time, with special emphasis on microstructural processes in the rock.

The geoenvironmental engineering laboratory has the equipment to characterize landfill construction materials, leachates, and hazardous wastes. Current research focuses on hazardous waste containment, soil bioremediation, and aerobic composting.

The focus of the hydrogeology research efforts is directed towards modelling and simulation of groundwater and contaminant transport. Resources are also directed at sustainable aquifer development within the Manitoba environs.

With current developments in computer technology and its associated impacts on geotechnical engineering, the University of Manitoba has kept up by providing graduate students in geotechnical engineering with state-of-the-art computer facilities. The geotechnology computer facility at the University of Manitoba has 8 personal computers, 3 SPARC workstations, all connected on a local area network with T1 Internet access 24 hours a day.

Structural Engineering Equipment and Facilities: The research facilities include concrete, structural, and materials laboratories covering approximately 7500 sq. ft. A Structural Engineering and Construction Research and Development Facility adds 2500 sq. ft. and includes a 23-ton overhead crane, as well as a 1,200,000-lb.-capacity MTS servo-controlled loading system. The new facilities enable the testing of full-scale specimens. Also in the structural laboratory are a 600,000-lb. Baldwin testing machine, a 60,000-lb. Riehle testing machine and a 30,000-lb. Baldwin testing machine. A number of jacks and loading frames are also available which can be attached to two strong floors and allow a wide range of loading assemblages to be set up easily. The laboratory also houses an MTS servo-controlled loading system, with a 220,000-lb. test frame and one fixed and one portable actuator, which can be used for programmed cyclic and fatigue testing. The materials laboratory contains an environmental cabinet and a freeze/thaw cabinet which are used to study the behaviour of materials under a wide range of temperatures and humidity. Three high-speed computer-controlled data acquisition systems are available for both laboratory and field testing.

Theoretical and Applied Mechanics Equipment and Facilities: Research Facilities in Theoretical and Applied Mechanics include several workstations and a variety of engineering analysis software. Current research is directed toward investigation of non-destructive evaluation of flaws in plate and shell structures, dynamics of electrical transmission lines and communication towers; finite and boundary element analysis, and mechanics of piezo ceramics, shape memory alloys and smart structures.

Water Resources Engineering Equipment and Facilities: The Hydraulics Research and Testing Facility (HRTF) has an area of 780 sq m and supports both physical and numerical modelling in hydraulics. The physical modelling laboratory houses a constant-head tank (500 l/s capacity), a 15 m variable slope flume, a 14 m hydraulic model flume, and a 34 m random wave

flume. Floor space is available for the study of hydraulic structures and river models. The facility is also equipped with a range of modern instrumentation including acoustic Doppler velocimeters (3 component), hot-wire probes, servo-motor positioning systems, electronic discharge monitoring with inline volumetric tanks for calibration, and high speed data acquisition equipment. All of the computers in the physical modelling laboratory are networked to the facility's computer lab. A counter-rotating flume and cold room (to -30 C) are used to study hydraulics of frazil and anchor ice. A digital image acquisition and processing system complement the facility's ice research equipment. The HRTF computer laboratory has a number of high-end Pentium based PCs for numerical modelling. Software is available for 2D finite-element modelling of rivers and lakes, sediment transport modelling, and 2D modelling of wind generated wave fields.

The Hydrologic Processes Laboratory (HPL) supports research dealing with the management and analysis of spatially distributed in situ and remotely sensed data, for solving complex, large-scale problems of hydrology. The facility has several PC machines linked to a main UNIX workstation. A wide variety of software is available within HPL, including ARC/INFO, Arcview and other GIS, as well as ENVI software for processing remotely sensed data. The emphasis of research carried out in the facility is in distributed hydrological modelling, operational hydrology, and environmental monitoring using remotely sensed data.

M.Sc. in Civil Engineering

Admission

For admission into the Master of Science program, applicants are required to hold a bachelor's degree in Civil Engineering from a recognized university. Applicants with other engineering degrees or with honours degrees in related areas may also be accepted at the discretion of the department head and the dean of the Faculty of Graduate Studies. In certain cases acceptance may initially be limited to pre-Master's study. Please contact the Department for details.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 4 months prior to their intended start date. International students should submit their application and supporting documentation to the Department of Civil Engineering at least 7 months prior to their intended start date.

Program Requirements

The Master of Science degree is attainable only through coursework and thesis. Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. M.Sc. students are required to spend at least one academic session in full-time resident graduate study. On recommendation of the department and the Faculty Graduate Committee, the residence requirement may be waived in special cases.

A minimum of 18 credit hours of coursework is required with at least 12 credit hours at the 7000 level. The coursework program would normally include 6 credit hours of ancillary courses from other than the candidate's discipline. These ancillary courses could include courses from the department or courses from another department, normally at the 4000 level. Depending upon the student's background, the student's advisor may require the student to take 3000 level or additional 4000 level (and in exceptional circumstances, 2000 level) courses in major or ancillary fields of study which would not count towards the minimum 18-credit hour requirement. The candidate is required to make an oral presentation on the completed M.Sc. thesis to the Examining Committee, and to pass an oral examination.

The maximum time allowed for the completion of the Master's degree is 5 years.

Second language reading requirement: none

Expected time to graduate: two years

M.Eng. in Civil Engineering

The Master of Engineering (M.Eng.) program provides an industrially oriented program for practicing engineers who wish to continue their studies on a broad base. The program also facilitates continuing education for credit.

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Department of Civil Engineering at least 4 months prior to their intended start date. International students should submit their application and supporting documentation to the Department of Civil Engineering at least 7 months prior to their intended start date.

Program Requirements

It is desirable that full-time students have one or two years of engineering experience. The minimum requirement for the award of the Master of Engineering degree is 30 credit hours. The degree can be obtained through two different options:

Option 1

Coursework Alone/Comprehensive Examination

The minimum requirement of 30 credit hours can be met by coursework alone with at least 18 credit hours at the 7000 level. The program should include 6 credit hours of ancillary coursework from other than the candidate's discipline. These ancillary courses could include courses from the department or courses from another department, normally at the 4000 level. Depending upon the student's background, the student's advisor may require the student to take 3000 level or additional 4000 level (and in exceptional circumstances, 2000 level) courses in his/her major or ancillary field of study which would not count towards the minimum 30-credit-hour requirement.

Students must pass a Comprehensive Examination (GRAD 7010).

Option 2

Coursework and Project and Report

The minimum requirement of 30 credit hours can be met by a combination of coursework and an engineering report, with at least 12 credit hours at the 7000 level. Of the 30 credit hours, 6 credit hours will be assigned to an approved project and report. The program should include 6 credit hours of ancillary coursework from other than the candidate's discipline.

These ancillary courses could include courses at the 4000 level from the Department of Civil Engineering or from another department, normally at the 4000 level. Depending upon the student's background, the student's advisor may require the student to take 3000-level or additional 4000 level (and in exceptional circumstances, 2000 level) courses in the major or ancillary field of study which would not count towards the minimum 30-credit-hour course requirement.

The candidate is required to give an oral presentation on the project at about the time the report is submitted.

Second language requirement: none

Expected time to graduation: Two years

Ph.D. in Civil Engineering

Admission

Admission to the Ph.D. program is normally from the Master's degree level, i.e., M.Eng. or M.Sc. Students making exceptional progress while enrolled in either the M.Eng. or M.Sc. program may be transferred to the Ph.D. program by the dean of the Faculty of Graduate Studies upon the recommendation of the department head based on recommendations from the student's advisor and an appointed Selection Committee. In such cases, the program credit-hour requirements shall be decided in conjunction with the transfer.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 4 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. The Ph.D. program consists of coursework, original research and thesis. Normally, 12 credit hours of coursework (all at the 700/7000 level) are required beyond the Master's degree or its equivalent. The minimum time requirement is two calendar years of full-time study and research, of which at least one academic year must be spent on campus. For research projects

conducted off-campus, the student must be geographically proximate to the campus and visit it regularly.

Second language requirement: none

Expected time to graduation: Four years

Course Descriptions

CIVL 7010 Modern Railway Engineering Cr.Hrs.3 (Formerly 023.701) A course in aspects of the design, construction, and operation of modern railways, examining main lines, branch lines, and terminals.

CIVL 7040 Analysis and Design of Freight Transport Systems Cr.Hrs.3 (Formerly 023.704) Overview of the structure and organization of Canada's freight transport system; measurement, analysis and forecasting of freight movements; transportation system performance; operating, service and cost characteristics of freight transport systems; design considerations for freight handling facilities; case studies in analysis and design of freight transport systems. *Prerequisite:* CIVL 4840 (or 023.484) or permission of the instructor for non-engineering students specializing in transport studies.

CIVL 7050 Transportation Engineering in Developing Regions Cr.Hrs.3 (Formerly 023.705) Aspects of transportation in developing regions that differ significantly from those of conventional North American practice. Factors and assumptions in developing region context; analysis and design of surface transportation systems and components in developing regions; special aspects of professional practice; case studies from Third World and northern Canada.

CIVL 7060 Analysis and Design of Passenger Transport Systems Cr.Hrs.3 (Formerly 023.706) Passenger travel forecasting principles and techniques; demand models; passenger transportation system performance; vehicle cycles; cost functions; congestion; evaluation; examination of case studies.

CIVL 7090 Water Resources Systems Cr.Hrs.3 (Formerly 023.709) The application of operations research/systems analysis techniques to water resources and urban and environmental systems. *Prerequisite:* permission of instructor.

CIVL 7100 Prestressed Concrete Cr.Hrs.3 (Formerly 023.710) A study of the analysis and design of prestressed concrete structures; pre-tensioning; post-tensioning; importance of material properties; modern design specifications.

CIVL 7140 Structural Masonry Cr.Hrs.3 (Formerly 023.714) Masonry materials, properties and behaviour. Plain and reinforced masonry, axial load, flexure, combined loading. Design methods, building code developments, building design.

CIVL 7150 Deformation and Fracture of Rocks Cr.Hrs.3 (Formerly 023.715) Physical properties of rock and rock masses. Mechanism of deformation and fracture at the microscopic, laboratory and field scales of investigation. The measurements of strength and deformation in the laboratory and the field. Time dependent deformation: creep and static fatigue.

CIVL 7170 Modelling of Surface Water Quality Development Cr.Hrs.3 (Formerly 023.717) Application of water quality models for lakes, rivers, estuaries and reservoirs. Derivation of differential equations of pollutant transport; kinetic relationships for physical and chemical transformation of substances; numerical and analytical solutions to transport equations; and calibration and verification of models.

CIVL 7190 Solid Mechanics Cr.Hrs.3 (Formerly 023.719) Cartesian Tensors, analysis of stress and strain, constitutive relations, formulation and solution of problems in 2-D and 3-D elasticity, Hankel integral transforms, plasticity; yield surface and criteria, flow rule, plastic potential, hardening, viscoelasticity; creep, relaxation, basic viscoelastic models, stress-strain relations, correspondence principle.

CIVL 7200 Topics in Environmental Engineering Cr.Hrs.3 (Formerly 023.720) Includes topics such as energy and the environment, solid waste management, and environmental problems in transport. Topics are studied through case histories of contemporary issues.

CIVL 7210 Solid Waste Composting and Disposal Cr.Hrs.3 (Formerly 023.721) Advanced engineering principles related to resource recovery and solid waste disposal. Biological conversion technologies and the disposal of solid wastes are discussed in detail.

CIVL 7260 Behaviour of Reinforced Concrete Members Cr.Hrs.3 (Formerly 023.726) Study of the actual behaviour and strength of reinforced concrete members; examination of recent significant publications, correlation to research with current design specifications and codes.

CIVL 7270 Boundary Element Method Cr.Hrs.3 (Formerly 023.727) Review of approximate methods, direct boundary element formulations, fundamental solutions, computer implementation of fictitious stress and displacement discontinuity methods, applications in stress analysis, geomechanics, fracture mechanics and fluid mechanics.

CIVL 7280 Intelligent Decision Support in Water Resources Cr.Hrs.3 (Formerly 023.728) Decision support systems; basic concepts of artificial intelligence and expert systems in water resources; theory, software and testing examples for intelligent decision support systems in water resources. *Prerequisite:* CIVL 2780 (or 023.278), CIVL 7090 (or 023.709) and/or permission of instructor.

CIVL 7320 Topics in Groundwater Hydrology Cr.Hrs.3 (Formerly 023.732) A review of pertinent literature; current issues in groundwater hydrology.

CIVL 7350 Topics in Advanced Structural Engineering Cr.Hrs.3 (Formerly 023.735) Lectures and seminars on selected advanced topics in structural engineering; current problems; implications on current research.

CIVL 7360 Landslides and Slope Failures: Identification, Causes, and Control

Cr.Hrs.3 (Formerly 023.736) Slope movement types and processes in soil and rock masses; recognition and identification: factors influencing stability; field investigation and instrumentation; strength properties and their measurement; stability analysis; assessment of hazard and risk analysis; stability in open pit mining; remedial measures including stabilization, protection, and warning.

CIVL 7380 Case Studies in Soils Engineering Cr.Hrs.3 (Formerly 023.738) Geomorphic regions and soil types in Canada related to engineering performance; case studies of foundations, excavations, tunnels, earth and rockfill dams; retaining structures, and geoenvironmental projects using a seminar approach; cold regions engineering geosynthetics. Examples will be taken from published records of the performance of construction projects in Canada.

CIVL 7400 Finite Element Method in Engineering Mechanics Cr.Hrs.3 (Formerly 023.740) Review of flexibility and stiffness methods; concept of finite elements and energy formulations; various shape functions; solutions of planar and three-dimensional elasticity problems; beams, plates and shells; special problems, e.g., seepage, non-linear material.

CIVL 7420 Advanced Methods of Structural Analysis Cr.Hrs.3 (Formerly 023.742) Review of matrix algebra; efficient solution of large sets of equations; vector and matrix transformations; force-displacement relationships; the direct stiffness method; the flexibility method; non-linear structural analysis; special topics.

CIVL 7430 Special Topics in Geotechnical Engineering Cr.Hrs.3 (Formerly 023.743) A tutorial approach to the study of topics in soil, rock and ice engineering not covered in the formal coursework.

CIVL 7450 Soil Properties and Behaviour Cr.Hrs.3 (Formerly 023.745) Testing methods for strength, compressibility and hydraulic conductivity of engineering soils; traditional models for soil characterization; introduction to hypoelastic and elastic plastic modelling; extension of models to account for strain-rate, temperature, and unsaturation; influence of soil chemistry; relationship between laboratory results and computational needs.

CIVL 7460 Geotechnical Design with Geosynthetics Cr.Hrs.3 (Formerly 023.746) Properties and test methods of geosynthetics (i.e., geotextiles, geogrids, geomembranes, geonets and geocomposites); functions of geosynthetics (separation, reinforcement, filtration, drainage and containment); design of reinforced soil structures (retaining walls, slopes, embankments and unpaved roads); design of filtration and drainage works; design of lined waste containment facilities; case histories.

CIVL 7480 Soils Engineering Cr.Hrs.3 (Formerly 023.748) Analysis and design for construction in engineering soils: review of soil strength and compressibility, site characterization, stability and settlements of shallow foundations, deep foundations, earth retaining structures, slope design and remediation, earth dams. Emphasis will be placed on published records comparing predictions with field performance.

CIVL 7490 Rock Engineering Cr.Hrs.3 (Formerly 023.749) Review of strength of intact and discontinuous rock masses; energy changes due to excavation; weathering and residual materials; site investigations; rock mass classifications; blasting; rock slopes, surface subsidence due to underground excavation or natural phenomena; rock cuts and support; structural foundations on rock; field instrumentation.

CIVL 7530 Environmental Geotechnology Cr.Hrs.3 (Formerly 023.753) Application of geotechnical engineering solutions to environmental problems. Physical-chemical principles of clays, clay mineralogy; influence of pore fluid chemistry; engineering behaviour of compacted clay soils; coupled fluid flow; geotechnical aspects of waste disposal/storage; design, construction and maintenance of tailing dams, ponds, sewage lagoons and landfills.

CIVL 7600 Water Quality Management Cr.Hrs.3 (Formerly 023.760) Water quality modelling: management options for water quality planning; treatment options and management schemes.

CIVL 7610 Special Topics in Theoretical and Applied Mechanics Cr.Hrs.3 (Formerly 023.761) Lectures and seminar on selected advanced topics in the field of mechanics; current problems and research.

CIVL 7650 Selected Topics in Water-Resources Development Cr.Hrs.3 (Formerly 023.765) Lectures and seminars on selected advanced topics in water-resources engineering.

CIVL 7660 River Engineering Cr.Hrs.3 (Formerly 023.766) Classification of rivers; regime of river channels; channel patterns, sediment transport; design of stable channels; engineering interference (diversions, dams, dredging); river training works; hydraulic-model studies of rivers.

CIVL 7680 Soil/Ground Improvement Techniques Cr.Hrs.3 (Formerly 023.768) Analysis and design of mechanical and chemical treatment techniques commonly applied to problem foundation soils for civil engineering structures. Mechanical modification; hydraulic modification; modification by admixtures; modification by reinforcement and confinement; in-situ evaluation of soil improvement and monitoring.

CIVL 7700 Water Resources Planning Cr.Hrs.3 (Formerly 023.770) Principles and methodologies of planning water resources development projects. An evaluation of a major multi-purpose project from inter-disciplinary viewpoints, incorporating those of designers, planners, critics and political decision makers. Offered in alternate years.

CIVL 7710 Coastal Hydraulics Cr.Hrs.3 (Formerly 023.771) Mechanics of wave motion; wave and water level predictions; types and design of coastal protection; littoral processes.

CIVL 7720 Groundwater and Solute Transport Modelling Cr.Hrs.3 (Formerly 023.772) The physics and numerical solution of mathematical models of steady-state and transient groundwater flow and mass transport in the saturated and unsaturated zones; introduction to the finite difference and finite element methods; popular software; other modelling techniques, including random-walk particle methods; modelling groundwater contamination; non-linear problems; applications to regional

groundwater flow and groundwater recharge, aquifer resource evaluations, contamination prediction.

CIVL 7730 Groundwater Engineering Cr.Hrs.3 (Formerly 023.773) The role of geology and hydrogeology in the siting, design of engineering structures; synthesis of groundwater mechanics in various geologic environments; case studies in construction dewatering, groundwater resource evaluation, subsidence, seepage in dams and foundations and slope stability; basic review of analytic solutions and numerical methods.

CIVL 7740 Special Topics in Hydrology Cr.Hrs.3 (Formerly 023.774) Selected topics examining the statistical aspects of hydrology. Time series analysis; disaggregation processes; flood frequency analysis; analysis of extremes.

CIVL 7750 Advanced Civil Engineering Systems Cr.Hrs.3 (Formerly 023.775) Optimization of Civil Engineering Systems. Use of linear and dynamic programming and network theory in all aspects of civil engineering. Introduction to the use of stochastic processes in operations research. Particular emphasis is given to water resources and environmental and transportation engineering.

CIVL 7770 Hydrological Processes Cr.Hrs.3 (Formerly 023.777) Runoff generation and runoff modelling; scale effects in hydrology; ramifications of distributed and lumped approaches; computer models of watershed modelling; optimization schemes and minimization functions; special concerns dealing with digital elevation models.

CIVL 7780 Advanced Behaviour and Design of Steel Structures Cr.Hrs.3 (Formerly 023.778) Behaviour and design of welded thin-walled members; plate girders, composite construction, beam-columns, and connections. Special topics such as stability of metal structures and bracing requirements are also covered.

CIVL 7790 Pavement Evaluation and Performance Cr.Hrs.3 (Formerly 023.779) Pavement classification, pavement management, performance measures, condition surveys, sensor technology, material sampling, test methods on asphalt binders and unbound layers, non-destructive testing, sources of variability, pavement maintenance, rehabilitation, long-term performance.

CIVL 7800 Design of Light Industrial Steel Buildings Cr.Hrs.3 (Formerly 023.780) Design criteria for metal building systems; behaviour and design of tapered and prismatic built-up columns and girders; design of gable frames; behaviour and design of cold-formed members; bracing requirements for metal buildings and design of connections.

CIVL 7820 Operational Hydrology Cr.Hrs.3 (Formerly 023.782) Hydrographic analysis; relation between the physical processes and the hydrograph; estimation and prediction. Floods; statistical analysis; maximum probable floods. Water supply; estimates of dependable flow, simulation, synthetic flow series, statistical analysis.

CIVL 7840 Traffic Systems Analysis Cr.Hrs.3 (Formerly 023.784) Mathematical theories of traffic flow, introductory queueing theory with application to traffic performance at intersections; travel forecasting principles and techniques; the use of simulation in traffic engineering design.

CIVL 7860 Structural Stability Cr.Hrs.3 (Formerly 023.786) Elastic and inelastic stability of columns and frames; equilibrium, energy and dynamic methods of analysis, approximate solutions; beam-columns; torsional instability of thin plates.

CIVL 7870 Advanced Engineering Analysis Cr.Hrs.3 (Formerly 023.787) Analytical techniques used in engineering, including such topics as the application of complex variables, partial differential equations, generated Fourier series, integral transforms, and special functions, to advanced problems in civil engineering.

CIVL 7880 Continuum Mechanics Cr.Hrs.3 (Formerly 023.788) Selected topics in non-linear mechanics (e.g., generalized tensors, viscoelastic constitutive equation, strain gradient, micropolar theories of elasticity; coupled mechanical and thermal or electromagnetic phenomena, continuum thermodynamics, waves, surfaces of discontinuities).

CIVL 7910 Sanitary Chemistry Cr.Hrs.3 (Formerly 023.791) Physical, inorganic, and organic chemistry topics as related to water and waste handling and treating.

CIVL 7920 Theory of Water Treatment Cr.Hrs.3 (Formerly 023.792) Physical and chemical characteristics of water; water treatment processes including coagulation/flocculation, sedimentation, filtration, softening, adsorption, ion exchange, disinfection, and membrane processes.

CIVL 7930 Theory of Waste Treatment Cr.Hrs.3 (Formerly 023.793) Characteristics of waste-specific and generic determinations; unit operations and unit process for physical, chemical and biological treatment and transformation of particulate and dissolved contaminants. Biochemical transformations and degradation of hazardous pollutants; unit processes for enhanced nutrient removal and hazardous waste treatment. Full treatment trains for industrial and municipal waste treatment, including solids handling. *Prerequisite:* CIVL 3700 (or 023.370) and CIVL 3690 (or 023.369) or permission of instructor.

CIVL 7950 Environmental Engineering Laboratory Cr.Hrs.3 (Formerly 023.795) Laboratory work in water and wastewater analysis and treatment processes related to water quality management. *Prerequisites:* CIVL 7930 (or 023.793) and CIVL 7920 (or 023.792).

CIVL 7960 Environmental Engineering Design Cr.Hrs.3 (Formerly 023.796) Design of unit operations. Planning, cost effectiveness analysis, and conceptual design of a whole wastewater treatment plant. *Prerequisites:* CIVL 7930 (or 023.793).

CIVL 7970 Water Resources Project Design Cr.Hrs.3 (Formerly 023.797) Planning and studies and preliminary design of a number of hydraulic structures such as large storage dams with appurtenant works, river diversion works for flood control, hydro-electrical plants, conveyance canals, and irrigation distribution works.

CIVL 7990 Special Topics in Transportation Cr.Hrs.3 (Formerly 023.799) Lectures and seminars on selected topics in transportation not covered in the formal coursework.

Section 14: Classics

General Office: 364 University College

Telephone: (204) 474-9502

Fax: (204) 474-7684

E-mail: classics@umanitoba.ca

Website: umanitoba.ca/classics/

Head and Graduate Chair: Mark Joyal

Academic Staff: umanitoba.ca/classics/staff/

Professors

Egan, R.B., B.A. (Assumption), M.A. (Western Ontario), Ph.D. (Southern California); Joyal, M., B.A. (Manitoba), Ph.D. (St. Andrews), Stirling, L.M., B.A. (Hons.) (Alberta), M.A., M.A., Ph.D. (Michigan).

Associate Professors

Lawall, M., B.A. (William & Mary), M.A., Ph.D. (Michigan).

Assistant Professors

Chlup, J.T., B.A.(Hons.) (New Brunswick), M.A. (Dalhousie), Ph.D. (Durham);

Program Information

The department provides programs of study leading to the degree of Master of Arts in several areas of classical studies that include Greek and Roman art and archaeology, Greek and Roman history and historiography, and Greek and Latin languages and literatures. The department attempts, within the range of expertise of its personnel, to tailor the M.A. program to the particular interests and needs of the individual student. In many instances the M.A. is planned as a preparation for admission to a Ph.D. program in another university. In the past students have had good success in proceeding to doctoral programs in leading North American and British universities.

Fields of Research

- Greek and Roman art history and archaeology, with particular strengths in Roman North Africa, Greek ceramics and Late Antique sculpture
- Greek literature, especially lyric and dramatic poetry, philosophical literature and Hellenistic poetry and prose
- Greek language: history and lexicology
- Latin literature, especially epic and dramatic poetry
- Greek and Roman historiography
- Greek and Roman economic history
- Greek thought and intellectual history

Research Facilities

The university library's holdings are supplemented locally by those of the University of Winnipeg. Both institutions have collected classical monographs and periodicals for over a century. Together they maintain subscriptions to a respectable number of current periodicals representing all fields of classical studies. Through the library, students have electronic access to an ever-increasing list of materials such as the *Patrologia Latina*. The department holds licenses for the *Thesaurus Linguae Graecae* data-base and the Packard Humanities Institute's data-bases for Latin literature and for documentary papyri and inscriptions.

The department holds an institutional membership in the American School of Classical Studies in Athens and the Canadian Institute in Greece. The American School makes course and field-work opportunities available to students and also gives them access to various research resources including its excellent library. Field archaeologists in the department occasionally offers credit courses and opportunities for field-experience at their overseas excavations or surveys in such places as Greece, Ukraine and North Africa.

M.A. in Classics

Admission

In addition to the minimum admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, demonstrated proficiency in ancient Greek and Latin and an honours B.A. or its equivalent in Greek, Latin or Classics is a prerequisite for admission to the M.A. Program.

Application Deadlines

The deadline for students to submit their application and supporting documentation to the Faculty of Graduate Studies is March 1 prior to the intended start date. However, students who wish to be considered for financial assistance from the University of Manitoba must submit their application and supporting documentation no later than January 15 prior to the intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. Course work will normally include 12 credit hours at the 7000 level, but students may be required to complete further courses. Students are required to pass one Greek reading exam and one Latin reading exam on prescribed texts, normally at the end of the first year of their programs. A knowledge of French and/or German is not required but is desirable.

Language Reading Requirements: Latin and Greek

Expected Time to Graduate: Two years.

Ph.D.

There is no Ph.D. program in the Department of Classics

Course Descriptions

GRK 7100 Greek Literature 1 Cr.Hrs.3 A reading course involving a selected Greek author or authors, or a set of related works.

GRK 7102 Greek Literature 2 Cr.Hrs.3 A reading course involving a selected Greek author or authors, or a set of related works.

GRK 7110 Greek History Cr.Hrs.3 This course will investigate aspects of Greek history, emphasizing different topics, sources, and theoretical approaches. Possible focuses for the course include a period of Greek history, or a particular region of the Greek world.

LATN 6000 Latin Reading Test Cr.Hrs.0 For graduate students in other departments which require a reading knowledge of Latin

LATN 7200 Latin Literature 1 Cr.Hrs.3 A reading course involving a selected Latin author or authors, or a set of related works.

LATN 7202 Latin Literature 2 Cr.Hrs.3 A reading course involving a selected Latin author or authors, or a set of related works.

LATN 7210 Roman History Cr.Hrs.3 This course will investigate aspects of Roman history, emphasizing different topics, sources, and theoretical approaches. Possible focuses for the course include a period of Roman history, or a particular region or province of the Roman Empire.

CLAS 7300 Topics in Greek Art and Archaeology Cr.Hrs.3 This course will investigate aspects of Greek art, archaeology, and material culture, emphasizing different topics, methods, genres, or theoretical approaches. Possible focuses for the course include vase painting and other ceramic artifacts, sculpture, architecture, the archaeology of particular regions, and archaeological approaches to the economy and other issues in social history.

CLAS 7302 Topics in Roman Art and Archaeology Cr.Hrs.3 This course will investigate aspects of Roman art, archaeology, and material culture, emphasizing different topics, methods, genres, or theoretical approaches. Possible focuses for the course include sculpture, architecture, mosaics, wall painting, the archaeology of particular regions, and archaeological approaches to the economy and other issues in social history.

CLAS 7310 Readings in Selected Topics 1 Cr.Hrs.3 Intensive study of one or more authors in Greek or Latin literature or of a special topic in ancient history.

CLAS 7320 Readings in Selected Topics 2 Cr.Hrs.3 Intensive study of one or more authors in Greek or Latin literature or of a special topic in ancient history.

Section 15: Community Health Sciences

Head: Sharon Macdonald

General Office: S111, Medical Services Building, 750 Bannatyne Avenue

Telephone: (204) 789 3655

Fax: (204) 789 3905

E-mail: kennedyt@ms.umanitoba.ca

Website: umanitoba.ca/medicine/chs

Academic Staff

Senior Scholars

Shapiro, E., B.A., M.A. (McGill), L.L.D.(Hon.) (Manitoba).

Professors

Black, C., M.D. (Manitoba), Sc.D. (Baltimore); **Butler-Jones, D.**, MD (Toronto), CCFP, MHSc (Toronto), FRCPC, FACPM; **Chochinov, H.M.**, B.A. (Winnipeg) M.D., F.R.C.P.C., Ph.D. (Manitoba); **Cooper, J.**, Dip.P., O.T., (Toronto), B.O.T., M.Sc., Ph.D. (Manitoba); **Cox, B.**, B.A.(Hons.) (Winnipeg); M.A., Ph.D. (York); **Dekker, S.**, M.A., M.Sc., Ph.D.; **Enns, M.W.**, B.Sc.(Med), M.D. (Manitoba), F.R.C.P.C.; **Evans, J.**, B.Sc. (Birmingham), Ph.D. (Leicester); **Forget, E.**, B.A.(Hons.) (Glendon College), M.A., Ph.D. (Toronto); **Glavin, G.**, PhD (Manitoba); **Halli, S.**, B.Sc., M.Sc. (Karnataka), Ph.D. (Western Ontario); **Hassard, T.H.**, B.Sc.(Hons.), M.Sc., Ph.D. (Queen's, Belfast); **Judd, E.R.**, BA, MA (Queen's), PhD (UBC), FRSC; **Kaufert, J.**, B.A. (Minnesota), M.A., Ph.D. (Northwestern); **Kaufert, P.**, B.A.(Hons.) (Leeds), Ph.D. (Birmingham); **Kerr, R.**, B.Sc., M.Sc., M.D.; **Moffatt, M.**, B.Sc., M.D. (Toronto), M.Sc. (McGill), F.R.C.P.C.; **Moses, S.**, M.D. (Toronto), M.P.H. (Johns Hopkins); **O'Neil, J.**, B.A., M.A. (Saskatchewan), Ph.D. (Berkeley); **Orr, P.**, M.Sc. (Manitoba), M.D. (Toronto), F.R.C.P.C.; **Plummer, F.**, M.D. (Manitoba), F.R.C.P.C.; **Ronald, A.**, M.D., B.Sc., F.A.C.P., F.R.C.P.C.; **Roos, L.L.**, A.B. (Stanford), Ph.D. (Massachusetts Institute of Technology); **Roos, N.P.**, B.A. (Stanford), Ph.D. (Massachusetts Institute of Technology); **Segall, A.**, B.A., M.A. (Manitoba), Ph.D. (Toronto); **Tenenbein, M.**, M.D. (Manitoba), F.R.C.P.C.; **Wade, J.**, B.S. (North Dakota), M.D. (Manitoba), B.Sc., F.R.C.P.C.; **Yassi, A.**, B.Sc. (McGill), M.D., D.O.H.S. (McMaster), M.Sc. (Toronto), F.R.C.P.C.

Associate Professors

Bartlett, J., M.D. (Manitoba), C.C.F.P., F.C.F.P.; **Blanchard, J.**, B.Sc.(Med.), M.D. (Manitoba), M.P.H., Ph.D. (Johns Hopkins); **Brownell, M.**, B.A. (Winnipeg), M.A. (Toronto), Ph.D. (Manitoba); **Driedger, S.M.**, B.A.(Hons.) (Winnipeg), M.A. (Carleton), Ph.D. (McMaster); **Elliott, L.**, M.D., M.Sc. (Manitoba), C.C.F.P. (Dalhousie), F.R.C.P.C.; **Finlayson, M.**, B.M.R., M.Sc., Ph.D. (Manitoba); **Fowke, K.**, B.Sc.(Hons.), Ph.D (Manitoba); **Garland, A.**, B.S., M.A., M.D.; **Hammond, G.**, B.Sc., M.D.C.M. (McGill), F.R.C.P.C.; **Heaman, M.**, BN, MN, PhD (Manitoba); **Jardine, C.**, B.Sc. (Manitoba), M.Sc., Ph.D. (Alberta); **Katz, A.**, B.Sc., M.B.Ch.B. (Capetown), M.Sc. (Manitoba), C.C.F.P.; **Kliwer, E.**, B.Sc., M.Sc. (Manitoba), Ph.D. (British Columbia); **Kozyrskyj, A.**, B.Sc.Pharm.(Hons.) (Toronto), M.Sc., Ph.D., (Manitoba); **Kraut, A.**, M.D. (Manitoba), F.R.C.P.C.; **Latosinsky, S.**, B.E.Sc.(Hons.) (Western Ontario), M.D.(Hons.) (Toronto), M.Sc. (McMaster), F.R.C.S.C.; **Lix, L.**, B.SHEC. (Saskatchewan), M.Sc., Ph.D. (Manitoba); **Macdonald, S.**, B.Sc., M.D. (Manitoba), F.R.C.P.C.; **Martens, P.**, B.Sc., B.Ed., M.Sc., Ph.D. (Manitoba); **Menec, V.**, B.A., M.A., Ph.D. (Manitoba); **Payne, B.J.**, B.A. (York), M.Sc., Ph.D. (Toronto); **Plourde, P.**, M.D. (Ottawa), F.R.C.P.C.; **Sareen, J.**, B.Sc. (Winnipeg), B.Sc.(Med.), M.D. (Manitoba), F.R.C.P.C.; **Sevenhuysen, G.**, B.Sc., Ph.D. (London); **Taback, S.**, B.Sc., M.D. (Manitoba), F.R.C.P.C.; **Tate, R.B.**, B.Sc. (Winnipeg), M.Sc., Ph.D. (Manitoba); **Turner, D.**, B.Sc. (Victoria), M.Sc. (Calgary), Ph.D. (Alberta); **Walker, J.R.**, B.A.(Hons.), M.A., Ph.D. (Manitoba); **Washington, R.**, Dipl.D.N.B., M.D., M.B.B.S. (India); **Wirtzfeld, D.**, B.A. (Hons.), B.Sc. (Distinction), M.D. (Calgary), M.Sc. (Memorial), F.R.C.S.C., F.A.C.S.

Assistant Professors

Agot, K., B.Educ., M.Phil. (Kenya), M.P.H., Ph.D. (Washington); **Anderson, M.**, B.Sc. (Winnipeg), M.D. (Manitoba), M.P.H. (Johns Hopkins), F.R.C.P.C.; **Avery, L.**, B.Sc.(Hons.) (McGill); M.D., F.R.C.P.C. (Manitoba); **Beaudoin, C.**, B.A., M.Sc., Ph.D. (Manitoba); **Becker, M.**, M.D., F.R.C.P.C., M.P.H.; **Bohm, E.**, B.Sc.M.E., M.D. (McMaster), M.Sc. (Dalhousie), F.R.C.S.C.; **Botting, I.**; B.A. (Winnipeg), Ph.D. (Memorial University); **Bowen, S.**, B.A., Cert.Ed., M.Sc., Ph.D. (Manitoba); **Brown, K.**, M.D., M.B.A. (Western Ontario); **Bruce, S.**, B.A., M.A., Ph.D. (Manitoba); **Buchan, S.**, M.D., C.C.F.P. (Saskatchewan), F.R.C.P.; **Carrothers, L.**, B.A. (Brandon), M.P.A., Ph.D. (Manitoba); **Caetano, P.**, B.Sc.(Hons) (Winnipeg), Ph.D. (Manitoba); **Chartier, M.**; R.N., Ph.D. (Manitoba); **Chase, R.**,

B.Sc. (Toronto), M.D., C.C.F.P., F.R.C.P.C., M.Sc. (McMaster); **Chipperfield, J.**, B.A.(Hons.), M.A., Ph.D. (Manitoba); **Cleary, E.**, B.A., M.B., B.Ch., B.A.O., DCH, DObs (Ireland), M.R.C.G.P. (U.K.), M.Sc. (Manitoba); **Cohen, B.**, B.A. (Carleton), B.N. (Ottawa), M.Sc., Ph.D. (Manitoba); **Cook, C.**, M.Sc., M.D. (Manitoba), C.C.F.P.; **Czaykowski, P.**, B.Sc., M.D. (British Columbia), M.Sc. (Toronto); **DeCoster, C.**, R.N. (St. Boniface), C.A.C.E., M.B.A.(Hons.), Ph.D. (Manitoba); **Demers, A.**, B.Sc., M.Sc., Ph.D. (Laval); **Demeter, S.**, B.Sc., M.D. (Saskatchewan), M.H.Sc. (Toronto), F.R.C.P.C.; **Doupe, M.**, B.P.E., M.Sc., Ph.D. (Manitoba); **Durcan, A.**, M.D. (Manitoba), C.C.F.P. (Dalhousie); **Elias, B.**, M.A., Ph.D. (Manitoba); **Emmanuel, F.**, M.B.B.S. (Punjab), M.Sc. (Aga Khan University); **Eni, R.**, B.A. (Winnipeg), M.Sc., Ph.D. (Manitoba); **Ens, C.**, B.Ed., B.HEC., M.Sc., Ph.D. (Manitoba); **Fast, M.**, B.Sc., M.D. (Manitoba), F.R.C.P.C., D.T.C.H. (Liverpool); **Fransoo, R.**, B.Sc., M.Sc., Ph.D. (Manitoba); **Gelskey, S.**, B.Sc. (D.H.) (Marquette), M.P.H. (Michigan), Ph.D. (Manitoba); **Green, C.**, B.A. (Winnipeg), M.H.Sc. (Toronto), Ph.D. (Manitoba); **Griffith, J.**, B.P.E., Ed. Cert., M.A., Ph.D. (Manitoba); **Harlos, S.**, B.Sc. (Alberta), M.D. (British Columbia), F.R.C.P.C.; **Hilderman, T.**, B.Sc. (Med.), M.D. (Manitoba), F.R.C.P.C.; **Kettner, J.**, M.D. (Manitoba), F.R.C.S.C., M.Sc. (London), F.R.C.P.C.; **Kreindler, S.**, B.A. (Hons.) (Manitoba), D.Phil. (Oxford); **Larcombe, L.**, M.A., Ph.D. (Manitoba); **Lavoie, J.**, B.Sc., M.A. (McGill), Ph.D. (London); **Lorway, R.**, B.A.(Hons.) (St. Mary's), M.A. (Dalhousie), Ph.D. (Toronto); **Lutfiyya, M.N.**, B.A. (Manitoba), M.A. (Iowa), Ph.D. (UMASS-Amherst); **Macaulay, A.**, B.Sc. (New Brunswick), M.Sc. (Manitoba), M.D., C.C.F.P. (Dalhousie); **Marchessault, G.**, B.HEC., M.Sc., Ph.D. (Manitoba); **Marrie, R.A.**, B.Sc., M.D. (Dalhousie), M.Sc., Ph.D. (Case Western Reserve); **Martin, B.**, B.Sc. (Toronto), M.D. (Queen's), C.C.F.P., M.Sc. (Manitoba); **McKay, A.**, M.D., M.Sc. (Manitoba), F.R.C.S.C.; **McKeen, N.**, R.N.(Dip.), B.A.(Hons.) (Carleton), M.A., Ph.D. (Manitoba); **Metge, C.**, B.Sc. (Alberta), Ph.D. (Maryland); **Mignone, J.**, M.A. (Alberta), Ph.D. (Manitoba); **Ngugi, E.**, R.N. (Kenya), B.Sc., M.A., Ph.D. (Columbia Pacific); **Penfold, R.**, B.A., M.A. (Waterloo), Ph.D. (Toronto); **Peschken, C.**, M.Sc. (McGill), M.D. (Saskatchewan), F.R.C.P.C.; **Peters, D.**, B.Sc., M.D. (Manitoba), M.P.H., D.P.H. (Johns Hopkins); **Poffenroth, L.**, B.Sc. (Alberta), M.Sc., M.D. (Manitoba), F.R.C.P.C.; **Pope, W.**, M.D., F.R.C.P.C., L.L.B. (Manitoba); **Raghavan, M.**, D.V.M., M.S., Ph.D.; **Ramesh, B.**, B.A., M.A., Ph.D. (India); **Ramsey, C.**, B.Sc., M.D. (Manitoba), M.Sc. (Harvard); **Raymond, C.**, B.Sc.Pharm. (Alberta), A.C.P.R. (Ottawa), Pharm.D. (British Columbia), M.Sc. (Manitoba); **Redekop, T.**, B.Sc., M.D. (Manitoba), C.C.F.P., F.R.C.P.C.; **Reza-Paul, S.**, M.B.B.S. (India), M.P.H., D.P.H. (Alabama); **Riese, N.**, M.D. (Manitoba), C.C.F.P.(McMaster), M.Sc. (Manitoba); **Roberts, J.**, B.M, B.S. (Sydney), M.Sc., Ph.D. (Manitoba); **Robson, R.**, B.A. (Manitoba), M.D. (McGill), F.R.C.P.C.; **Routledge, M.**, B.Sc.(Med.), M.D. (Manitoba), M.Sc., F.R.C.P.C.; **Santos, R.**, M.A., B.A., Ph.D. (Manitoba); **Shoostari, S.**, B.Sc., M.S.P.H. (Iran), Ph.D. (Manitoba); **Singh, H.**, M.D., F.R.C.P.C., M.P.H. (Manitoba); **Slater, J.**, B.SHEC. (Saskatchewan), M.Sc., Ph.D. (Manitoba); **Stranc, L.**, B.Sc.A.(Hons.), M.Sc., Ph.D. (Manitoba); **Tataryn, D.**, B.A.(Hons.) (Manitoba), M.A., Ph.D. (Arizona); **Taylor, M.**, M.Sc., M.D. (Toronto), F.R.C.P.S.C.; **Weiss, E.**, M.Sc., M.D. (Manitoba), C.C.F.P.; **Wright, B.**, B.Sc., M.D., F.R.C.P.C., M.B.A. (Manitoba); **Wylie, J.**, B.Sc. (Manitoba), M.Sc. (Ottawa), Ph.D.; **Yu, N.**, M.D. (Harbin); M.Sc., (Beijing), Ph.D. (Manitoba).

Adjunct Professors

Anderson, J., B.Sc. (British Columbia), B.Sc.(Med.), Ph.D. (Manitoba); **Brown, D.**; B.Sc.(Hons), Ph.D. (Alberta); **Salamon, E.**, B.Sc., M.D., F.R.C.P.C. (Manitoba); **Tough, S.**, B.Sc., M.Sc. (Calgary), Ph.D. (Alberta).

Program Information

CHS offers broad, multidisciplinary, graduate training at the Diploma, Master and Doctoral levels in the concepts and methods of the population-based health sciences and their application in the practice of public health and preventive medicine. In addition to training in the core areas of epidemiology, biostatistics and the social sciences as applied to health (anthropology, economics, sociology and political science), students have an opportunity to obtain advanced training in internationally recognized research programs conducted by specialized units within the department such as the Manitoba Centre for Health Policy, the Section of First Nations, Metis and Inuit Health and the newly established Centre for Global Public Health. As a result graduate students have the opportunity to access both internationally regarded researchers and award winning teachers.

The Doctoral (Ph.D.) program is designed to produce individuals who will teach in the community health sciences; train other researchers, design and

execute major research projects; and serve as senior advisors and consultants in the area of health care policy and planning.

In contrast, our two Master's programs, the Master of Science (M.Sc.) and Master of Public Health (M.P.H.) degrees, are intended to satisfy the demand of local, regional, provincial and federal health departments for trained community health professionals. Both Master's level programs provide core training in epidemiology, public health, health policy planning, and health administration. The M.Sc. program has a research focus requiring completion of a thesis while the M.P.H. program has a field-placement / practicum integrating applied public health concepts.

The Diploma in Population Health (Dip.P.H.) program is intended to provide senior clinicians in teaching hospitals and managers in provincial and regional health authorities with a set of core knowledge and skills in the population health sciences which will allow them to become more effective consumers and utilizers of health research data.

Program graduates currently occupy faculty positions in medical, dental, nursing and medical rehabilitation schools in Canada, the United States and overseas. Others work in government at the provincial and federal levels as medical officers of health, and as directors of research and planning programs. Some graduates have returned to primarily clinical positions in a variety of health disciplines while others have become independent consultants in health services planning and evaluation.

Fields of Research

Researchers in the department are involved in a wide range of research activities in community health. Many have achieved national, and in some cases, international reputation in their fields. Particular areas of strength are health services research, health policy planning, northern and aboriginal health, occupational and environmental health, women's health, disability issues, aging and health, the epidemiology of infectious diseases and the epidemiology of chronic diseases.

Researchers are also actively working in areas such as health promotion, HIV/AIDS prevention, medical anthropology, health education and socio-economic factors in health. In addition, several researchers in the department have active interests in Global Health with projects currently running in India and Kenya.

The department has researchers with high levels of expertise in both qualitative and quantitative research methodologies. The opportunity for graduate students to work with researchers in both research paradigms represents a major strength of the program.

Research Facilities

The ability to seamlessly interact with internationally regarded research groups within the department creates an extremely rich graduate research environment. Through the Manitoba Centre for Health Policy graduate students have potential access to administrative health databases which are unique in Canada.

The department maintains a graduate student computer resource centre supporting a broad range of statistical, graphical and information processing software. The department also maintains a suite of carrels that provide a dedicated study centre for its graduate students.

Ph.D. in Community Health Sciences

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. The Ph.D. program is open to individuals with thesis-based M.A. and M.Sc. degrees.

The deadline for receipt of the application form and supporting documents is early January.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. Eighteen credit hours of coursework from 7000-level courses (six from required courses, twelve from electives), candidacy examination and thesis. (In addition, eighteen credit hours of prerequisite courses, or their equivalents, must have been completed before entering the program or in the first year).

Second language requirement: none

Expected time to graduation: three years full-time, five years part-time

M.Sc. in Community Health Sciences

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. The M.Sc. program is open to individuals with four year degrees in the health sciences or professions or with honours degrees in the biological or social sciences.

The deadline for receipt of the departmental application form and supporting documents is early January.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. Thirty credit hours of course work from 7000-level courses (eighteen from required courses, twelve from electives) and thesis.

Second language reading requirement: none

Expected time to graduate: two years full-time, four years part-time

M.P.H. in Community Health Sciences

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. The M.P.H. program is open to individuals with four-year degrees in the health sciences or allied health professions or with honours degrees in the biological or social sciences, and a minimum of three years experience working in a field of health.

The deadline for receipt of the departmental application form and supporting documents is early January.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. The M.P.H. program consists of completion of core courses, elective courses and a supervised field placement component. Thirty credit-hours from 7000-level courses will be required for completion of the degree: twelve credit hours from core courses and eighteen credit hours from elective courses. The field placement is a zero credit hour component.

Second language reading requirement: none

Expected time to graduate: two years full-time, four years part-time

Diploma in Population Health

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. The Dip.P.H. program is open to individuals with four year degrees in the health sciences or professions or with honours degrees in the biological or social sciences.

The deadline for receipt of the departmental application form and supporting documents is early January.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Eighteen credit hours of course work from 7000-level courses (nine from required courses, nine from electives),

Second language requirement: none

Expected time to graduation: one year full-time

Course Descriptions

CHSC 7130 Methods in Health Services Research and Evaluation Cr.Hrs.3 (Formerly 093.713) Examines the process of planning and conducting research and evaluation to assess health services with an emphasis on the methods by which a question may be translated into a testable hypothesis, and the specification of a research plan that will produce results of maximum internal and external validity.

CHSC 7200 Health and Health Care in Developing Countries Cr.Hrs.3 (Formerly 093.720) The course will focus on the patterns of mortality and morbidity in developing countries and the organization of health care services. Social, cultural, and economic development will be related to health and health services.

CHSC 7210 Epidemiology of Women's Health Cr.Hrs.3 (Formerly 093.721) This course will deal with problems and concerns particular to women's health. The topics will be approached from an epidemiological perspective but use will be made of materials from health economics, evaluation research, medical sociology and anthropology.

CHSC 7220 Health and Health Services of Native People Cr.Hrs.3 (Formerly 093.722) This course provides a detailed review of the health status and the determinants of health of Canada's native people.

CHSC 7240 Cultural Epidemiology (Critical Public Health) Cr.Hrs.3 (Formerly 093.724) This course will provide an opportunity for students to critically examine the use of social science theory in epidemiological research. Course material will explore the nexus between the health consequences of behaviour and the social and cultural correlates and context of that behaviour. Social and cultural factors will be shown to have direct impact on epidemiological constructs such as the perception of risk factors, management of chronic illness, and the distribution and utilization of primary health care services. *Prerequisite:* permission of instructor and previous coursework in epidemiology, anthropology and sociology.

CHSC 7270 Epidemiology of Chronic (Non-Cancer) Diseases Cr.Hrs.3 (Formerly 093.727) The objective is to study the natural history of chronic diseases including the distribution of diseases, risk and prognostic factors, rationale and strategies for prevention. The methodological issues concerning the investigation of severe disease are also discussed. *Prerequisite:* a minimum grade of "B" in CHSC 7520 (or 093.752).

CHSC 7280 Advanced Biostatistics Cr.Hrs.3 (Formerly 093.728) Techniques for the analysis of complex health and medical data sets. Principles of statistical modelling. Multiple regression. Logistic regression. Survival analysis and proportional hazards regression. Multidimensional contingency tables and log linear models. Factor and cluster analysis. The utilization of statistical packages will be emphasized. *Prerequisite:* a minimum grade of "B+" in CHSC 7480 (or 093.748) and permission of instructor.

CHSC 7290 Economic Evaluation of Health Care Cr.Hrs.3 (Formerly 093.729) The objectives of this course are to enable students to understand economic evaluation methodologies (cost-effectiveness, cost-benefit, cost-utility analysis) as applied to health care and to familiarize them with the applied literature on economic evaluation of health care. *Prerequisite:* permission of instructor.

CHSC 7300 Health Policy and Planning Cr.Hrs.3 (Formerly 093.730) This course defines health policy and describes the planning and decision-making process. Case studies will be used to illustrate and critique the substance, process and outcome of policy papers that address contemporary policy issues. *Prerequisite:* permission of instructor.

CHSC 7310 Epidemiology of Health Care Cr.Hrs.3 (Formerly 093.731) This course will discuss the advantages and disadvantages of using large administrative data bases for research purposes. Substantive topics dealt with include: regional variations in provision and utilization of health care, short- and long-term outcome studies, individual physician behaviour, and technology assessment. Policy implications are considered. *Prerequisite:* a minimum grade of "B" in CHSC 7520 (or 093.752) or equivalent and permission of instructor.

CHSC 7320 Organization and Financing of the Canadian Health Care System Cr.Hrs.3 (Formerly 093.732) Students will study the historical development and current structure of the Canadian health care system and relate its development to changes in social and political factors. The course provides an economic perspective on current policy issues in the organization, financing, and delivery of health care in Canada.

CHSC 7330 Cultural Perspectives on Illness and Medical Practice Cr.Hrs.3 (Formerly 093.733) The objective of this course is to make students aware of the ways in which disease, illness, and medical practice are socially and culturally mediated. The course will examine cultural influences on the experience and expression of illness and consider the medical practitioner's role in the development and provision of culturally responsive health care. *Prerequisite:* permission of instructor.

CHSC 7340 Hospital Medical Administration Cr.Hrs.3 (Formerly 093.734) This course provides a broad overview of the principles and practice of Medical Administration for Canadian Hospitals. Special emphasis will be placed on the strategic planning process for hospitals, and the key role played by Clinical Heads and other Medical Staff leaders in this activity. *Prerequisite:* permission of instructor.

CHSC 7350 Research Methods in Health Care Cr.Hrs.3 (Formerly 093.735) This course provides a survey and practical experience in design, strategies, research methods, and applied socio-medical disciplines as related to health. The course emphasizes the application of quantitative and qualitative techniques, in the measurement of health-related attitudes, behaviours and program outcomes. *Prerequisite:* an undergraduate research methods course in Sociology, Anthropology, Psychology or Nursing and permission of instructor.

CHSC 7360 Clinical Trials Cr.Hrs.3 (Formerly 093.736) The Randomized Clinical Trial is the only true experiment in clinical research. This course is intended to give students a detailed knowledge of the design and implementation of RCTs. Students will participate in a qualitative review of RCTs. *Prerequisites:* a minimum grade of "B" in CHSC 7520 (or 093.752), CHSC 7470 (or 093.747), CHSC 7480 (or 093.748) or equivalents.

CHSC 7370 Measurement of Health and Disability Cr.Hrs.3 (Formerly 093.737) A survey of the conceptual and socio-political issues influencing health status and adaptation to disability. The course emphasizes the methodological aspects of developing, validating and applying measures of health status and physical impairment. Determinants of health and disability, stigma, environmental barriers, medicalization, professionalization, policy initiatives in rehabilitation, and the disabled consumers movement in Canada are discussed. *Prerequisite:* permission of instructor.

CHSC 7380 Prevention and Health Cr.Hrs.3 (Formerly 093.738) The course will

cover frameworks used in formulating preventive strategies. Topics will include risk factor assessment, screening, health education, legislation, litigation, lifestyle and prevention. Actual case studies will be used. *Prerequisite:* CHSC 7520 (or 093.752) and CHSC 7530 (or 093.753).

CHSC 7390 Health Promotion Cr.Hrs.3 (Formerly 093.739) An examination of theories, principles, practices and settings for health promotion. *Prerequisite:* permission of instructor.

CHSC 7400 Directed Readings I: In Epidemiologic Methods Cr.Hrs.3 (Formerly 093.740) An opportunity for advanced students to acquire knowledge in a defined and specific area of interest. *Prerequisites:* permission of instructor and Graduate Program Director.

CHSC 7410 Directed Readings II - In Epidemiology Cr.Hrs.3 (Formerly 093.741) An opportunity for advanced students to acquire knowledge in a defined and specific area of interest. *Prerequisite:* permission of instructor and Graduate Program Director.

CHSC 7420 Seminars on Advanced Topics: I - In Health Care Evaluation Cr.Hrs.3 (Formerly 093.742) Seminars dealing with current research issues, emerging methodologies and analytical techniques will be offered for advanced students. *Prerequisite:* permission of instructor.

CHSC 7430 Seminars on Advanced Topics: II - In Methods of Health Care Cr.Hrs.3 (Formerly 093.743) Seminars dealing with current research issues, emerging methodologies and analytical techniques will be offered for advanced students. *Prerequisite:* permission of instructor.

CHSC 7450 Epidemiology of Communicable Diseases Cr.Hrs.3 (Formerly 093.745) Overview of epidemiological principles in communicable disease investigation and prevention and specific issues in controls of certain specific communicable diseases of public health importance in Canada will be introduced. *Prerequisite:* permission of instructor. *Prerequisite:* a minimum grade of "B" in CHSC 7520 (or 093.752).

CHSC 7460 Environmental and Occupational Health Cr.Hrs.3 (Formerly 093.746) The aim of the course is to acquaint the student with the role of the environment (general and specifically working) as the determinant of health. The content of the course will be presented in the form of lectures, seminars, and field visits. *Prerequisite:* permission of instructor.

CHSC 7470 Biostatistics 1 Cr.Hrs.3 (Formerly 093.747) An introduction to statistical ideas and techniques for health sciences research. The description of data. Patterns in data, the normal, binomial and Poisson distributions. Principles of estimation. Principles of hypothesis testing. The major statistical tests (t tests, analysis of variance, chi squared tests, correlation and regression).

CHSC 7480 Biostatistics 2 Cr.Hrs.3 (Formerly 093.748) Techniques of research design and analysis for health scientists. Principles of experimental design. Clinical trial planning. Study size -determination. Analysis of variance for factorial and split plot experiments. Analysis of covariance. Multiple regression. Non-parametric hypothesis testing. Principles of survey design. *Prerequisite:* a minimum grade of "B" in CHSC 7470 (or 093.747).

CHSC 7490 Empirical Perspectives on Social Organization and Health Cr.Hrs.3 (Formerly 093.749) This course will focus on a selected review of the epidemiological literature which has integrated social factors in the investigation of the distribution of health and illness in society. The course will review a selection of important empirical studies investigating the roles played by social, psychological and economic status factors in determining health and illness. Emphasis will be placed on identifying the central theoretical and methodological approaches to defining and measuring socio-economic status in this literature. *Prerequisite:* permission of instructor.

CHSC 7510 Current Topics in Community Health Cr.Hrs.3 (Formerly 093.751) Focus on current issues and topics in community health, particularly as they relate to Manitoba and to Canada. Emphasis will be placed on current literature and ongoing research to examine emerging policies and programs within health care and social development. *Prerequisite:* basic courses in Epidemiology and Statistics. *Prerequisites:* a minimum grade of "B" in CHSC 7520 (or 093.752) and CHSC 7470 (or 093.747) and CHSC 7320 (or 093.732).

CHSC 7520 Principles of Epidemiology I Cr.Hrs.3 (Formerly 093.752) This course will introduce the basic concepts and methods of epidemiology, including the definition and measurement of health status and health determinants in populations, assessing health risks and inferring causation, and issues in the design and analysis of population health studies.

CHSC 7530 Principles in Epidemiology II Cr.Hrs.3 (Formerly 093.753) This course follows the Principles of Epidemiology I and discusses the applications of epidemiological principles in public health practice, including the investigations of epidemics, disease surveillance, clinical applications, evaluation of health programs, and the planning of preventive programs. Students will also receive instruction in microcomputer applications and use of EPI-INFO software for data entry, analysis and presentation. *Corequisite:* CHSC 7480. *Prerequisite:* a minimum grade of "B" in CHSC 7520 (or 093.752) and in CHSC 7470 (or 093.747)..

CHSC 7540 Advanced Epidemiology Cr.Hrs.3 (Formerly 093.754) Advanced epidemiologic research methods focusing on selected epidemiological issues (bias, confounding, matching, etc.). Discussion will be directed to both epidemiological and statistical considerations to find the optimal solution to a research problem. *Prerequisites:* a minimum grade of "B" in CHSC 7520 (or 093.752), CHSC 7530 (or 093.753), CHSC 7280 (or 093.728).

CHSC 7550 Observational Epidemiology Cr.Hrs.3 (Formerly 093.755) Intermediate epidemiologic research methods focusing on case-control and cohort studies, with discussion on issues relating to planning and design, implementation, and data analysis. *Prerequisite:* a minimum grade of "B" in CHSC 7520 (or 093.752) and CHSC 7530 (or 093.753) and CHSC 7470 (or 093.747) and CHSC 7480 (or 093.748)..

CHSC 7560 Epidemiology of Cancer Cr.Hrs.3 (Formerly 093.756) This course intro-

duces the magnitudes, risk factors and prevention strategies of cancer. It focuses on current knowledge related to the etiology of cancer, medical interventions and potential for prevention. *Prerequisite:* a minimum grade of "B" in CHSC 7520 (or 093.752).

CHSC 7570 Managing Health Systems Cr.Hrs.3 (Formerly 093.757) An internet-based course involving students from Europe and Canada. The course provides a

greater understanding of the health care systems of participating countries through comparative analysis of topics such as health service funding and delivery issues, impact of health system reform and evidence based management. *Prerequisite:* a minimum grade of "B" in CHSC 7320 (or 093.732).

Section 16: Computer Science

Head: John Bate

General Office: E2-445 EITC

Telephone: (204) 474 8313

Fax: (204) 474 7609

Graduate Program Assistant: Lynne Hermiston

E-mail: hermisto@cs.umanitoba.ca

Website: www.cs.umanitoba.ca

Academic Staff

Professor Emeritus

King, P.R., B.Sc., Ph.D. (Nottingham), I.S.P.

Distinguished Professor

Stanton, R.G., B.A.(Hons.) (Western), M.A., Ph.D. (Toronto), Cert.Ling.Port. (Rio de Janeiro), Hon.D.Sc. (Newcastle, NSW), F.S.S., F.I.M.A., Killam Laureate, Hon.D.Sc. (Queensland), Hon.D.Sc. (Natal), Hon.D.Math. (Waterloo).

Professors

Arnason, A.N., B.Sc., M.Math. (Waterloo), Ph.D. (Edinburgh); **Baltes, H., B.Sc., Ph.D.** (Calgary); **Barnard, D.T., B.Sc., M.Sc., Ph.D.** (Toronto); **Hoskins, J.A., B.E.S., M.Sc., Ph.D.** (Manitoba); **Kocay, W.L., B.Sc.(Hons.)** (Manitoba), M.Math., Ph.D. (Waterloo); **Meek, D.S., B.Math.** (Waterloo), M.Sc. (Toronto), Ph.D. (Manitoba); **Scuse, D.H., B.A. (Math.)** (York), M.Sc., Ph.D. (Manitoba); **van Rees, G.H.J., B.Math., M.Math., Ph.D.** (Waterloo); **Walton, D.J., B.Sc.(Hons.)** (South Africa), M.S.Math (Illinois), M.Sc., Ph.D. (Manitoba)

Associate Professors

Anderson, J.E., B.Sc.(Hons.), M.Sc., Ph.D. (Manitoba); **Bate, J.A., B.Sc.(Hons.), M.Sc., Ph.D.** (Manitoba); **Cameron, H.A., B.Sc., M.Sc.** (Manitoba), Ph.D. (Waterloo); **Eskicioglu, M.R., B.Sc.** (Istanbul Technical), M.Sc. (Middle East Technical), Ph.D. (Alberta); **Graham, P., B.C.Sc.(Hons.), M.Sc., Ph.D.** (Manitoba); **Leung, C., B.Sc., M.Sc., Ph.D.** (UBC); **Liu, Y.E., B.Eng.** (Beijing), M. Math., Ph.D. (Waterloo); **Li, P., B.Sc.(Hons), M.Sc., Ph.D.** (Manitoba); **Thulasiram, R., B.Sc., M.Sc.** (Madursi-Kamaraj), M.Sc., Ph.D. (Indian Inst. of Science); **Thulasiraman, P., B.Eng., M.A.Sc.** (Concordia), Ph.D. (Delaware).

Assistant Professors

Bunt, A., B.Sc. (Queens), M.Sc., Ph.D. (UBC); **Durocher, S., B.Sc.** (Queens) M.Sc., Ph.D. (UBC); **Irani, P., B.Sc., Ph.D.** (New Brunswick); **Jin, D., B.A., B.Sc., M.Sc., Ph.D.** (Queens); **Dormartzki, M., B.Math** (Hons.), M.Math (Waterloo), Ph.D (Queens);

Adjunct Professors

Camorlinga, S., B.Sc. (Monterrey Tech), M.Sc. (Nebraska), PhD (Manitoba); **Kemke, C., Dipl.-Inform.** (Dortmund), B.Sc., Dip. Psych (Open U.), Ph.D.(Bielefeld); **Misic, J., B.Sc., M.Sc., Ph.D.** (Belgrade); **Misic, V., B.Sc., M.Phil., Ph.D.** (Belgrade); **Pizzi, N., B.Sc., M.Sc., Ph.D.** (Manitoba); **Van Domselaar, G., B.Sc, PhD**, Alberta

Program Information

The department offers Master's and Ph.D. programs at the graduate level, which cover many areas of computer science. The department also participates in the Master's of Mathematical, Computational and Statistical Sciences program offered through the Institute of Industrial Mathematical Sciences. Graduates find employment in industry and academia.

Fields of Research

The department has people working in the areas of robotics, computer vision, intelligent agents, multi-agent systems, multimedia and hypermedia, bioinformatics, biomedical and health informatics, self-organizing systems, medical information systems, software engineering and integration, human-computer interaction, networks, parallel and distributed systems, databases, data mining, networks, multiplayer online games, data structures, algorithms, combinatorics and combinatorial designs, graph theory,

artificial intelligence, computer graphics and curve design, computer-aided geometric design, computational finance, grid computing, wireless sensor networks, and pervasive computing. More information about specific individuals and their current research work can be found on the department's web site.

Research Facilities

Each graduate student will have a personal study space in an appropriate departmental research laboratory, and access to laser printers, mail, photocopying, a fax machine, and a graduate student lounge.

Computing facilities for research include a large variety of desktop computers as well as access to large clusters within the department, at the University of Manitoba, and across Western Canada via the WestGrid II network.

M.Sc. in Computer Science

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Students may be admitted to the Master's program if they hold an Honours Bachelor's degree in Computer Science and if they present a suitable selection of courses. Admission is not guaranteed and each application will be individually considered by the department's Graduate Studies Committee.

Students can also be admitted to the Master's program upon successful completion of their pre-Master's program.

Application Deadlines

The Department of Computer Science allows students to begin their program in September or January. For admission for each of these start dates, Canadian/U.S. students should send their applications with complete supporting documentation to the Department of Computer Science no less than three (3) months before the intended start date. All other students should have their applications with complete supporting documentation received by the Department of Computer Science no later than eight (8) months before the intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students must complete 12 credit hours of coursework and a thesis. All credit hours must be at the 7000 level and must include the 0-credit-hour Research Methodologies course. See the departmental Graduate Supplemental Regulations (available on the department's web site). Students must consult with their departmental advisor prior to deciding on courses. The courses listed below will not all be offered in any one particular year.

Second language reading requirement: none

Expected time to graduate: two years

Ph.D. in Computer Science

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. A candidate must normally complete an M.Sc. degree before entering the Ph.D. program. Individual qualifications other than this will be considered.

Application Deadlines

The Department of Computer Science allows students to begin their program in September or January. For admission for each of these start dates, Canadian/U.S. students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than three (3) months before the intended start date. All other students should have their applications with complete supporting documentation received by the Faculty of Graduate Studies no later than eight (8) months before the intended start date.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Students must complete a minimum of 12 credit hours of coursework and a thesis. All credit hours must be at the 7000 level. See the departmental Graduate Supplemental Regulations (available on the department's web site). Students must consult with their departmental advisor prior to deciding on courses. The courses listed below will not all be offered in any one particular year.

Second language reading requirement: none

Expected time to graduate: four years

Course Descriptions

COMP 7220 Research Methodologies Cr.Hrs.0 This course explores the research process in general and the resources for research in computer science. Traditional research approaches and use of emerging technology will be discussed. Attendance at department seminars and classes is required. The course is evaluated on a pass/fail basis.

COMP 7570 Advanced Topics in Computer Science 1 Cr.Hrs.3 Topics of current research interest in areas of computer science, available on an occasional basis, subject to the interests and availability of faculty. *Prerequisite:* written consent of instructor.

COMP 7580 Advanced Topics in Computer Science 2 Cr.Hrs.6 Topics of current research interest in areas of computer science, available on an occasional basis, subject to the interests and availability of faculty. *Prerequisite:* written consent of instructor.

COMP 7700 Advanced Design and Analysis of Algorithms Cr.Hrs. An advanced course covering models of computation, advanced analysis techniques, lower bounds, NP-completeness (from an algorithmic viewpoint), with applications of these techniques to various areas. *Prerequisites:* COMP 3170 (or 074.317) or equivalent or written consent of instructor.

COMP 7710 Group Algorithms and Graph Isomorphisms Cr.Hrs.3 Techniques for representing and manipulating permutation groups by computer; Schreier's algorithm, stabiliser towers, orbits, block systems, graph isomorphism, coset enumeration in permutation groups, the Butler-Sims base change algorithm. Not to be held with the former 074.727 or 074.728). *Prerequisites:* COMP 4340 (or 074.434) or equivalent or written consent of instructor.

COMP 7720 Advanced Topics in Algorithms Cr.Hrs.3 Topics of current research interest in advanced algorithms. Possible topics include string matching, data compression, computational geometry, probabilistic algorithms; subject to the interests and availability of faculty. *Prerequisites:* COMP 3170 (or 074.317) or equivalent or written consent of instructor.

COMP 7730 Theory of Computation and Complexity Cr.Hrs.3 Study of the nature and complexity of computations. Formal theory of computability and decidability. Complexity on Turing machines, RAMs and circuits. Non-deterministic computation and NP-completeness. New developments on topics including randomized algorithms, parallel computation, counting problems, and approximation. *Prerequisites:* COMP 3170 (or 074.317) and COMP 3030 (or 074.303) or equivalents or written consent of instructor.

COMP 7740 Symbolic and Algebraic Computation Cr.Hrs.3 Problems in both the theory and practice of symbolic and computational algebra. Possible topics include implementation issues in Computer Algebra Systems, polynomial factoring, symbolic solution of systems of equations, Grobner bases, probabilistic techniques, algebraic complexity theory. Applications to cryptography, error correcting codes, robot motion planning, and others. *Prerequisite:* written consent of instructor.

COMP 7750 Advanced Topics in Computation Theory Cr.Hrs.3 Topics of current research interest in computation and complexity theory. Possible topics include decidability and complexity theoretic issues in parallel computation, cryptography, graph theory, or number theory, subject to the interests and availability of faculty. *Prerequisite:* written consent of instructor.

COMP 7760 Algorithmic Methods in Number Theory and Combinatorics Cr.Hrs.3 Large scale problems arising in combinatorics and number theory; practicable algorithms for solution of such problems. Computer implementation of these algorithms. *Prerequisite:* written consent of instructor.

COMP 7770 Coding Theory Cr.Hrs.3 Algebraic background of coding theory. Theory of linear codes. Hamming, Golay, Reed-Muller, Macdonald, and Hadamard codes. Structure of finite fields. Application to cyclic and Bose Chaudhuri codes. Decoding algorithms and error-correcting bounds. Specialized topics. *Prerequisite:* written consent of instructor.

COMP 7780 Queuing Theory and Performance Evaluation Cr.Hrs.3 Theory and application of queuing systems applied to problems of computer systems performance. Investigation of deterministic and stochastic models of single and multiple queuing systems using analytical, numerical, and simulation techniques. Performance evaluation methods for computer systems and communications networks. *Prerequisites:* STAT 1000 (or 005.100) or equivalent or written consent of instructor.

COMP 7790 Advanced Topics in Mathematical Foundations Computer Science Cr.Hrs.3 Topics of current research interest in the area of mathematical foundations of computer science. Possible topics include cryptography, computational number theory, combinatorics, queuing theory, statistical computing and performance evaluation; subject to the interests and availability of faculty. *Prerequisite:* written consent of instructor.

COMP 7810 Computer Networks Cr.Hrs.3 A selection of current research topics from such areas as network modeling and analysis, packet switching, circuit switching, non-switched nets, frame relay, cell relay, ATM, integrated voice/video/data networks, B-ISDN, and emerging technologies. *Prerequisites:* STAT 1000 (or 005.100) and COMP 4720 (or the former 074.430) or equivalents or written consent of instructor.

COMP 7820 Advanced Topics in Computer Architecture Cr.Hrs.3 Topics of current research interest from such areas as computer design and architecture, distributed systems, multiprocessor and parallel systems, computer networks, specialized architectures, and VLSI; subject to the interests and availability of faculty. *Prerequisites:* written consent of instructor.

COMP 7830 Distributed Database Systems Cr.Hrs.3 Architecture and management of distributed database systems; distributed design, query processing, transaction management; traditional and object-oriented database systems; overview of existing systems. *Prerequisites:* COMP 4380 (or 074.438) or equivalent or written consent of instructor.

COMP 7840 Operating Systems Design and Implementation Cr.Hrs.3 A discussion of the current research issues in operating systems including, but not limited to: distributed operating systems, multiprocessor operating systems, and other application-specific operating systems such as those for mobile computing. *Prerequisites:* COMP 3430 (or 074.343) or equivalent or written consent of instructor.

COMP 7850 Advances in Parallel Computing Cr.Hrs.3 This course introduces advanced research topics in parallel architectures, parallel programming, parallelizing compilers, runtime systems, and parallel I/O. *Prerequisite:* written consent of instructor.

COMP 7860 Advanced Topics in Computer Systems Cr.Hrs.3 Topics of current research interest in database and operating systems. Possible topics include: operating systems, parallel systems, real-time systems, networks, and database systems; subject to the interests and availability of faculty. *Prerequisite:* written consent of instructor.

COMP 7870 Advanced Programming Language Design, Translation, and Implementation Cr.Hrs.3 A selection of topics taken from the following: formal methods for the description and translation of programming languages, parsing theory and methods, automatic translator writing systems, recent developments in programming language design and implementation. *Prerequisites:* COMP 4290 (or 074.429) or equivalent or written consent of instructor.

COMP 7880 Object-Oriented Software Development Cr.Hrs.3 Object-oriented principles; OO life cycle models; OO analysis and design; OO programming and testing; discussion on research topics in OO techniques. *Prerequisites:* COMP 3350 (or 074.335) or equivalent or written consent of instructor.

COMP 7890 Advanced Topics in Languages and Software Cr.Hrs.3 Topics of current research interest in the areas of programming languages or software engineering. Possible topics include program language design and implementation, visual programming languages, formal specification techniques, and software verification and validation; subject to the interests and availability of faculty. *Prerequisite:* written consent of instructor.

COMP 7910 Advanced Graphics Cr.Hrs.3 (Formerly 074.791) This course will focus on two major advanced topics in computer graphics: the principles and properties of lighting models such as Phong shading, ray tracing and radiosity; and a selection of visualization and modelling techniques. *Prerequisites:* COMP 4490 (or 074.449) or equivalent or written consent of instructor.

COMP 7920 Advanced Topics in Graphics and Human Interfaces Cr.Hrs.3 Topics of current research interest in advanced graphics and human interfaces, chosen from such areas as intelligent user interfaces, user modelling, user interface design, visualization, computer animation, advanced multimedia, and computer-based training; subject to the interests and availability of faculty. *Prerequisite:* written consent of instructor.

COMP 7930 Natural Language and Speech Processing Cr.Hrs.3 Analysis and evaluation of computational models of language and speech understanding and generation including: syntactic analysis, semantic interpretation, statistical methods in speech and language understanding, applications of NLP such as machine translation, information extraction, and human-computer interfaces. *Prerequisites:* COMP 3190 (or 074.319) or equivalent or written consent of instructor.

COMP 7940 Machine Learning Cr.Hrs.3 This course examines topics in machine learning. Topics will be chosen from: statistical learning, symbolic learning, neural networks, and genetic algorithms. *Prerequisites:* COMP 3190 (or 074.319) or equivalent or written consent of instructor.

COMP 7950 Advanced Topics in Artificial Intelligence Cr.Hrs.3 Topics of current research interest in artificial intelligence chosen from such areas as: expert systems, knowledge representation, intelligent systems, planning systems, multi-agent systems, symbolic logic, knowledge engineering, and automated reasoning; subject to the interests and availability of faculty. *Prerequisites:* COMP 3190 (or 074.319) or equivalent or written consent of instructor.

COMP 7960 Image Processing Cr.Hrs.3 A detailed study of the methods used for image processing including: image quantization, transformations, enhancement, and analysis. *Prerequisites:* COMP 4490 (or 074.449) or equivalent or written consent of instructor.

COMP 7970 Curves and Surfaces in Computer Graphics Cr.Hrs.3 Algorithms and techniques for curve and surface generation, representation, and display in an interactive computer graphics environment. Discussion of applications to computer-aided design and computer-aided geometric design. *Prerequisites:* COMP 4490 (or 074.449) or equivalent or written consent of instructor.

COMP 7980 Advanced Topics in Scientific and Numerical Computing Cr.Hrs.3 Topics of current research interest in scientific and numerical computing chosen from

Section 17: Curriculum, Teaching and Learning

For information about graduate programs in the following units: Collège universitaire de Saint-Boniface, Education (Doctoral), or Educational Administration, Foundations and Psychology please refer to the table of contents for page numbers.

Head and Graduate Chair: F. Morin
General Office: 227 Education Building
Telephone: (204) 474 7886
Fax: (204) 474 7551
E-mail: edgradpr@umanitoba.ca
Website: umanitoba.ca/education

Academic Staff

Professors Emeriti

Jenkinson, D.H., B.A., B.Ed.(Manitoba), B.L.S., M.Ed. (Alberta), Ph.D.(Minnesota); **Osborne, K.W.**, B.A.(Hons.) (Oxford), B.Ed., M.A. (Manitoba); **Trosky, O.**, B.A., B.Ed., M.Ed. (Manitoba), Ph.D. (Toronto); **Zakaluk, B.L.**, B.A., B.Ed., M.Ed. (Manitoba), Ph.D. (Minnesota).

Senior Scholars

Bochonko, H., B.A., M.A. (Michigan); **Johns, B.A.**, B.S.(Indiana), M.A.(Michigan State); **Mathews, P.G.**, B.Ed., M.Ed. (Manitoba), Ph.D. (Minnesota); **Rosenstock, S.A.**, B.A. (Manitoba), M.A. (North Dakota), Ph.D. (Ohio State); **Schulz, R.**, B.A. (Manitoba), M.Ed. (Queen's), Ph.D. (North Dakota); **Spencer, P.**, B.A., B.Ed., M.Ed., Ed.Dip. (New York).

Professors

Cap, O., B.A. (Quebec), M.Ed. (Rutgers), Ph.D. (Ohio State); **Hlynka, L.D.**, B.Sc., B.Ed. (Manitoba), M.A. (Minnesota), Ph.D. (Michigan State); **Kanu, Y.**, B.A., Dip.Ed., M.Ed. (Sierra Leone), Cert.Curr.Dev.Soc.St. (Leeds), B.Litt. (Birmingham), Ph.D. (Alberta); **Morin, F.**, R.C.M. (Affiliate Teacher Toronto), B.P.E., M.Ed. (Manitoba), Ph.D. (North Dakota); **Stinner, A.O.**, B.A., B.Sc., B.Ed. (Alberta), M.Sc. (York), Ed.D. (Toronto); **Straw, S.B.**, B.A., M.A. (Missouri), Ph.D. (Minnesota).

Associate Professors

Kouritzin, S., B.A., M.A., Ph.D. (British Columbia); **Lewthwaite, B.**, B.Sc., B.Ed. (Saskatchewan), M.Ed. (Massey), Sc.Ed.D. (Curtin); **Mason, R.**, B.Ed., M.A. (Calgary), Ph.D. (Alberta); **Serebrin, W.**, B.A., B.Ed. (Dalhousie), Ph.D. (Indiana); **Smith, K.**, B.F.A., Cert.Ed. (Manitoba), M.Ed. (British Columbia), Ph.D. (Manitoba).

Assistant Professors

Babiuk, G., B.A. (Royal Military College), M.Ed. (Alberta), Ph.D. (OISE/Toronto); **Black, J.**, B.A. (Guelph), B.Ed. (Toronto), M.A. (Concordia), Ph.D. (OISE/Toronto); **Bryan, G.**, B.Sc., M.A. (Brigham Young), Ph.D. (British Columbia); **Casey, C.**, B.P.H.E.(Hons), B.Ed.(Toronto), M.A.(Western Ontario), Ph.D.(OISE/Toronto); **Deer, Frank, B. Ed.**, M.Ed. (Manitoba), Ph.D.(Saskatchewan); **Falkenberg, T.**, First State Examinations of Studierate, Ph.D. (Free University, Berlin), Post.Bac.D., Ph.D. (Simon Fraser); **Hechter, R.**, B.Sc (Winnipeg), B.Ed. (Winnipeg), M.Ed (Manitoba), Ph.D. (North Dakota); **Li, Y.**, B.A.(Shanghai International Studies, China), M.Ed., Ph.D.(Alberta); **McMillan, B.A.**, B.Sc. (Wisconsin), B.Sc.(Hons.), M.Sc., Ph.D. (Manitoba); **Schmidt, C.**, B.A. (York), M.A. (Carleton), Ph.D. (OISE);

Adjunct Professors

Ameis, J., Cert.Ed., B.Sc., B.Ed., M.Ed., Ph.D.(Manitoba); **Klassen, S.**, B.Sc. (Winnipeg), M.Sc., Ph.D. (Manitoba); **Metz, D.**, B.Sc. (Winnipeg), Cert. Ed., M.Ed., Ph.D. (Manitoba); **Robinson, G.G.C.**, B.Sc.(Hons.)(St. Andrew's), Ph.D. (British Columbia); **Sutherland, D.**, B.Sc.(Hons)(Queen's), M.Sc. (Manitoba), Ph.D. (Nottingham); **Wishart, R.**, B.Sc., M.Sc.(McGill), Ph.D.(Manitoba), **Zakaluk, B.L.**, B.A., B.Ed., M.Ed. (Manitoba), Ph.D. (Minnesota).

Program Information

The Department of Curriculum, Teaching and Learning offers the Master of Education Program with specializations in language and literacy; second language education; and studies in curriculum, teaching and learning (an area that includes art, drama and music; curriculum studies; early years curriculum; educational technology; language and literacy curriculum;

mathematics education; physical education/health; science education; social studies education; second language education; and technology education). The Department is not accepting applications into drama and early years curriculum concentrations at this time.

Fields of Research

Department members provide leadership in a variety of areas including curriculum development, curriculum reform and curriculum theorizing; teacher inquiry, professional development and teacher practice; teaching and learning within and across individual curriculum areas and streams (Early, Middle and Senior Years); language and literacy development; and second language education.

M.Ed. in Curriculum, Teaching and Learning

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, the Department of Curriculum, Teaching and Learning has the following admission application deadline dates and admission requirements:

For sessions starting	Canadian applicants	International applicants including US
January	October 1	none
May	None	none
July	February 1	none
September	May 1	January 15

Applicants must possess:

a four-year Bachelor of Education degree, or two year After Degree Bachelor of Education, or equivalent degree from an academic institution recognized by the Faculty of Graduate Studies. For Second Language Education, an acceptable four year equivalent undergraduate degree from an academic institution recognized by the Faculty of Graduate Studies;

- a grade point average of 3.0 or better in the last 60 credit hours of university coursework;
- normally, two years of relevant work experience; and
- appropriate academic and/or professional background for the program area and concentration. Consult with Department Head for further information.

Applicants should note that admission to the M.Ed. program is competitive. A number of factors are taken into account in arriving at an admissions decision: (1) the capacity of the department to provide the program of study requested by the applicant; (2) the applicant's previous academic background and achievement; (3) the referees' assessment of the applicant; (4) the capacity of the department to provide the applicant with an advisor in the program area; and (5) the applicant's Statement in Support of their application, including relevant professional experience.

Transfer of Credit

The granting of advanced credit is subject to the regulations of the Faculty of Graduate Studies and subject to approval of the advisor and department head.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this *Calendar*. The M.Ed. in Curriculum, Teaching and Learning has a thesis-based route and a course-based route with an oral defense. The M.Ed. comprehensive route at the University of Manitoba is typically a terminal degree. That is, it is insufficient, in number and of itself, as evidence of research capacity for admission into the Ph.D. program in Education at the University of Manitoba.

The following program requirements apply to all specializations in the Department of Curriculum, Teaching and Learning. Specific specialization requirements are listed under each specialization below.

M.Ed. programs have a maximum completion time of six years from the date of first registration. Not all courses are offered every year. The gradu-

ate course offering schedule is posted on the Faculty's website: umanitoba.ca/education/current/gradinfo.shtml. Although we offer many courses yearly, most of our courses are offered in the evening and those wishing to study full-time should consult with the Department Head.

Second Language Reading Requirement: None

Expected Time to Graduate: full-time: 2 to 3 years; part-time: 4 to 5 years

Program by Coursework and Thesis

- A minimum of 18 credit hours of coursework. At least 12 credit hours must be at the 7000 level or equivalent. The remaining 6 credit hours may be at the 5000 level or above, in the Faculty of Education and/or at the 3000 level or above in other faculties.

- Students must take 3 credit hours of research methodology at the 7000 level in Education or 3000 level or above in other faculties.

- Upon entry into the program, a student will be assigned a program advisor who is not necessarily the thesis advisor. Students who have chosen to follow the thesis-based route should contact the head of department to identify a faculty member with expertise in the proposed specialization and who is available to supervise their thesis.

Program by Coursework and Comprehensive Option (either Examination or Project) (Course-based)

- A minimum of 30 credit hours of coursework. At least 18 credit hours must be at the 7000 level, which may include EDUB 7540, or equivalent. The remaining 12 credit hours may be at the 5000 level or above in the Faculty of Education and/or at the 3000 level or above in other faculties.

- All coursework plus comprehensive option programs require a culminating activity and an oral defense. This culminating requirement may be met through taking a comprehensive examination or carrying out a research project. The research project may take a variety of forms including a research review, a small-scale study, or a curriculum/instruction application project. In some cases, the research project may include the student taking EDUB 7540 Final Seminar in Curriculum, Teaching and Learning to facilitate the development of the project. Students should contact and discuss with their advisors the specific requirements of both the examination and the research project activities.

Studies in Curriculum, Teaching and Learning Specialization

The Master of Education in Studies in Curriculum, Teaching and Learning includes a range of potential concentrations: art, drama, music; curriculum studies; early years curriculum; educational technology; language and literacy curriculum; mathematics education; physical education/health; science education; social studies education; second language education; and technology education. The Department is not accepting applications into drama education and early years curriculum subject concentrations at this time. In consultation with their faculty advisors, students will be encouraged to create a program of study that addresses their own interests in a particular curricular field and which enhances the students' understanding of curriculum and its intents and effects. The aim of the program is to develop individuals who are informed, critical, and reflective about curriculum theory and practice in their particular area of concentration. In order to support this aim, courses are designed to provide graduate students with the requisite skills to conduct and to understand research in a variety of formats and paradigms.

Admission and Program requirements are those listed above. Specific course requirements are as follows:

- Required courses: EDUA 5800, EDUB 7550
- Thesis-based students select 3 credit hours from: EDUB 7560, EDUB 7420. Course-based students are required to take both courses.

Language and Literacy Specialization

Language and Literacy is a broad field encompassing a number of major sub-fields from pre-school to post-secondary levels. The sub-fields include developmental reading, clinical reading, composition studies, rhetoric, oral language development, children's and adolescent literature, response to literature, the language arts associated with listening, representing, viewing, spelling, and handwriting instruction, along with instruction in comprehension. The purpose of the program is to strengthen practitioners' theoretical understanding of one or more of these sub-fields, and to develop skills that will enable them to conduct independent research into lan-

guage and literacy practices in their chosen area of concentration. Students in the program can anticipate experiences that range from general courses in curriculum development and implementation to specialized courses specific to their own needs and interests.

Admission and Program requirements are listed above. Specific course requirements are as follows:

- Required courses: EDUB 7530 and EDUA 5800
- Thesis-based students will select 3 credit hours and course-based students will select 6 credit hours from: EDUB 7070, EDUB 7100, EDUB 7180

- In addition, thesis-based students will select 6 credit hours and course-based students will select 18 credit hours from: EDUB 7060, EDUB 7070, EDUB 7090, EDUB 7100, EDUB 7110, EDUB 7120, EDUB 7150, EDUB 7170, EDUB 7180, EDUB 7190, EDUB 7200, EDUB 7290, EDUB 7420, EDUB 7550, EDUB 7560. Course-based students may also select from: EDUB 7330, EDUB 7540.

Second Language Education Specialization

The purpose of the Master's in Second Language Education (SLE) Program is to further the knowledge of experienced ESL teachers. Courses are designed to enable teachers to reflect on their teaching practices in light of influential and relevant research in second language acquisition/learning, curriculum theory and development, and SLE pedagogy. Students accepted into the program will be introduced to the research methodologies employed in educational research and in SLE, and will have the opportunity to develop expertise in one or more research methodologies.

Admission and Program requirements are those listed above. Specific course requirements are as follows:

Required courses: EDUB 7210, EDUB 7220, EDUB 7580, EDUA 5800.

In addition, thesis-based students will select 3 credit hours at the 7000 level from e.g., EDUB 7550, EDUB 7420, EDUB 7270, EDUA 7270, EDUA 7280; EDUA 7420, and course-based students will select 18 credit hours with a minimum of 9 credit hours at the 7000 level from e.g.: EDUB 5510, EDUB 5520, EDUB 5530, EDUB 5540, EDUB 5580, EDUB 5830, EDUB 7070, EDUB 7180, EDUB 7330, EDUB 7420, EDUB 7540, EDUB 7550, EDUB 7560, EDUA 7270/7280, EDUA 7420, or courses from the Faculties of Education or Arts of the University of Manitoba or other universities, in particular those within the Western Deans Agreement, and approved by the program advisor and the department head.

Course Descriptions

Adult and Post-Secondary Education

EDUB 7416 Teaching and Learning in Post-Secondary Education Cr.Hrs.3 An in-depth study of teaching and learning in post-secondary education contexts grounded in current theoretical, research and pedagogical literatures.

Arts Education

EDUB 7010 Seminar in Art Education 1 Cr.Hrs.3 (Formerly 132.701) An examination of the major historical, philosophical, psychological and socio-cultural foundations of art education. The study of major developments in each of these areas will form a basis for understanding current theory and practice. Not to be held with the former 063.725.

EDUB 7020 Seminar in Art Education 2 Cr.Hrs.3 (Formerly 132.702) The study of the methodology, content and problems of art education research, curriculum development and practice. Students will explore research methodology and curriculum design through individualized projects related to classroom practice. Not to be held with the former 063.726.

EDUB 7030 The Arts in Education Cr.Hrs.3 (Formerly 132.703) An examination of the role of the arts in general education. Emphasis will be placed on knowledge of the role of perception, aesthetic valuing and cognition in arts education, and application of this understanding and knowledge to educational practice. Not to be held with the former 063.750.

EDUB 7040 Seminar in Educational Drama Cr.Hrs.3 (Formerly 132.704) A critical examination of the literature and current research in educational drama. Consideration will be given to the philosophy, theory, and practice of drama in the classroom, and the evaluation of programs. Not to be held with the former 063.743.

EDUB 7050 Seminar in Educational Theatre Cr.Hrs.3 (Formerly 132.705) A critical examination of the literature and current research in educational theatre. Consideration will be given to the philosophy, theory, and practice of theatre in the school setting, and to the evaluation of programs. Not to be held with the former 063.744.

EDUB 7570 Contemporary Perspectives and Practices in Music Education Cr.Hrs.3 (Formerly 132.757) A study of current and emerging perspectives and practices in mu-

sic education with emphasis on recent theory and research as it relates to music teaching and learning at all levels.

Curriculum

EDUB 7280 Early Years Curriculum: Philosophical Traditions and Future Directions Cr.Hrs.3 (Formerly 132.728) An exploration and evaluation of models, issues, and priorities in Early Years curriculum (K-4). Participants will design curriculum which realizes and particularizes the theories, models, concepts and engagements being examined in the course. Not to be held with EDUB 7281 or the former 063.747.

EDUB 7290 Curriculum Research in Early Years: Young Children and Social Semiotics Cr.Hrs.3 (Formerly 132.729) An investigation of the social nature of learning and children's use of semiotic systems (language, art, music, dance, drama, and mathematics) as ways of knowing in the Early Years (K-4) classroom. Participants will conceive, organize, and conduct a research project that allows them to develop an understanding of children's use of one or more semiotic systems within a curriculum context. Not to be held with the former 063.748.

EDUB 7320 Twentieth Century Curriculum Development History and Biography Cr.Hrs.3 (Formerly 132.732) An examination of the innovators and institutions that have influenced curriculum development in the 20th century. Attention will be given to exemplars of curriculum ideology and their contributions to the field. Not to be held with the former 063.736.

EDUB 7330 Inquiry in Curriculum and Instruction Cr.Hrs.3 (Formerly 132.733) An examination of the issues involved in critiquing and synthesizing inquiry in curriculum and instruction studies in the humanities and social sciences. The course will also introduce students to the variety of ways in which inquiry may be conducted in instructional settings and will focus on how the research on curriculum and instruction can be validly synthesized across studies. Not to be held with the former 063.754. *Prerequisite:* EDUB 7550 (132.755)(C+) or 132.730 (C+) or permission from the instructor.

EDUB 7340 Topics in Curriculum: Humanities and Social Sciences Cr.Hrs.3 (Formerly 132.734) The study of selected topics in curriculum and instruction in the humanities and social sciences.

EDUB 7350 Independent Studies in Curriculum: Humanities and Social Sciences Cr.Hrs.3 (Formerly 132.735) Independent study of selected issues related to curriculum and instruction in the humanities and social sciences. This course may be used for field studies.

EDUB 7360 Topics in Curriculum: Mathematics and Natural Sciences 1 Cr.Hrs.3 (Formerly 132.736) A reading and research course in topics of significance to curriculum development in the areas of specialization offered by the Department.

EDUB 7370 Topics in Curriculum: Mathematics and Natural Sciences 2 Cr.Hrs.3 (Formerly 132.737) A continuation of EDUB 7360 for students engaging in readings and research too great in scope to be included within a three-credit program.

EDUB 7380 Field Seminar in Curriculum: Mathematics and Natural Sciences Cr.Hrs.6 (Formerly 132.738) An investigation of selected curricular programs in specific content fields as indicated by individuals and by educational institutions and systems. Project work will include visits and field investigations. Not to be held with the former 081.709.

EDUB 7420 Study of Teaching Cr.Hrs.3 (Formerly 132.742) Views of teaching, paradigms, and methodologies for studying teaching and carrying out inquiries into teaching. Not to be held with EDUB 7421 or the former 081.722.

EDUB 7540 Final Seminar in Curriculum, Teaching and Learning Cr.Hrs.3 (Formerly 132.754) Seminar and workshop on processes and products in writing and defending an M.Ed. final inquiry paper. Both qualitative and quantitative research models will be acknowledged. *Prerequisite:* Minimum 24 credit hours (C+ in each course) completed in a comprehensive M.Ed. Program. Not to be held with EDUB 7541.

EDUB 7550 Historical and Contemporary Approaches to Curriculum Cr.Hrs.3 (Formerly 132.755) Historical Developments of curriculum as a field of study and inquiry, including the philosophical, social, political, and cultural contexts of curriculum. Not to be held with the former 132.730 and 063.734.

EDUB 7560 Theory and Practice of Curriculum Design and Development Cr.Hrs.3 (Formerly 132.756) An examination of the theory and practice of the design, development, implementation and evaluation of curricula for K-12 and adult/post-secondary levels. Not to be held with the former 132.731 or 63.735.

EDUB 7980 Supervision of Educational Programs Cr.Hrs.3 (Formerly 132.798) A study of supervisory methods; staff roles and utilization; use and evaluation of materials and programs as these apply in one or more of the curricular areas. Not to be held with the former 081.703.

Educational Technology

EDUB 7450 Seminar in Educational Technology Cr.Hrs.3 (Formerly 132.745) A review of current research in educational technology and a critical appraisal of recent technology in instructional development. Not to be held with the former 081.721.

EDUB 7460 Information Technology and Education Cr.Hrs.3 (Formerly 132.746) A theoretic study of information media and environments, their educational and societal impact, and their educational application. Not to be held with the former 081.723.

Health/Physical Education

EDUB 7510 Educational Problems and Advanced Methods in Health and/or Physical Education Cr.Hrs.3 (Formerly 132.751) An examination of the relationship of research to educational practice in the teaching of health and/or physical education. Not to be held with the former 081.711.

EDUB 7520 Contemporary Curricula in Health and/or Physical Education Cr.Hrs.3

(Formerly 132.752) An examination of principles and content of health and/or physical education curricula and programs. Logistical and social-political factors associated with implementation will be examined. Not to be held with the former 081.712.

Language and Literacy

EDUB 7060 Seminar and Practicum in Clinical Diagnosis and Remediation Cr.Hrs.6 (Formerly 132.706) A thorough study of the etiology, diagnosis, and treatment of complex reading disabilities; practical experience under supervision in diagnosing reading problems and in prescribing, treating, interpreting, and reporting findings. Not to be held with the former 063.705. *Prerequisite:* EDUB 5400 (132.540)(C+).

EDUB 7070 Classical Research in Reading Cr.Hrs.3 (Formerly 132.707) A critical review, analysis, and synthesis of classical research studies in the psychology, psycholinguistics, sociology, and pedagogy of reading. Not to be held with EDUB 7071 or the former 063.713.

EDUB 7080 Designing, Conducting, and Evaluating Reading Research Cr.Hrs.3 (Formerly 132.708) A critical evaluation of current research in reading; emphasis on design, methodology, and statistical consideration for conducting reading research. Not to be held with the former 063.714. *Prerequisite:* EDUB 7070 (132.707)(C+).

EDUB 7090 Seminar in Reading Processes Cr.Hrs.3 (Formerly 132.709) A critical examination of theories and models of reading; a thorough study of the reading processes in relation to language, vision, hearing, neurological development, cognition and motivation. Not to be held with the former 063.739.

EDUB 7100 Language and Literacy Curriculum Inquiry in the Early Years Cr.Hrs.3 (Formerly 132.710) A study of language and literacy curriculum in the early years of schooling. Participants will identify and examine issues and problems arising out of theory, research, and curriculum practices in early years classrooms. Participants will have the opportunity to develop and pursue a curriculum project in accordance with their professional research interests. Not to be held with the former 063.755.

EDUB 7110 Research in Language and Literacy Development Cr.Hrs.3 (Formerly 132.711) An exploration of language and literacy development issues of professional interest to teachers. Participants will critically analyze language/literacy development theories, published research, and classroom observations. Opportunities will be created for participants to conduct their own language/literacy development inquiry in an educational setting. Not to be held with EDUB 7111 or the former 063.756.

EDUB 7120 Curricular Issues in English Language Arts Education Cr.Hrs.3 (Formerly 132.712) This course will address a number of problematic issues in the development and implementation of school-based instruction in English language arts through critically considering the relationship of current theory, research and pedagogy. Not to be held with the former 063.757.

EDUB 7140 The Legacy of Theory and the Teaching of Literature Cr.Hrs.3 (Formerly 132.714) This course provides an in-depth study of the writings of major theorists with a view to assessing critically the current and future influence of their theoretical legacy on the nature and direction of literacy instruction in the schools. Not to be held with the former 063.759.

EDUB 7150 Seminar in Reading and Response to Literature Cr.Hrs.3 (Formerly 132.715) This course is designed to familiarize students with the historical and philosophical trends in reading and response to literature; it will survey major developmental reading and literary response trends, examine the epistemological assumptions associated with those developments and explore the developing thought in how students process written texts, in particular, literary texts. The course will also examine curricular implications in reading and literary response. Not to be held with the former 063.760.

EDUB 7160 Language Teacher as Researcher Cr.Hrs.3 (Formerly 132.716) The purpose of this course is to investigate the characteristic parameters of teachers as researchers in the context of their own classroom. Three fundamental principles provide a curricular perspective to guide the participants: voice, conversation, and community. With this perspective, the language teacher engages in classroom inquiry with the goal of understanding language and teaching through the learners as curricular informants. Not to be held with EDUB 7161 or the former 063.761.

EDUB 7170 Rhetoric in Education Cr.Hrs.3 (Formerly 132.717) This course is intended to demonstrate how rhetorical theory can serve as a pattern for developing pedagogy in language, reading, and composition. The course will briefly cover classical models for rhetoric, but will focus on modern language and rhetorical theories and their relationships to developing curricula in language arts. Not to be held with the former 063.762.

EDUB 7180 Research in Written Composition Cr.Hrs.3 (Formerly 132.718) A critical analysis of research and research methods in written composition process and pedagogy. Consideration will be given to classic studies, historical development, current trends and research, and evaluation procedures as they apply to the study and teaching of writing. Not to be held with EDUB 7181 or the former 063.763.

EDUB 7190 Research in Language for Learning Cr.Hrs.3 (Formerly 132.719) A critical study of the research literature in how language can support learning in all areas of schooling. The course will focus on the role of language in supporting learning in all subject areas and will specifically investigate the research about the role of talking, reading, and writing as tools for learning. Not to be held with EDUB 7191 or the former 063.764.

EDUB 7200 Language Literacy and Policy Development Cr.Hrs.3 (Formerly 132.720) A survey seminar in how policy has been developed in literacy and how these policies impact on our conceptualizations of a literary curriculum and our definitions of literacy. An emphasis will be on concepts of functionality in literacy and policy in literacy education. Not to be held with EDUB 7201 or the former 63.765.

EDUB 7530 Curriculum Development and Implementation in Language and Literacy Cr.Hrs.3 (Formerly 132.753) A study of historical antecedents - issues, theory and research - in relation to both the reading and writing curriculum contrasted with cur-

rent structuralist, poststructuralist and deconstructivist views of knowledge construction with emphasis on discourse synthesis, individual cognitive processes and social influences on literacy learning. Not to be held with EDUB 7531. *Prerequisite:* A minimum of 3 credit hours of reading courses (C+).

Mathematics

EDUB 7470 Seminar in Mathematics Education Cr.Hrs.3 (Formerly 132.747) An analysis of methods and materials in mathematics education, a review of research, and a critical appraisal of current curriculum development. Not to be held with the former 081.720.

EDUB 7480 Advanced Seminar in Mathematical Diagnosis and Remedy Cr.Hrs.3 (Formerly 132.748) A close examination of the theory and practice of mathematical diagnosis and remedy across the school curriculum. Not to be held with the former 081.724. *Prerequisite:* permission of instructor.

EDUB 7490 Theories of Teaching Mathematics (Secondary) Cr.Hrs.3 (Formerly 132.749) An examination of the objectives of secondary school mathematics, mathematics curriculum organization and development, theories of learning and teaching secondary school mathematics, and mathematics assessment programs. Not to be held with the former 081.725.

Research and Evaluation

EDUA 7800 Methods of Educational Research Cr.Hrs.3 (Formerly 129.780) A study of design and data collection techniques for educational research in field settings. Topics covered include quasi-experimentation, survey and observational techniques, simulation, content analysis, and sociometry. Not to be held with EDUA 7801 or the former 043.709. *Prerequisite:* [EDUA 5800 or EDUA 5801 (129.580)(C+)] or [one of the former courses 129.680 (C+), 043.610 (C+)] or consent of instructor.

EDUA 7810 Evaluating Educational Programs Cr.Hrs.3 (Formerly 129.781) An introduction to current approaches to evaluating educational programs. A review of various evaluation methods/approaches, along with consideration of specific design, ethical, consulting and political issues will be the main focus of this course. Specific skills to be developed are the implementation of educational evaluations, data collection and analysis, and final report writing. Not to be held with the former 043.726.

EDUA 7840 Qualitative Research Methods in Education Cr.Hrs.3 (Formerly 129.784) An introduction to qualitative research methods. While the theoretical underpinnings of qualitative research will be discussed, emphasis is placed on learning to conduct a study including design, collecting and analyzing data, and research ethics. Not to be held with EDUA 7841. *Prerequisite:* EDUA 5800 or EDUA 5801 (129.580)(C+) or equivalent.

EDUA 7850 Design and Analysis of Educational Research (Quantitative) Cr.Hrs.3 (Formerly 129.785) A study of the use of quantitative methods of analyzing educational research data. Descriptive and inferential procedures commonly used in educational research will be discussed and students will learn to use statistical packages. The course will also address when it is appropriate to employ quantitative designs and present common designs and their associated analyses. *Prerequisite:* EDUA 5800 or EDUA 5801 (129.580)(C+). Not to be held with the former 129.681 or the former 43.535 or 43.611.

EDUA 7860 Advanced Topics in Educational Research Cr.Hrs.3 (Formerly 129.786) An advanced study of special topics in educational research with an in-depth study of specific topics which will change from year to year. *Prerequisite:* EDUA 5800 or EDUA 5801 (129.580)(C+) and permission of the instructor. Not to be held with the former courses 129.783 or 043.711

EDUA 7870 Measurement and Evaluation in Schools Cr.Hrs.3 (Formerly 129.787) An advanced study of the principles of measurement and evaluation and their application to teaching and learning in schools. Current issues in measurement and evaluation, including alternative forms of classroom assessment and standard setting, will be discussed. *Prerequisite:* EDUA 5810 or EDUA 5811 (129.581)(C+) or the former 043.301 (C+) or equivalent or consent of instructor.

EDUB 7600 Action Research in Education Cr.Hrs.3 The study of the theory and practice of action and participatory action research in education including models, principles and practices, criteria for assessing quality, ethics, and modes of representation. *Prerequisite:* EDUA 5800 or EDUA 5801 (129.580)(C+).

Science

EDUB 7500 Seminar in Science Education Cr.Hrs.3 (Formerly 132.750) A review of current research in science education, and a critical appraisal of current curriculum

development in science. Not to be held with the former 081.719. *Prerequisite:* [STAT 1000 (005.100)(C+) and STAT 2000 (005.200)(C+)] or [EDUA 5800 or EDUA 5801 (129.580)(C+)] or equivalent.

EDUB 7990 Seminar in Environmental Education Cr.Hrs.3 (Formerly 132.799) Designed for students wishing to concentrate on science teaching and learning within the context of environmental education. Existing and projected programs and approaches to environmental education will be subjected to critical analysis. Not to be held with the former 081.710.

Second Language Education

EDUB 7210 Seminar in E.S.L. Theory and Practice Cr.Hrs.3 (Formerly 132.721) Opportunity will be given to examine critically the major theories and methodologies used in E.S.L. instruction and research. Not to be held with the former 063.727.

EDUB 7212 Critical Applied Linguistics in a Global Context Cr.Hrs.3 We will examine the role of English comparatively and internationally in a variety of educational systems and regimes, relating the micro-relations of applied linguistics to the macro-relations of society, exploring the roles of critical theory in language teaching and learning, and developing self-reflexivity as scholars in second language education.

EDUB 7220 Research Issues and Application in TESL (Teaching English as a Second Language) Cr.Hrs.3 (Formerly 132.722) This course focuses on a survey of ESL and language development research issues, procedures, and findings. This research review will serve as the basis for students to plan individual research and conduct a pilot study. Not to be held with the former 063.753.

EDUB 7580 Theory and Research in a Second Language Acquisition Cr.Hrs.3 (Formerly 132.758) Examination of the development of the field of second language acquisition study, including historical views, issues, theories and models in relation to language universals, cognitive development, language mastery, and second language acquisition and learning.

Social Studies

EDUB 7250 Theoretical Foundations of the Social Studies Cr.Hrs.3 (Formerly 132.725) An examination of the development of social studies education, including the theories, research, ideas and ideologies that have and continue to shape social studies curriculum and pedagogy. Not to be held with the former 063.737.

EDUB 7260 Seminar in Social Science Education Cr.Hrs.3 (Formerly 132.726) An examination of current trends and developments in social science education as they affect the school curriculum at all grade levels, K-12. Particular attention will be paid to questions of curriculum contents, teaching strategies and student evaluation. Not to be held with the former 063.738.

EDUB 7270 Culture, Citizenship and Curriculum Cr.Hrs.3 (Formerly 132.727) An examination of the role of school curricula in preserving, transmitting and transforming conceptions and practices of culture and citizenship, with particular reference to social and political education in schools. Not to be held with the former 063.749.

Technical/Vocational

EDUB 7390 Curriculum in Vocational Education Cr.Hrs.3 (Formerly 132.739) A review of the major curriculum changes in vocational education with reference to the public school, the community college and post-compulsory institutions. Emphasis will be on models, supportive research and curricular design strategies. Not to be held with the former 081.714.

EDUB 7430 Trends in Vocational Education Cr.Hrs.3 (Formerly 132.743) An examination of the historical trends in vocational education as influenced by a changing society. Special emphasis will be placed on the contributions of individuals on the impact of federal and provincial legislation as it affects vocational education. Not to be held with the former 081.713.

EDUB 7440 Seminar in Home Economics Education Cr.Hrs.3 (Formerly 132.744) An application of current research to the design, implementation and evaluation of programs in home economics education. Not to be held with the former 081.716.

EDUB 7590 Internationalization of Technical and Vocational Education and Training Cr.Hrs.3 (Formerly 132.759) An exploration and critical evaluation of basic assumptions underlying the theories and values of globalization and the internationalization of technical and vocational education and training (TVET). Emphasis will be placed on the examination of how these theories and values influence institutions, programs, policies and practices in TVET.

Section 18: Dental Diagnostic and Surgical Sciences

For information about graduate programs in the following units: Oral Biology or Preventative Dental Science please refer to the table of contents for page numbers.

Oral and Maxillofacial Surgery

Head: A. Shah

Head, Oral and Maxillofacial Surgery: A. Shah

General Office: D343-790 Bannatyne Avenue

Telephone: 204 789 3633

Fax: 204 272-3077

E-mail: oral_surgery@umanitoba.ca

Website: umanitoba.ca/faculties/dentistry/gradPrograms/grad_OMS

Graduate Program Assistant: H. Katrick

Academic Staff

Professors

Shah, A., B.Sc., B.D.S. (Pakistan), M.D.S. (Manchester), F.R.A.C.D.S (Australia), F.D.S.R.C.S (Edinburgh), F.F.D.R.C.S (Ireland)

Associate Professors

Ahing, S.I., B.Sc. (Sir George Williams), D.D.S. (McGill), M.S.D. (Indiana), F.R.C.D.; **Cohen**, M., B.Sc., B.D.S., M.Dent. (Witwatersrand), F.R.C.D. (C); **Curran**, J., B.D.S. (NUI), F.R.C.D.(C), F.F.D., R.C.S. (Ireland); **Elgazzar**, R., B.D.S. (Egypt), MSc (Egypt), PhD (UK); **Perry**, J.B., A.R.C.T., D.M.D. (Manitoba), Cert. Oral Path. (Emory), M.Sc. (Manitoba);

Assistant Professors

Cottick, C., BSc (Manitoba), D.M.D. (Manitoba) **Dale**, C., D.M.D. (Manitoba), Dip. O.M.S. (Manitoba); **McFadden**, L., D.D.S. (Alberta), M.Sc. (Dalhousie), M.R.C.D.(C); **Penner**, C., D.D.S. (Missouri), F.R.C.D.(C); **Stoykewych**, A.A., B.S. (Manitoba), D.M.D. (Manitoba), Dip. O.M.S. (Manitoba)

Program Information

The Master of Dentistry (Oral and Maxillofacial Surgery) which is four years in length includes a four-year hospital residency for which a Post-Graduate Training Certificate is awarded. Usually one student is accepted per year. The program has full accreditation from the Commission on Dental Accreditation of Canada. The primary objective of the program is to train dentists to become competent, ethical Oral and Maxillofacial surgeons for practice in Canada, and to provide them with a scientifically based curriculum which will prepare them for the challenges they will face in the development of their speciality, throughout their professional careers.

The clinical program provides comprehensive training in all the major areas generally included within the scope of practice of an Oral and Maxillofacial Surgeon. Students are provided with opportunities to attend and present papers at National and International conferences related to aspects of their speciality and an external elective rotation is permitted subject to approval of the Program Director.

Fields of Research

Faculty supervises every student in at least one research project during the training period and their interests provide for a wide spectrum of clinically related topics. Dental implants, maxillofacial trauma, temporomandibular disorders, cleft lip and palate, tissue regeneration and wound healing, cranio-facial deformity, surgical pathology, including head and neck oncology, oral medicine and therapeutics are examples of areas in which faculty have published and have a continuing interest. Collaborative research with other departments is encouraged and does occur.

Research Facilities

The research facilities in the Faculties of Dentistry and Medicine, the Health Sciences Centre and related institutions in the Winnipeg Regional Health Authority are extensive, accessible, and provide opportunities for a wide range of research endeavours by graduate students in Oral and Maxillofacial Surgery.

Master of Dentistry (Oral and Maxillofacial Surgery)

Admission Requirements

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, applicants must be Canadian citizens or permanent residents of Canada and be in possession of a National Dental Examining Board of Canada Certificate. They must comply with provincial requirements for licensing of interns and residents. Some additional post-graduate experience is desirable.

Application Deadlines

Students must submit their application and supporting documentation to the Faculty of Graduate Studies by September 1st, prior to the year of admittance. The normal starting date is July 1st.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students must complete: all clinical rotations and assignments as set out in the four years of hospital residency training; courses DDSS 7230, DDSS 7240, DDSS 7250, DDSS 7260, DDSS 7270, DDSS 7280 and DDSS 7290; ancillary course ANAT 7060, CHSC 7470 and other basic science courses as selected by the department. An essay/research project DDSS 7220 in a specified area selected in consultation with the department is required.

Second Language Reading Requirement: None

Expected Time to Graduate: Four years

Ph.D.

There is no Ph.D. Program in Dental Diagnostic and Surgical Sciences

Periodontics

Head: A. Shah

Head, Periodontics: Shirley Gelskey (Acting)

Director, Periodontology Clinic: G. Nogueira

General Office: D343 - 790 Bannatyne Avenue

Telephone: 204 789 3633

Fax: 204 272-3077

E-mail: periodontics@umanitoba.ca

Website:

umanitoba.ca/faculties/dentistry/gradPrograms/grad_periodontics

Graduate Program Assistant: H. Katrick

Master of Dentistry (Periodontics)

Academic Staff

Senior Scholar

Singer, D.L., D.D.S. (Alberta), Ph.D., Dip. Perio (Manitoba), F.I.C.D.

Professors

Birek, C., D.D.S. (Turgu-Mures), Ph.d. (Toronto), Dip.Oral Path. (Toronto); **Gelskey**, S.C., B.Sc. (D.H.) (Marq.), M.P.H (Michigan), Ph.D. (Manitoba); **McNicol**, A., B.Sc., Ph.D. (Glasgow); **Scott**, J.E., B.Sc. (Brandon), M.Sc., Ph.D. (Manitoba); **Shah**, A., B.Sc., B.D.S. (Pakistan), M.D.S. (Manchester), F.R.A.C.D.S (Australia), F.D.S.R.C.S (Edinburgh), F.F.D.R.C.S (Ireland)

Associate Professors

Ahing, S.I., B.Sc. (Sir George Williams), D.D.S. (McGill), M.S.D. (Indiana), F.R.C.D.; **Curran**, J B.D.S. (NUI), F.R.C.D.(C), F.F.D., R.C.S. (Ireland); **Perry**, J.B., A.R.C.T., D.M.D. (Manitoba) F.R.C.D.(C), Cert. Oral Path. (Emory), M.Sc. (Manitoba); **Pesun**, I. J., D.M.D. (Manitoba), M.Sc. (Georgia), F.A.C.P., Diplomate ABP; **Nogueira**, G., D.D.S (Brazil), M.Dent (Brazil), Ph.D (Brazil)

Assistant Professors

Cholakis, A., B.A., D.M.D., Dip. Perio (Manitoba) F.R.C.D.(C); **Hayduk**, S., D.M.D. (Manitoba); **Hyman**, G., D.M.D. (Manitoba), Cert. Perio (Oregon); **Todescan**, S., D.D.S. (Brazil), MSc (Brazil), PhD (Brazil).

Program Information

Introduction

The three-year Master of Dentistry (Periodontics) Program is one of only four graduate periodontics programs in Canada. The program accepts two students every two of three years. At any given time there are four students in the program. The program entails clinical training, lectures, seminars in the clinical and related basic sciences and research. The program is certified and fully accredited by the Commission on Dental Accreditation of Canada and, as such, is also recognized by the American Dental Association.

The mission of the program is to educate dentists to be scientifically-based, clinically-competent, and community-concerned, ethical periodontists. The program provides periodontal consultation and treatment services, including dental implants, to patients attending the dental school and patients referred by dentists in Winnipeg and throughout Manitoba. Students are provided the opportunity to treat a full range of periodontal problems and to participate in on-going clinical and basic periodontal research. The Graduate Periodontics Clinic simulates a private periodontics practice and provides dental hygienist and dental assistant support to students. In addition, a clinic is held at the adjacent Health Sciences Centre where periodontal consultative and treatment procedures are provided for patients who have serious medical conditions.

Fields of Research

Research interests of faculty involved with the program include (a) clinical trials of therapeutic interventions in the treatment of periodontitis and peri-implantitis, (b) diagnosis of periodontal diseases, and (c) the effect of tobacco on periodontal tissues and smoking cessation initiatives in Periodontics and (d) oral systemic relationships. In addition, collaborative research opportunities are available in such areas as saliva, calculus and plaque formation, the microbiology of periodontitis and cell signaling mechanisms, through the Department of Oral Biology.

Research Facilities

In addition to the clinical facilities, general laboratories, radiographic and darkroom facilities of the Faculty of Dentistry, there is access to equipment belonging to the Department of Oral Biology. Clinical facilities are also available at the adjacent Health Sciences Centre Hospital. The Grad Perio Clinic has high-tech instruments for research like Periotron and Florida Probe.

Admission Requirements

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, applicants must have a D.M.D. degree or its equivalent from an approved college or university.

Application Deadlines

Students must submit their application and supporting documentation to the Faculty of Graduate Studies by September 1, prior to the year of admittance. The normal starting date is August 1.

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, students must complete: courses DDSS 7010, DDSS 7050, DDSS 7120, DDSS 7130, DDSS 7150, DDSS 7210, DDSS 7230 and DDSS 7300; ancillary courses ANAT 7060, CHSC 7470, ORLB 7090, ORBL 7110 and other basic sciences as selected by the department; An essay/ research project (DDSS 7220) in a specified area selected in consultation with the department.

Second Language Reading Requirement: None

Expected Time to Graduate: Three years

Ph.D.

There is no Ph.D. Program in Dental Diagnostic and Surgical Sciences

Course Descriptions

DDSS 7010 Biology and Pathology of the Periodontium Cr.Hrs.6 (Selected topics in cell biology precedes a comprehensive and detailed survey of the periodontium, its constituent tissues and its function; the cell dynamics of inflammation and wound healing and the histopathology of the early and advanced periodontal lesion.

DDSS 7050 Oral Medicine and Oral Diagnosis Cr.Hrs.12 This course provides the student, through clinical rotations, with the opportunity to enhance diagnostic and non-surgical management of oral pathologic conditions including mucosal and intraoral lesions, temporomandibular joint disorders, and oral manifestations of systemic disease in both otherwise healthy and medically compromised patients.

DDSS 7120 Advanced Clinical Periodontics Cr.Hrs.18 This seminar course will review contemporary clinical periodontics by considering assigned readings in current

texts and review articles. This course is intended to assure that students have a comprehensive overview of conventional periodontal therapy early in their education.

DDSS 7130 Occlusion Cr.Hrs.6 A seminar series devoted to the diagnosis, treatment planning and management of patients with craniomandibular disorders.

DDSS 7150 Review of Periodontal Literature Cr.Hrs.6 This course will consider the basic concepts underlying the current practice of periodontics by reviewing assigned readings from the scientific literature. Students will be expected to apply principles of critical evaluation in order to identify and appreciate the limitations of these studies and thus the limitations of the current concepts derived from them.

DDSS 7210 Clinical Practice in Periodontics Cr.Hrs.18 Designed to provide the clinical experience which is essential for specialty practice in Periodontics (circa 1600 hours).

DDSS 7220 Essay/Research Project Cr.Hrs.3 An essay/research project is required for each student. It is selected in consultation with, and approved by the program director and department head. This course is graded pass/fail.

DDSS 7230 Advanced Oral Pathology Cr.Hrs.6 The four major etiopathogenic categories of diseases affecting the oral and paraoral structures are discussed with emphasis on common conditions and entities significant to various dental specialties. Lectures cover epidemiology, clinical and laboratory features and management principles with supplementation by seminars or laboratories.

DDSS 7240 Advanced Oral and Maxillofacial Surgery Seminar 1 Cr.Hrs.3 This course includes a thorough review of the applied scientific basis for the practice of oral and maxillofacial surgery and emphasizes surgical anatomy and pathology, diagnosis and technique. Instruction will be given by means of lectures, seminars, case presentations and a critical review of current literature. Year I.

DDSS 7250 Clinical Advanced Oral and Maxillofacial Surgery 1 Cr.Hrs.6 The first year of hospital residency includes training in history taking and physical diagnosis; hospital protocols and ward procedure; minor oral surgery procedures and pain control techniques; operating room procedures and general in-patient care. Year I.

DDSS 7260 Advanced Oral and Maxillofacial Surgery Seminar 2 Cr.Hrs.3 Lectures, seminars, case presentations and reviews of current literature will emphasize the state of current knowledge regarding the clinical practice of advanced oral and maxillofacial surgery. Year II.

DDSS 7270 Clinical Advanced Oral and Maxillofacial Surgery 2 Cr.Hrs.6 The second year of the hospital residency training program includes training in minor oral surgery, including dento-alveolar, pre-prosthetic surgery and implantology. It also provides an introduction to advanced oral and maxillofacial surgery and maxillofacial imaging. A rotation to Internal Medicine is included. Year II.

DDSS 7280 Clinical Advanced Oral and Maxillofacial Surgery 3 Cr.Hrs.6 The third year of the hospital residency training program includes rotations in Anaesthesia, Internal Medicine, General and Plastic Surgery, Surgical Intensive Care and Emergency Room. It also includes training in advanced oral and maxillofacial surgery. An elective rotation may also be arranged. Year III.

DDSS 7290 Clinical Advanced Oral and Maxillofacial Surgery 4 Cr.Hrs.6 The fourth year of the hospital residency training program is devoted to advanced oral and maxillofacial surgery. The student is designated senior resident and assumes a greater degree of responsibility in patient care and administrative activities. Year IV.

DDSS 7300 Dental Implantology Cr.Hrs.3 A seminar course devoted to providing an in-depth understanding of the basic and applied aspects of the placement of dental root form implants in humans. This course is a *prerequisite* to the actual surgical placement of implants undertaken in DDSS 7210.

Section 19: Design and Planning

For information regarding programs offered by the following units:

Architecture

City Planning

Interior Design

Landscape Architecture

Please see the table of contents for page numbers.

Head and Graduate Chair: Associate Dean (Research)

General Office: 201 Russell Building

Telephone: (204) 474 9458

Fax: (204) 474 7532

E-mail: architecture@umanitoba.ca

Website:

<http://umanitoba.ca/faculties/architecture/programs/Phd/index.html>

Academic Staff

Professors

Blake S., B.E.S. (Waterloo), M.Eng., D.Eng. (Tokyo), M.C.I.P.; **Bridgman R.**, B.A., B.Music (Toronto), M.A., Ph.D. (York), M.C.I.P.; **Skelton I.**, B.A., M.U.P., (McGill), Ph.D. (York), M.C.I.P.; **Witty D.**, B.A. (Hons.), M.A. Urban & Reg. Plan. (Waterloo), Ph.D. (British Columbia), M.R.A.I.C., F.C.I.P.

Associate Professors

Beecher, Mary Anne, B.A., M.A. (Iowa State University, Ames Iowa), M.A., Ph.D. (University of Iowa, Iowa City), IDEC, ASA, VAF; **Eaton M.**, B.E.S. (Manitoba), Ph.D. (Edinburgh Coll. of Art, Heriot Watt); **Perron R. P.**, B.Sc., M.N.R.M. (Manitoba), Ph.D. (Victoria); **Karpan C.**, B.I.D., M.Ed., Ph.D. (Manitoba); **Milgrom R.**, B.E.S. (Manitoba), M.Arch. (Pennsylvania), Ph.D. (York), M.A.A., M.C.I.P.; **van Vliet D.**, B.A. (Fine Arts) (Saskatchewan), M.E.Des. (Calgary), Ph.D. (UBC), M.C.I.P.; **Wight J. B.**, M.A. (Aberdeen), M.Sc. (Alberta), Ph.D. (Aberdeen), M.C.I.P.

Assistant Professors

Close S., B.F.A. (Saskatchewan), M.A. (Carleton), Ph.D. (Amsterdam); **Mal-lory-Hill S.** B.E.S., M.Arch. (Manitoba), Ph.D. (Eindhoven);

Program Information

The Ph.D. in Design and Planning in the Faculty of Architecture is a Faculty based program under the general supervision of the Doctoral Studies Committee. The Doctoral Studies Committee is responsible for the general administration of the Program, in accordance with the policy guidelines approved by the Faculty of Architecture Council and, where applicable, the Faculty of Graduate Studies. In essence, the Doctoral Studies Committee exercises the responsibilities assigned to a Department Head by the Faculty of Graduate Studies in the case of department-based graduate pro-

grams. The Doctoral Studies Committee is composed of five members and is chaired by the Associate Dean (Research). The remaining members of the Doctoral Studies Committee, all of whom hold a doctorate or equivalent, are appointed by the Departmental Councils of the Faculty of Architecture.

In addition to the regulations, policies and procedures of the Faculty of Graduate Studies which govern Ph.D. programs (see the Graduate Calendar of the University of Manitoba), the Faculty of Architecture has adopted these supplemental regulations to govern the Faculty-based Ph.D. Program.

Please note that the existing Ph.D. program areas in the Faculty of Architecture are: Design and Planning Technologies; Planning and Design Education; Planning and Design Practice; Planning and Design Theory; and Sustainable Planning and Design. Candidates will be required to specialize in one of these five areas.

Admission

Admission to Ph.D. in Design and Planning program is competitive. A number of factors are taken into account in arriving at an admission decision: (1) the applicant's previous academic background, (2) the practice-based and/or academic experience of the applicant, (3) the referees' assessments of the applicant, (4) the ability of the Faculty to provide the program of studies and research requested by the applicant, (5) the funding support that the applicant has obtained and/or confirmed, and (6) the availability of a faculty member that has expertise in the research area and is willing to supervise the program of studies and research of the applicant.

Students who have a Masters degree in a planning or design discipline (architecture, planning, interior design or landscape architecture or equivalent related degree [e.g., industrial design, urban design]) from a recognized institution and who have met the requirements of the Faculty of Graduate Studies will be eligible for consideration to the program.

Students who possess a Masters degree in another field outside of the Design and Planning disciplines from a recognized institution may be considered if they have an undergraduate degree in planning or a design discipline from a recognized institution and have an accumulated grade point average of 3.75 in their Masters degree.

Candidates must demonstrate that they have an established record in professional practice and/or professional education, and have demonstrated interdisciplinary experience and/or knowledge. It is recommended that candidates have a minimum of five years of professional practice experience and/or have taught at a recognized institution for a minimum of five years.

Candidates will declare a specialization in one of five following areas: Building Structures and Technologies; Planning and Design Education; Planning and Design Practice; Planning and Design Theory; and Sustainable Planning and Design. Candidates to the program will provide: (a) a Problem Statement and Study/Research Rationale (i.e., a description of proposed study [minimum of 5 pages and maximum of 10 pages]); (b) a dossier of their work; (c) evidence of financial support; and (d) three letters of reference (at least one of whom will be an academic) from distinguished members of the planning and/or design profession(s) or equivalent institutions. All candidates to the program will be interviewed by at least three faculty members, two of whom will be from the Faculty of Architecture.

Application Deadlines

Due to funding opportunities, all completed applications must be received by the Faculty of Graduate Studies by the second Friday of October of the year preceding September registration. For updated information please visit the Faculty of Architecture website.

Program Requirements

Each student will be required to take a minimum of 12 credit hours of 700 level courses of which 6 credit hours must include two Faculty of Architecture courses, namely Advanced Theory of Design and Planning (3) and Advanced Research Methods in Design and Planning (3). Students should complete their course work by the end of their first year.

All students will complete a Comprehensive Research Paper and a Comprehensive Design and Planning Theory Project by the end of their second year.

IMPORTANT NOTE:

Each student is responsible for ensuring that they have approval for and have registered in the courses appropriate for their area of study, as determined in consultation with their Advisor and their Advisory Committee.

Coursework:

Coursework is subject to the following regulations:

Each student will be required to take a minimum of 12 credit hours of 700 level courses of which 6 credit hours must include Advanced Theory of Design and Planning (3) and Advanced Research Methods in Design and Planning (3).

All candidates will complete a Comprehensive Research Paper, and a Comprehensive Design and Planning Theory Project.

A minimum of 6 credit hours of coursework at the 700 level must be in the student's program area and must include the program core coursework appropriate to the student's program area. The program area coursework is specific to the individual student and is defined by the Advisory Committee;

Where necessary, the student may be required to complete additional background coursework as identified by the Advisory Committee.

On the recommendation of the Advisory Committee and with the approval of the Doctoral Studies Committee, a maximum of 3 credit hours may be transferred into the program from other approved institutions.

Comprehensive Research Paper and Comprehensive Design and Planning Project:

The Comprehensive Research Paper is a literature review that examines potential research methods appropriate for the student's doctoral studies program. The student's Advisor will be responsible for reviewing the Comprehensive Research Paper and determining if it is acceptable or not acceptable. If a Comprehensive Research Paper is deemed by the Advisor to be unacceptable, the student will re-submit the Paper to the Advisor. If the Advisor deems that the re-submitted Comprehensive Research Paper is still not acceptable, the Advisor will submit the Comprehensive Research Paper to the Associate Dean: Research who will make the final determination of acceptability. The Associate Dean: Research's opinion will be final. Should a student fail to have their re-submitted Comprehensive Research Paper accepted, they will be asked to withdraw from the Ph.D. Program.

The Comprehensive Design and Planning Project is a project that will explore the student's area of research interest and identify preliminary considerations that will be explored in detail in the doctoral thesis. The Comprehensive Design and Planning Project will be a written and/or design based submission that is reviewed by the student's Advisory Committee. The Advisory Committee will determine by majority if the Comprehensive Design and Planning Project is acceptable or unacceptable. If the Comprehensive Design and Planning Project is deemed to be unacceptable, the student will be requested to re-submit their work until the Advisory Committee deems the Comprehensive Design and Planning Project acceptable. The Advisory Committee may ask the student to withdraw from the Ph.D. program if the re-submitted Comprehensive design and Planning Project is deemed unacceptable.

IMPORTANT NOTE:

As soon as the student and advisor agree upon the program of studies, the program forms must be completed and submitted by the Advisor to the Chair of the Doctoral Studies Committee for approval. These forms are available online:

umanitoba.ca/faculties/graduate_studies and umanitoba.ca/architecture

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. The Ph.D. program consists of coursework, original research and thesis. Normally, 12 credit hours of coursework (all at the 700 level) are required beyond the Master's degree or its equivalent. The minimum time requirement is two calendar years of full-time study and research, of which at least one academic year must be spent on campus.

Second language requirement: none

Expected time to graduation: Two to Four years

Course Descriptions for Ph.D. in Design and Planning

ARCG 7100 Advanced Theory of Design and Planning (3) This course is intended to promote critical thinking and provide opportunities to explore in detail key issues, ideas and theories about design and planning. Considerations may include: The relationship of design and planning theories to the evolution of design and planning practice; Ways in which design and planning theories have been understood to shape built form; Factors that have shaped design and planning theories, their commonalities and disjuncture; Theory discourse as a means of discovering design and planning meaning; The role of theory in practice, research and discovery; The relationship of design and planning theories to other discipline theories as a means of identifying commonalities of interest.

ARCG 7120 Advanced Research Methods in Design and Planning (3) This course is intended to explore research methods pertinent to the study of design and planning. The considerations to be examined may include: Potential research tools and techniques that are pertinent to the exploration of design and planning theory, practice and development; Exploration of emerging research processes and methodologies that inform minority and feminist discourse; Review of the evolution of design and planning methods; Analysis of the relationships between research methods in aligned disciplines as those research methods may inform design and planning understanding.

Course Descriptions for Ph.D. in Design and Planning

ARCG 7100 Advanced Theory of Design and Planning Cr.Hrs.3 This course is intended to promote critical thinking and provide opportunities to explore in detail key issues, ideas and theories about design and planning. Considerations may include: The relationship of design and planning theories to the evolution of design and planning practice; Ways in which design and planning theories have been understood to shape built form; Factors that have shaped design and planning theories, their commonalities and disjuncture; Theory discourse as a means of discovering design and planning meaning; The role of theory in practice, research and discovery; The relationship of design and planning theories to other discipline theories as a means of identifying commonalities of interest.

ARCG 7120 Advanced Research Methods in Design and Planning Cr.Hrs.3 This course is intended to explore research methods pertinent to the study of design and planning. The considerations to be examined may include: Potential research tools and techniques that are pertinent to the exploration of design and planning theory, practice and development; Exploration of emerging research processes and methodologies that inform minority and feminist discourse; Review of the evolution of design and planning methods; Analysis of the relationships between research methods in aligned disciplines as those research methods may inform design and planning understanding.

Section 20: Disability Studies

Director: Dr. Nancy E. Hansen

General Office: 128 Education Building

Telephone: (204) 474-7017

Fax: (204) 474-6676

E-mail: disability_studies@umanitoba.ca

Website: umanitoba.ca/disability_studies

Graduate Program Assistant: Tanis Woodland

Academic Staff

Distinguished Professors

McCance, D., B.Sc., M.A., Ph.D., (Manitoba);

Professors

Freeze, D.R., B.A., B.Ed. (Queen's), M.A., Ph.D. (Victoria); **Fuchs, D.M.**, B.A. (Regina), M.S.W. (Calgary), Ph.D. (Toronto); **Heinonen, T.**, B.A. (Alberta), B.S.W. (Calgary), M.S.W. (McGill), D.Phil. (Sussex); **LeBow, M.D.**, B.A. (UCLA), M.A. Ph.D. (Utah); **Lutfiyya, Z.M.**, B.A. (Manitoba), M.S., Ph.D. (Syracuse); **Mactavish, J.**, B.P.E. (UBC), M.Sc. (Manitoba), Ph.D. (Minnesota); **Stienstra, D.**, B.A. (Hons.) (Alberta), M.A., Ph.D (York).

Associate Professors

Blais, C., B.Sc., M.Sc., Ph.D. (Ottawa); **Etcheverry, E.**, Dip.O.T., B.O.T., M.Ed., Ph.D. (Manitoba); **Enns, C.**, B.Sc., M.Cl.Sc. (Western Ontario), Ph.D. (Manitoba); **MacPherson, D.L.**, LL.B. (Dalhousie), LL.M. (Cantab.).

Assistant Professors

Hansen, N.E., B.A., B.A. (Hons.), M.A. (Carleton, Ottawa), Ph.D., (Glasgow); **Warne, V.K.**, B.A. (Hons.), M.A., Ph.D. (Queen's).

Program Information

The focus of the program allows students to examine the policies and practices of all societies in order to understand the social, rather than the physical or psychological determinants, of the experience of disability. This focus shifts the emphasis from a prevention, treatment, remediation paradigm to a social, cultural, political one.

We offer an interdisciplinary Master's Degree Program in Disability Studies. We also offer a graduate level Option in Disability Studies that is available to both Master's and Doctoral students.

Students in the Master's Program will have the opportunity to apply their undergraduate degrees and work experience to pursue advanced interdisciplinary research and scholarship. Students taking the Option in Disability Studies will complement their major program area of study with course work which analyses the social construction of disability.

M.A./M.Sc. in Disability Studies

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Graduates of honours or equivalent programs at the University of Manitoba (or equivalent from other recognized universities) with a minimum Grade Point Average (GPA) of 3.0 in the last 60 credit hours, are eligible for direct admission to a course of study leading to the Master's degree. Students who have completed a University of Manitoba Pre-Master's program with a minimum GPA of 3.0 are also eligible for admission. Pre-Master's programs taken at other universities may be accepted.

Students who wish to pursue the M.Sc. are required to have an undergraduate degree in Science.

Students with undergraduate degrees from a wide range of disciplines – such as Architecture, Arts, Education, Human Ecology, Engineering, Law, Management, Medical Rehabilitation, Medicine, Nursing, Physical Education and Recreation Studies, Science, Social Work and Women's Studies - will be considered eligible to apply if they meet the above requirements.

Students who do not meet current admission requirements may contact Disability Studies for advice on appropriate options.

Application Deadlines

The deadline for receipt of the program application form and supporting documents in the department for a September admission is March 1 for International students and June 1 for Canadians and Americans as well as permanent residents. For January admission, the deadlines are July 2 for International applicants and October 1 for Canadian applicants. Students who wish to apply for scholarships and fellowships need to have their applications in by February 1 (for a September admission) or one month prior to the University's deadline for the scholarship application.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar.

The Master's Degree in Disability Studies requirements are twenty-four credit hours; eighteen credit hours of required course work, six credit hours of elective course credit, plus a thesis. The six credit hours of elective courses can be taken from a list of approved courses at the 3000, 4000, 5000 or 7000 level.

M.Sc. students will be required to take at least six hours of elective credit hours at the 7000 level in science subjects in those Faculties participating in the M.Sc. The student's Advisory Committee or the Disability Studies Graduate Program Committee may require other additional science courses at the 3000 or 4000 level. It should be noted that students will normally

be required to fulfil 7000 level course prerequisites before enrolling in 7000 level courses.

All academic programs must be approved by the Disability Studies Graduate Program Committee. This is normally done on the recommendation from the student's advisor and/or Advisory Committee following consultation with the student.

Option in Disability Studies

Admission

The Option in Disability Studies is offered to students in faculties and departments that currently have a graduate program. Upon completion of the requirements, a concentration in Disability Studies will be recorded on the student's transcript. For information concerning the option, interested students are directed to their student advisor or to the Director of Disability Studies.

Program Requirements

The Option in Disability Studies requirements are DS 7010 (6) Disability Studies and either DS 7020 (3) The History of Disability or DS 7030 (3) Evaluation and Application of Research Methods in Disability Studies.

Section 21: Economics

Head: David Stangeland, Acting Head

Graduate Office: 504 Fletcher Argue

Telephone: (204) 474 6240

Fax: (204) 474 7681

E-mail: Economics@umanitoba.ca

Website: umanitoba.ca/arts/economics/

Academic Staff

Professors Emeriti

Cameron, N., B.A. (Queens), Ph.D. (Michigan); Ph.D.; **Rempel, H.**, B.Comm. (Manitoba) **Waterman, A.M.C.**, B.A., M.A. (Cambridge), Ph.D. L(Australian National University)

Senior Scholars

Gray, J.A., B.S.F. (UBC), M.Sc.(Econ.) (London), Ph.D. (Michigan); M.A. (Ohio), Ph.D. (Wisconsin); **Dennis, K.**, B.Comm.,M.A. (Manitoba), Ph.D. Oxford; **Vorst, J. I.**, Ph.D.(Equiv.) (Netherlands School of Economics).

Professors

Chernomas, R., B.A. (Bridgeport), M.A., Ph.D. (New School of Social Research); **Dean, J.M.**, B.Comm. (St.Mary's), M.A. (Dalhousie), Ph.D.(VPI); **Hum, D.**, B.Sc.(Hons.) (Mount Allison), M.A. (Oxford), Ph.D. (Toronto); **Loddell, R.A.**, B.A. (Kansas), M.A. (Wisconsin), Ph.D. (McGill); **Loxley, J.**, B.A.(Hons.), Ph.D. (Leeds) F.R.S.C.; (London); **Sepehri, A.**, B.A. (National University of Iran), M.A., Ph.D. (Alberta); **Simpson, W.**, Ph.D. (London)

Associate Professors

Baragar, F., B.A. (Winnipeg), M.A. (Manitoba), Ph.D. (Utah); **Brown, L.**, B.A. (Alberta), M.A. (Carleton), Ph.D. (Queen's); **Chuchman, G.**, B.A., M.A. (Manitoba), Ph.D. (Western Ontario); **Dhruvarajan, P. S.**, B.Sc. (Mysore), M.A. (Chicago), Ph.D. (Northwestern); **Guard, J.**, B.A.(Western Ontario), M.E.S., (York), Ph.D. (Toronto); **Gunay, H.**, B.S., M.S. (METU-Turkey), M.A., Ph.D. (Iowa); **Hudson, I.**, M.A. (Carleton), Ph.D. (Manitoba); **Lipnowski, I.F.**, M.A. (Manitoba), Ph.D. (London); **Mason, G.C.**, Ph.D. (UBC); **Troutt, E.**, B.S. (Cornell), M.A., Ph.D. (Wisconsin-Madison)

Assistant Professors

Camfield, D., B.A.,M.A., Ph.D. (York); **Compton, J.**, B.A. (Concordia), M.A. (Dalhousie), M.A., Ph.D. (Washington State, St. Louis); **Compton, R.**, B.A. (Winnipeg), M.D.E. (Dalhousie), M.A., Ph.D. (Washington, St. Louis); **Serieux, J.**, B.A.(Toronto), M.A.(Cornell), M.A., Ph.D. (Toronto); **Jiang, J.**, B.Eng., M.Sc. (Beijing), Ph.D. (Simon Fraser); **Kim, Y.**, B.A., M.A. (Korea Univ), M.A.,Ph.D. (Washington); **Oguzoglu, U.**, B.A.(McMaster), M.A., Ph.D. (Guelph); **Smith, J.**, B.A. (McMaster), M.A. (Simon Fraser), Ph.D. (McMaster); **Witt, J.**, B.A. (Toronto),M.A., Ph.D (Guelph)

Adjunct Professors

Benarroch, M., B.A., (Winnipeg), M.A. (Western Ontario), Ph.D. (Carleton); **Buckland, J.** B.A. (Calgary), M.A. L(Carleton), Ph.D. (Manitoba);

Course Descriptions

DS 7010 Disability Studies Cr.Hrs.6 (Formerly 162.701) Explores the key concepts and issues in disability studies. Includes a critical examination of models and theories of disability, Canadian and other national laws and international standards, social and economic policy, and professional and service responses.

DS 7020 History of Disability Cr.Hrs.3 (Formerly 162.702) Traces the historical development of responses to disability, by the medical/rehabilitation community, the governments, advocacy organizations and others. Canadian history will be the initial framework and the historical developments in other countries (including the UK, France, the USA, the Caribbean) will be used as a comparison. Pre- or co-requisite: DS 7010 (or 162.701)

DS 7030 Evaluation and Application of Research Methods in Disability Studies Cr.Hrs.3 (Formerly 162.703) Provides a critical evaluation of quantitative and qualitative research methodologies used in disability studies. Methods to address disability used in different disciplines as well as transformative and empowerment methodologies such as participatory action and feminist disability research will be examined. Pre- or co-requisite: DS 7010 (or 162.701)

DS 7040 Selected Topics in Disability Studies Cr.Hrs.3 (Formerly 162.704) One key theme will be chosen for each year from the interests and availability of faculty. Topics could include women with disabilities, international dimensions of disability, disability policy and practice, disability organizing and other topics developed over time. Pre- or co-requisite: DS 7010 (or 162.701)

Dong, X., M.A., Ph.D. (Alberta); **Tedds, L.**, B.A. (Carleton, Victoria), M.A. (Victoria), Ph.D. (McMaster)

Program Information

The Department of Economics offers graduate instruction leading to MA and PhD degrees, as well as a Pre-MA program. Enrolment is limited in order to sustain the flexibility and other advantages of a small graduate program and to tailor the program to individual needs. Students in the program come from Canada and around the world. Departmental funding policies are geared to the maintenance of a broad, international student base.

The Department of Economics at the University of Manitoba is both heterodox and policy-oriented. Faculty are heavily involved in shaping policy locally as well as at the national and international levels. Faculty have strong ties to economic research and forecasting organizations, international aid agencies and institutes for social policy research. Faculty members include neoclassicists, Keynesians, post-Keynesians, Marxists, institutionalists, empiricists, and econometricians. In addition to the standard economics curriculum, graduate students can choose from a variety of approaches and research areas, as well as take advantage of the department's openness to research topics that extend beyond the bounds of the department itself.

Fields of Research

Faculty interests span the areas of labour economics, macro and micro economics, public finance, development, international trade, econometrics, environmental and resource economics, sustainable development, institutional economics, economic history, history of economic thought, health economics, alternative economic theory, and agricultural economics.

Research Facilities

The university has a Research Data Centre providing close access to Statistics Canada confidential data files. The department also maintains close links to other departments on campus in order to facilitate student learning in a wide range of areas. Graduate students are encouraged to do interdisciplinary research associated with the Transport Institute, the Natural Resources Institute, the Centre on Aging, and the Labour and Workplace Studies program. These centres offer academic expertise, facilities, grass roots connections, and, occasionally, funding opportunities. PhD fields in the department are classified as: agricultural economics, applied econometrics, applied microeconomics, development economics, and heterodox economics.

M.A. in Economics

Admission

Applicants with a B.A. (Hons.) degree in Economics from the University of Manitoba, or its equivalent, may be admitted to the M.A. degree program. All M.A. students must successfully complete ECON 6040 as the first

course of their program, which will be taken during a two-week period immediately preceding the first term of each academic year. However, applicants lacking the level of education normally required, i.e. B.A. (Hons.) in Economics or equivalent, for entry into the M.A. program or to the M.A. year of a Ph.D. program will be expected to acquire these qualifications in one or more pre-M.A. years.

Application Deadline Dates

September Admission

January 15 (International Students) May 1 (Canadian/Canadian permanent residents/US Students)

Please send application and all supporting documentation directly to the Faculty of Graduate Studies. Please note that students applying to the Department of Economics must submit 3 letters of reference with their application.

Please note that the Department of Economics does not normally accept students in the January session as the required Math and Theory courses start in the fall.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. Department requirements can be found in the Departmental Supplementary Regulations available from the department.

MA including thesis: Master's in Economics students must complete ECON 6040 and 15 credit hours of coursework. Courses will be at the 7000 level, with the following exceptions. If deemed necessary by the Graduate Studies committee, a maximum of six credit hours may be permitted at the 4000 level if the field is not offered at the 7000 level in Economics or at the 3000 level or above in an ancillary field. Students must also complete a suitable thesis.

MA, without a thesis: Alternatively, candidates may complete the M.A. degree by coursework and research paper. A minimum of 27 credit hours of coursework is required, including ECON 6040 and ECON 7000. Courses will normally be at the 7000 level. If deemed necessary by the Graduate Studies committee, a maximum of six credit hours may be permitted at the 4000 in Economics if the field is not offered at the 7000 level or at the 3000 level or above in an ancillary field.

A minimum of six credit hours of coursework in economic theory at the graduate level is normally required. The theory requirement consists of ECON 7650 and ECON 7722. On the recommendation of the student's advisor and with the approval of the Graduate Studies Committee, a student completing a thesis may be allowed to substitute an ancillary course for part of the theory requirement.

Ancillary courses are normally selected from disciplines related to Economics and to a candidate's thesis (e.g., political studies, sociology, history, statistics, mathematics).

Second Language Reading Requirement: none
Expected Time to Graduate: one year

Ph.D. in Economics

Admission

1) Except as provided in 2) below, applicants for admission to the Ph.D. program must have completed the entrance requirements and the program requirements of an M.A. degree in Economics or in Agricultural Economics equivalent to that awarded by the University of Manitoba.

2) In exceptional cases, applications may be considered from students who have completed an Honours degree in Economics equivalent to that awarded by the University of Manitoba. In such cases, the applicant will be required to fulfill, in addition to the requirements below, all coursework requirements for the M.A. degree by comprehensive examination option.

Application Deadline Dates

September Admission

January 15 (International Students) May 1 (Canadian/Canadian permanent residents/US Students)

Please send application and all supporting documentation to the Faculty of Graduate Studies. Please note that students applying to the Department of Economics must submit 3 letters of reference with their application.

Please note that the Department of Economics does not normally accept students in the January session as the required Theory courses start in September.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. Ph.D. students in Economics must complete:

- A minimum of 24 credit hours of course work at the 7000 level. No more than 6 credit hours may be taken in a department other than Economics as part of this minimum course work requirement, if deemed necessary by the Graduate Studies committee in consultation with the student's supervisor.
- A minimum of 36 credit hours of 7000 level courses in their M.A. and Ph.D. programs. These 36 credit hours must include:
 - A minimum of 12 credit hours in economic theory. The theory requirement will normally be ECON 7650, ECON 7660, ECON 7722, and ECON 7732. Upon the recommendation of a student's advisory committee, the Graduate Studies Committee may permit a student to substitute two of the following for ECON 7660 and ECON 7732: ECON 7670 and ECON 7740.
 - 3 credit hours of Econometrics at the 7000 level, 3 credit hours of heterodox economics at the 7000 level and either 3 credit hours of History of Economic Thought or Economic History.

Fields of Concentration and Candidacy Examinations

Students must present themselves for one set of theory candidacy examinations. The theory examination consists of microeconomic and macroeconomic theory, which are assessed separately. Students must choose two fields of concentration and complete a research paper in one of the fields: Fields from which a student may select are:

Agricultural Economics	Development Economics
Applied Econometrics	Heterodox Economics
Applied Microeconomics	

The Ph.D. in Agricultural Economics is offered with the cooperation with the Department of Agribusiness and Agricultural Economics. For information on faculty, course offerings and specialization, contact the department of Agribusiness and Agricultural Economics.

Second language requirement: none
Expected time to graduation: four years

Course Descriptions

ECON 6010 Urban Economic Issues Cr.Hrs.3 Not currently offered.

ECON 6020 Macroeconomic Theory: Survey and Applications Cr.Hrs.3 A review of the principles of contemporary macroeconomic theory and of the application of that theory, in both closed and open economies.

ECON 6030 Microeconomic Theory: Survey and Applications Cr.Hrs.3 A review of the principles of contemporary microeconomic theory and of the application of that theory, in both closed and open economies.

ECON 6040 Survey of Mathematical Topics for Economists Cr.Hrs.3 A review of mathematical concepts used in economics, particularly at the graduate level. Topics include linear economic systems and matrix algebra, differentiation and optimisation, integration, economic dynamics and optimisation through time, and difference and differential equations. This course cannot be counted toward the minimum degree requirements for M.A. and Ph.D. degrees. This course is graded pass/fail.

ECON 7000 M.A. Research Workshop Cr.Hrs.3 An examination of research methodology to assist students in understanding the process of research in Economics. Students will complete a research project under direct supervision. This is a required course for students in the M.A. by course work. *Prerequisite:* permission of department head.

ECON 7010 - Econometrics I Cr. Hrs. 3 An advanced course in estimation and hypothesis testing in various regression models. Topics may include: asymptotic distribution theory; ordinary least squares estimation; maximum likelihood estimation; generalized least squares estimation; generalized method of moment estimation; and seemingly unrelated regressions estimation.

ECON 7020 - Econometrics II Cr. Hrs. 3 An advanced applied course in cross-section and panel data econometrics. Topics may include logit, probit, heckman selection, and poisson; instrumental variables, difference-in-differences, regression discontinuity; fixed and random effects; dynamic panel models; quantile regression, nonparametric estimation; bootstrapping. *Prerequisite:* ECON 7010.

ECON 7032 – Econometrics III Cr.Hrs.3 Theory and applications of time-series analysis. Topics may include stationary univariate process; maximum likelihood estimation; Markov-switching models; state-space models; unit root process; vector autoregressive models; spurious regression; cointegration; and vector error correction

models. Students cannot hold credit for both ECON 7032 and the former ECON 7030. Prerequisite: ECON 7010

ECON 7040 Topics in Applied Microeconomics I Cr.Hrs.3 Advanced study in a selected topic in applied microeconomics. Topics covered in rotation include, but are not limited to labour economics, health economics, public finance, industrial organization, international trade, environmental economics evaluation of public policy production economics and applied game theory. Prerequisite: ECON 7722.

ECON 7050 Topics in Applied Microeconomics II Cr.Hrs.3 Advanced study in a selected topic in applied microeconomics. Topics to be covered in rotation include, but are not limited to labour economics, health economics, public finance, industrial organization, international trade, environmental economics evaluation of public policy production economics and applied game theory. Prerequisite: ECON 7722.

ECON 7060 Advanced Heterodox Theory Cr.Hrs.3 This course is a review and examination of heterodox economic theory. Core topics include the theory of capitalist production, effective demand and economic fluctuations, growth and accumulation, crisis theory, and the state and economic policy.

ECON 7130 Advanced Development Economics Cr.Hrs.3 Introduction to development economics at the graduate level. A core objective is to provide breadth in terms of the coverage of salient topics in economic development and rigor in terms of the level of analysis. The course presumes a substantive background in the basic tools of economic analysis. This is a required course for doctoral students who intend to make development economics one of their field specializations.

ECON 7140 Topics in Development Economics Cr.Hrs.3 A generic course title intended to accommodate various topics in development economics. The specific topic will be chosen by the instructor.

ECON 7170 Topics in Heterodox Economics I Cr.Hrs.3 Selected study of advanced work in a selected field of heterodox economics.

ECON 7180 Topics in Heterodox Economics II Cr.Hrs.3 Selected study of advanced work in a selected field of heterodox economics.

ECON 7200 Industrial Organization Cr.Hrs.6 The structure of industries; nature and performance of markets. Anti-combines legislation. Characteristics of public enterprise. Problems of regulations of industry.

ECON 7210 Comparative Economic Systems Cr.Hrs.6 Not currently offered.

ECON 7230 Directed Special Studies in Economics Cr.Hrs.6 Intensive study of advanced work in a selected field of economics. As the course content will vary from year to year, students may take this course more than once for credit.

ECON 7300 Directed Special Studies in Economics Cr.Hrs.3 First term of ECON 7230 (or 018.723). As the course content will vary from year to year, students may take this course more than once for credit.

ECON 7310 Research Seminar in Economics Cr.Hrs.3 Not currently offered.

ECON 7330 National and Social Accounting Cr.Hrs.3 Not currently offered.

ECON 7350 Public Finance: Public Expenditures Cr.Hrs.3 The role of government expenditures and criteria for their evaluation. Public goods theory. Externality problems. Public choice. Benefit-cost analysis. Public enterprising pricing.

ECON 7360 Public Finance: Taxation Cr.Hrs.3 Examination of income, profits, sales, property and other taxes, their allocational and distributional effects. Canadian tax policy. Tax incentives. Resource taxation. Intergovernmental fiscal relations in Canada and elsewhere. Public debt.

ECON 7430 Advanced Theory of Resource Economics Cr.Hrs.3 Economic theory of the development and management of natural resources. Application of capital theory, investment theory, the theory of externalities and decision-making theory to resource utilization and management. A strong background in microeconomics is required. Also offered as ABIZ 7430 by the Department of Agribusiness and Agricultural Economics.

ECON 7440 Renewable Resource Economics Cr.Hrs.3 A research seminar in applied economic analysis of the development and management of renewable natural resources, agriculture, environmental quality, forestry, fisheries, game, outdoor recreation and other renewable resources. Also offered as ABIZ 7440 by the Department of Agribusiness and Agricultural Economics.

ECON 7450 Non-Renewable Resource Economics Cr.Hrs.3 A research seminar in applied economic analysis of the development and management of non-renewable resources, concentrating on specific topics and policy issues in energy and mineral resources. Also offered as ABIZ 7450 by the Department of Agribusiness and Agricultural Economics.

ECON 7500 Monetary and Financial Theory Cr.Hrs.3 The microeconomics of money and other financial assets, in partial and general equilibrium frameworks. Explanation of financial market structure and behaviour with and without costless information. Students may not hold credit for both ECON 7500 (or 018.750) and the former 018.704.

ECON 7510 Advanced Monetary Macroeconomics Cr.Hrs.3 Mainstream and other

theories of how money matters to macroeconomics, theory and practice of policy rules for both monetary and other stabilization policy tools. Students may not hold credit for both ECON 7510 (or 018.751) and the former 018.704.

ECON 7540 Advanced History of Economic Thought Cr.Hrs.3 Detailed study of a selected topic, or a selection of related topics, in the history of economic thought. Topic(s) vary from year to year, and are normally related to the research interests of the instructor(s) and/or students.

ECON 7610 Approaches, Methodologies and Techniques in Economic History Cr.Hrs.3 A review of methodologies, approaches, techniques, and contemporary controversies in economic history.

ECON 7620 Selected Studies in Economic History Cr.Hrs.3 Not currently offered.

ECON 7630 Theory of International Trade Cr.Hrs.3 Theories of trade flow; trade and income distribution; economic growth and changes in trade flows; instruments of trade intervention; international labour and capital movements; and economic integration.

ECON 7640 International Money and Finance Cr.Hrs.3 Analysis of the theory of international money and finance. Assessment of existing international institutions dealing with money and finance. Theory, rationale and evaluation of structural adjustment policies. Prerequisite: ECON 7630 (or 018.763), or both ECON 7500 (or 018.750) and ECON 7510 (or 018.752) (or the former 018.704), or permission of instructor.

ECON 7650 Advanced Macroeconomic Theory 1 Cr.Hrs.3 A review of contemporary macroeconomic theories and their applications; analysis of static equilibrium and disequilibrium models; exploration of such models' implications for cyclical behaviour and for policymaking. Prerequisite: ECON 6040 (or 018.604) which may be waived on demonstration of equivalent mathematical competence.

ECON 7660 Advanced Macroeconomic Theory 2 Cr.Hrs.3 Analysis of cyclical models and of equilibrium growth models, and a review of contemporary theories of stabilization policy. Prerequisite: ECON 7650 (or 018.765).

ECON 7670 Advanced Macroeconomic Topics Cr.Hrs.3 Not currently offered.

ECON 7690 Structuralist Theories of Development Cr.Hrs.3 Study of structuralist classical Marxist and Neo-Marxist theories of development and underdevelopment. Appraisal of the development strategies which follow from the various theories.

ECON 7722 Advanced Microeconomic Theory I Advanced Microeconomic Theory I Cr. Hrs. 3 This course will cover topics in theories of consumer demand, production and cost, distribution, market equilibrium, market organization, general equilibrium and welfare. Students may not hold credit for both ECON7722 and the former ECON7720 (018.772) Prerequisite: ECON 6040 (or 018.604) which may be waived on demonstration of equivalent mathematical competence.

Econ 7732 Advanced Microeconomic Theory II Cr. Hrs. 3 This course will cover topics in game theory. Static and dynamic games with complete or incomplete information will be studied. Topics such as market failure arising from asymmetric information, firm behaviour in oligopolistic markets, auctions, signaling, free riding, externalities, and public goods will be discussed. Students cannot hold credit for both ECON7732 and the former ECON7730 (018.773) Prerequisite: ECON7722. ECON 7720 (or 018.772).

ECON 7740 Advanced Topics in Microeconomic Theory Cr.Hrs.3 Not currently offered.

ECON 7760 Multinational Enterprise and Nation States Cr.Hrs.3 Not currently offered.

ECON 7770 Economics of Marx Cr.Hrs.3 An intensive study of Marx's mature theory and especially of 'Capital'. 'Theories of Surplus Value', and 'the Grundrisse'.

ECON 7780 Debates in Marxian Economics Cr.Hrs.3 An analysis of the major theoretical debates within the Marxian paradigm.

ECON 7790 Advanced Labour Economics Cr.Hrs.3 A review of the theoretical and empirical foundations of modern labour economics.

ECON 7800 Labour Problems and Policies Cr.Hrs.3 A course dealing with various contemporary problems and controversies in labour economics. Prerequisite: ECON 7790 (or 018.779).

ECON 7900 Advanced Agricultural Marketing Cr.Hrs.3 Critical evaluation of micro-theory vis-a-vis technical and economics structure of plants; theory of location in relation to time, form and space. Also offered as ABIZ 7100 in the Department of Agribusiness and Agricultural Economics.

ECON 7940 Production Economics Cr.Hrs.3 Development of static microeconomic theories of the firm, functional forms, aggregation issues, productivity analysis, risk and uncertainty and in introduction to dynamics. The following are emphasized: a rigorous treatment of the models using duality; a critical understanding of the limitations and possibilities for generalizing the models; and relevance of the models for empirical research, especially in agriculture. Also offered as ABIZ 7940 by the Department of Agribusiness and Agricultural Economics. May not be held with ABIZ 7940 (or 061.794) or 018.794 or ABIZ 7130 (or 061.713).

Section 22: Education - Collège universitaire de Saint-Boniface

Head and Graduate Chair: L. Rivard

General Office: 200 de la Cathédrale Avenue

Telephone: (204) 233 0210

Fax: (204) 233 0217

E-mail: 2ecycle@cusb.ca

Website: www.cusb.ca

Administrative Assistant: Kelly Bado
Graduate Student Coordinator: Johanne Boily

Program Information

The Department offers the following specializations: Inclusive Special Education; Educational Administration; Guidance and Counselling; Lan-

guage, Literacy and Curriculum. Some courses are the French equivalent of the courses offered at the Faculty of Education, University of Manitoba. Many courses are specific to French education in the Province of Manitoba.

Contact the department for information on this program of study.

Section 23: Education - Ph.D.

For information about graduate programs in the following units: Collège universitaire de Saint-Boniface, Curriculum, Teaching and Learning, or Educational Administration, Foundations and Psychology please refer to the table of contents for page numbers.

Head and Graduate Chair: Z.M. Lutfiyya

General Office: 227 Education Building

Telephone: (204) 474 7886

Fax: (204) 474 7551

E-mail: edgradpr@umanitoba.ca

Website: umanitoba.ca/education

Academic Staff

Deans Emeriti

Magsino, R., B.A. (Magna Cum Laude), B.Sc., Ed. (Magna Cum Laude) (Luzon), M.Ed. (Sydney), M.A., Ph.D. (Wisconsin); **Stapleton, J.J.**, B.S. (Iona), M.T.S. (C.U.A.), M.A., Ph.D. (Toronto).

Professors Emeriti

Jenkinson, D.H., B.A., B.Ed. (Manitoba), B.L.S., M.Ed. (Alberta), Ph.D. (Minnesota); **Poonwassie, D.**, B.A. (Manitoba), B.Ed., M.Ed., Ph.D. (Oregon); **Riffel, J.A.**, B.A., M.Ed. (Saskatchewan), Ph.D. (Alberta); **Schulz, W.E.**, B.A. (Winnipeg), B.Ed. (Manitoba), M.Ed., Ph.D. (Wyoming); **Trosky, O.**, B.A., B.Ed., M.Ed. (Manitoba), Ph.D. (Toronto); **Wilson, K.**, M.A. (Sheffield), M.Ed. (Manitoba), Ph.D. (Michigan State); **Zakaluk, B.L.**, B.A., B.Ed., M.Ed. (Manitoba), Ph.D. (Minnesota).

Senior Scholars

Crippen, C., B.A. (Carleton), M.Ed. (Ottawa), Ph.D. (North Dakota); **Long, J.C.**, B.Ed. (Alberta), M.Ed. (Calgary), Ph.D. (Alberta); **Mathews, P.G.**, B.Ed., M.Ed. (Manitoba), Ph.D. (Minnesota); **Rosenstock, S.A.**, B.A. (Manitoba), M.A. (North Dakota), Ph.D. (Ohio State); **Schulz, R.**, B.A. (Manitoba), M.Ed. (Queen's), Ph.D. (North Dakota); **Schulz, W.E.**, B.A. (Winnipeg), B.Ed. (Manitoba), M.Ed., Ph.D. (Wyoming); **Spencer, P.**, B.A., B.Ed., M.Ed., Ed.Dip. (New York).

Professors

Bartell, R., B.A., M.A. (Hebrew University, Jerusalem), Ph.D. (Chicago); **Cap, O.**, B.A. (Quebec), M.Ed. (Rutgers), Ph.D. (Ohio State); **Clifton, R.A.**, B.Ed., M.Ed. (Alberta), Ph.D. (Toronto), Ph.D. (Stockholm); **Freeze, D.R.**, B.A., B.Ed. (Queen's), M.A., Ph.D. (Victoria); **Hlynka, L.D.**, B.Sc., B.Ed. (Manitoba), M.A. (Minnesota), Ph.D. (Michigan State); **Kanu, Y.**, B.A., Dip.Ed., M.Ed. (Sierra Leone), Cert.Curr.Dev.Soc.St. (Leeds), B.Litt. (Birmingham), Ph.D. (Alberta); **Lutfiyya, Z.M.**, B.A. (Manitoba), M.Sc., Ph.D. (Syracuse); **Morin, F.**, A.C.M. (Affiliate Teacher Toronto), B.P.E., M.Ed. (Manitoba), Ph.D. (North Dakota); **Morphy, D.R.**, B.A. (Alberta), M.A. (Calgary), Ph.D. (Michigan State); **Seifert, K.L.**, B.A. (Swarthmore), M.A., Ph.D. (Michigan); **Stapleton, J.J.**, B.S. (Iona), M.T.S. (C.U.A.), M.A., Ph.D. (Toronto); **Stinner, A.O.**, B.A., B.Sc., B.Ed. (Alberta), M.Sc. (York), Ed.D. (Toronto); **Straw, S.B.**, B.A., M.A. (Missouri), Ph.D. (Minnesota); **Wiens, J.R.**, B.A., B.Ed., M.Ed. (Manitoba), Ph.D. (Simon Fraser); **Young, J.C.**, B.A., M.A. (Durham), P.G.C.E. (Cambridge), M.Ed. (Queen's), Ph.D. (Toronto).

Associate Professors

Enns, C., B.Sc., M.Cl.Sc. (Western), Ph.D. (Manitoba); **Kouritzin, S.**, B.A., M.A., Ph.D. (British Columbia); **Lewthwaite, B.**, B.Sc., B.Ed. (Saskatchewan), M.Ed. (Masse), Sc.Ed.D. (Curtin); **Mandzuk, D.**, B.Ed., M.Ed., Ph.D. (Manitoba); **Mani, P.**, B.Ed. (Alberta), M.Ed. (Ottawa), Ph.D. (Victoria); **Mason, R.**, B.Ed., M.A. (Calgary), Ph.D. (Alberta); **Piquemal, N.**, DEUG, Licence, Maitrise, D.E.A. (Strasbourg), Ph.D. (Alberta); **Renauld, R.**, B.A. (Hons.), M.A., Ph.D. (Western Ontario); **Serebrin, W.**, B.A., B.Ed. (Dalhousie), Ph.D. (Indiana); **Smith, K.**, B.F.A., Cert.Ed. (Manitoba), M.Ed. (British Columbia), Ph.D. (Manitoba); **Wallin, D.** B.Ed., M.Ed., Ph.D. (Saskatchewan).

Assistant Professors

Atleo, M., B.H.E., M.A., Ph.D. (British Columbia); **Babiuk, G.**, B.A. (Royal Military College), M.Ed. (Alberta), Ph.D. (OISE/Toronto); **Black, J.**, B.A. (Guelph), B.Ed. (Toronto), M.A. (Concordia), Ph.D. (OISE/Toronto); **Bryan, G.**, B.Sc., M.A. (Brigham Young), Ph.D. (British Columbia); **Casey, C.**, B.P.H.E. (Hons), B.Ed. (Toronto), M.A. (Western Ontario), Ph.D. (OISE/Toronto); **Cranston, J.** B.Sc., B.Ed. (Alberta), M.Ed. (Lethbridge), Ph.D. (Manitoba); **Deer, Frank, B.** Ed., M.Ed. (Manitoba), Ph.D. (Saskatchewan); **Falkenberg, T.**, First State Examinations of Studienrate, Ph.D. (Free University, Berlin), Post.Bac.D., Ph.D. (Simon Fraser); **Fitznor, L.**, B.A., M.Ed. (Manitoba), Ed.D. (Toronto); **Hechter, R.**, B.Sc. (Winnipeg), B.Ed. (Winnipeg), M.Ed. (Manitoba), Ph.D. (North Dakota); **Katz, J.**, B.A. (Hons. (Ottawa), B.Ed., M.A., Ph.D. (British Columbia); **Li, Y.**, B.A. (Shanghai International Studies, China), M.Ed., Ph.D. (Alberta); **McCabe, G.**, B.A. (Winnipeg), M.Ed., Ph.D. (Manitoba); **McMillan, B.A.**, M.Sc. (Winnipeg), B.Sc. (Hons.), M.Sc., Ph.D. (Manitoba); **Schmidt, C.**, B.A. (York), M.A. (Carleton), Ph.D. (OISE); **Ukasoanya, G.**, B.Ed. (Calabar, Nigeria), M.Ed. (Jos, Nigeria), Ph.D. (Michigan State).

Adjunct Professor

Binda, K. B.A. (Laurentian), B.Ed., M.Ed. (Toronto); **Green, F.**, B.A. (Winnipeg), M.A. (York), Ph.D. (Manitoba); **Mactavish, J.**, B.P.E. (British Columbia), M.Sc. (Manitoba), Ph.D. (Minnesota); **Schnitzer, D.**, B.A. (Hons.) (Western Ontario), M.A. (Calgary), Ph.D. (Manitoba); **Trott, C.J.**, B.A. (Hons.) (Toronto), B.Th. (McGill), Ph.D. (Toronto); **VanWalleghem, J.**, B.A. (Manitoba), M.S. (Wisconsin), Ph.D. (Idaho).

Cross Appointments

Dodd, J., B.Sc., M.Sc., Ph.D. (Toronto); **Halas, J.**, B.P.E. (Manitoba), M.Sc. (Ottawa), Ph.D. (Alberta).

Program Offerings

Each year, the Faculty offers a cohort in a specified area of study. The Faculty also considers applications through an individualized, or "ad hoc" route. For more information, see our website://umanitoba.ca/education/

Ph.D. in Education

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this *Calendar*, successful applicants must possess:

- an earned Master's degree from a recognized institution (The M.Ed. comprehensive route at the University of Manitoba is typically a terminal degree. That is, it is insufficient, in number and of itself, as evidence of research capacity for admission into the Ph.D. program in Education at the University of Manitoba);
- a minimum Grade Point Average of 3.0 in the last 60 credit hours;
- an appropriate academic background as defined by the program area to which admission is being sought; and
- appropriate research capability as evidenced by: a thesis from a recognized institution; a major research paper equivalent to a thesis from a recognized institution; an independently completed research article published in a refereed journal; or a research product equivalent to one of the categories above; and appropriate occupational experience such as: teaching in schools or non-school settings; post-secondary teaching; practice in school counselling; psychology, or a similar helping profession; educational administration; administrative experience in a government department; or experience equivalent to one of the five categories above.

Admission to the Ph.D. in Education program is competitive. A combination of factors are taken into account in arriving at an admission decision:

the applicant's previous academic background; the referees' assessments of the applicant; the ability of the faculty to provide the program of studies and research requested by the applicant; and the availability of a faculty member competent and willing to supervise the program of studies and research of the applicant.

The application deadline date for the Ph.D. in Education program is January 15, for admission in the following September.

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this *Calendar*, students must complete a minimum of 24 credit hours of coursework. The minimum coursework is comprised of a minimum of 12 credit hours in the program area; a minimum of six credit hours in a cognate area; and a minimum of six credit hours of research methods/analysis. A minimum of 18 credit hours must be at the 7000 level. All courses taken in the Faculty of Education must be at the 7000 level or above. Courses taken outside the Faculty of Education must be at the 3000 level or above. A minimum of 12 credit hours of coursework must be taken in the Faculty of Education. In addition, a minimum of 6 credit hours normally must be taken outside of the Faculty of Education of the University of Manitoba.

Residence Requirement: Ph.D. students must devote two terms at the University of Manitoba to full-time study. One term is Fall (September to December), Winter (January to April), or Summer (May to August). Students may not be employed full-time during their residency.

Second Language Reading Requirement: None

Expected Time to Graduate: 3 to 4 years for full-time studies

Course Descriptions

EDUC 7030 Doctoral Tutorial in Education Cr.Hrs.3 (Formerly 124.703) A course of directed independent study relevant to a student's area of doctoral specialization. *Prerequisite:* GRAD 8010 (069.801) Candidacy Examination.(P)

EDUC 7040 Current Issues in Mathematics Education Cr.Hrs.6 (Formerly 124.704) An investigation of topics of current theoretical and practical significance in mathematics education. Students will be required to complete a series of explorations, typically involving observation or experimentation in the field, which will be the focus of discussion.

EDUC 7050 Doctoral Study in Education Cr.Hrs.3 (Formerly 124.705) Directed

study of contemporary research and theory in selected areas within the field of education. The content of this course will vary from year to year and will depend upon students' research interests.

EDUC 7060 Advanced Seminar in Educational Administration 1 Cr.Hrs.3 (Formerly 124.706) A study of alternative conceptions of educational administration, from its origins as a field to the present. Attention will be given both to historical and contemporary theories of administration. Limited to Ph.D. students and compulsory for Ph.D. students with a focus in educational administration.

EDUC 7070 Advanced Seminar in Educational Administration 2 Cr.Hrs.3 (Formerly 124.707) A consideration of some of the central problems of contemporary social theory and their relationship to the study and practice of educational administration. The course is limited to Ph.D. students and is compulsory for Ph.D. students with a focus in educational administration. *Prerequisite or concurrent:* EDUC 7060 (124.706)(C+).

EDUC 7080 Language and Rhetoric Education Cr.Hrs.3 (Formerly 124.708) Current theories of language with a particular emphasis on concepts of education as discourse and instruction as a rhetorical activity. *Prerequisite:* admission into the Ph.D. program in Language and Literacy Education.

EDUC 7090 Language Arts Curriculum Cr.Hrs.3 (Formerly 124.709) How current research, scholarship and theorizing in the areas of language, literature and curriculum studies can assist in developing fresh approaches to reconceiving the nature and purpose of the language arts curriculum as a linguistic, political and cultural enterprise. *Prerequisite:* admission into the Ph.D. program in Language and Literacy Education.

EDUC 7100 Reading Education Cr.Hrs.3 (Formerly 124.710) Current trends, curricular issues and new concerns in reading education including the continuing tension between traditional and progressive ideologies. Identifies, from a historical perspective, what has changed, what has not and why; reflects on what is known and what to study; and sets a research agenda for the study of literacy. *Prerequisite:* admission into the Ph.D. program in Language and Literacy Education.

EDUC 7110 Doctoral Seminar in Science Education Cr.Hrs.3 (Formerly 124.711) An exploration of current research, scholarship and thinking in science education as exemplified by key themes and current issues related to science and science education. *Prerequisite:* admission into the Ph.D. program in Science Education.

EDUC 7120 Current Issues in Science Education Cr.Hrs.3 (Formerly 124.712) An examination of current issues in science education by way of selected topics tailored to individual students' programs and interests. *Prerequisite:* admission into the Ph.D. program in Science Education.

EDUC 7130 Language and Identity in Second Language Contexts Cr.Hrs.3 (Formerly 124.713) An exploration of linguistic and cultural issues arising from the internationalization of English as a second language (ESL) teaching and learning, including current research of linguistic imperialism, linguistic human rights, cultural hybridization, sexual politics, and the feminization of speech. *Prerequisite:* EDUB 7210 (132.721) (C+) or permission of instructor.

Section 24: Educational Administration, Foundations and Psychology

For information about graduate programs in the following units: Collège universitaire de Saint-Boniface, Curriculum, Teaching and Learning, or Education (Doctoral) please refer to the table of contents for page numbers.

Head and Graduate Chair: C. Enns

General Office: 227 Education Building

Telephone: (204) 474 7886

Fax: (204) 474 7551

E-mail: edgradpr@umanitoba.ca

Website: umanitoba.ca/education

Academic Staff

Dean Emeriti

Magsino, R., B.A. (Magna Cum Laude), B.Sc., Ed. (Magna Cum Laude) (Luzoniano), M.Ed. (Sydney), M.A., Ph.D. (Wisconsin); **Stapleton, J.J.**, B.S. (Iona), M.T.S. (C.U.A.), M.A., Ph.D. (Toronto).

Professors Emeriti

Poonwassie, D., B.A. (Manitoba), B.Ed., M.Ed., Ph.D. (Oregon); **Riffel, J.A.**, B.A., M.Ed. (Saskatchewan), Ph.D. (Alberta); **Schulz, W.E.**, B.A. (Winnipeg), B.Ed. (Manitoba), M.Ed., Ph.D. (Wyoming); **Wilson, K.**, M.A. (Sheffield), M.Ed. (Manitoba), Ph.D. (Michigan State).

Senior Scholars

Crippen, C., B.A. (Carleton), M.Ed. (Ottawa), Ph.D. (North Dakota); **Long, J.C.**, B.Ed. (Alberta), M.Ed. (Calgary), Ph.D. (Alberta); **Schulz, W.E.**, B.A. (Winnipeg), B.Ed. (Manitoba), M.Ed., Ph.D. (Wyoming).

Professors

Bartell, R., B.A., M.A. (Hebrew University, Jerusalem), Ph.D. (Chicago); **Clifton, R.A.**, B.Ed., M.Ed. (Alberta), Ph.D. (Toronto), Ph.D. (Stockholm); **Freeze, D.R.**, B.A., B.Ed. (Queen's), M.A., Ph.D. (Victoria); **Lutfiyya, Z.M.**, B.A. (Manitoba), M.S., Ph.D. (Syracuse); **Morphy, D.R.**, B.A. (Alberta), M.A. (Calgary), Ph.D. (Michigan State); **Seifert, K.L.**, B.A. (Swarthmore), M.A., Ph.D. (Michigan); **Stapleton, J.J.**, B.S. (Iona), M.T.S. (C.U.A.), M.A., Ph.D. (Toronto); **Wiens, J.R.**, B.A., B.Ed., M.Ed. (Manitoba), Ph.D. (Simon Fraser); **Young, J.C.**, B.A., M.A. (Durham), P.G.C.E. (Cambridge), M.Ed. (Queen's), Ph.D. (Toronto).

Associate Professors

Enns, C., B.Sc., M.Cl.Sc. (Western), Ph.D. (Manitoba); **Mandzuk, D.**, B.Ed., M.Ed., Ph.D. (Manitoba); **Mani, P.**, B.Ed. (Alberta), M.Ed. (Ottawa), Ph.D. (Victoria); **Piquemal, N.**, DEUG, Licence, Maitrise, D.E.A. (Strasbourg), Ph.D. (Alberta); **Renaud, R.**, B.A. (Hons.), M.A., Ph.D. (Western Ontario); **Wallin, D.**, B.Ed., M.Ed., Ph.D. (Saskatchewan).

Assistant Professors

Atleo, M., B.H.E., M.A., Ph.D. (British Columbia); **Cranston, J.** B.Sc., B.Ed. (Alberta), M.Ed. (Lethbridge), Ph.D. (Manitoba); **Fitznor, L.**, B.A., M.Ed. (Manitoba), Ed.D. (Toronto); **Katz, J.**, B.A. (Hons. (Ottawa), B.Ed., M.A., Ph.D. (British Columbia); **McCabe, G.**, B.A. (Winnipeg), M.Ed., Ph.D. (Manitoba); **Ukasoanya, G.**, B.Ed. (Calabar, Nigeria), M.Ed. (Jos, Nigeria), Ph.D. (Michigan State).

Adjunct Professors

Asper, L., B.A., B.Ed., M.Ed., Ph.D. (Manitoba); **Bruno-Jofrè, R.**, Licentiate in History (National University of the South, Argentina) Professorship in History, Ph.D. (Calgary); **Davidson, H.**, B.A., (California), M.A., Ed.D. (Toronto); **Henley, R.**, B.A. (Mount Allison), B.Ed. (New Brunswick), M.Ed. (Manitoba), Ph.D. (Toronto); **Kirby, D.M.**, B.Sc., Ed.Cert. (London), M.Ed. (Memorial), Ph.D. (London); **Kristjanson, C.**, B.P.E., M.Ed., Ph.D. (Manitoba); **McCluskey, K.W.**, B.A., M.A., Ph.D. (Manitoba); **Schonwetter, D.J.**, B.Th. (CMBC), B.A., M.A., Ph.D. (Manitoba); **Sloane-Seale, A.**, B.A., M.Ed. (Manitoba), Ed.D. (British Columbia).

Cross Appointment

Creamer, D.G., B.Sc., B.Ed. (St. Mary's), M.Div. STB. (Regis College), M.Ed., Ed.D. (OISE).

Program Information

The Department of Educational Administration, Foundations, and Psychology offers specializations in the areas of adult and post-secondary education, educational administration, guidance and counselling, inclusive special education, and the social foundations of education.

Fields of Research

The department is a leader in research in a variety of areas including: Equity and Education (race, gender, disabilities); school reform and school improvement; citizenship education; counselling; cross-cultural education; disability studies; and adult & post-secondary/vocational education.

M.Ed. in Educational Administration, Foundations and Psychology

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this *Calendar*, the Department of Educational Administration, Foundations and Psychology has the following admission application deadline dates (see below for the Guidance and Counselling specialization) and admission requirements:

For sessions starting	Canadian applicants	International applicants including US
January	October 1	none
May	none	none
July	February 1	none
September	February 1	January 15

Guidance and Counselling has only one set of admission dates:

July/September	February 1	November 1
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Applicants must possess:

a four-year Bachelor of Education degree, or two year After Degree Bachelor of Education, or a four-year bachelor's degree (or academically equivalent degree/program) from an academic institution recognized by the Faculty of Graduate Studies;

a grade point average of 3.0 or better in the last 60 credit hours of university coursework;

normally, two years of relevant work experience; and

appropriate academic and/or professional background for the program area and concentration.

The Guidance and Counselling and Inclusive Special Education specializations require specific prerequisite coursework that must be completed prior to admission.

Applicants should note that admission to the M.Ed. program is competitive. A number of factors are taken into account in arriving at an admission decision: (1) the capacity of the department to provide the program of study requested by the applicant; (2) the applicant's previous academic background and achievement; (3) the referees' assessment of the applicant; (4) the capacity of the department to provide the applicant with an advisor in the program area; and (5) the applicant's Statement in Support of their application, including relevant professional experience.

Transfer of Credit

The granting of advanced credit is subject to the regulations of the Faculty of Graduate Studies and subject to approval of the advisor and department head.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this *Calendar*. The M.Ed. in Educational Administration, Foundations and Psychology has a thesis-based route and a course-based route. The M.Ed. comprehensive route at the University of Manitoba is typically a terminal degree. That is, it is insufficient, in number and of itself, as evidence of research capacity for admission into the Ph.D. program in Education at the University of Manitoba.

The following program requirements apply to all specializations in the Department of Educational Administration, Foundations and Psychology. Specific specialization requirements are listed under each specialization below.

M.Ed. programs have a maximum completion time of six years from the date of first registration. Not all courses are offered every year. The graduate course offering schedule is posted on the Faculty's website: umanitoba.ca/education/current/gradinfo.shtml. Although we offer many courses yearly, most of our courses are offered in the evening and those wishing to study full-time should consult with the Department Head.

Second Language Reading Requirement: None

Expected Time to Graduate: full-time: 2 - 3 years; part time: 4 - 5 years

Program by Coursework and Thesis

- A minimum of 18 credit hours of coursework. At least 12 credit hours must be at the 7000 level or equivalent. The remaining 6 credit hours may be at the 5000 level or above, in the Faculty of Education and/or at the 3000 level or above in other faculties.

- As part of their coursework, students must take 3 credit hours of research methodology at the 7000 level in Education or 3000 level or above in other faculties.

Program by Coursework and Comprehensive Examination (Course-based)

- A minimum of 30 credit hours of coursework. At least 18 credit hours must be at the 7000 level or equivalent. The remaining 12 credit hours may be at the 5000 level, or above, in the Faculty of Education and/or at the 3000 level or above in other faculties.

Adult and Post-Secondary Education Specialization

The specialization is designed to serve the professional needs of a diverse group of students in continuing, workplace and professional education development; college teaching, administration and student services; university teaching, student services, and administrative management; local and international community development, program delivery, and administration.

Admission and Program Requirements are listed above. Specific course requirements are as follows:

- Required courses: EDUA 7402, EDUA 7404 and EDUA 5800. Course-based students must also take EDUA 7408.

Thesis-based students will select 6 credit hours and course-based students will select 9 credit hours from: EDUA 7260, EDUA 7406, EDUA 7412, EDUA 7414, EDUA 7416, EDUA 7420, EDUA 7810, EDUB 7390, EDUB 7420, EDUB 7430, EDUB 7450, EDUB 7460, EDUB 7560 or other courses approved by the advisor and department head.

Course-based students will also require 9 credit hours of electives to pursue their specific interests such as TESL, Nursing Education, Medical Education, etc.

Educational Administration Specialization

The Master's Program in Educational Administration is designed to develop leadership for the province's school systems and to provide students with an in-depth and theoretical understanding of educational administration as both a moral and a technical endeavour.

Students in this program will benefit from their prior experiences as teachers or administrators in an educational organization. This experience need not be restricted to public schools. Experience is important because the program takes seriously the relationship between theory and practice in education.

Provincial Certification

It is expected that all candidates in the Master's Program with a specialization in Educational Administration will attain provincial certification in Ed-

educational Administration (Level 2) by the time they complete their Master's degree. In some instances, this may require additional coursework. Certification is granted by Manitoba Education, Citizenship and Youth and not by the Faculty of Education or the University of Manitoba.

Admission and Program requirements are listed above. Specific course requirements are as follows:

- Required courses: EDUA 7010, EDUA 7050 and EDUA 5800. Course-based students must also take 3 credit hours from: EDUA 7200, EDUA 7210, EDUA 7270.
- Thesis-based students will select 6 credit hours, course-based students will select 12 credit hours from: EDUA 5040, EDUA 5100, EDUA 7020, EDUA 7030, EDUA 7040, EDUA 7060, EDUA 7070 or other courses approved by the program advisor and department head.

Guidance and Counselling Specialization

The purpose of the Master's Program in Guidance and Counselling is to prepare counselling graduates who are able to integrate critical knowledge and understanding of the theoretical bases of counselling, the counselling process and outcome research, and current professional issues in counselling, with competent ongoing development of counselling skills. The model of training is scientist-practitioner with an emphasis on reflective practice.

Specifically, the graduate program is designed to help students with the development of generic skills of individual and group counselling; the capacity to conduct research and to interpret current research; a knowledge of the latest developments in counselling and literature in the field; education/training in group leadership and communication skills; a knowledge of career development, career information and job search skills; the principles, processes and methods of interviewing children, adolescents and adults; and the skills of measurement and evaluation.

The program provides an array of supervised practicum placements that support a more specialized experience to meet individual needs and interests. Graduates find employment in a wide range of settings, including schools, community agencies, clinics, hospitals, business and industry, rehabilitation centres, government service and private practice.

In addition to the admission and program requirements listed above, admission to the Guidance and Counselling specialization requires the following prerequisite coursework, which must be completed prior to beginning the M.Ed. program:

- A minimum of 9 credit hours of university coursework at the 5000 level or equivalent consisting of:
- EDUA 5480 Counselling Skills (3)
- EDUA 5500 Theories and Issues in School Counselling (3)
- EDUA 5540 Groups in Guidance (3)

For applicants who have attended the University of Manitoba, the prerequisite coursework can be fulfilled by taking the above courses. Applicants who have attended other universities can fulfil the prerequisite requirements by taking courses equivalent to the ones listed above; the alternate courses, however, will need to be approved by the Guidance and Counselling Area Group.

Specific course requirements for the Master's are as follows:

- Required courses: EDUA 7520*, EDUA 7550 and EDUA 5800.

Thesis-based students will select 3 credit hours and course-based students will select 18 credit hours from: EDUA 7510, EDUA 7530, EDUA 7540, EDUA 7750, EDUA 7760. Course-based students may also select approved electives at the 5000 level. (NOTE: EDUA 7750 requires advisor approval.)

*A three hour weekly seminar offered over fall and winter terms taken concurrently with a minimum of 180 hours of supervised practicum experience in a selected placement. Students are required to be available September to April during the day for a minimum of one to one-and-a-half days per week for the practicum component.

Inclusive Special Education Specialization

The Master's Program in Inclusive Special Education (ISE) is designed not only to develop skills needed to serve students with special needs directly, but also to develop leadership and research skills for assisting educators and other professionals working on behalf of persons with disabilities. To

this end, the graduate courses are designed to enable graduate students to conduct research in a variety of formats and paradigms, to lead in the professional development of their colleagues, to foster program development at their workplaces, and to provide clinical or consultant services to classroom teachers. Courses in the program are focused on topics in inclusive special education as a profession, on applied learning theories and assessment of learning, on critical thinking, and on research methods and findings in this field. Graduates from the program work in a variety of callings: as administrators, clinicians, consultants, program leaders, resource and special education teachers. Many graduates also are active in research, educational program development, advocacy groups, teacher education and professional development.

In addition to the admission and program requirements listed above, admission to the Inclusive Special Education Specialization requires the following prerequisite coursework, which must be completed prior to beginning the M.Ed. program:

A minimum of 18 credit hours of university level coursework at the 5000 level or equivalent with a Grade Point Average of 3.0 (B) consisting of:

- EDUA 5600 Introduction to Inclusive Special Education (6)
- EDUA 5630 Assessment and Instruction in Inclusive Special Education (6); and

6 credit hours from:

- EDUA 5610 Field Experience in Inclusive Special Education (6)
- EDUA 5620 Teaching Children through Alternative and Augmented Communication (3)
- EDUA 5640 Inclusive Special Education: Early and Middle Years (3)
- EDUA 5650 Inclusive Special Education: High School and Transition to Adult Life (3)
- EDUA 5660 Organization and Delivery of Resource Program and Support Services (3)
- EDUA 5670 Strategies for Organizing Inclusive Classrooms and Schools (3)
- EDUA 5680 Promoting Responsible Behaviour in Educational Settings (3)

Specific course requirements for the Master's are as follows:

- Required courses: EDUA 7600 and EDUA 5800
- Thesis-based students will select a minimum of 3 credit hours and course-based students will select a minimum of 6 credit hours from: EDUA 7610, EDUA 7630, EDUA 7650, EDUA 7740, EDUA 7750. (NOTE: EDUA 7740 and EDUA 7750 require advisor approval)
- In addition, thesis-based students will select a maximum of 3 credit hours and course based students will select a maximum of 12 credit hours from: EDUA 5610, EDUA 5620, EDUA 5640, EDUA 5650, EDUA 5660, EDUA 5670, EDUA 5680.

• Students may also choose from a variety of courses not directly related to special education, depending on their interests and career goals. Students should consult the *Undergraduate and Graduate Calendars* for course titles and brief descriptions: EDUA 5070, EDUA 5220, EDUA 5240, EDUA 5500, EDUA 5550, EDUA 5570, EDUA 5590, EDUA 5700, EDUA 5730, EDUA 5740, EDUA 5750, EDUA 5810, EDUA 5900, EDUA 5930, EDUA 7620, EDUA 7710, EDUA 7720, EDUB 5340, EDUB 5400, EDUB 5770, EDUB 7060, EDUB 7480

Certification in Special Education

This provision may not apply to applicants with certification requirements in an allied non-teaching field or who are pursuing a M.Ed. in Inclusive Special Education after undergraduate work in an allied non-teaching field. It is expected that most students in the M.Ed. Program with specialization in Inclusive Special Education will attain provincial certification in special education by the time they complete their Master's degree. Students who already have provincial certification at the time of entry into the program will therefore not need to take any prerequisite coursework for this purpose. Those who do not already have provincial certification, however, should expect to take additional credit hours of coursework to fulfil this requirement. The precise number and nature of the additional work will depend on the prior academic background of the student, as well as on the

specific courses taken to complete the M.Ed. degree. To assess the additional work needed informally, it is recommended that students consult with their Faculty Advisor early in their program, and also obtain and read a copy of the special education certification guidelines published by Manitoba Education, Citizenship and Youth. Official assessment of required coursework, however, can only be done by providing Manitoba Education, Citizenship and Youth with a complete set of academic transcripts and requesting a formal assessment from them. Certification is granted by Manitoba Education, Citizenship and Youth, not by the Faculty of Education or the University of Manitoba.

Social Foundations of Education Specialization

The aim of Social Foundations of Education is to develop educational researchers who are critical and reflective about educational theory and practice. Theories from the humanities and the social sciences will guide students as they examine, criticize, and explain the meanings, intents and the effects of education in both its institutional and non-institutional forms.

The Master's Program in Social Foundations is designed to promote the understanding of normative educational thought and practice and to probe assumptions about education and schooling. The analysis is multi-dimensional and interdisciplinary.

Admission and Program requirements are those listed above. Specific course requirements are as follows:

- Required course: EDUA 5800
- Thesis-based students will select 6 credit hours and course-based students will select 9 credit hours from: EDUA 7200, EDUA 7210, EDUA 7270.
- Thesis-based students will also select 6 credit hours and course-based students will also select 18 credit hours from: EDUA 7230, EDUA 7240, EDUA 7250, EDUA 7260, EDUA 7270/7280, EDUA 7300, EDUA 7340; or
- All students may select courses chosen from the Faculty of Arts of the University of Manitoba or from other universities, in particular those within the Western Dean's agreement approved by the program advisor and department head.

Course Descriptions

Not all courses are offered every year. The graduate course offering schedule is posted on the Faculty's Website: umanitoba.ca/education/current/gradinfo.shtml

Adult and Post-Secondary Education

EDUA 7402 Development of Adult Education and Post-Secondary Education Cr.Hrs.3 A survey structures, theory, philosophies, and curricula of educational systems for adults, as affected by cultural, political, religious, theological and institutional contexts both nationally and internationally. Not to be held with the former EDUA 7400 (129.740) or former EDUA 5400 (129.540).

EDUA 7404 Lifelong Learning in Educational Settings Cr.Hrs.3 Explores recent issues, research, and theories about learning across the lifespan, with emphasis on adulthood, as learning is affected by cultural, political, and interpersonal contexts.

EDUA 7406 Topics in Adult and Post-Secondary Education Cr.Hrs.3 This course provides an opportunity for students to investigate methodologically, in depth, significant trends and topics from both the scholarly literature of adult and post-secondary education and internet resources.

EDUA 7408 Seminar in Adult and Post-Secondary Education Cr.Hrs.3 This course entails an examination of topical issues in adult education and post-secondary education with particular focus on scholarly developments in Canada and Manitoba, based on student interests and thesis or comprehensive examination foci, with learning process instructor facilitated.

EDUA 7412 Governance of Post-Secondary Education Cr.Hrs.3 This course examines the history of the governance of post-secondary institutions, the roles of stakeholders in governance, and factors influencing governance in post-secondary institutions today.

EDUA 7414 Seminar in the Administration of Post-Secondary Education Cr.Hrs.3 This course has as its focus the application of theoretical concepts of field situations. It will explore administrative skills and their application to selected issues of post-secondary education.

EDUA 7420 Program Planning in Adult Education Cr.Hrs.3 (Formerly 129.742) Introduction to factors affecting the planning of programs for adults. Examination of various planning models in relation to principles of adult education. A consideration of theory with major emphasis on directions for planning a program for adults. Local examples will be used. Not to be held with the former 116.733.

EDUB 7416 Teaching and Learning in Post-Secondary Education Cr.Hrs.3 An in-

depth study of teaching and learning in post-secondary education contexts grounded in current theoretical, research and pedagogical literatures.

Educational Administration

EDUA 7010 Educational Administration as a Field of Study and Practice Cr.Hrs.3 (Formerly 129.701) An overview of educational administration, focusing on a review of some of the main intellectual traditions in the study of educational administration and on an analysis of some of the forces which shape administrative practice. Not to be held with EDUA 7011 or the former 116.731.

EDUA 7020 Politics of Education Cr.Hrs.3 (Formerly 129.702) A review of the political features of educational organizations, with emphasis on value systems, community power structures, local government, and political change. Not to be held with EDUA 7021 or the former 116.702.

EDUA 7030 Educational Finance Cr.Hrs.3 (Formerly 129.703) Study of economic and financial aspects of education, with emphasis on costs and analysis of expenditures; sources and types of revenue; productivity and efficiency, planning and budgeting. Not to be held with EDUA 7031 or the former 116.703.

EDUA 7040 Legal Aspects of Education Cr.Hrs.3 (Formerly 129.704) Studies of legal issues in education. Not to be held with EDUA 7041 or the former 116.704.

EDUA 7050 Theoretical Perspectives on Educational Administration Cr.Hrs.3 (Formerly 129.705) A study of the main currents of organization theory and administrative thought and their implications for the study and administration of educational organizations. Not to be held with EDUA 7051 or the former 116.705.

EDUA 7060 Organizational Planning and Development in Education Cr.Hrs.3 (Formerly 129.706) A review of approaches to planning and development in education. Major emphasis is placed on the systematic development of educational organizations. Not to be held with EDUA 7061 or the former 116.709.

EDUA 7070 The Analysis of Educational Organizations Cr.Hrs.3 (Formerly 129.707) The application of methods of organizational analysis to educational institutions. Not to be held with EDUA 7071 or the former 116.710.

EDUA 7090 Seminar in Administrative Problems in Education Cr.Hrs.3 (Formerly 129.709) Application of theoretical concepts in field situations. Not to be held with EDUA 7091 or the former 116.706.

EDUA 7100 Topics in Educational Administration (Readings) 1 Cr.Hrs.3 (Formerly 129.710) A readings course in topics of significance to educational administration.

EDUA 7110 Topics in Educational Administration (Field) 2 Cr.Hrs.3 (Formerly 129.711) A projects and field study course in topics of significance to educational administration.

Guidance and Counselling

EDUA 7510 Seminar in Current Issues in Counselling Cr.Hrs.3 (Formerly 129.751) Focus on research, theoretical and professional developments; critical contemporary issues; and specific social problems in counselling. Not to be held with EDUA 7511 or the former 043.703.

EDUA 7520 Practicum Seminar in Counselling Cr.Hrs.6 (Formerly 129.752) Supervised experience in both individual and group counselling. Attention is given to analysis of case studies using audio- and video-tapes. A minimum of 180 hours of counselling experience in placement situations is required. Not to be held with EDUA 7521 or the former 043.704. *Prerequisite:* EDUA 5480 or EDUA 5481 (129.548) (P) and permission from the instructor. *Prerequisite or concurrent:* EDUA 7550 or EDUA 7551 or the former 129.755. Course evaluated on a pass/fail basis.

EDUA 7530 Group Counselling: Theory and Practice Cr.Hrs.6 (Formerly 129.753) Study of theories, rationale, objectives, and research. Acquisition of an experiential understanding of group work through participation in class activities. Development of leadership skills in group counselling by conducting counselling groups under supervision. Not to be held with EDUA 7531 or the former 043.718. *Prerequisite:* EDUA 5540 or EDUA 5541 (129.554) (C+) and EDUA 5480 or EDUA 5481 (129.548)(P).

EDUA 7540 Programs in Career Development Cr.Hrs.3 (Formerly 129.754) A practical course designed for helpers wishing a wider knowledge of career development programs. Participants will investigate and evaluate a wide variety of career counselling techniques and programs and will develop specific, innovative programs to meet the needs of their future counselees. Not to be held with EDUA 7541 or the former 043.719.

EDUA 7550 Theories of Counselling Cr.Hrs.3 (Formerly 129.755) The objectives of counselling, assessment of counselling outcomes, theories of personality and counselling. Not to be held with EDUA 7551 or the former 043.701 or 129.750.

Inclusive Special Education

EDUA 7600 Seminar in Inclusive Special Education Cr.Hrs.6 (Formerly 129.760) A forum for the discussion of topics related to disability issues. Opportunity will be provided for students to examine issues related to their particular professional and scholarly needs. Not to be held with EDUA 7601 or the former 043.705. *Prerequisite or concurrent:* 18 credit hours in Special Education at 5000 level or equivalent (C+).

EDUA 7610 Behavioural Issues in Educational Settings Cr.Hrs.3 (Formerly 129.761) A study designed to give teachers and school counsellors the necessary theoretical background as well as the practical tools to implement programs for children in conflict. Not to be held with EDUA 7611 or the former 043.707. *Prerequisite or concurrent:* EDUA 5600 or EDUA 5601 (129.560)(C+) or EDUA 5680 or EDUA 5681 (129.568)(C+).

EDUA 7620 Seminar in Disability Studies Cr.Hrs.3 (Formerly 129.762) The aim of this course is to review research literature which is directly related to the problems of learning and instruction of the mentally retarded. Not to be held with EDUA 7621 or the former 043.721. *Prerequisite:* a course in mental retardation (such as the former

043.531 or 043.534)(C+) or permission of instructor.

EDUA 7630 Advanced Assessment and Instruction in Inclusive Special Education Cr.Hrs.3 (Formerly 129.763) An advanced study of diagnostic/prescriptive techniques used to ameliorate learning and behavioural problems in special education. Emphasis is on the development and analysis of related instructional delivery systems. Not to be held with the former 043.722. *Prerequisite or concurrent:* EDUA 5630 or EDUA 5631 (129.563)(C+).

EDUA 7650 Field Experience in Inclusive Special Education Cr.Hrs.6 (Formerly 129.765) A minimum of 200 hours of supervised placement in an inclusive special education setting. Scheduled seminars facilitate directed study and discussion. *Prerequisite:* 18 credit hours at the 5000-level in Inclusive Special Education (C+) or its equivalent. Not to be held with EDUA 7651 or the former 129.764 or 043.706. Course evaluated on a pass/fail basis.

Research and Evaluation

EDUA 7800 Methods of Educational Research Cr.Hrs.3 (Formerly 129.780) A study of design and data collection techniques for educational research in field settings. Topics covered include quasi-experimentation, survey and observational techniques, simulation, content analysis, and sociometry. Not to be held with EDUA 7801 or the former 043.709. *Prerequisite:* [EDUA 5800 or EDUA 5801 (129.580)(C+)] or [one of the former courses 129.680 (C+), 043.610 (C+)] or consent of instructor.

EDUA 7810 Evaluating Educational Programs Cr.Hrs.3 (Formerly 129.781) An introduction to current approaches to evaluating educational programs. A review of various evaluation methods/approaches, along with consideration of specific design, ethical, consulting and political issues will be the main focus of this course. Specific skills to be developed are the implementation of educational evaluations, data collection and analysis, and final report writing. Not to be held with the former 043.726.

EDUA 7840 Qualitative Research Methods in Education Cr.Hrs.3 (Formerly 129.784) An introduction to qualitative research methods. While the theoretical underpinnings of qualitative research will be discussed, emphasis is placed on learning to conduct a study including design, collecting and analyzing data, and research ethics. Not to be held with EDUA 7841. *Prerequisite:* EDUA 5800 or EDUA 5801 (129.580)(C+) or equivalent.

EDUA 7850 Design and Analysis of Educational Research (Quantitative) Cr.Hrs.3 (Formerly 129.785) A study of the use of quantitative methods of analyzing educational research data. Descriptive and inferential procedures commonly used in educational research will be discussed and students will learn to use statistical packages. The course will also address when it is appropriate to employ quantitative designs and present common designs and their associated analyses. *Prerequisite:* EDUA 5800 or EDUA 5801 (129.580)(C+). Not to be held with the former 129.681 or the former 43.535 or 43.611.

EDUA 7860 Advanced Topics in Educational Research Cr.Hrs.3 (Formerly 129.786) An advanced study of special topics in educational research with an in-depth study of specific topics which will change from year to year. *Prerequisite:* EDUA 5800 or EDUA 5801 (129.580)(C+) and permission of the instructor. Not to be held with the former courses 129.783 or 043.711

EDUA 7870 Measurement and Evaluation in Schools Cr.Hrs.3 (Formerly 129.787) An advanced study of the principles of measurement and evaluation and their application to teaching and learning in schools. Current issues in measurement and evaluation, including alternative forms of classroom assessment and standard setting, will be discussed. *Prerequisite:* EDUA 5810 or EDUA 5811 (129.581)(C+) or the former 043.301 (C+) or equivalent or consent of instructor.

EDUB 7600 Action Research in Education Cr.Hrs.3 The study of the theory and practice of action and participatory action research in education including models, principles and practices, criteria for assessing quality, ethics, and modes of representation. *Prerequisite:* EDUA 5800 or EDUA 5801 (129.580)(C+).

Social Foundations of Education

EDUA 7200 Philosophy of Education Cr.Hrs.3 (Formerly 129.720) A study of the philosophic foundations of education. Emphasis will be given to various schools of philosophic inquiry as they relate to education and to contemporary philosophy of education issues. Not to be held with the former 116.735.

EDUA 7210 Educational Sociology Cr.Hrs.3 (Formerly 129.721) An examination of the relationship between education and society, with particular attention to ethnicity, family, and socio-economic status and to the role of the school in the socialization process in the Canadian context. Not to be held with EDUA 7211 or the former 116.736.

EDUA 7220 History of Education in Manitoba Cr.Hrs.3 (Formerly 129.722) A study of the themes underlying the historical development of education in Manitoba. Not to be held with the former 116.737.

EDUA 7230 Social Criticism in Education Cr.Hrs.3 (Formerly 129.723) A critical examination of education, giving special attention to various perspectives which challenge conventional interpretation of education and schooling. Not to be held with the former 116.738.

EDUA 7240 Values in Education Cr.Hrs.3 (Formerly 129.724) Examines the place of values in education. It explores the notion of values, its pervasiveness in education, the approaches to values in education, and the trends and issues related to values in education. Not to be held with EDUA 7241 the former 116.732.

EDUA 7250 Comparative Education Cr.Hrs.3 (Formerly 129.725) An analysis of educational systems and problems in selected environments in terms of social, political, economic, cultural and other contexts. Not to be held with the former 116.714.

EDUA 7260 Education and Development Cr.Hrs.3 (Formerly 129.726) A study of the interrelationships between education and social, economic and political development in a variety of areas. Not to be held with the former 116.715.

EDUA 7270 Seminar in Cross-Cultural Education 1 Cr.Hrs.3 (Formerly 129.727) A critical analysis of the social theories and research which form the basis of cross-cultural education. Not to be held with EDUA 7271 or the former 116.724.

EDUA 7280 Seminar in Cross-Cultural Education 2 Cr.Hrs.3 (Formerly 129.728) A critical analysis of the approaches and research in cross-cultural education. Not to be held with EDUA 7281 or the former 116.725.

EDUA 7300 History of Canadian Education from 1867 Cr.Hrs.3 (Formerly 129.730) A study of the historical development of education in Canada from 1867 to the present. Not to be held with the former 116.723.

EDUA 7330 Topics in Educational Foundations (Readings) 1 Cr.Hrs.3 (Formerly 129.733) A reading and research course in topics of significance to educational foundations.

EDUA 7340 Seminar in Educational Thought Cr.Hrs.3 (Formerly 129.734) Intensive studies of the works of selected educational theorists. Not to be held with the former 116.719.

Ungrouped

EDUA 7700 Field Work in School Psychology Cr.Hrs.6 (Formerly 129.770) Students will engage in a minimum of one day a week of supervised experience in psychoeducational assessment and programming, counselling and consulting with teachers, students, parents and related others. Not to be held with the former 043.723. *Prerequisite:* [EDUA 7720 or EDUA 7721 (129.772 or 043.725)(C+)] and [EDUA 7870 (129.787 or 129.782 or 043.710)(C+)] and, [EDUA 7760 or EDUA 7761 (129.776 or 043.717)(C+)] and [one of EDUA 7800 or EDUA 7801 (129.780 or 043.709)(C+) or (129.783 or 043.711) (C+)] and [one of PSYC 8200 (017.820)(C+) or PSYC 8210 (017.821)(C+)]. Course evaluated on a pass/fail basis.

EDUA 7710 Development in Learning Environments Cr.Hrs.3 (Formerly 129.771) Explores recent advances in developmental psychology as they apply to learning in classrooms and other education-related settings. Emphasis will be given to cognitive change, but motivation and social skill development will also be considered as they relate to cognitive development. Not to be held with the former 043.724 or 043.708.

EDUA 7720 Psychology of Classroom Learning Cr.Hrs.3 (Formerly 129.772) Explores recent advances in cognitive research as they apply to classroom learning and to other education-related settings. Emphasis will be given to information processing theory, situated cognition, and the development of expertise, as they relate to educational processes, especially in classrooms. Not to be held with EDUA 7721 or the former 043.708 or 043.725.

EDUA 7730 Psychological Perspectives in Early Education Cr.Hrs.3 (Formerly 129.773) An examination of psychological theories as they relate to early years education. Emphasis will be placed on research about children's learning and development, especially as it is situated in classroom settings for grade levels K-4. Not to be held with the former 043.727.

EDUA 7740 Topics in Educational Psychology 1 Cr.Hrs.3 (Formerly 129.774) A reading and research course in topics of significance to educational psychology.

EDUA 7750 Topics in Educational Psychology 2 Cr.Hrs.3 (Formerly 129.775) A reading and research course in topics of significance to educational psychology.

EDUA 7760 Interview Techniques with Children and Adolescents Cr.Hrs.3 (Formerly 129.776) Focuses on the principles, processes and methods of interviewing and counselling individual children, adolescents, parents, school personnel and others. The course aims at integrating theory and practice involving diagnostic and therapeutic communication and observation of behaviour in natural situations with individual children. Not to be held with EDUA 7761 or the former 043.717. *Prerequisite:* [EDUA 5820 or EDUA 5821 (129.582)(C+) or EDUA 5550 or EDUA 5551 (129.555)(C+) or EDUA 5480 or EDUA 5481 (129.548)(P)] and [EDUA 5490 or EDUA 5491 (129.549)(P)].

EDUA 7770 Advanced Computer Application in Educational Psychology Cr.Hrs.3 (Formerly 129.777) Explores the use of recent innovations in computer-assisted learning technology and will be set up to take into account the needs of the graduate level student in the Faculty of Education. Not to be held with EDUA 7771 or the former 043.716. *Prerequisite:* any one of the following courses: EDUA 5850 or EDUA 5851 (129.585 or 043.306 or 081.412)(C+).

Section 25: Electrical and Computer Engineering

Acting Head: U. Annakkage
General Office: E2-390 Engineering
Telephone: (204) 474 9603

Fax: (204) 261 4639
E-mail: enquiries@ee.umanitoba.ca
Website: www.ee.umanitoba.ca

Academic Staff

Distinguished Professors

Shafai, L., B.E.Sc. (Tehran), M.A.Sc., Ph.D. (Toronto), F.I.E.E.E., P.Eng.

Dean Emeritus

Kuffel, E., B.Sc., M.Sc., Ph.D. (E.E.) (Dublin), D.Sc. (E.E.) (Manchester), P.Eng.

Professors Emeriti

Bridges, E., M.Sc. (E.E.) (Manitoba), P.Eng.; **Kao**, K.C., B.Sc.(E.E.) (Nanking), M.Sc. (Michigan), Ph.D., D.Sc. (Birmingham), F.Inst.P., F.I.E.E., C.Eng., P.Eng.; **Martens**, G.O., B.Sc.(E.E.) (Manitoba), M.A.Sc. (Toronto), Ph.D. (Illinois), P.Eng.; **Swift**, G.W., M.Sc.(E.E.) (Alberta), Ph.D. (Illinois Institute of Technology), P.Eng.; **Wexler**, A., B.Sc.(E.E.) (Manitoba), Ph.D., D.I.C. (London) F.R.S.A., P.Eng.

Senior Scholars

Lehn, W.H., B.Sc.(E.P.) (Manitoba), M.Sc.(E.E.) (M.I.T.), **Menzies**, R.W., B.Sc.(E.E.) (Hons.) McMaster, Ph.D. (St. Andrews), P.Eng.; **Onyshko**, S., M.Sc. (Alberta), Ph.D. (Washington), P.Eng. **Raghuveer**, M.R., B.Sc.(Hons.) (Delhi), B.Eng. (Indian Inst. Sci.), M.Sc. (Manitoba), Ph.D. (Windsor), P.Eng.; **Shweddyk**, E., M.Sc.(E.E.) (Manitoba), Ph.D. (New Brunswick), P.Eng.

Professors

Alfa, A.S. B.Eng. (Ahmadu Bello), M.Sc. (Manitoba), Ph.D. (New South Wales); **Annakkage**, U., B.Sc. (Moratuwa), M.Sc., Ph.D. (Manchester IST); **Bridges**, G.E.J., B.Sc.(E.E.), M.Sc., Ph.D. (Manitoba), P.Eng.; **Buchanan**, D.A., B.Sc., M.Sc. (Manitoba), Ph.D. (Durham); **Ciric**, I.M.R., B.Sc., Dipl. Ing., Ph.D., Dr. Ing. (Bucharest), F.I.E.E.E.; **Gole**, A.M., B.Tech. (Bombay), M.Sc.(EE), Ph.D. (Manitoba), P.Eng.; **Kinsner**, W., M.Sc. (Wroclaw-Breslau), Ph.D. (McMaster), P.Eng.; **LoVetri**, J., B.Sc., M.Sc. (Manitoba), Ph.D. (Ottawa); **McLeod**, R.D., B.Sc. (E.E.), M.Sc., Ph.D. (Manitoba); **Pawlak**, M., M.S. (Control and Comp Eng.), Ph.D. (Comp Eng.) (Wroclaw); **Peters**, J.F., B.A. (California), M.S. (Santa Clara), Ph.D. (Kansas). **Thomson**, D.J., B.Sc.(E.E.), M.Sc. (Manitoba), Ph.D. (Stanford).

Associate Professor

Moussavi, Z., B.Sc. (Sharif U.), M.Sc. (Calgary), Ph.D. (Manitoba); **Oliver**, D. R., B.Sc. (Western Australia), Ph.D. (Monash U), P.Eng; **Shafai**, C., B.Sc. (E.E.), M.Sc. (Manitoba), Ph.D. (Alberta), **Hossain**, A.E., B.Sc., M.Sc., (Buett), Ph.D. (Victoria)

Assistant Professors

Cai, J. B.Sc. (Xi'an Jiaotong), M.Sc. (Xi'an Jiaotong), Ph.D. (Waterloo); **Ferens**, K., B.Sc.(E.E.), M.Sc., Ph.D. (Manitoba); **Filizadeh**, S. B.Sc., M.Sc. (Sharif), Ph.D. (Manitoba); **Fung**, WK. B.Eng. (Hong Kong), M. Phil. (Hong Kong), Ph.D. (Hong Kong); **Kordi**, B., B.Sc., M.Sc. Ph.D. (Amirkabir); **Major**, A., B.Sc.(Lithuania), M.Sc. (Lithuania), PhD, (Strathclyde, UK); **McNeill**, D., B.Sc., M.Sc., Ph.D. (Manitoba); **Okhmatovski**, V., M.Sc., Ph.D. (Moscow Power Eng. Inst.); **Rajapakse**, A. B.Sc. (U. Moratuwa), M.Eng. (Asian Inst. of Tech.), Ph.D. (Tokyo); **Sherif**, S. B.Sc (Egypt), M.Sc (Madison, USA), PhD (Boulder, USA); **Thomas**, G. B.S.E.E. (IETSM, Mexico), M.Sc., Ph.D. (El Paso); **Yahampath**, P., B.Sc. (Moratuwa), M.Sc. (Trondheim), Ph.D. (Manitoba).

Adjunct Professors

Baltes, H., B.Sc., Ph.D. (Calgary); **Barakat**, M.A., B.Sc. (Alexandria), M.Sc., Ph.D. (Manitoba), P.Eng.; **Baumgartner**, R., M.Sc. (Slovak Technical), Ph.D. (University of Technology – Vienna); **Bowman**, C., B.Sc. (Manitoba), M.Sc. (Manitoba), Ph.D. (Arizona); **Chapman**, D.G., B.Sc. (Manitoba), Ph.D. (London), P.Eng; **Coroy**, T. B.Sc (Saskatchewan), PhD (Toronto); **Diamond**, J. B.Sc., M.Sc., Ph.D. (Manitoba); P.Eng.; **Fazel**, R. B.Sc. (Sharif), M.Sc.(Amirkabir); Ph.D. (Manitoba); **Freund**, M. B.S. Chemistry (Florida), PhD (Florida); **Jacobson**, D., B.Sc., M.Sc., Ph.D. (Manitoba), P.Eng.; **Jayasinghe**, R., B.Sc. (Moratuwa), Ph.D. (Manitoba), P.Eng.; **King**, S.B., B.Sc., Ph.D. (Manitoba); **Kundar**, P.; **Liao**, S.X., B.Sc. (Beijing); M.Sc., Ph.D. (Manitoba); **Maheswaran**, M., B.Sc. (Sri Lanka), M.Sc. (Indiana), Ph.D. (Indiana); **Maguire**, T.L., B.Sc., M.Sc., Ph.D. (Manitoba); **Nguyen**, H., B.Eng. (Hanoi), M.Eng. (Thailand), Ph.D. (Manitoba); **Noghianian**, S., B.Sc. (Sharif U), M.Sc., Ph.D., (Manitoba); **Pasterkamp**, H., M.D. (Germany); **Pizzi**, N. B.Sc. (Manitoba), M.Sc. (Manitoba), Ph.D. (Manitoba); **Sebak**, A., B.Eng. (Cairo), B.Sc. (Shams, Egypt), M.Eng., Ph.D. (Manitoba), P.Eng.; **Serrai**, H., M.S. (Algeria), B.S. (France), M.S. (France), Ph.D. (France); **Szturm**, A., B.Sc.(P.T.) (Western), Ph.D. (Manitoba); **Swatek**, D., B.Sc., Ph.D. (Manitoba); **Tomaneck**, B., M.Sc. (Poland), Ph.D. (Poland); **Turanli**, H., B.Sc., M.Sc. (METU, Turkey), Ph.D. (Manitoba); **Wedepohl**, M., B.Sc. (Witwatersrand, South Africa), Ph.D. (Victoria, Manchester); **Willink**, T. Ph.D. (Queen's),

M.A., B.A. Cambridge); **Willink**, T. B.A (Cambridge), M.A. (Cambridge), Ph.D. (Queen's); **Woodford**, D.A., M.Sc. (Manitoba), Assoc. Dip. of EE (Melbourne), P.Eng.; **Ziomek**, W., M.Sc., Ph.D. (Poznan, Poland).

Program Information

The department offers programs leading to the Master of Engineering, Master of Science, and Doctor of Philosophy. The department has well equipped research and teaching laboratories. Students may select either a specialized research-oriented activity, an interdisciplinary program, or collaboration with industry or research centres in Canada.

Fields of Research

The areas of research in the department which are internationally recognized include: applied electromagnetics; atmospheric optics; biomedical engineering; communications engineering; computer architecture and software systems; microelectronics; power apparatus and systems engineering; signal and image processing.

Research Facilities

The Applied Electromagnetics Laboratories are far the most comprehensive and modern antenna measurement facility of any university nationally and internationally. It consists of eight different test systems housed in three different anechoic chambers. The unique feature of this facility is in its ability to test small and very large antennas in a controlled indoor environment, from 500 MHz to 110 GHz, using conventional Far-Field system, the Compact-Test Range and Near-Field to Far-Field transformation. The test systems include: A large 16ft Compact-Range for testing antennas as large as 6ft and up to 50 GHz, A high precision millimetre wave Compact-Range up to 110 GHz, A conventional Far-Field Range up to 50 GHz, A triple linear-cylindrical-spherical Near-Field Range, A 16-probe Starlab Range for rapid measurements, A 110 GHz Network Analyzer for network characterization, and a small Far-Field range for educational tests.

The merger of biology with engineering sciences and the creation of biomedical engineering has brought innovation to the practice of medicine that could only be dreamed about a decade ago. By many accounts, we are now at the outset of the Biomedical Century and the need for engineers trained in biomedicine is greater than ever. Biomedical Engineering research is interdisciplinary by nature and therefore involves close collaboration with other departments and faculties in the University of Manitoba and associated hospitals. The centre of our activity, however, is the Biomedical Acoustic and Motor Control Laboratory and Biomedical Photonics Laboratory within the Electrical and Computer Engineering department. The Acoustic and Motor Control Laboratory is equipped with biological instrumentation amplifiers/filter, different sensors, acoustic chamber as well as a 2DOF robotic arm, an EEG recording system, and a large network of computers. The Biomedical Photonics Laboratory houses optical test and measurement equipment, various laser sources as well as advanced setups for high-resolution nonlinear microscopy, spectroscopy and optical coherence tomography of biological samples.

Software Systems is an area that represents a strong research program in the Department. The VLSI laboratory is an important component of the research program in Computer Engineering, as well as supporting research areas in Electrical Engineering such as electronics, signal processing and communications. The laboratory includes a network of Sparc workstations for research and education. The laboratory has access to the fabrication of chip designs, via the Canadian Microelectronics Corporation. The current implementation technologies are full-custom CMOS, FPGAs, and integrated sensors. Software CAD packages available include CADENCE, simulators for Neural Networks and many standard university programs such as circuit and logic simulators. There are also facilities for experimental work with mobile robots.

The Computational Intelligence (CI) Laboratory has a collection of robots (a number of individual hexapod, crawling and tractor robots). In addition, the CI Laboratory has seven Intel core 2 PCs, 9 large LCD displays, 7 UPS surge protection power supplies, Wii game controller, two Bamboo tablets, one MacPro laptop, one Lenovo X200 tablet, one HP non-colour printer and one HP 3-way printer. This equipment is used in the design of intelligent systems (both hardware and software) using a number of technologies associated with computational intelligence, namely, Cantor sets, fuzzy sets, near sets, rough sets, neural networks, and evolutionary computing. This research laboratory has its own web page at <http://wren.ee.umanitoba.ca>, that includes access to various research registries and downloadable reports, publications as well as software systems designed in this Laboratory.

The Power Systems and Machine Laboratories are well equipped with several workstations, a real time digital power system simulator (developed at the HVDC Research Centre), a large variable frequency supply, and several well instrumented machine sets. Facilities for developing DSP-based controllers and protection devices are available. The McMath High Voltage Power Transmission Research Laboratory is the largest of its kind amongst Canadian universities and is equipped with generating and measuring apparatus, including digital data acquisition systems for research on insulation, HV phenomena and diagnostics.

The Data and Signal Compression Laboratory has dedicated and network computers, a high resolution scanner, a video capture facility, a digital camera, a CD-ROM mastering system, and an FPGA development facility. It also has access to a large ATM facility for research.

The Microprobe and Microfabrication Laboratory is a well-equipped laboratory with three faculty members. Topics of interest include scanning probe microscopy, micromachining and microfabrication, semiconductor manufacturing, and high frequency microelectronics and microwave circuit testing. Probe microscopy systems include tunnelling (STM), ultra high vacuum STM, atomic force (AFM), resistive (SRM), capacitive (SCM), and dynamic electrostatic force microscopes used for in situ IC testing. CAD platforms include a number of workstations. CAD tools used are Cadence, L-EDIT and MEMSPro for IC design, and Libra, Spice, Ensemble and HFSS for high frequency modelling. RF test equipment includes 50 GHz sampling scopes, a 6 GHz Network Analyser and on-wafer probing facilities. Microfabrication capabilities include a cleanroom, thermal evaporation, 3 inch mask aligner, wet etching, oxidation furnaces, electroplating, UHV system, and an inspection microscope. A 1000 sq. foot cleanroom, 6 inch two-sided mask aligner, ICP plasma etching, XeF₂ etching, RF sputtering, E-beam evaporation, Alpha-Step surface profiler, 50 GHz millimetre wave probe station, and a wafer saw.

M.Sc. in Electrical and Computer Engineering

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, a student must normally hold a B.Sc. degree in Electrical or Computer Engineering (or its equivalent) from a recognized university with a minimum University of Manitoba equivalent GPA of 3.0.

Application Deadlines

Potential M.Sc. students should complete the online Student Information Form for Potential Graduate Students, (www.ee.umanitoba.ca/admissions/preapplication.html) prior to making a formal application to the Faculty of Graduate Studies. Canadian/U.S. students, if invited by the Department to submit a formal application, should submit their application and supporting documentation to the Faculty of Graduate Studies at least four months prior to their intended start date. International students, if invited by the Department to submit a formal application, should submit their application and supporting documentation to the Faculty of Graduate Studies at least 8 months prior to their intended start date.

Program Requirements

In keeping with the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, the M.Sc. program in Electrical and Computer Engineering requires a minimum of 18 credit hours of advisor-approved course work as follows: a minimum of 12 credit hours at or above the 700/7000 level; and 6 credit hours at or above the 300/3000 level from other departments or 400/4000 level elective courses from this department. **At least 12 of the 18 credit hours must be from this Department.**

An M.Sc. thesis, which is based on research work normally carried out at this university, is required. All full-time M.Sc. students are also required to present a paper, at least once during their program, at the Department's annual graduate student conference, as outlined at the website www.ee.umanitoba.ca/~gradcon.

For complete supplemental regulations on the M.Sc. program in Electrical and Computer Engineering, see website: www.ee.umanitoba.ca.

Second language reading requirement: none

Expected time to graduation: two years

M.Eng. in Electrical and Computer Engineering

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, a student must normally hold a B.Sc. degree in Electrical or Computer Engineering (or its equivalent) from a recognized university with a minimum University of Manitoba equivalent GPA of 3.0.

Application Deadlines

Potential M.Eng. students should complete the online Student Information Form for Potential Graduate Students (www.ee.umanitoba.ca/admissions/preapplication.html) prior to making a formal application to the department. Canadian/U.S. students, if invited to submit a formal application by the Department, should submit their application and supporting documentation to the Faculty of Graduate Studies at least four months prior to their intended start date. International students, if invited to submit a formal application by the Department, should submit their application and supporting documentation to the Faculty of Graduate Studies at least 8 months prior to their intended start date.

Program Requirements

This program is meant to satisfy the particular needs of students and practicing engineers wishing to extend their studies on a broad basis of coursework and an engineering project.

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The M.Eng. program in Electrical and Computer Engineering requires a minimum of 24 credit hours of advisor-approved course work as follows: a minimum of nine credit hours at or above the 700/7000 level from this department, a maximum of nine credit hours of elective courses from this department at or above the 400/4000 level and a maximum of 12 credit hours from other departments at or above the 300/3000 level. In exceptional cases, the student may be allowed to take 200/2000 level courses from other departments if pre-approved by the student's advisor.

In addition, the student is required to complete an advisor-approved engineering project and proposal. The effort involved in this project should be at least the equivalent of six credit hours of coursework.

For complete supplemental regulations on the M.Eng. program in Electrical and Computer Engineering, refer to the website www.ee.umanitoba.ca

Second language reading requirement: none

Expected time to graduation: two years

Ph.D. in Electrical and Computer Engineering

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, a student must normally hold a Master of Science degree in Electrical or Computer Engineering from a recognized university. Provisional acceptance of students nearing completion of the M.Sc. degree in Electrical or Computer Engineering may be considered with a minimum University of Manitoba equivalent GPA of 3.0.

Application Deadlines

Potential Ph.D. students should complete the online Student Information Form for Potential Graduate Students (www.ee.umanitoba.ca/admissions/preapplication.html) prior to making a formal application to the department. Canadian/U.S. students, if invited to submit a formal application by the department, should submit their application and supporting documentation to the Department at least four months prior to their intended start date. International students, if invited to submit a formal application by the department, should submit their application and supporting documentation to the Department at least 8 months prior to their intended start date.

In exceptional cases, a transfer into the Ph.D. program from the M.Sc. program may be recommended for students holding a B.Sc. degree in Electrical or Computer Engineering, provided the following three conditions are met: the transfer occurs within 12 months of initial registration in the M.Sc. program; the student has successfully completed at least nine credit hours of approved course work at or above the 700/7000 level, **all** from this Department; and the transfer is recommended by the departmental Graduate Studies Committee. In this case, the time spent in the Master's program will normally be counted as time in the Ph.D. program.

If preliminary admission into a Master's program is being recommended by the advisor with the intention of reviewing the student's status for possible upgrading to a Ph.D. admission, then this must be indicated on the application form at the time of admission. Otherwise, the student will be required to pay both M.Sc. and Ph.D. program fees.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. The Ph.D. program in Electrical and Computer Engineering depends on student classification as follows:

- For students who hold an M.Sc. degree in electrical and Computing Engineering and have been admitted directly into the Ph.D. program, a minimum of 12 credit hours of advisory committee approved course work is required at or above the 700/7000 level. **At least 9 of the 12 credit hours must be from this Department.**

- For students who hold a B.Sc. degree in Electrical or Computer Engineering and who are recommended for transfer into the Ph.D. program from the M.Sc. program in Electrical and Computer Engineering at this university, a minimum of 24 credit hours of advisory committee-approved course work is required, of which 18 credit hours must be at or above the 700/7000 level and the balance of 6 credit hours must be at or above the 300/3000 level from other departments or 400/4000 level elective courses from this department. **At least 15 of the 24 credit hours must be from this Department.** Credit will be given for approved course work completed at the M.Sc. level.

- For all other categories of students, a minimum of 18 credit hours of advisory committee-approved course work is required, of which 12 credit hours must be at or above the 700/7000 level and the balance of 6 credit hours must be at or above the 300/3000 level from other departments or 400/4000 level elective courses from this department. **At least 12 of the 18 credit hours must be from this Department.**

A Ph.D. thesis, which is based on research work normally carried out at this university, is required. All full-time Ph.D. students are also required to present a paper every year during their program at the department's annual graduate student conference, as outlined at the website: www.ee.umanitoba.ca/~gradcon

For complete supplemental regulations on the Ph.D. program in Electrical and Computer Engineering, refer to the website www.ee.umanitoba.ca

Second language reading requirement: none

Expected time to graduation: 3.5 years

Course Descriptions

ECE 7010 High Voltage Techniques and Insulation Design Criteria Cr.Hrs.3 (Formerly 024.701) Laboratory generation and measurement techniques related to ac and dc high voltages, conventional and steep front high voltage pulses, composite voltages and pulsed currents. Charge measurements. Test techniques for assessing insulation quality and life.

ECE 7020 Power Transmission Lines: Phenomenon and Insulation Design Cr.Hrs.3 (Formerly 024.702) High voltage dc, ac and hybrid transmission line corona modes, electrostatic and ionized field calculations, field effects of overhead transmission lines. Surge propagation including corona effect. Transmission line insulation design to withstand normal/abnormal voltages and conditions. Modern and conventional arresters. Principles and practice of insulation coordination.

ECE 7030 Advanced Electrical Machines Cr.Hrs.3 Magnetically-coupled circuits, energy conversion principles, field generation in ac machines, windings and inductances, reference frame theory, dc machine and dc drives, scalar control of induction machines, vector control of induction machines, drives for special machines.

ECE 7040 Signal and Data Compression Cr.Hrs.3 (Formerly 024.704) The course presents the theory of signal and data compression with their applications in engineering, including lossless compression (Shannon-Fano, Huffman, arithmetic and dictionary) and lossy compression, including scalar and vector quantization. References to sub-band and transform coding (wavelets and fractal) and analysis-synthesis coding will be made.

ECE 7050 Switching and Automata Theory Cr.Hrs.3 (Formerly 024.705) The course presents basic material in discrete mathematics and the theory of switching circuits. It provides electrical and computer engineering students with a firm basis in the modern theory of logic design, and illustrates some applications through formal characterization of combinational functions and sequential machines, using contemporary techniques for the automatic synthesis and diagnosis of digital systems.

ECE 7060 Power system Protection Cr.Hrs.3 (Formerly 024.706) History and philosophy of power system protection; typical protection schemes; instrument transformers; protection hardware and application; hardware testing techniques; software models and their use in simulation studies.

ECE 7070 Power System Analysis Cr.Hrs.3 (Formerly 024.707) Power system operation; load flow analysis; transient stability modeling and simulation using the classical model; detailed machine models for transient stability analysis, modeling of exciters, governors, and FACTS devices for transient stability analysis; methods of transient stability analysis; voltage stability concepts and assessment.

ECE 7072 Advanced Power Electronics Cr.Hrs.30 AC/DC and DC/DC converters, switching functions, voltage source converters, advanced PWM techniques, analytical modeling and simulation, control system design, applications of power electronics in motor drives and power systems, additional topics of current interest.

ECE 7074 Biomedical Signal Processing Cr.Hrs.3 Presents an overview of different methods used in biomedical signal processing with particular emphasis on problems in biomedical research and clinical medicine. Different types of biomedical signals considering their sources are defined and suitable analysis methods are discussed.

ECE 7076 Advanced Electric Machines and Drives Cr.Hrs.3 Magnetically-coupled circuits, energy conversion principles, field generation in ac machines, windings and inductances, reference frame theory, dc machine and dc drives, scalar control of induction machines, vector control of induction machines, drives for special machines.

ECE 7170 Queueing Systems for Telecommunications Cr.Hrs.3 Applied stochastic models for queueing systems; analysis of queueing models using matrix-analytic methods and also traditional transform based approaches. Course will focus on applications; how to develop models that represent real communication network problems and how to analyze them.

ECE 7180 Embedded Systems Engineering Cr.Hrs.3 (Formerly 024.718) A Structured approach to the design of modern digital systems is presented with specific emphasis on embedding computer applications. Topics will include the formal methodology of digital design together with selected topics from the current research literature

ECE 7190 Micromachining and MEMS Technology Cr.Hrs.3 (Formerly 024.719) The course focuses on micromachining and micro-electro-mechanical systems (MEMS). Topics include microfabrication technologies, microactuators, and microsensors. Applications to optical, electrical, mechanical, chemical, and biological systems are discussed.

ECE 7200 Advanced Wireless Communication Cr.Hrs.3 (Formerly 024.720) The course covers several advanced issues in wireless communication networks. Topics of study will include trends and future of mobile computing, advanced wireless technologies, multimedia wireless LANs, wireless ad hoc networks, energy mgmt, channel coding, privacy issues in wireless networking. *Prerequisite:* Either ECE 4250 (or 024.425) or ECE 4700 (or 024.470)

ECE 7202 Cognitive Wireless Networks Cr.Hrs.3 The course will address both the theoretical concepts and system-level implementation issues for cognitive wireless networks. The topics covered will include information-theoretic analysis of cognitive radio systems, challenges and issues in designing cognitive radio systems, architectures and protocols for cognitive wireless networks, distributed adaptation and optimization methods, channel allocation cognitive machine learning techniques, interoperability issues, cross-layer optimization of cognitive radio systems, and applications of cognitive radio networks.

ECE 7204 Queueing Systems for Telecommunications Cr.Hrs.3 Applied stochastic models for queueing systems; analysis of queueing models using matrix-analytic methods and also traditional transform-based approaches. Course will focus on applications; how to develop models that represent real communication network problems and how to analyze them.

ECE 7210 Fractal and Chaos Engineering Cr.Hrs.3 (Formerly 024.721) This course presents the general theory of fractals and their applications in engineering, including fractal modelling of complex phenomena, such as dielectric discharges, and fractal image compression. It also relates fractals to chaos and dynamics.

ECE 7220 Topics in VLSI Test and Fault Tolerance Cr.Hrs.3 (Formerly 024.722) Faults and fault models for VLSI. Test generation algorithms. Design for testability: scan design for sequential circuits; built-in test; testable PLA design. Totally self-checking logic. Fault tolerance in VLSI: yield and performance enhancement through redundancy. System level diagnosis: applications to VLSI processor arrays.

ECE 7230 Artificial Neural Circuits and Networks Cr.Hrs.3 (Formerly 024.723) Examination of electronic neural networks and related computational systems, both from a circuit theory and from a system-theory perspective. Digital and analog VLSI implementations of neural systems are presented and compared. Connections with other systems from physics, biology and computer science are made.

ECE 7240 Signal Theory Cr.Hrs.3 (Formerly 024.724) Representation and analysis of deterministic signals: Continuous and Discrete; Random processes and spectral analysis; Bandlimited signals and systems.

ECE 7250 Information Theory and Applications Cr.Hrs.3 (Formerly 024.725) Development of information theory and the engineering implications for the design of communication systems and other information handling systems.

ECE 7260 Broadband Communication Networks Cr.Hrs.3 This course provides fundamentals for designing and analyzing broadband communication networks. The major content includes: structure and organization of broadband communication networks, typical protocols and technologies applied in broadband communication networks mathematical network modeling, and performance analysis. *Prerequisite:* Undergraduate level Probability Theory & Random Processes.

ECE 7270 Scattering and Diffraction of Electromagnetic Waves Cr.Hrs.6 (Formerly 024.727) Formulation and analysis of scattering problems by classical methods. Radar cross section of smooth bodies by geometrical and physical optics. Diffraction by edges. Impedance and Leontovitch boundary conditions.

ECE 7280 Static Compensation in Power Systems Cr.Hrs.3 (Formerly 024.728) Requirements for Static Compensation in Power Systems. The thyristor controlled reactor (TCR) and thyristor switched capacitor (TSC). Advanced GTO thyristor

compensators. Operation and control of compensators. Load Compensation, filter design and specifications.

ECE 7310 Power System Transient Simulation Cr.Hrs.3 (Formerly 024.731) Methods of Network Equation Formulation; Modeling of network nonlinearities and transmission lines; Modeling of electrical machines and controls.

ECE 7320 Sampled-Data Control Systems Cr.Hrs.3 (Formerly 024.732) Analysis and design of discrete-time systems, compensation to improve stability and performance, introduction to digital logic control.

ECE 7330 Experimental Methods for Electronic Materials Cr.Hrs.3 (Formerly 024.733) Methods for growing and analyzing electronic materials. Growth will include chemical vapour deposition, diffusion, and plasma processing. Analysis will include capacitance, voltage and current voltage techniques.

ECE 7370 Memory Devices and Systems Cr.Hrs.3 (Formerly 024.737) Review of computing system architectures. Memory structures and implementations: static, dynamic, synchronous, asynchronous, single and multiport. Testability of memories. Smart memories. Memories for VLSI: configurable and reconfigurable. Case study of a CMOS self-synchronizing RAM.

ECE 7400 Neural Nets and Neurocomputing Cr.Hrs.3 (Formerly 024.740) Foundations of neural networks. Basic architecture and different structures. Associative networks. Mapping networks. Spatio-temporal networks. Learning and adaptability. Supervised and unsupervised learning. Stability. Adaptive resonance networks. Self-organization. Examples of existing systems. Applications.

ECE 7410 Phased Array Antennas Cr.Hrs.3 (Formerly 024.741) Linear and Planar Arrays Theory; Pattern Synthesis Techniques, Analysis and Design of Radiating elements, Phase Shifters and Beam-Forming Network; Scanning Techniques; Effect of phase, amplitude and mechanical errors on Array Performance.

ECE 7430 Experimental Methods of Microwave Engineering Cr.Hrs.3 (Formerly 024.743) Methods for determining: scattering parameters; insertion, mismatch and return loss; cavity parameters. Detector and mixer performance characteristics. Power measurement. System noise determination. Antenna radiation pattern and gain measurements.

ECE 7440 Current Research Issues in Electrical Engineering Cr.Hrs.3 (Formerly 024.744) Presentation of important research developments in the area of Electrical Engineering, selected to complement other established graduate courses. Approval of the head of the department is required to register for this course.

ECE 7450 High Frequency Integrated Circuit Design and Analysis Cr.Hrs.3 (Formerly 024.745) Monolithic microwave integrated circuit fabrication and circuit design techniques. Analysis and modeling of microwave passive components and GaAs active devices. High frequency circuit simulation techniques. Basic circuit examples.

ECE 7460 Real time Process Engineering Cr.Hrs.3 (Formerly 024.746) Identification, description, and analysis of the behaviour of systems of real-time communicating processes, and the application of real-time process algebras in the design of hardware and software systems. *Prerequisite:* COMP 3430 (or 074.343).

ECE 7490 Verification Tools Cr.Hrs.3 (Formerly 024.749) Study of automated reasoning systems useful in describing and reasoning about properties of hardware and software systems. Investigate mechanizations of process algebras, representations of communicating processes, time-critical process constructors, time-outs, communication constructs, sequential and parallel computation. *Prerequisite:* COMP 3430 (or 074.343).

ECE 7540 Selected Topics of Solid State Electronics Cr.Hrs.3 (Formerly 024.754) Homojunction and heterojunction phenomena; Gunn effect, organic semiconductors, properties of thin films, quantum electronic devices, space charge limited current devices, and newly developed solid state electronic devices.

ECE 7560 Topics in Signal Compression and Coding Cr.Hrs.3 This course covers selected topics in signal compression with emphasis on recent advances: theory and practice of quantization, introduction to rate distortion theory, principles of predictive coding, transform coding and trellis coding, applications, emerging topics including joint source-channel coding, multiple description coding and distributed source coding.

ECE 7590 Telecommunication Networking Cr.Hrs.3 (Formerly 024.759) This course will cover issues in the design and analysis of telecommunication networks and systems in terms of physical implementation, protocols, routing algorithms, management, software interfaces, and applications. Focus will be on high speed LAN, WAN and Telecommunication networks using a systems engineering perspective. *Prerequisites:* although no *prerequisites* are required, either course ECE 4250 (or 024.425) or COMP 4300 (or 074.430) would be recommended.

ECE 7650 Current Research in Computer Engineering Cr.Hrs.3 (Formerly 024.765) Presentation of important research developments in the area of Computer Engineering, selected to complement other established graduate courses in this area.

ECE 7660 Logic Problem Solving Cr.Hrs.3 (Formerly 024.766) Introduction to declarative techniques in symbolic problem solving with emphasis on relational representations, query construction, and recursive formulations of knowledge structures in engineering.

ECE 7670 Optimization Methods for Computer-aided Design Cr.Hrs.3 (Formerly 024.767) Constrained optimization of functions of several variables. Optimization methods suitable for the solution of engineering problems by modern digital computers. Both gradient and direct search methods are included.

ECE 7680 Dielectric Properties and Phenomena Cr.Hrs.3 (Formerly 024.768) Elementary structure of matter, polarization, response of dielectrics to static and periodic fields, ionization and decay processes, electrical breakdown of gases, liquids, and solids.

ECE 7700 Nonlinear Systems Analysis 1 Cr.Hrs.3 (Formerly 024.770) Introduction to nonlinear phenomena; linearization; state-space methods - quantitative and quali-

tative; introduction to the principal methods of determining stability.

ECE 7720 Optimal Control 1 Cr.Hrs.3 (Formerly 024.772) Introduction to optimal control systems; topics will include statement of the control problem, controllability, calculus of variations, Pontryagin's Maximum Principle, and design of optimal controls.

ECE 7740 Physical Electronics 1 Cr.Hrs.3 (Formerly 024.774) Fundamental principles. Wave mechanics, statistical mechanics, structure of matter, free electron theory and electron emission, band theory of solids, electrical conduction, and transport phenomena. *Prerequisite:* ECE 3600 (or 024.360) or equivalent.

ECE 7750 Physical Electronics 2 Cr.Hrs.3 (Formerly 024.775) Properties of materials. Semiconductors, junction phenomena; ferroelectrics, magnetic materials, superconductivity, optical processes, effects of radiation. *Prerequisite:* ECE 3600 (or 024.360) and ECE 4190 (or 024.419) or equivalent.

ECE 7780 Microwave Circuits Cr.Hrs.3 (Formerly 024.778) Circuit properties of microwave transmission systems. Matrix representation and analysis of microwave networks, microwave junctions, resonators, and impedance matching networks.

ECE 7810 Solution of Fields by Numerical Methods 1 Cr.Hrs.3 (Formerly 024.781) Numerical integration, differentiation. Finite-difference solutions of the Poisson, Laplace and Helmholtz equations. Initial-value problems. The eigen problem. Examples chosen from electromagnetic, thermal, fluid-flow, stress, and other fields.

ECE 7880 Distributed Energy Generation Cr.Hrs.3 Rationale for distributed generations (DG); Distributed electricity generation technologies (Thermal and Renewable); Availability of renewable energy resources; Technical and economic evaluation of DG projects; DG grid integration and protection issues; Interconnection standards Microgrids. *Prerequisite:* Energy Systems I or equivalent course.

ECE 7890 Power System Control Cr.Hrs.3 (Formerly 024.789) The application of modern systems engineering methods to power system problems.

ECE 7920 Human Physiology for Engineers Cr.Hrs.3 (Formerly 024.792) The analysis and measurements of human physiological systems. Anatomical descriptions are limited to those required to support the functional analysis. Mathematical modeling is reinforced by analog and digital computer models.

ECE 7990 HVDC Transmission 1 Cr.Hrs.3 (Formerly 024.799) Rectifier-inverter fundamentals. Compounding and regulation. Grid firing control systems. Reactive power requirements. Ground return and electrode design. Transmission lines. Economics and efficiency.

ECE 8000 HVDC Transmission 2 Cr.Hrs.3 (Formerly 024.800) Protection. Harmonics: telephone interference. Corona: radio and television interference. Analytical methods. Conversion equipment, the use of solid devices. Selected topics from current literature. *Prerequisite:* ECE 7990 (or 024.799).

ECE 8010 Advanced Network Synthesis Cr.Hrs.3 (Formerly 024.801) Mathematical treatment of various approximation techniques, matrix transformation methods applied to equivalent networks of minimum sensitivity or other criteria, theory of multi-variable functions, lumped-distributed network synthesis.

ECE 8050 Topics in Microelectronics Cr.Hrs.3 (Formerly 024.805) Equilibrium and non-equilibrium processes in semiconductors, properties of junctions and thin films, carrier transport phenomena, effects of traps, and selected topics pertinent to recent literature in microelectronics.

ECE 8110 Digital Systems Design Cr.Hrs.3 (Formerly 024.811) Fixed-instruction-set microprocessor design; microprogramming, bit-slice based design; parallel processing and multiprocessing; applications to data acquisition, data logging, and data communications.

ECE 8130 Statistical Communication Theory Cr.Hrs.3 (Formerly 024.813) Representations of random processes; signal detection and estimation techniques.

ECE 8140 Digital Communications and Coding Cr.Hrs.3 (Formerly 024.814) Fundamentals of information theory; source and channel coding; digital modulation techniques.

ECE 8150 Digital Signal Processing Cr.Hrs.3 (Formerly 024.815) Discrete-time linear system theory, digital filter design techniques, discrete Fourier transforms including FFT, discrete Hilbert transform, Walsh-Hadamard transforms high-speed convolution and correlation techniques.

ECE 8160 Digital Filters Cr.Hrs.3 (Formerly 024.816) Theories, techniques and procedures used to analyze, design and implement digital filters in both software and hardware.

ECE 8190 Topics in Antenna Theory and Design Cr.Hrs.3 (Formerly 024.819) Antennas as a boundary value problem, antenna parameters, analysis and synthesis methods, antenna measurements.

ECE 8200 Advanced Engineering Electromagnetics Cr.Hrs.3 (Formerly 024.820) Solution of wave equation; special theorems and concepts, computer aided analysis.

ECE 8210 Power Electronic Circuits Cr.Hrs.3 (Formerly 024.821) Thyristor properties, ac controllers, controlled rectifiers, dc to dc converters (choppers), and inverters. Permission of instructor required. Credit not to be held with ECE 4370 (or 024.437).

ECE 8220 Digital Image Processing Cr.Hrs.3 (Formerly 024.822) Digital representation of images. Two-dimensional operations and transforms. Image enhancement, restoration, and coding. Reconstruction from projections. *Prerequisite:* ECE 3580 (or 024.358) or equivalent desirable.

ECE 8230 Pattern Recognition and Scene Analysis Cr.Hrs.3 (Formerly 024.823) Supervised and unsupervised learning techniques. Linear discriminant analysis. Scene analysis methods.

ECE 8240 Parallel Processing Architecture Cr.Hrs.3 (Formerly 024.824) Abstract parallel processing system (APPS), Flynn's classification, pipelining, crossbar switches, associative parallel processors, Bene's network, multistage interconnection networks (MIN), alternating -sequential parallel processing.

ECE 8270 Computer Communication Networks Cr.Hrs.3 (Formerly 024.827) Overview of existing computer networks. Elements of queueing theory. Error, delay, cost and capacity analysis. Fixed assignment schemes. Packet and switched networks. Random access. Satellite networks. Hybrid protocols.

ECE 8280 Electromagnetic Field Modelling Cr.Hrs.3 (Formerly 024.828) Coulombian and amperian models for polarized media and magnetized media; uniqueness theorems, formulation and classical methods of analysis of static, stationary and quasistationary field problems; modelling of electromagnetic fields in the presence of moving solid conductors; elements of relativistic electrodynamics.

ECE 8300 Computer Vision Cr.Hrs.3 (Formerly 024.830) This course is an extension of ECE 8220 (or 024.822) "Digital Image Processing." Techniques of image modeling, segmentation, texture analysis, matching and inference will be studied.

ECE 8310 Computer-Aided Design in Biomedical Engineering Cr.Hrs.3 (Formerly 024.831) Representation of surfaces in space. 3D display methods and hardware. 3D boundary tracing and texture. Biosterometry and stereophotogrammetry in biomedicine. Some aspects of computer-aided manufacturing of prostheses and other topics. *Prerequisites:* an introductory course in computing or equivalent experience and one year of any physical, engineering or biological science.

ECE 8320 Advanced Topics in Power Systems Cr.Hrs.3 (Formerly 024.832) Study of selected topics of recent advances in electrical power systems.

ECE 8360 VLSI Design Methodology Cr.Hrs.3 (Formerly 024.836) Design of custom and semi custom Very Large Scale Integrated (VLSI) circuits and systems including design for testability. Static and dynamic VLSI circuits; software design tools, layout, logic and timing simulation. *Prerequisites:* ECE 2220 (or 024.222), ECE 4240 (or 024.424), or equivalent.

ECE 8370 Topics in Biomedical Engineering Cr.Hrs.3 (Formerly 024.837) A discussion of current topics in biomedical engineering. The latest in instrumentation, procedures and practices relevant both to clinical engineering and ongoing research are covered. *Prerequisite:* ECE 4400 (or 024.440) or consent of instructor.

ECE 8380 Reflector Antennas Cr.Hrs.3 (Formerly 024.838) Mathematical analysis of common reflector antennas including effects of various types of feed structures.

ECE 8400 Intelligent Systems Cr.Hrs.3 (Formerly 024.840) Continuation of ECE 7660 (or 024.766) "Resolution Problem Solving," plan formation, default and temporal reasoning as applicable to engineering.

Section 26: English, Film, and Theatre

Graduate Office: 623 Fletcher Argue Building

Telephone: (204) 474 7365

Fax: (204) 474 7669

E-mail: english@umanitoba.ca

Website: umanitoba.ca/english

Department Head: Judith Owens

Graduate Chair: Mark Libin

Academic Staff

Distinguished Professor Emeritus

Kroetsch, R.P., B.A. (Alberta), M.A. (Middlebury), Ph.D. (Iowa), F.R.S.C.

Professors Emeriti

Teunissen, J.J., B.A. (Hons.), M.A. (Saskatchewan), Ph.D. (Rochester);

Weil, H.S., B.A. (Tulane), M.A., Ph.D. (Stanford) **Weil, J.R.,** B.A. (Middlebury), M.A., Ph.D. (Stanford).

Senior Scholars

Lenoski, D.S., B.A. (Hons.), M.A. (Manitoba), Ph.D. (Queen's); **Ogden, J.T.,** A.B. (Princeton), M.A.T. (Johns Hopkins), Ph.D. (Illinois); **Rempel, W.J.,** B.A. (UBC), Ph.D. (Texas); **Snyder, W.S.,** B.A., M.A. (Idaho), Ph.D. (Florida);

Professors

Arnason, D.E., B.A., Cert.Ed., M.A. (Manitoba), Ph.D. (New Brunswick); **Brydon, D.L.,** B.A.(Hons.), M.A. (Toronto), Ph.D. (Australian National University), Canada Research Chair; **Cooley, D.O.,** B.Ed., B.A. (Hons.), M.A. (Saskatchewan), Ph.D. (Rochester); **de Toro, F.,** B.A., M.A. (Carleton), Ph.D. (Montréal); **Finnegan, R.E.,** B.A. (St. Peter's), M.A., Ph.D. (Notre Dame); **Johnson, C.G.,** B.A., M.A. (UBC), Ph.D. (Leeds); **Lenoski, D.S.,** B.A. (Hons.), M.A. (Manitoba), Ph.D. (Queen's); **O'Kell, R.P.,** B.A. (Hons.) (Carleton), A.M., Cert. Vict. Studies, Ph.D. (Indiana); **Perkins, P.,** B.A. (Utah); M.A., Ph.D. (Dalhousie); **Toles, G.E.,** B.A. (New York), M.A., Ph.D. (Virginia); **Walz, E.P.,** B.A. (St. John Fisher), M.A. (Indiana), Ph.D. (Massachusetts); **Williams, D.L.,** B.A.(Hons.) (Saskatchewan), M.A., Ph.D. (Massachusetts); **Young, A.D.,** B.A., M.A. (Manitoba), M.A., Ph.D. (Cornell).

Associate Professors

Austin-Smith, B.L., B.A. (Acadia), M.A. (Victoria), Ph.D. (Manitoba); **Cariou, W.,** B.A. (Hons.) (Saskatchewan), M.A., Ph.D. (Toronto); **Calder, A.C.,** B.A. (Hons) (Saskatchewan), M.A., Ph.D. (Western Ontario); **Faubert, M.R.,** B.A., M.A. (Regina), Ph.D. (Toronto); **Libin, M.I.,** B.A. (Calgary), M.A. (Toronto), Ph.D. (Manitoba); **Medoro, D. B.A.** (Toronto), M.A. (Queen's), B.Ed. (Western Ontario), Ph.D. (Queen's); **Muller, A.,** B.A. (Calgary), M.A. (Alberta), Ph.D. (McGill); **Owens, J.M.C.,** B.A., M.A., Ph.D., (Manitoba); **Sinclair, S.,** B.A. (Hons), M.A. (McGill), Ph.D. (Cardiff); **Warne, V.K.,** B.A., M.A., Ph.D. (Queen's).

Assistant Professors

Clark, G., B.A.(Hons) (UBC), M.A., Ph.D. (Chicago); **Corne, J.,** B.A. (Manitoba), M.A., Ph.D. (Cornell); **Groome, M.,** B.A. (Hons), M.A., Ph.D. (McGill); **Joo, H.-J.,** B.A. (Louisiana), Ph.D. (Oregon); **Kerr, W. R.,** B.A.

(Saskatchewan), M.A., Ph.D. (Alberta); **Tromly, L.,** B.A. (Hons), M.A. (Queen's), Ph.D. (Toronto); **Watt, D.,** B.A., M.A. (Alberta), Ph.D. (Oxford).

Program Information

As a moderate-sized department, English is able to offer M.A. and Ph.D. programs covering a wide range of periods, genres, media, and theoretical approaches. Both scholarly and creative thesis options are offered for the M.A. In addition to teaching (at all levels), publishing, writing, editing, advertising, arts management, acting and entertainment, English graduates have worked in small businesses, corporations, government, the foreign service, research and development, public relations, fund-raising, filmmaking, the National Film Board, and many other areas.

One of the major strengths of the faculty is its commitment to teaching excellence, with three of its current members having been honoured with the University's highest teaching award, and several others having been honoured with Merit Awards, Graduate Teaching Awards, and UMSU Certificates of Teaching Excellence. In keeping with this record, graduate student teachers have also won a number of the Teaching Excellence Awards offered by the Faculty of Arts since 1994.

Fields of Research

Students are welcome to consider all areas of literary specialization: Canadian literature, American literature, prairie literature, 20th-century literature, 19th-century literature, 18th-century literature, Milton, medieval literature, film, drama, theatre, post-colonial literature and theory, modern and post-modern literature, literary and critical theory, cultural and media studies, women's writing, and creative writing.

Research Facilities

University of Manitoba Libraries have extensive holdings in literature, film studies, and theatre. The Libraries provide access to both local and remote databases. Of note are the University of Manitoba Department of Archives and Special Collections and St. John's College Library. The Department of Archives and Special Collections has an extensive holding in Canadian literature. It is particularly good in Canadian prairie literature, the Archives' holdings including a large and growing collection of prairie literary manuscripts.

Our department benefits from close affiliations with the University of Manitoba Institute for the Humanities, the Centre for Globalization and Cultural Studies, and the Centre for Creative Writing and Oral Culture.

The Canadian Literature Archive, a project of the Department of English, Film, and Theatre, is an internet site which serves as a repository for information about Canadian writers, novelists, poets, playwrights, essayists, Canadian literary organizations, magazines, publications, texts, and library archives. The Archive has been online since 1994.

Students are invited to join the Association of Graduate English Students (AGES). The association, which has recently been dramatically reanimated, organizes student publications, graduate colloquia, and other events. The department also operates a media lab and provides a reading room for student and faculty use.

M.A. in English

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Students with other degrees or backgrounds may be eligible for admission to a pre-Master's program to the satisfaction of the department. Contact the English, Film, and Theatre Department for further information.

Application Deadlines

Applications of Canadian/U.S. students are to be received in the Faculty of Graduate Studies, complete with all supporting documentation, by January 5th. International students should submit their applications to the Faculty of Graduate Studies, complete with all supporting documentation, by November 1st.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. Requirements for the M.A. degree in English can be met in one of two ways; **either** a thesis (critical or creative) and 18 credit hours of course work, of which 12 credit hours will normally be graduate English seminars; **or** a major paper and 30 credit hours of course work.

Second language reading requirement: Yes

Expected time to graduate: 2 years

Ph.D. in English

Admission

In addition to the minimum admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, applicants must normally hold an M.A. degree in English with a GPA of at least 3.5 in their work at the M.A. level.

Application Deadlines

Applications of Canadian/U.S. students are to be received in the Faculty of Graduate Studies, complete with all supporting documentation, by January 5th. International students should submit their applications to the Faculty of Graduate Studies, complete with all supporting documentation, by November 1st.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. The first year of full-time Ph.D. study will normally include 18 credit hours, at least 12 credit hours of which should be graduate seminars in English literature. This program of studies will be arranged in consultation with the student's advisory committee at a meeting that will take place no later than one week before the start of classes.

Candidacy examinations, consisting of a paper on the student's period of specialization and a paper on the research area, will normally be written in the second year of Ph.D. study. Each paper will be followed by a one-hour oral examination.

Second language requirement: yes

Expected time to graduation: 4 years

Course Descriptions

ENGL 7010 Reading for Thesis Cr.Hrs.6 Reading for thesis

ENGL 7020 American Literature Cr.Hrs.6 A detailed study of an aspect of American Literature. Topics will vary from year to year. Not to be held with ENGL 7030.

ENGL 7030 Studies in American Literature Cr.Hrs.3 A detailed study of an aspect of American Literature. Topics will vary from year to year. Not to be held with ENGL 7020. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7040 Canadian Literature Cr.Hrs.6 A detailed study of an aspect of Canadian Literature. Topics will vary from year to year. Not to be held with ENGL 7050.

ENGL 7050 Studies in Canadian Literature Cr.Hrs.3 A detailed study of an aspect of Canadian Literature. Topics will vary from year to year. Not to be held with ENGL 7040. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7060 British Literature since 1900 Cr.Hrs.6 A detailed study of an aspect of post-1900 British Literature. Topics will vary from year to year. Not to be held with ENGL 7070.

ENGL 7070 Studies in British Literature since 1900 Cr.Hrs.3 A detailed study of an aspect of post-1900 British Literature. Topics will vary from year to year. Not to be held with ENGL 7060. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7080 Contemporary Literature Cr.Hrs.6 A detailed study of an aspect of contemporary literature in English. Topics will vary from year to year. Not to be held with ENGL 7090.

ENGL 7090 Studies in Contemporary Literature Cr.Hrs.3 A detailed study of an aspect of contemporary literature in English. Topics will vary from year to year. Not to be held with ENGL 7080. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7100 International Literature Cr.Hrs.6 A detailed study of an aspect of international literature in English. Topics will vary from year to year. Not to be held with ENGL 7140.

ENGL 7140 Studies in International Literature Cr.Hrs.3 A detailed study of an aspect of international literature in English. Topics will vary from year to year. Not to be held with ENGL 7100. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7150 Modernism Cr.Hrs.6 A detailed study of an aspect of Modernism. Topics will vary from year to year. Not to be held with ENGL 7160.

ENGL 7160 Studies in Modernism Cr.Hrs.3 A detailed study of an aspect of Modernism. Topics will vary from year to year. Not to be held with ENGL 7150. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7170 Studies in Media Cr.Hrs.3 A detailed study of an aspect of media and literature. Topics will vary from year to year. Not to be held with ENGL 7250. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7180 Studies in Old English Poetry Cr.Hrs.6 Studies in Old English poetry. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7190 Special Topics in Literary Figures Cr.Hrs.3 Focuses on the works of an individual author. Subjects will vary from year to year. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7250 Media Cr.Hrs.6 A detailed study of an aspect of media and literature. Topics will vary from year to year. Not to be held with ENGL 7170.

ENGL 7300 Creative Writing Cr.Hrs.3 This seminar will foster advanced craft in a variety of literary genres and will include an analytic and a workshop component. Admission will be at the instructor's discretion, based on the submission of a creative portfolio.

ENGL 7540 Special Topics Cr.Hrs.6 Description not available for this course. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7590 Teaching Literature at University Cr.Hrs.0 Description not available for this course.

ENGL 7600 Bibliography Cr.Hrs.3 Description not available for this course.

ENGL 7690 Special Topics in Literary Periods 1 Cr.Hrs.3 Description not available for this course. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7710 Special Topics in Literary Genres 1 Cr.Hrs.3 No description available. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7750 Directed Reading 1 Cr.Hrs.3 Directed Reading 1. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7760 Directed Reading 2 Cr.Hrs.3 Directed Reading 2. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7770 Poetry and Poetics Cr.Hrs.6 Focuses on poetry and poetics. Topics will vary from year to year. Not to be held with ENGL 7780.

ENGL 7780 Studies in Poetry and Poetics Cr.Hrs.3 Focuses on poetry and poetic theory. Topics will vary from year to year. Not to be held with ENGL 7770. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7790 Drama/Theatre Cr.Hrs.6 Focuses on drama possibly using some consideration of theatrical practice and performance. Topics will vary from year to year. Not to be held with ENGL 7800.

ENGL 7800 Studies in Drama/Theatre Cr.Hrs.3 Focuses on drama possibly using some consideration of theatrical practice and performance. Topics will vary from year to year. Not to be held with ENGL 7790. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7810 Prose Cr.Hrs.6 Examines the theory and practice of literary prose. Topics will vary from year to year. Not to be held with ENGL 7820.

ENGL 7820 Studies in Prose Cr.Hrs.3 Examines the theory and practice of literary prose. Topics will vary from year to year. Not to be held with ENGL 7810. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7830 Critical Theory Cr.Hrs.6 Explores literary theory. Topics will vary from year to year and may involve study of a particular theorist or theoretical school. Not to be held with ENGL 7840.

ENGL 7840 Studies in Critical Theory Cr.Hrs.3 Explores literary theory. Topics will vary from year to year. Not to be held with ENGL 7830. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7850 Cultural Studies Cr.Hrs.6 Provides an overview of the theory and practice of cultural studies. Topics will vary from year to year. Not to be held with ENGL 7860.

ENGL 7860 Topics in Cultural Studies Cr.Hrs.3 Provides an overview of the theory and practice of cultural studies. Topics will vary from year to year. Not to be held with ENGL 7850. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7870 Literature and Film Cr.Hrs.6 Brings together literature and film. Topics will vary from year to year. Not to be held with ENGL 7880.

ENGL 7880 Studies in Literature and Film Cr.Hrs.3 Brings together literature and film. Topics will vary from year to year. Not to be held with ENGL 7870. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7890 Medieval Literature Cr.Hrs.6 A detailed study of an aspect of Middle English literature. Topics will vary from year to year. Not to be held with ENGL 7900.

ENGL 7900 Studies in Medieval Literature Cr.Hrs.3 A detailed study of an aspect of Middle English literature. Topics will vary from year to year. Not to be held with ENGL 7890. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7910 Early Modern Literature Cr.Hrs.6 A detailed study of an aspect of Early Modern literature. Topics will vary from year to year. Not to be held with ENGL 7920.

ENGL 7920 Studies in Early Modern Literature Cr.Hrs.3 A detailed study of an aspect of Early Modern literature. Topics will vary from year to year. Not to be held with

ENGL 7910. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7930 Eighteenth-Century Literature Cr.Hrs.6 A detailed study of an aspect of eighteenth-century literature. Topics will vary from year to year. Not to be held with ENGL 7940.

ENGL 7940 Studies in Eighteenth-Century Literature Cr.Hrs.3 A detailed study of an aspect of eighteenth-century literature. Topics will vary from year to year. Not to be held with ENGL 7930. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7950 Romanticism Cr.Hrs.6 A detailed study of an aspect of romanticism. Topics will vary from year to year. Not to be held with ENGL 7960.

ENGL 7960 Studies in Romanticism Cr.Hrs.3 A detailed study of an aspect of romanticism. Topics will vary from year to year. Not to be held with ENGL 7950. As the course content will vary from year to year, students may take this course more than once for credit.

ENGL 7970 Nineteenth-Century British Literature Cr.Hrs.6 A detailed study of an aspect of Nineteenth-Century British Literature. Topics will vary from year to year. Not to be held with ENGL 7980.

ENGL 7980 Studies in Nineteenth-Century British Literature Cr.Hrs.3 A detailed study of an aspect of Nineteenth-Century British Literature. Topics will vary from year to year. Not to be held with ENGL 7970. As the course content will vary from year to year, students may take this course more than once for credit.

Section 27: Entomology

Head: N.J. Holliday

General Office: 214 Animal Science Building

Telephone: 204 474 8077

Fax: 204 474 7628

E-mail: head_entomo@umanitoba.ca

Website: umanitoba.ca/afs/entomology

Graduate Program Assistant: K. Graham

Academic Staff

Professor Emeritus

Brust, R.A., B.S.A., M.Sc. (Manitoba), Ph.D. (Illinois).

Senior Scholar

MacKay, P.A., B.Sc., M.Sc. (Toronto), Ph.D. (British Columbia).

Professors

Currie, R.W., B.Sc., M.Sc., Ph.D. (Manitoba); Galloway, T.D., B.Sc. (Agr.) (Guelph), Ph.D. (Manitoba); Holliday, N.J., B.Sc. (Hons.) (London), Ph.D. (Bristol).

Adjunct Professors

Arthur, F.H., B.S. (Florida), M.S., Ph.D. (North Carolina State); Fields, P.G., B.Sc. (McMaster), Ph.D. (Laval); Iranpour, M., B.Sc. (Shiraz), M.Sc. (Tehran Medical Sciences), Ph.D. (Manitoba); Kuhlmann, U., Diploma U., Ph.D. (Kiel); Lamb, R.J., B.Sc., M.Sc. (Toronto), Ph.D. (UBC); Lindsay, L.R. B.Sc. (Winnipeg), M.Sc. (Manitoba), Ph.D. (Guelph); Mason, P.G., B.Sc. (Hons.) (Guelph), M.Sc., Ph.D. (Saskatchewan); McIntosh, R.L., B.Sc.F. (New Brunswick), M.Sc., Ph.D. (British Columbia), R.P.F.(N.B.); Paterson, M.J., B.Sc. (Hons) (Manitoba), M.A. (Indiana), Ph.D. (Dalhousie); Podemski, C.L., B.Sc. (Alberta), M.Sc. (Western Ontario), Ph.D. (Saskatchewan); Rosenberg, D.M., B.Sc.(Hons.) (Alberta), Ph.D. (Alberta); Savage, J., B.Sc., Ph.D. (McGill); Smith, M.A.H., B.Sc., M.Sc. (Waterloo), Ph.D. (Manitoba); Soroka, J.J., B.Sc. (Saskatchewan), M.Sc., Ph.D. (Manitoba); Vanderwel, D., B.Sc. (Hons.) (Victoria), Ph.D. (Simon Fraser); Westwood, A.R., B.Sc., M.Sc. (Manitoba), Ph.D. (Guelph); White, N.D.G., B.Sc. (Agr.), M.Sc. (Guelph), Ph.D. (Manitoba).

Program Information

The Department of Entomology is the only such in Canada. The Department has strong links with agricultural and environmental research organizations in Winnipeg and across Canada, and is uniquely positioned to provide comprehensive graduate training in entomological research. The Department offers M.Sc. and Ph.D. degrees. In both M.Sc. and Ph.D. programs, students must achieve a high standard in a research project and in a thesis reporting their results. Students must also take some course work, including a course intended to develop written and oral communication skills, to promote critical thinking and to provide exposure to diverse fields of entomology and related sciences.

Graduates of the Ph.D. programme from the Department of Entomology occupy academic positions in a number of universities in Canada and elsewhere; others occupy senior scientist positions with Agriculture and Agri-Food Canada, Environment Canada, or other government research and regulatory agencies. Graduates of the M.Sc. programme have proceeded to Ph.D. programs elsewhere, while others have entered the workforce following their M.Sc. degree. A high proportion of insect extension specialists in provincial governments in western Canada are graduates of the department's M.Sc. program. Other recent graduates have positions as forest and prairie management ecologists, careers in agribusiness, producer organizations or pesticide companies, or technical positions in research organizations.

Fields of Research

The research of the Department is about equally divided between basic and applied studies. The Department has faculty in the areas of apiculture and pollination biology; physiological, population and community ecology of insects; insect systematics; insect-vertebrate interactions and aquatic entomology. Particular areas of focus include honey bee parasite management, insects as agents of biological control, crop and livestock entomology, arthropod ectoparasites of mammals and birds, and the study of insect biodiversity in response to forest and prairie management. Adjunct professors associated with the department provide additional depth and breadth in the areas of forest entomology, pheromone chemistry, crop protection entomology, stored product entomology, medical entomology, and the role of insects in aquatic ecosystems.

Research Facilities

Departmental research facilities include the J.B. Wallis Museum of Entomology, controlled environment chambers and an apiary. Other accessible facilities include a scanning electron microscope, pesticide analysis laboratories, livestock, field plots and commercial scale fields, and greenhouse space.

M.Sc. in Entomology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

The Department of Entomology allows students to begin their program on either 1 September, 1 January or 1 May. For admission for each of these start dates, Canadian and U.S. students should send their applications with complete supporting documentation to arrive in the Faculty of Graduate Studies at least three (3) months before the intended start date. International students should send their applications with complete supporting documentation to arrive in the Faculty of Graduate Studies at least seven (7) months before the intended start date. Before making a formal application,

students should contact the Department of Entomology to determine what documentation should accompany the application.

Program Requirements

The minimum course requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. As part of their academic program, students are required to take ENTM 7150 Advanced Entomology 1.

Second language reading requirement: none

Expected time to graduation: 2 - 3 years

Ph.D. in Entomology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

The Department of Entomology allows students to begin their program on either 1 September, 1 January or 1 May. For admission for each of these start dates, Canadian and U.S. students should send their applications with complete supporting documentation to arrive in the Faculty of Graduate Studies at least three (3) months before the intended start date. International students should send their applications with complete supporting documentation to arrive in the Faculty of Graduate Studies at least seven (7) months before the intended start date. Before making a formal application, students should contact the Department of Entomology to determine what documentation should accompany the application.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. As part of their academic program, students are required to take ENTM 7220 Advanced Entomology.

Second language reading requirement: yes, although this may be waived.

Expected time to graduation: approximately 3 - 5 years

Course Descriptions

ENTM 7120 Insect Population Management Cr.Hrs.3 (Formerly 038.712) Term papers, tutorials and workshops to study systems of managing populations of injurious and useful insects based upon models of the processes of insect population dynamics. *Prerequisite:* consent of instructor. Not all courses are offered every year. Please contact the department regarding course availability.

ENTM 7150 Advanced Entomology 1 Cr.Hrs.3 (Formerly 038.715) A required course for M.Sc. students in Entomology. Students must submit essays and seminars in areas chosen to fit the requirements of their program. They are required to prepare for and participate actively in discussion sessions and other class meetings. Not available for credit in a Ph.D. program.

ENTM 7200 Advanced Insect Taxonomy Cr.Hrs.3 (Formerly 038.720) Tutorials, laboratory periods and discussion of classification and evolution of insects. Not all courses are offered every year. Please contact the department regarding course availability.

ENTM 7210 Special Topics in Entomology Cr.Hrs.3 (Formerly 038.721) The content of this course will deal with specific topics of entomology at the advanced level.

ENTM 7220 Advanced Entomology Cr.Hrs.3 (Formerly 038.722) A required course for Ph.D. students in Entomology. Students must submit essays and present seminars in areas chosen to fit the requirements of their program. They are required to prepare for and participate actively in discussion sessions and other class meetings. Not available for credit in a M.Sc. program.

ENTM 7230 Advanced Pollination Biology Cr.Hrs.3 (Formerly 038.723) Tutorials, assignments and discussion periods of current topics relating to the physiology and life history of insect pollinators and their ecological interactions with entomophilous plants. Subjects studied may be selected to fit the interests of individual students. *Prerequisite:* Consent of instructor.

ENTM 7240 Advances in Physiological Ecology of Insects Cr.Hrs.3 (Formerly 038.724) The effect of environmental factors such as temperature, moisture, light and other organisms on the physiology and ecology of insects. *Prerequisite:* ENTM 2050 (or 038.205) or consent of instructor. Not to be held for credit with ENTM 4520 (or 038.452). Not all courses are offered every year. Please contact the department regarding course availability.

Section 28: Environment & Geography

Head: Dr. R. Stewart

General Office: 211 Isbister Building

Telephone: 204 474 9667

Fax: 204 474 7699

E-mail: environment_geography@Umanitoba.ca

Website: umanitoba.ca/faculties/environment/departments/geography

Graduate Chair: Dr. F. Wang

Graduate Program Assistant: Patricia Gutoski

Academic Staff

Distinguished Professor

Smil, V., M.S. (Prague), Ph.D. (Pennsylvania State), F.R.S.C.

Senior Scholars

Brierley, J.S., B.A. (Victoria), Dip.Ed. (Oxford), M.A. (Alberta), Ph.D. (Edinburgh); **Foster, R.H.**, B.A. (U.C.-Berkeley), M.A. (San Francisco State), Ph.D. (U.C.-Berkeley); **Smith, G.C.**, B.A.(Hons.), M.A. (Reading), Ph.D. (McMaster); **Tiwari, R.C.**, M.A. (Agra), Ph.D. (Reading).

Professors

Barber, D.G., B.P.E., M.N.R.M. (Manitoba), Ph.D. (Waterloo); **Baydack, R.K.**, B.Sc. (Hons.), M.N.R.M. (Manitoba), Ph.D. (Colorado State); **Norton, W.**, B.A.(Hons.), Dip.Ed.(Hull), M.A. (Queen's), Ph.D. (McMaster); **Oakes, J. B.H.** Ecol., MSc., Ph.D. (Manitoba); **Stewart, R.E.**, B.Sc. (Hons) (Manitoba), M.Sc., PhD (Toronto); **Todd, D.**, B.A.(Hons.), Cert. Ed. (Leeds), M.A. (Queen's), Ph.D. (London School of Economics); **Wang, F. B.S.** (Wuhan), Ph.D. (Peking).

Associate Professors

Benbow, S.M.P., B.A.(Hons.), Ph.D. (Liverpool); **Hallman, B.C.**, B.A., M.A., Ph.D. (Guelph); **Hanesiak, J.M.**, B.Sc. (Winnipeg), M.Sc. (York), Ph.D. (Manitoba); **McLachlan, S.M.**, B.Sc.(Hons.) (McMaster), M.Sc. (Guelph), Ph.D. (York); **Papakyriakou, T.N.**, B.Sc. (McMaster), M.Sc. (Queen's), Ph.D. (Waterloo).

Assistant Professors

Hanson, M.L., B.Sc. (Hons.) (Toronto), Ph.D. (Guelph); **Masuda, J.R.**, B.Sc.(Hons.), M.Sc., Ph.D. (Alberta); **Walker, D.J.**, B.Sc.(Hons.), M.Sc., Ph.D. (Manitoba).

Adjunct Professors

De Abreu, R.A., B.E.S. (Hons), P.hD. (Waterloo); **Ferguson, S.H.**, B.Sc. (Guelph), M.Sc. (Victoria), Ph.D. (Saskatchewan); **Kotak, B.G.**, B.Sc., M.Sc. (Manitoba), PhD (Alberta); **Macdonald, R.W.**, B.Sc.(Hons), Ph.D. (Dalhousie); **Michel, C.**, B.Sc., M.Sc., Ph.D. (Laval); **Prinsenbergh, S.**, B.Sc. (British Columbia), M.Sc., Ph.D. (Washington); **Rahman, M.**, B.A., M.A., M.Phil. (Jahangirnagar), Ph.D. (Manitoba); **Richard, P.R.**, B.Sc. (McGill), M.Sc. (Quebec at Montreal); **Stern, G.A.**, B.Sc., M.Sc., Ph.D. (Manitoba); **Tomy, G.T.**, B.Sc., PhD (Manitoba); **Watler, D.E.**, B.A. (Keele), M.Sc. (London), PhD (Alberta).

Program Information

The Department of Environment and Geography is one of the most dynamic and eclectic research units at the University of Manitoba. The focus of

the graduate program is innovative scholarship that contributes meaningfully to our understanding of how we interact with and can influence the

world around us. As a department, we strive to be recognized regionally, nationally, and internationally as a centre for excellence in teaching, research and outreach and in integrating physical, biological and human environmental knowledge. This is reflected in our commitment to graduate students and the successes they continue to achieve.

Fields of Research

Department research activities span a wide range of disciplinary and interdisciplinary activities, including: the evolution of the cultural landscape; aging; maritime shipbuilding and seaports; homelessness; global (and China's) energy supplies; global food and agriculture; alternative energy sources; replacement of petroleum feedstock in petrochemical industry; speciation, cycling, and bioavailability of trace elements across environmental interfaces; stress ecology and risk assessment in aquatic systems

from chemical contaminants, ecosystem functioning and biodiversity impacts of nutrients in riparian and aquatic systems and the ecophysiology of invasive species, animal geographies; applied meteorology; severe weather including precipitation and drought analyses; microclimatology, greenhouse gas source-sink analysis; geographies of health, caregiving and care work in urban and rural settings; human-animal relations; the changing role of zoos and zoo maps; prairie and forest restoration; traditional Aboriginal knowledge; sustainable rural and urban agriculture; risk analysis of GM crops and disease; plant, wildlife and landscape ecology; environmental conservation and ecological restoration; gender and development; environmental health; arctic climate change and system-science studies in polar marine ecosystems.

Researchers in the Department collaborate with a wide variety of other academic, governmental and private institutions, non-governmental and grassroots organizations, and community groups. These include: Networks of Centres of Excellence (NCE – ArcticNet, PrioNET), IPY, NSERC and CF-CAS national research networks (e.g. BIOCAP, CASES, IPY-CFL, MITE-RN, COMERN, DRI, ArcticStorms); national climate-related research centres (e.g. HAL, PSPC, MRB and CRB) within the Meteorological Services of Canada (MSC); Department of Fisheries and Oceans facilities (including the Canadian Ocean Climate Chemistry Centre, IOS, FWI); numerous zoos both in Canada, and abroad; Clearwater and Erikson rural communities, Hollow Water and Grassy Narrows First Nations; Spence and Furby urban community gardens; NGOs that include Boreal Forest Network and Council of Canadians, Manitoba Conservation; Parks Canada; Manitoba Hydro; Ducks Unlimited and many others. In addition, the department is a forerunner in research outreach activities, including Schools on Board, a national initiative to engage schools and communities in Arctic science research by interacting with international CASES research teams on board the Canadian Research Icebreaker. Other important collaborations include action research and education with rural communities, farm groups and First Nations across the country, especially the Harvest Moon Society, and environmental NGOs including Council of Canadians, Boreal Forest Network, Saskatchewan Organic Directorate, Status of Women Canada, Manitoba Centre for Health Policy and the Delta Waterfowl Foundation.

Meteorological and marine research involves collaboration with international research networks and agencies (e.g. Universities of Miami (RSMAS), Wisconsin, the Radiometrics Corp., Quebec Oceans, International Polynya Program, IPY-Pan-Arctic Ecosystem Cluster). Other international research involves major ion chemistry with scientists in China; trace element behaviour research in the Himalaya, Nepal and India; energy and food supply in China; agriculture for the Eastern Caribbean; grasslands conservation strategy in North America; international zoo visitor views of conservation; ports and regional development in East Asia; and community-located environmental conservation in Ecuador, Peru, as well as India and Bangladesh.

Research Facilities

The Department enjoys close collaboration with the Centre for Earth Observation Science (CEOS). CEOS is structured as an interdisciplinary centre through the partnering arrangements with the Departments of Statistics, Botany, Biological Sciences, Soil Science, Civil Engineering, Physics and Applied Mathematics. External partners include Manitoba Natural Resources, the Canadian Wheat Board, Parks Canada, Fisheries and Oceans Canada, MB Hydro as well as those with national and international affiliations such as the Canadian Ice Services, Environment Canada, Canada Centre for Remote Sensing, Canadian Space Agency, National Air and Space Administration, and the Canadian International Development Agency. Because of this extensive network, it is possible to access facilities and equipment far beyond the holdings of the University. Three fully equipped computer laboratories and data-sharing agreements with CEOS partners provide the infrastructure support for research and teaching programs. Students have access to a research laboratory with fully integrated PC and UNIX (IBM RS/6000 and DEC Alpha) work stations, with two calcomp digitizers, slide-output device and plotter. Another laboratory is Pentium based with 15 workstations and a server. Available software includes Arc/Info, PCI Ease/Pace, ER Mapper, Idrisi, ArcView, IDL, Adobe Illustrator and Photoshop.

Faculty within the Department have acquired a vast array of field and laboratory research equipment. A partial list includes a GPS base stations, handheld units and a satellite receiving station; radiometers, spectrometers, scatterometers for monitoring of electromagnetic radiation in the solar, terrestrial and microwave wavelengths, atmospheric boundary layer profiling equipment, surface meteorological and energy and CO₂ flux monitoring facilities, infrastructure for gas chromatography (DMS, CO₂, CH₄), state of the art calibration facilities, research moorings and buoys,

and support craft for sampling on water (jet boats, air boats, zodiaks, etc.,) and land (snowmobiles, trucks, ATV's). Laboratory facilities include a cold laboratory for snow and sea ice microstructure analysis.

A CFI award has enabled the acquisition and operation of (i) the Ultra-Clean Trace Element Laboratory (UCTEL; home.cc.umanitoba.ca/~wangf/uctel), which is one of the most advanced ultra-trace analytical facilities in the world. NSERC grants have led to the purchase of atmospheric boundary layer profiling equipment and surface heat and mass flux facilities for energy budget and greenhouse gas studies, (ii) the Riparian and Littoral Process Laboratory, which is equipped with stand alone growth facilities and ecotoxicity and field bioassay instrumentation to support research into stress ecology, ecology and ecophysiology, and (iii) the Sea-Ice Environmental Facility (SERF), which is Canada's only experimental sea - ice facility that houses interdisciplinary studies on sea ice in a laboratory setting.

The Environmental Conservation Lab (umanitoba.ca/environment/ecl) focuses on the interface between biological and social sciences, and conducts community-entered research, education, and outreach across North America and in the Global South. Research incorporates extensive field-work, spatial analyses at multiple scales of organization, and participatory video making. Several researchers in the Department use the field stations of Delta Marsh, Clearwater, the Experimental Lakes Area (ELA), Oak Hammock Marsh, and the Manitoba Zero Till Research Association (MZTRA).

Environment

Master of Environment (M.Env.)

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, students must have a minimum GPA of 3.25 in the last 60 CH of course work and should be accepted for study by an academic advisor prior to being accepted into the program.

Admission Deadlines

Canadian/U.S. students should submit their application and supporting documentation at least 3 months prior to their intended start date. International students should submit their application and supporting documentation at least 7 months prior to their intended start date. Please see the application deadline chart below.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Master of Environment students are required to complete at least 12 credit hours as follows: 6 credit hours from the 7000 level, including GEOG 7360 (53.736) and 6 credit hours of any other course at the 3000-level or higher. Students must attend and present their original research at a department seminar. Students are also encouraged to attend and present at an academic or professional conference or seminar as approved by their advisory committee. In addition, a thesis is required. An oral defence of the thesis is an integral part of the M.Env. examination.

Second Language Reading Requirement: none

Expected Time to Graduate: two years

M.Sc. in Environment and Geography

Admission

Students with an honours degree or equivalent (including a 4-year advanced degree) in Geography (physical geography specialization) or from a program in the Earth or environmental sciences will be considered. The requirement for admission is a minimum GPA of 3.25 in the last 60CH of course work. Students must be accepted for study by an academic advisor prior to being accepted into the program.

Admission Deadlines

Canadian/U.S. students should submit their application and supporting documentation at least 3 months prior to their intended start date. International students should submit their application and supporting documentation at least 7 months prior to their intended start date. Please see the application deadline chart below.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. M.Sc.

students are required to complete a minimum of 12CH of approved course work plus a thesis. Courses typically include 6CH of 7000-level Departmental courses and 6CH selected from graduate or upper level undergraduate courses from either within the Department or from other departments. Students must attend and present their original research at a department seminar. Students are also encouraged to attend and present at an academic or professional conference or seminar as approved by their advisory committee. All students must complete and defend a thesis that makes a distinctive contribution to the fields of environment and/or geography.

Second Language Reading Requirement: none
 Expected Time to Graduate: two years

Geography

M.A. in Geography

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, students must have a minimum GPA of 3.25 in the last 60 CH and be accepted for study by an academic advisor prior to being accepted into the program.

Admission Deadlines

Canadian/U.S. students should submit their application and supporting documentation at least 3 months prior to their intended start date. International students should submit their application and supporting documentation at least 7 months prior to their intended start date. Please see the application deadline chart below.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. M.A. students are required to complete at least 12 credit hours as follows: 6 credit hours from the 7000 level and 6 credit hours of any other course at the 3000-level or higher. Students must attend and present their original research at a department seminar. Students are also encouraged to attend and present at an academic or professional conference or seminar as approved by their advisory committee. In addition, a thesis is required. An oral defence of the thesis is an integral part of the M.A. examination.

Second Language Reading Requirement: none
 Expected Time to Graduate: two years

Ph.D. in Geography

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Students must be accepted by an advisor prior to submitting an application to enter the program. A 3.5 GPA (or equivalent) in their previous 60 credit hours of course work is normally required.

Admission Deadlines

Canadian/U.S. students should submit their application and supporting documentation at least 3 months prior to their intended start date. International students should submit their application and supporting documentation at least 7 months prior to their intended start date. Please see the application deadline chart below.

Program Requirements

In addition to the minimum 12 credit hour course requirement of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, students are required to attend and present their original research at a department seminar. Students are also encouraged to attend and present at an academic and/or professional conference or seminar as approved by their supervisor. These minimum course requirements may be increased on the recommendation of the student's advisory committee or the departmental Graduate Studies Committee. Students are also required to pass a candidacy exam, and complete and successfully defend a dissertation. The dissertation is to be a distinctive contribution to the field of geography and must be of publishable quality.

Second language requirement: none
 Expected time to graduation: four years

Application Deadline Dates

Session	Start Date	Canadian/US	International
Regular	(September)	June 1	February 1
Winter	(January)	October 1	June 1
Spring	(May)	February 1	October 1

Course Descriptions

GEOG 7010 Selected Topics in Geography Cr.Hrs.3 Advanced study of a selected topic from any one of the department's fields of specialization.

GEOG 7030 Regional Analysis Cr.Hrs.3 A seminar course reviewing theories of regional development which have planning applications. Further, it assesses government policy aimed at regional intervention and notes procedures of evaluation.

GEOG 7040 Seminar in Population Geography Cr.Hrs.3 Examination of the spatial and temporal character of demographic controls. Special emphasis will be placed upon the problems faced by developing areas in their attempts to deal with population growth.

GEOG 7050 Seminar in Land Settlement Cr.Hrs.3 Three hours per week, one term. The emphasis of this course is on research methods and techniques that are applicable to the study of settlement.

GEOG 7060 Urban Land Use Cr.Hrs.3 An analytical study of the location patterns of various city land uses, in terms of their geographic, economic, social, and political determinants. Includes field research in Winnipeg.

GEOG 7080 Quantitative Methods Cr.Hrs.3 A discussion of analysis and model construction in the study of urban and rural systems; analysis of socioeconomic and demographic data, construction of measures, and testing of models.

GEOG 7140 Historical Geography Cr.Hrs.3 The course is designed to provide a critical understanding of the development, philosophy, and methodology of historical geography.

GEOG 7160 Hydroclimatology Cr.Hrs.3 Special consideration is given to storm models, temporal and spatial variations of precipitation, and the estimation of precipitation. Literature and instrumentation are reviewed.

GEOG 7180 Methodology of Agricultural Geography Cr.Hrs.3 The course first provides an understanding of social and economic concepts in agricultural geography, and then examines methods of data collection, sampling techniques, and analysis with relevance to specific research topics.

GEOG 7200 Environment, Resources, and Population Cr.Hrs.3 This course discusses the contemporary imbalance between population and resources. The consequences of resource exploitation upon the natural environment are also examined.

GEOG 7220 Tourism and Recreation Cr.Hrs.3 Three hours per week, one term. Seminar. The emphasis is on research methodology applicable to spatial and environmental aspects of tourism and recreation. *Prerequisite:* GEOG 2410, or permission of department head.

GEOG 7240 Industrial Location and Analysis Cr.Hrs.3 The course will critically examine theories that help to explain the location of industrial activity. Consideration will be given to normative, behavioural, and predictive methodologies.

GEOG 7250 Geomorphology Cr.Hrs.3 A study of field, laboratory, and other analytical techniques in selected aspects of geomorphology.

GEOG 7260 Selected Regional Issues in Geography Cr.Hrs.3 Advanced study of specific issues and problems in selected world regions.

GEOG 7270 Physical and Synoptic Climatology Cr.Hrs.6 A survey of advances in climatology providing a foundation for climatic research. An examination is made of principles and problems in physical and synoptic climatology. Two hour lectures and three hour laboratory per week both terms.

GEOG 7280 Geographic Approaches to Land Resource Conflict Resolution Cr.Hrs.3 A survey of the ecologic, environmental and regional approaches to the resolution of land resource conflicts and the planned enhancement of land-related utilities.

GEOG 7290 Energy Analysis Cr.Hrs.3 A survey of origins, methods and applications of energy analysis, a new technique of system energetics designed to provide information for a more efficient use of scarce natural resources.

GEOG 7300 Urban Transportation Geography Cr.Hrs.3 Current issues and problems in urban transportation are analyzed within several geographic contexts (e.g., spatial, environmental, economic, social, political). Students are encouraged to focus research on Winnipeg.

GEOG 7310 Geographic Theory and Methodology Cr.Hrs.3 A discussion of the meaning of explanation in human geography, the status of geography as a science and the construction of theory.

GEOG 7350 Techniques in Cognitive-Behavioral Geography Cr.Hrs.3 An examination of the methods used to elicit and analyze the human's cognitive-behavioural responses to geographic phenomena.

GEOG 7360 Interdisciplinary Perspectives on Issues in the Environment Cr.Hrs.3 An intensive examination of research relating to various issues in the environment, this course will challenge students to consider crosscutting themes found in the literature and from their own learning experiences, and apply them to environmental problems.

GEOG 7380 Advanced Ecotoxicology: Understanding Stress Ecology Cr.Hrs.3 Ecotoxicology characterizes how organisms interact with anthropogenic and natural stressors in an ecological context. This course is an examination of the fundamental

science, approaches and issues being addressed in the field. Students should have a four-year science-based undergraduate degree and be registered in a graduate program. Prerequisite; permission of instructor.

GEOG 7400 Field Topics in Arctic Systems Cr.Hrs.3 Field and practical experience in selected topics of multidisciplinary research in Arctic System Science from science theory to field sampling, to modeling and remote measurements. Focuses on the ocean-sea ice-atmosphere interface and its relationship with the biological and geochemical processes operating in the cryosphere.

GEOG 7410 Spatial Analysis in Geography Cr.Hrs.3 The theory and techniques of spatial statistical data exploration, inference and hypothesis testing as they pertain to geographic analysis is explored. The role of spatial analytical techniques in field investigations, GIS and remote sensing applications are discussed. Prerequisites: (GEOG 3680 (C)), and (MATH 1300 or MATH 1301 (C), or MATH 1500 or MATH 1501 (C)), or permission of instructor.

GEOG 7420 Synoptic Meteorology and Weather Analysis Cr.Hrs.3 The course covers applied aspects of meteorology in terms of weather analysis and forecasting techniques for synoptic-scales and meso-scales using various meteorological tools. An introduction to severe weather forecasting techniques will also be described. Familiarity with computers is essential. Prerequisite: permission of instructor.

GEOG 7430 Modelling the Atmosphere and Physical Climate Cr.Hrs.3 The course covers numerical modeling techniques and applications to the atmosphere and climate system. Utilization of various models are employed to demonstrate physical concepts, their limitations and errors. Familiarity with computers is essential and experience in programming is beneficial. Prerequisite: permission of instructor.

GEOG 7440 Climate Change Cr.Hrs.3 The course will provide an overview of General Circulation Models (GCMs) and how these models are used to study various aspects of global climate change. More specifically the course will deal with the coupling between the atmosphere, hydrosphere, lithosphere and biosphere from the perspective of Earth System Science.

Section 29: Family Social Sciences

General Office: 204 Human Ecology Building
Telephone: (204) 474 9225
Fax: (204) 474 7592
E-mail: family_social_sciences@umanitoba.ca
Website: umanitoba.ca/human_ecology/grad_fs.html
Head: TBA

Academic Staff

Dean and Professor Emeritus

Berry, R.E., B.H.E. (UBC), M.S. (Penn State), Ph.D. (Purdue).

Senior Scholars

Berry, R.E., B.H.E. (UBC), M.S. (Penn State), Ph.D. (Purdue); **Bond, J.B.**, B.Sc. (Illinois), M.S., Ph.D. (Purdue); **Harvey, C.D.H.**, B.S. (H.Ec.) (Idaho), M.Sc., Ph.D. (Washington State).

Professors

Brownridge, D.A., B.A. (Brandon), M.A., Ph.D. (Manitoba); **Durrant, J.E.**, B.A., M.A., Ph.D. (Windsor); **Mills, R.S.L.**, B.A. (Concordia), M.A. (Memorial), Ph.D. (Toronto).

Associate Professors

Duncan, K.A., B.S.H.Ec. (Saskatchewan), M.S., Ph.D. (Ohio State); **Piotrowski, C.C.**, B.A., M.A. (Waterloo), M.P.H. (San Diego State), Ph.D. (Pennsylvania State).

Assistant Professors

Eni, R., B.A., M.Sc., Ph.D. (Manitoba); **Mignone, J.J.**, Lic. Psic. (Salvador), M.H.S.A. (Alberta), Ph.D. (Manitoba); **Shooshtari, S.**, B.Sc. (Iran), M.S.P.H. (Iran), Ph.D. (Manitoba); **Robles, W.**, B.A. (Campinas, Brazil), DipCs (UBC), M.A.I.A. (Athens, Ohio), Ph.D. (Guelph); **Roger, K.**, B..A. (Winnipeg), M.E. (OISE/Toronto), Ph.D. (Toronto).

Program Information

Focusing on issues that influence health, well being and family relations, the Master of Science (M.Sc.) in Family Social Sciences provides a strong research foundation in family psychosocial health. We study family issues from a multidisciplinary perspective that integrates psychological, sociological and economic theory and research.

A Master's degree in Family Social Sciences prepares graduates for positions in fields such as health promotion, policy analysis, community development, health research, human services administration, program development, and victim services.

GEOG 7450 Boundary-Layer Climatology and Micrometeorology Cr.Hrs.3 A seminar-based course devoted to the study of advanced topics in microclimatology and micrometeorology. Prerequisite: permission of instructor.

GEOG 7460 Advanced Methods in Geographic Information Systems Cr.Hrs.3 Weekly two-hour lab. This course focuses on practical application of techniques used in Geographic Information Systems (GIS) and the development of GIS models. The development, testing and presentation of GIS data, models and results are studied. Prerequisite: GEOG 3730 (C), or permission of instructor.

GEOG 7470 Techniques in Climatology Cr.Hrs.3 This course overviews the theoretical basis that underpins the measurement and application of climate elements in micrometeorological and microclimatological research. Prerequisite: permission of instructor.

GEOG 7480 Advanced Methods in Remote Sensing Cr.Hrs.3 This course provides instruction in the current theory and application of remote sensing technology to Earth System Science. Emphasis will be placed on the processing and interpretation of remote sensing imagery and the integration of remote sensing data with other spatial data. Prerequisite: GEOG 3200 (C), or permission of instructor.

GEOG 7490 Natural Hazards and Disasters Cr.Hrs.3 This course provides a conceptual and methodological survey of natural hazards. Characteristics and causes of geophysical disasters, human exacerbation of hazards, and human adjustments to and perceptions of natural threats will be studied. Prerequisites: (GEOG 2440), and (GEOG 2550), and (GEOG 3580), or permission of instructor.

GEOG 7500 Biogeography Cr.Hrs.3 The course will emphasize principles and approaches to understanding biogeography on a worldwide scale with specific examples from Canadian and Manitoban research. Topics discussed include the physical environment and biological interactions, effects of disturbance and climate change, the geography of biological diversity, evolution and extinction.

Areas of Study

The graduate program is organized around four major areas of study. Each student selects one area in which to focus both course work and a research thesis.

Developmental Health is concerned with the determinants of healthy development throughout life and the implications for prevention and health promotion. Health is broadly defined as social, psychological and physical. The determinants of health are considered in the context of families as they interact with communities and societies.

Family Resource Management is focused on the interface between families and their resources - time, energy and money. The interaction of families with societal systems in the economy is emphasized, as are issues that affect family well-being, such as managing stress, making decisions and resolving problems.

Family Violence and Conflict Resolution surveys the prevalence, incidence, etiology, and consequences of conflict and violence in family relationships across the life span. Risk and protective factors at the individual, family, community, and societal levels are studied, with an emphasis on violence prevention and conflict mediation.

Inner City Families and Communities is designed to increase student knowledge of issues, perspectives and dynamics of individuals and their interactions in families and communities within the inner city.

Fields of Research

Faculty in the Department of Family Social Sciences use a variety of research methodologies, both quantitative and qualitative. We support observational, interview and survey research, as well as analysis of large data sets and case studies. Through our network of community partnerships, we support community-based research. We have well-equipped observational and computer facilities.

Research interests of the faculty reflect the four major areas of study in Family Social Sciences.

● **Developmental Health:** parent-child relations, parenting and public policy, social and emotional development, developmental psychopathology, sibling relations, aging, death and dying

● **Family Resource Management:** work and family, bankruptcy, gambling, home-based business, consumer economics, financial counselling, time use, economic value of household production, family problem solving, managerial decision making

• **Family Violence and Conflict Resolution:** domestic violence, child maltreatment and exploitation, abuse and neglect of the elderly, children's exposure to conflict and violence, conflict management

• **Inner City Families and Communities:** healthy communities, housing policy, homelessness, street-involved youth, community development, neighbourhoods

M.Sc. in Family Social Sciences

Admission

In addition to the minimum admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, a grade point average of 3.25 in the last 60 credit hours of undergraduate study and a grade point average of 3.25 in at least 30 credit hours of 3000- and 4000-level courses are required for entry to the program.

Students who have completed a four-year undergraduate degree in a related field will be considered for entry at the Master's level. Students with a three-year degree will be required to enter at the Pre-Master's level. Contact the department for information.

Application Deadlines

Students may begin on 1 September or 1 January in a given year. For admission, complete applications from Canadian/U.S. students should be received in the Faculty of Graduate Studies by March 1 for September start or October 1 for January start. Non-Canadian and non-U.S. citizens/residents complete applications should be received in the Faculty of Graduate Studies by February 1 for September start or July 1 for January start.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students are required to complete: 6 credit hours of statistics/research methods from the department-approved list, 6 credit hours of foundation courses in one area of study at the 7000 level in the Department of Family Social Sciences, 6 additional credit hours at the 7000 level within the Department or 3 at the 7000 level within the Department and 3 at the 5000 level (or higher) outside the department, and a research thesis.

As the content of some courses may vary and not all courses may be scheduled in a given year, students should consult the department for more specific details. Supplementary regulations can be obtained from the department.

Second language reading requirement: none.

Expected time to graduate: two years.

Foundation Course Requirements

The required 6 credit hours of foundation courses for each area of study must be selected as follows:

Developmental Health Area

two of:

- FMLY 7600 Parent-Child Relationships
- FMLY 7610 Aging and Families
- FMLY 7620 Children and Violence

Family Resource Management Area

FMLY 7230 Work and Family Interrelationships
and either:

- FMLY 7010 Seminar in Family Finance, *or*
- FMLY 7220 Management of Family Stress

Family Violence and Conflict Resolution Area

- FMLY 7800 Family Violence, *and*
- FMLY 7810 Conflict and Mediation in Families

Inner City Families and Communities Area

- FMLY 7900 Understanding the Inner City: Processes and Dynamics, *and*
- FMLY 7910 Understanding the Inner City: Issues and Perspectives

Ph.D.

The Department of Family Social Sciences does not offer a Ph.D. program.

Course Descriptions

FMLY 7000 Family Theory in Research Cr.Hrs.3 Theories related to the study of families; use of theory in research on families. Theoretical orientations considered include, for example, social exchange, human ecological, symbolic interactional and family developmental. Not currently offered.

FMLY 7010 Seminar in Family Finance Cr.Hrs.3 (Formerly 062.701) Advanced study on topics related to family financial management. As well as a review of theory and literature in the field, contemporary family issues such as financial abuse, financial addictions, and financial literacy are discussed. A micro-economic perspective and Canadian data sources are used where possible.

FMLY 7190 Canadian Consumer Protection and Policy Cr.Hrs.3 (Formerly 062.719) A study of the current problems of consumer interest; the programs and policies of education, business, and government as they bear upon consumer decision-making in the market. Not currently offered.

FMLY 7210 The Family and Decision Making Cr.Hrs.3 (Formerly 062.721) Investigates theories and research applicable to family management of problems across the life span, as families face changes, challenges and difficulties. Strategies families use to make decisions are evaluated, results of family functioning are considered, and roles of professional helpers are discussed. Not currently offered.

FMLY 7220 Management of Family Stress Cr.Hrs.3 (Formerly 062.722) Investigates specific stressor events of contemporary families and suggests ways in which families can meet and manage their responses to these events. Applies theories of family stress and of family resource management to frame and evaluate current research and professional practice.

FMLY 7230 Work and Family Interrelationships Cr.Hrs.3 (Formerly 062.723) Advanced study of the earning and caring activities of families and how these activities interrelate at the community, provincial, national, and global levels. Emphasis on relating current research to relevant theoretical perspectives and professional practice.

FMLY 7500 Evaluation of Family, Health and Social Development Cr. Hrs. 3. Investigates both theory and practice of program evaluation with a focus on family, health, and social development programs. Emphasis will be on a utilization-focused evaluation approach from a "real world" perspective, including the political and ethical issues related to evaluation. The course will provide a strong theoretical and practical foundation to evaluation common to family, health, and social development programs. Students will choose a particular field on which to develop an actual evaluation plan with an existing agency, and will produce an evaluation report related to a particular program in their field of interest.

FMLY 7600 Parent-Child Relationships Cr.Hrs.3 (Formerly 062.760) Advanced study of the nature of parenting and its influence on developmental health. Focus is on theory and research concerned with parenting and parent-child relationships, changes across time, the influence of the context in which parenting occurs, and the effect of the parent-child relationship on developmental health.

FMLY 7610 Aging and Families Cr.Hrs.3 (Formerly 062.761) An examination of contemporary issues confronting families with aging family members. Emphasis is on a review of selected empirical studies in specific topic areas. Relevant theoretical perspectives are reviewed and related to the empirical studies.

FMLY 7620 Children and Violence Cr.Hrs.3 (Formerly 062.762) An examination of children's experiences of violence at the levels of families, communities and societies. Relevant theoretical and measurement issues are addressed, as well as the developmental outcomes of various forms of violence. The incidence and prevalence of violence in children's lives is examined. Models of prevention, intervention and policy are explored.

FMLY 7700 Independent Study Cr.Hrs.3 (Formerly 062.770) Opportunity to pursue a topic independently. Student works with an individual professor on a topic of mutual choice. May include written, oral and field work. See Family Social Sciences Graduate Handbook for regulations.

FMLY 7710 Special Topics in Family Social Sciences Cr.Hrs.3 (Formerly 062.771) Opportunity to investigate an area of family social sciences not usually covered in the curriculum. May be repeated by a student if the topic changes.

FMLY 7800 Family Violence Cr.Hrs.3 (Formerly 062.780) Advanced study of current topics in family violence over the life course. Topics may include child abuse, sibling abuse, parent abuse, courtship violence, partner violence, and elder abuse. Emphasis is on understanding and critiquing current theory and research.

FMLY 7810 Conflict and Mediation in Families Cr.Hrs.3 (Formerly 062.781) Examination of conflict origin and manifestation in family relationships throughout the lifespan. Includes a review of spouse/partner, parent-child and sibling interaction patterns and current family mediation models.

FMLY 7900 Understanding the Inner City: Processes and Dynamics Cr.Hrs.3 (Formerly 062.790) Advanced study of community processes and dynamics relative to families within the inner city. Connection among theory, research and application emphasized. Usually offered at an inner city location to facilitate enhanced opportunities for community-based learning.

FMLY 7910 Understanding the Inner City: Issues and Perspectives Cr.Hrs.3 (Formerly 062.791) Examination of community issues and perspectives relative to families and communities within the inner city. The four components of housing (physical, social-psychological, community and neighbourhood) will be emphasized. Normally offered in an inner city location to facilitate on-site learning. Application of theory and methods to real-life situations; opportunity to exchange, develop and apply knowledge with community partners.

Section 30: Fine Arts

School of Art

General Office: Room 203 FitzGerald Building

Telephone: (204) 474-9367

Fax: (204) 474-7605

E-mail: fineart@cc.umanitoba.ca

Website: umanitoba.ca/schools/art

Director: Paul Hess

Business Manager: Char Okell

Student Advisor: Leslie Hoffman

Graduate Program Manager: Donna Jones

Academic Staff

Director Emeriti

Williams, R., B.A. (Carnegie), M.F.A. (Iowa)

Professors Emeriti

Archambeau, R.W., B.F.A. (Bowling Green, Ohio), M.F.A. (New York State, Alfred); **Eyre, I.K.,** B.F.A. (Manitoba); **Reichert, D.K.,** B.F.A. (Manitoba)

Senior Scholar

Werner, C.A., B.F.A., Ph.D. (Manitoba), M.A. (North Dakota)

Professors

Alward, S. M., B.A. (Winnipeg), B.F.A. (Hons.) (Manitoba), M.F.A. (University of California, Los Angeles); **Baker, M.C.,** B.A. (Northwestern), M.A., Ph.D. (Wisconsin); **Hess, P.,** B.A. (Guelph), M.F.A. (Nova Scotia College of Art and Design); **McMillan, D. S.,** B.Sc., M.F.A. (Wisconsin); **Pura, W.P.,** B.F.A. (Hons.) (Manitoba), M.F.A. (Indiana); **Rabinovitch, C.,** B.A. (Manitoba), B.F.A. (Hons.) (Manitoba), M.F.A. (Wisconsin), Ph.D. (McGill); **Reeve, G.M.,** B.F.A. (Cranbrook), M.F.A. (Rhode Island School of Design); **Steggles, M.A.,** B.F.A. (A.H.Hons.) (Manitoba), M.A. (Manitoba), Ph.D. (Leicester)

Associate Professors

Botar, O.A.I., B.A. (Hons.) (Alberta), Ph.D., M.A., M.Sc. (Toronto); **Bugslag, J.F.,** M.A., B.A. (Victoria), Ph.D. (East Anglia); **Eyland, C.,** B.F.A. (Hons.) (Nova Scotia College of Art and Design); **Poruchnyk, A.A.,** B.F.A. (Hons.) (Manitoba), M.F.A. (Windsor)

Assistant Professors

Funnell, J.A., B.F.A. (Manitoba), M.F.A. (Cincinnati); **Grimmer, S.,** B.F.A. (Kansas), B.Sc. (Iowa), M.F.A. (Massachusetts); **Kelly, K.,** B.F.A. (Victoria), M.F.A. (Rutgers); **Nunoda, S.K.,** B.F.A. (Western), M.F.A. (Calgary); **Warren, D.K.,** B.F.A. (Hons.) (Manitoba), M.A. (Syracuse)

Instructors

Nickel, E.G., B. F. A. (Hons.) (Manitoba), M.F.A. (Nova Scotia College of Art and Design); **Roy, E.C.,** B.A. (Hons.) (Guelph), M.F.A. (Cranbrook)

Lecturer

Howorth, E.J., B.F.A. (Manitoba), M.F.A. (North Dakota)

Program Information

The School of Art, established in 1913, is Western Canada's oldest art institution. Originally known as the Winnipeg School of Art, it has occupied a key role in the development of Canadian artists during the twentieth century. In 1950 it affiliated with the University of Manitoba and since has been known simply as the School of Art.

Its location in the city of Winnipeg, at the geographical centre of Canada, provides a culturally diverse environment that encourages an outward looking engagement with the global community. The School emphasizes traditional grounding in skills-based visualization and art historical knowledge connected to contemporary research in creative practices in art, design and scholarly activities. Undergraduate programs include Bachelor of Fine Arts, Bachelor of Fine Arts Honours, Bachelor of Fine Arts, Art History, Bachelor of Fine Arts Honours, Art History, and Diploma of Art.

The School of Art graduates energetic artists, scholars and designers who travel beyond the region to establish successful careers and make significant contributions to local, national and international cultural communities. The School of Art is committed to advancing excellence in creativity,

research, critical thinking and knowledge in the service of the Winnipeg community and, through its alumni, the local and national contexts and the global cultural community.

Fields of Creative Work and Research

The School of Art offers a newly established Master of Fine Arts (M.F.A.) in studio practice, a two-year, fulltime program. The emphasis of the program is on intensive research and expressive development afforded by concentrated work.

Areas of focus include: ceramics, drawing, graphic design, painting, photography, printmaking, sculpture, and video. The opportunity also exists for an interdisciplinary option within these areas, or with another discipline from another faculty at the University of Manitoba.

Research Facilities

At present the school uses three research facilities: the FitzGerald Building, the Ceramics/Sculpture Building and the Art Barn. The studios and lab spaces in these facilities are equipped with specialized equipment for the various disciplines of the school. The FitzGerald Building also provides digital media labs, a video production studio, an art history research and study centre, a faculty resource centre, and a wireless network for students and faculty.

The School of Art funds and houses Gallery One One One which presents work of historical and contemporary importance at a national level. Gallery One One One houses the School of Art Permanent Collection and the FitzGerald Study Collection.

The School of Art is currently developing a new 70,000 sq. ft. stand alone facility that will give students and faculty access to digital technologies and upgraded space for collaboration, experimentation and research, including animation and advanced computer-aided expression. Phase One is projected to open in 2011 and will offer state-of-the-art spaces for the gallery, and digital and studio research practices.

Master of Fine Art program

Admission:

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar.

Persons with a minimum of a Bachelor of Fine Arts Honours degree (or equivalent) or a Bachelor of Arts Honours with studio major from a recognized university, with a minimum G.P.A. of 3.0 out of 4.0 in the last 60 credit hours of study may apply for admission to the M.F.A. program. Graduates of the University of Manitoba Bachelor of Fine Arts Honours program are encouraged to have at least three years of post-degree professional studio experience. Admission decisions are based on the qualifications of the applicant as well as the ability of the School of Art and The University of Manitoba to serve the applicant's intended program of study and area of specialization.

Application Deadlines:

Applications should be sent to the Faculty of Graduate Studies. Applications for admission are considered for a September program start.

The deadline by which all required materials must be submitted is March 1 for Canadian/US applicants, and January 15 for international applicants. The Graduate Admissions Sub-Committee will consider only those applications that are complete and properly documented by the deadline. Late applications may be considered from Canadian/US applicants if space permits. Due to the time required to obtain requisite visas and permits, this opportunity cannot be extended to international applicants.

In addition to the admission requirements of the Faculty of Graduate Studies, the following materials are required: an artist's portfolio, a curriculum vitae, a statement of purpose, three letters of recommendation and, if necessary, an interview.

Program Requirements

The program is to be completed in two years of full-time study and students must register for summer session as well as the fall and winter terms. Graduate students are required to complete 30 credit hours of required course-

work and 6 credit hours of electives as well as the Master of Fine Arts Thesis/Studio Exhibition.

STDO 7010 Studio Concentration 1 Cr. Hrs. 6
STDO 7020 Studio Concentration 2 Cr. Hrs. 6
STDO 7110 Graduate Seminar 1 Cr. Hrs. 3
STDO 7120 Graduate Seminar 2 Cr. Hrs. 3
STDO 7200 Art Theory Cr. Hrs. 3
STDO 7230 Contemporary Art Theory Cr. Hrs. 3
STDO 7280 Visiting Artist Program 1 Cr. Hrs. 3
STDO 7290 Visiting Artist Program 2 Cr. Hrs. 3
GRAD 7200 M.F.A. Thesis/Studio Exhibition
Elective Course offerings: 6 credit hours required

Approved graduate level elective courses can be taken in the School of Art, or with committee permission, in another faculty at the University of Manitoba.

Course Descriptions

STDO 7010 Studio Concentration 1 Cr. Hrs. 6 Advanced individual instruction and critique in the student's chosen studio area by faculty and visiting artists.

STDO 7020 Studio Concentration 2 Cr. Hrs. 6 A continuation of Studio Concentration 1. Advanced individual instruction and critique in the student's chosen studio area by faculty and visiting artists.

STDO 7110 Graduate Seminar 1 Cr. Hrs. 3 An investigation of contemporary art concepts in the context of the studio program of work.

Section 31: Food Science

Acting Head: M.G. Scanlon

General Office: 250 Ellis Building

Telephone: (204) 474 9621

Fax: (204) 474 7630

E-mail: foodcas@ms.umanitoba.ca

Website: http://umanitoba.ca/food_science/

Academic Staff

Professor Emeritus

Bushuk, W., B.Sc., M.Sc. (Manitoba), Ph.D. (McGill), F.R.S.C., F.C.I.C., F.A.I.C.

Professors

Arntfield, S.D., B.Sc., M.Sc. (McGill), Ph.D. (Manitoba); **Blank, G.,** B.Sc., M.Sc., Ph.D. (Manitoba); **Fulcher, R.G.,** B.A., M.Sc. (Carleton), Ph.D. (Monash); **Holley, R.A.,** B.Sc., M.Sc. (McGill), Ph.D. (Guelph); **Jones, P.,** B.Sc., M.Sc. (UBC), Ph.D. (Toronto); **Scanlon, M.G.,** B.Sc.(Hons.), Ph.D. (Leeds); **Trevan, M.D.,** M.B., M.S. B.Sc.(Hons.), Ph.D. (London).

Associate Professor

Beta, T., B.Sc. (Zimbabwe), M.Sc. (Texas A & M), Ph.D. (Pretoria); **Sapirstein, H.D.,** B.Sc. (Michigan), B.Sc.Ag. (Alberta), Ph.D. (Manitoba).

Senior Instructor

Hydamaka, A., B.Sc., M.Sc. (Manitoba), Ph.D. (Reading)

Adjunct Professors

Edney, M., B.Sc. (Queens), M.Sc. (Saskatchewan), Ph.D. (Technical University Munich); **Hatcher, D.,** B.Sc. (Winnipeg), M.Sc., Ph.D. (Manitoba); **Edwards, N.,** B.Sc., M.Sc., Ph.D. (Manitoba); **Izydorczyk, M.,** B.Sc. (Ryerson), M.Sc., Ph.D. (Manitoba); **Mazza, G.,** Dip.Agr. (Italy), B.Sc., M.Sc. (Manitoba), Ph.D. (Alberta); **Rempel, C.,** B.Sc., M.Sc., (Manitoba), Ph.D., MBA (Guelph); **Zawistowski, J.,** M.Sc. (Warsaw), Ph.D. (Manitoba).

Program Information

A graduate degree program at the Master's level is offered in the Department of Food Science. Programs at the doctorate level are currently administered through the Interdepartmental Ph.D. program in Food and Nutritional Sciences which includes the departments of Human Nutritional Sciences, Food Science and Animal Science (although see note below). The general program in Food Science involves studies of the physical, chemical or biological characteristics of food during all phases of manufacturing and processing - starting with the raw materials and ending in consumer products. Uniquely positioned in the Faculty of Agricultural and

STDO 7120 Graduate Seminar 2 Cr. Hrs. 3 A continuation of Graduate Seminar 1. An investigation of contemporary art concepts in the context of the studio program of work.

STDO 7200 Art Theory Cr. Hrs. 3 An introduction and examination of art theory and methodology. An investigation of ideas that provide structure for art historical research and methodology.

STDO 7230 Contemporary Art Theory Cr. Hrs. 3 An examination of art theory from structuralism, post-structuralism, semiotic, sociological and psychoanalytic methods.

STDO 7280 Visiting Artist Program 1 Cr. Hrs. 3 Presentation of own work and discussion and critique of student work by visiting artists.

STDO 7290 Visiting Artist Program 2 Cr. Hrs. 3 A further investigation of the concepts introduced in Visiting Artist Program 1.

GRAD 7200 MFA Thesis / Studio Exhibition A written statement and visual thesis that must show that the student has developed an original contribution to knowledge in visual art. The process, schedule, format, and style must meet the requirements of the Faculty of Graduate Studies. Thesis students must pass an oral examination on the subject of the written statement and visual thesis. This course is graded pass/fail.

STDO 7060 Interdisciplinary or Intermedia Studio An exploration of studio issues between major disciplines and traditions of art making.

STDO 7210 Themes in Contemporary Art Studio Cr. Hrs. 3 Individual pursuit of studio investigations under a specific theme.

STDO 7230 Contemporary Art Theory Cr. Hrs. 3 An examination of art theory from structuralism, post-structuralism, semiotic, sociological and psychoanalytic methods.

STDO 7240 Cultural Studies in Studio Art Cr. Hrs. 3 Art research and exploration of social, anthropological, cultural or religious interest.

STDO 7260 Image and Word Cr. Hrs. 3 An exploration of the use of word and text in art studio.

STDO 7300 Special Topics in Fine Art Cr. Hrs. 3 Varying from offering to offering, this course will cover significant topics in Fine Art.

Food Sciences, the Department of Food Science develops and evaluates value-added opportunities for agricultural food products. New product development and food process improvement are important national and international priorities and the Department will continue its commitment to the training of highly qualified personnel in these areas.

Students graduating with an M.Sc. or Ph.D. in Food Science are readily employable in industry, government and academic positions. Most students have acquired jobs prior to completion of their graduate degree requirements. Recent graduates have gone on to key research positions in major corporations or taken administrative or management positions (e.g., quality assurance and product development technologists). Food is a universal necessity and the study of its various properties will continue to flourish.

Fields of Research

Expertise in the Department of Food Science is established in four major areas of study: cereal and pulse chemistry (including chemistry of proteins, carbohydrates and antioxidants), food processing, and food microbiology/safety. Chemistry projects investigate the functional roles played by major food constituents, how these properties translate into final food characteristics, quality and potential new uses. Key projects examine proteins in cereal and pulse fractions as well as carbohydrates and antioxidants in a variety of crops. Considerable emphasis is placed on the functional relationships among components in raw and processed foods, including the structure and organization of air cells ("bubbles"), hydration mechanisms, and distribution of soluble and insoluble fibres, among other properties. Many projects in the Department are multidisciplinary and interdepartmental, involving partners in the Richardson Centre for Functional Foods and Nutraceuticals, Departments of Physics & Astronomy, Animal Science, Human Nutritional Sciences, and Soil Science, to name only a few. Processes have also been developed to assist local producers and manufacturers of dairy, cereal, and pulse products as well as a number of emerging prairie products. Microbiological studies examine food safety issues (survival of bacterial pathogens like *Listeria*, *E.coli* 0157:H7, *Salmonella* and chemical toxicants) as well as food preservation technology to inhibit spoilage organisms in fresh and cured meat products.

Research Facilities

The Food Science Department houses up-to-date laboratory facilities for chemical, textural and microbiological analyses of raw foods (agricultural materials) and/or food products (e.g., dairy, bakery, extruded or meat products). In addition, the Department has two pilot plants, one being used primarily for vegetable, fruit, cereal, pulse and meat studies, while the other is dedicated to dairy product development and research.

M.Sc. in Food Science

Admission

In addition to the admission requirements of the Faculty of Graduate Studies (found in the Academic Guide section of this Calendar), entrance into the M.Sc. programs requires a bachelor's degree from a recognized food science department or the equivalent. Applicants with a four-year bachelor's degree from a non-food science department or the equivalent may be required to complete a pre-M.Sc. program in the Food Science Department (usually of one academic year) or take additional food science courses in their M.Sc. program in order to develop suitable knowledge in food science.

Admission Deadlines

The Department recommends that Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

There are two types of Master's programs in the Department of Food Science:

Thesis

Thesis projects may be of a basic research type or of an applied or practical nature relating to the chemistry, physics and/or microbiology of food raw materials, processes and/or products.

The thesis program requires a minimum of 12 credit hours of coursework, this to include at least 6 credit hours in Food Science 7000 level courses, an additional 3 credit hours at the 7000 level, and at least three credit hours in ancillary courses at the 7000, 6000, 4000 or 3000 levels. The thesis research topic shall be assigned within an area of interest to the student and pertinent to departmental research objectives. All M.Sc. students are required to take FOOD 7130 Food Science Seminar.

Non-thesis

Additional coursework plus practical work terms and a comprehensive examination are substituted for a research project and written thesis.

The non-thesis program requires a minimum of 30 credit hours of coursework. Of this total, a minimum of 15 credit hours must be at the 7000 level in Food Science with the remaining courses to be approved by the student's advisory committee.

Second language reading requirement: none

Expected time to graduation: two years

Ph.D. in Food Science

A proposal has been submitted to Senate and the province's COPSE to initiate a Ph.D. in Food Science. If approved, students registering for a Ph.D. in the Department in 2009-10 will be given the choice of pursuing a Ph.D. in Food Science or undertaking the Interdepartmental Ph.D. in Food and Nutritional Sciences (see below).

Interdepartmental Ph.D. in Food and Nutritional Sciences

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Academic Guide section of this *Calendar*.

Admission Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Department at least 6 months prior to their intended start date. International students should submit their application and supporting documentation to the Department at least 7 months prior to their intended start date.

Program Requirements

Requirements for the Interdepartmental Ph.D. program in Food and Nutritional Sciences are given in the Interdepartmental Section.

Course Descriptions

FOOD 7090 Unit Process Operations Cr.Hrs.3 A study of unit operations which are commonly utilized in the food industry with emphasis on separation processes, particle size reduction and heat transfers. *Prerequisite* or *co-requisite*: BIOE 3530 or equivalent. Offered in 2011-2012 and alternate years thereafter.

FOOD 7130 Food Science Seminar Cr.Hrs.3 Verbal and written presentation of selected topics in Food Science. This is a required course for all M.Sc. candidates in the Food Science Department.

FOOD 7150 Food Proteins Cr.Hrs.3 An examination of the structural and functional properties of proteins in foods. Laboratory sessions will emphasize experimental approaches to study proteins in foods, including topics such as surface characterization, thermal properties, rheological behaviour, and chemical modification. Offered in 2011-2012 and alternate years thereafter.

FOOD 7160 Food Carbohydrates Cr.Hrs.3 A study of the physico-chemical properties and functionality of food carbohydrates. Laboratory sessions will focus on quantitation, structural characterization, thermal properties and rheological behaviour of carbohydrates. Offered in 2010-2011 and alternate years thereafter.

FOOD 7180 Food Science of Cereal Grains Cr.Hrs.3 The course deals with cereal grains used for human food, the structure of constituents, and the relationship of constituent structure to functionality in the processing of the grains into food products. Emphasis will be on constituents and properties that contribute to optimum processing of wheat. *Prerequisites*: CHEM 2360 or CHEM 2770 or MBIO 2360 or MBIO 2770, or permission of instructor. Offered in 2010-2011 and alternate years thereafter.

FOOD 7200 Advanced Food Microbiology Cr.Hrs.3 Detection and quantitation of foodborne microorganisms and related toxins using developing methodology, including rapid microbiological assays with a comprehensive account of basic principles and advanced techniques. *Prerequisites*: MBIO 2100, FOOD 4150 or consent of instructor. Offered in 2010-2011 and alternate years thereafter.

FOOD 7240 Topics in Food Science Cr.Hrs.3 An in-depth study of selected topics of current relevance in Food Science. Available to students in the M.Sc. programs and in the Interdepartmental Ph.D. in Food and Nutritional Sciences. *Prerequisite*: written consent of Department Head.

FOOD 7250 Advanced Food Packaging Cr.Hrs.3 Advanced course for the principles, materials, design and development of packaging with emphasis on chemical and physical nature of packaging materials, food products and new technologies. Offered in 2009-2010 and alternate years thereafter.

FOOD 7260 Advanced Meat Science Cr.Hrs.3 Builds on fundamental aspects of muscle biochemistry and function to explain how pre- and post-harvest technology affect meat quality and safety. Issues of current concern, their resolution as well as recent advances will be discussed. *Prerequisite*: Consent of instructor. Offered in 2009-2010, 2011-2012 and alternate years thereafter.

FOOD 7270 Food Rheology Cr.Hrs.3 Evaluation of the textural properties of foods provides critical information in the development of quality food products. This course deals with the principles and methodologies in food rheology and includes examination of the rheological properties of selected food systems. Offered in 2010-2011 and alternate years thereafter.

Section 32: French, Spanish and Italian

Head: E. Fernandez

General Office: 430 Fletcher Argue Building

Telephone: (204) 474 9313

Fax: (204) 474 7578

E-mail: fsi@umanitoba.ca

Website: umanitoba.ca/fsi

Academic Staff

Professors Emeriti

Gordon, A.L., M.A.(Hons.) (Aberdeen), Docteur de l'Université (Paris), Chevalier Ordre Palmes Acad.; **Gordon, D.K., B.A., M.A., Ph.D.** (Toronto).

Senior Scholars

Allen, J., B.A. (SUNY Buffalo), M.A. (Syracuse), Ph.D. (Michigan); **Annan-dale, E.T.**, B.A. (Manitoba), Ph.D. (London); **Norell, D.**, B.Comm., B.A., M.A., Ph.D. (Manitoba).

Associate Professors

Cartmill, C., B.A. (Toronto), M.A., Ph.D. (Queen's); **Fernandez, E.**, Lic. (Oviedo), M.A. (Calgary), Ph.D. (Princeton); **Laporte, D.**, B.A., M.A., Ph.D. (Laval); **MacDonell, A.**, B.A. (Lakehead), M.A., Ph.D. (Manitoba); **Renúe, L.**, B.A., M.A., Ph.D. (Manitoba).

Assistant Professors

Beaulieu, ..., B.A. (Laval), M.A. (Lyon), Ph.D. (McGill); **Martinez, M.**, B.A. (Javeriana), M.A. (Ottawa), Ph.D. (Montréal); **St-Martin, A.**, B.A., B.Ed., M.A. (Manitoba), Docteur de l'Université (Paris VIII).

Adjunct Professor

Olsen, Mark V., Ph.D. (Ottawa).

Program Information

For over 50 years the Department of French, Spanish and Italian has offered M.A. and Ph.D. programs in French. Graduates have become department heads and professors in Canadian and American universities. They have also become entrepreneurs, administrators, teachers, and translators. Their success in post-graduate endeavours is a testimony to the quality of the programs.

Fields of Research

Research interests of faculty members include Canadian francophone literature, French literature (17th -21st centuries), critical and feminist theory, French and Québécois cinema, computer assisted research and second-language acquisition.

Research Facilities

The University of Manitoba subscribes to the ARTFL database (Project for American and French Research on the Treasury of the French Language, University of Chicago). The Faculty of Arts boasts a multi-media language laboratory, one of the most modern in the country.

Research

The department also regularly organizes information and/or skill development sessions with the Electronic Media Department, and the Elizabeth Dafoe Library.

M.A. in French

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Students with other degrees or backgrounds may be eligible for admission to a pre-Master's program to the satisfaction of the department. Contact Department for further information.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 4 months prior to their intended start date (normally by May 1 for a start date of September 1). International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date (normally by February 1 for a start date of September 1).

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students are required to complete 12 credit hours of coursework at the 700/7000 level and a thesis. Part of the required coursework includes three credit hours of literary theory.

Second language reading requirement: No

Expected time to graduation: One to two years

Ph.D. in French

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, ap-

plicants to the Ph.D. program must normally hold an M.A. degree in French with a GPA of at least 3.5 in their M.A. courses.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Department at least 4 months prior to their intended start date (normally by May 1 for a start date of September 1). International students should submit their application and supporting documentation to the Department at least 7 months prior to their intended start date (normally by February 1 for a start date of September 1).

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Candidates must complete 12 credit hours of coursework at the 700/7000 level, including a compulsory component of three credit hours of literary theory.

Candidacy examinations consist of two research papers in two distinct areas related to the thesis topic, followed by an oral examination. These examinations will normally be completed in the second year of study.

Second language requirement: No

Expected time to graduation: Four Years

Course Descriptions

FREN 6000 French Reading Knowledge Cr.Hrs.0 (Formerly 044.600) For graduate students in other departments which require a reading knowledge of French. This course is graded pass/fail.

FREN 6010 Spanish Reading Test Cr.Hrs.0 (Formerly 044.601) No description available.

FREN 6030 Italian Reading Test Cr.Hrs.0 (Formerly 044.603) No description available.

FREN 7520 Topics in Literary Periods 1 Cr.Hrs.3 (Formerly 044.752) Topics in Literary Periods 1. As the course content will vary from year to year, students may take this course more than once for credit.

FREN 7530 Topics in Literary Periods 2 Cr.Hrs.3 (Formerly 044.753) Topics in Literary Periods 2. As the course content will vary from year to year, students may take this course more than once for credit.

FREN 7540 Topics in Literary Genres 1 Cr.Hrs.3 (Formerly 044.754) Topics in Literary Genres 1. As the course content will vary from year to year, students may take this course more than once for credit.

FREN 7550 Topics in Literary Genres 2 Cr.Hrs.3 (Formerly 044.755) Topics in Literary Genres 2. As the course content will vary from year to year, students may take this course more than once for credit.

FREN 7560 Topics in Critical Theory and Practice 1 Cr.Hrs.3 (Formerly 044.756) Topics in Critical Theory and Practice 1. As the course content will vary from year to year, students may take this course more than once for credit.

FREN 7570 Topics in Critical Theory and Practice 2 Cr.Hrs.3 (Formerly 044.757) Topics in Critical Theory and Practice 2. As the course content will vary from year to year, students may take this course more than once for credit.

FREN 7580 Special Topics 1 Cr.Hrs.3 (Formerly 044.758) Special Topics 1. As the course content will vary from year to year, students may take this course more than once for credit.

FREN 7590 Special Topics 2 Cr.Hrs.3 (Formerly 044.759) Special Topics 2. As the course content will vary from year to year, students may take this course more than once for credit.

FREN 7600 Approches et méthodes critiques Cr.Hrs.3 (Formerly 044.760) Introduction générale aux tendances de la critique actuelle. Cours obligatoire pour les étudiants de Ma^{tr}rise.

FREN 7610 L'épopée médiévale française Cr.Hrs.3 (Formerly 044.761) La littérature du moyen âge, conservée dans de nombreuses chansons de geste, décrit des conflits entre deux sociétés. Ce cours examinera au moins une épopée de chacune des trois familles de chanson de geste: la geste du roi, la geste de Guillaume, et la geste des barons féodaux.

FREN 7620 Le Roman français médiéval Cr.Hrs.3 (Formerly 044.762) Une des plus grandes contributions de la littérature médiévale française ≠ la littérature mondiale se trouve dans le roman (long pome narratif) consacré à l'amour courtois et au conflit entre l'amour et les règles de la société.

FREN 7650 études sur Voltaire Cr.Hrs.3 (Formerly 044.765) Ce cours comprendra une étude d'aspects choisis de l'oeuvre et de la pensée de Voltaire.

FREN 7660 études sur Diderot Cr.Hrs.3 (Formerly 044.766) Ce cours comprendra une étude d'aspects choisis de l'oeuvre et de la pensée de Diderot.

FREN 7670 études sur Balzac Cr.Hrs.3 (Formerly 044.767) études de quelques-uns des romans de Balzac. Ce cours portera sur l'apport de Balzac au développement du genre romanesque en France. Les étudiants seront encouragés ≠ lire les textes ≠ la lumière de certains exemples de la théorie critique récente.

FREN 7690 Le Drame romantique français Cr.Hrs.3 (Formerly 044.769) étude des théories du drame et des pices de théâtre les plus marquantes de l'époque roman-

tique en France. Les principaux auteurs étudiés seront Victor Hugo, Alfred de Vigny et Alfred de Musset.

FREN 7700 La Poésie romantique française Cr.Hrs.3 (Formerly 044.770) Ce cours portera sur la poésie française de la période 1815-1850. Cette poésie sera abordée à la fois comme le témoignage d'une crise et d'une grande libération littéraire.

FREN 7710 études sur Flaubert Cr.Hrs.3 (Formerly 044.771) études des oeuvres maîtresses de Gustave Flaubert dans l'optique des centres d'intérêt surtout narratologiques et génétiques. Discussion d'un certain nombre de sujets connexes (l'érudition, l'ironie de Flaubert) permettant d'arriver à une définition de sa conception du roman.

FREN 7740 études sur Beauvoir Cr.Hrs.3 (Formerly 044.774) Une sélection d'oeuvres de Simone de Beauvoir étudiées selon la perspective de la critique féministe contemporaine.

FREN 7750 études sur la poésie contemporaine Cr.Hrs.3 (Formerly 044.775) études de quelques poètes représentatifs du XXe siècle. L'accent sera placé surtout sur la poésie innovatrice. Parmi les poètes étudiés: Reverdy, Ponge, Michaux, Bonnefoy, Jaccottet, Deguy.

FREN 7760 La Critique littéraire féministe Cr.Hrs.3 (Formerly 044.776) Une sélection de textes littéraires et théoriques analysés selon la perspective de la critique féministe contemporaine.

FREN 7770 Tendances nouvelles du roman Cr.Hrs.3 (Formerly 044.777) Une étude de romans publiés depuis vingt ans selon la perspective de la critique contemporaine.

FREN 7780 Révolution et roman québécois Cr.Hrs.3 (Formerly 044.778) La Révolution tranquille a transformé la société québécoise. Cette transformation fut en grande partie disséminée par des romanciers comme Hubert Aquin et Jacques Godbout, et par des précurseurs, comme Albert Memmi et Gaston Miron, qui ont jeté les bases d'une psychologie et d'une esthétique de la révolution.

FREN 7790 Hubert Aquin Cr.Hrs.3 (Formerly 044.779) Le roman aquinien est une lutte constante contre le roman conventionnel. Celui-ci représente pour Aquin un lieu d'évasion pour l'intellectuel colonisé. Le refus de toute tradition romanesque a mené à la création de romans qui exigent du lecteur une réflexion critique soutenue.

FREN 7800 Le Roman de la belle époque en France Cr.Hrs.3 (Formerly 044.780) Période d'expansion du pouvoir économique, politique et culturel français et apogée de l'idéologie bourgeoise, les dernières années du 19e siècle et la première décennie du vingtième ont également produit un nombre non négligeable de textes romanesques de première ordre qui seront examinés dans ce cours.

FREN 7810 Le Roman d'entre-deux-guerres en France Cr.Hrs.3 (Formerly 044.781) La première guerre mondiale mit fin à la belle époque et provoqua de profonds remous tant socio-économiques que culturels en France. Le roman sembla servir de champ d'élection pour l'expression de ce bouleversement. Ce cours examinera les réactions

tant implicites qu'explicites d'un nombre de grands romanciers vis-à-vis des nouvelles conditions en France.

FREN 7820 Le Roman de l'après-guerre en France Cr.Hrs.3 (Formerly 044.782) Période de l'essor, et de la mort de l'existentialisme, et des expériences formalistes communément désignées collectivement par l'étiquette "nouveau roman", les années après 1945 sont particulièrement importantes pour la compréhension des formes contemporaines du genre romanesque. Ce cours examinera au moins un auteur de chaque tendance.

FREN 7830 Le Cycle oriental dans les romans de Malraux Cr.Hrs.3 (Formerly 044.783) La Tentation de l'Occident débute chez le grand mythomane de la vie culturelle et politique de la France une suite de textes, qui aboutit au chef-d'oeuvre génial qu'est la Condition humaine. Ce cours examinera le bizarre mélange d'individualisme nietzschéen et de rhétorique gauchisante qui a permis à Malraux de forger un genre romanesque sui generis.

FREN 7860 Molière Cr.Hrs.3 (Formerly 044.786) Ce cours sera consacré à l'étude du théâtre de Molière. On examinera la pertinence des approches critiques contemporaines, en comparant différentes interprétations qui visent à rendre compte du plus grand nombre de pièces.

FREN 7870 Le roman du XVIIIe siècle Cr.Hrs.3 (Formerly 044.787) L'étude de quelques textes permettra de saisir un tournant dans l'histoire du roman français. On cherchera à établir l'apport critique des textes parodiques qui signalent l'émergence d'un nouveau discours romanesque. Il s'agit de suivre le passage du roman héroïque et pastoral à la "nouvelle classique."

FREN 7880 Littérature épistolaire du XVIIIe siècle Cr.Hrs.3 (Formerly 044.788) Pour ce cours on propose une étude du texte épistolaire dans différents contextes: la correspondance, le roman et le théâtre. On mettra l'accent sur la théorie de la communication et la problématique de la destination afin de mieux dégager une définition de l'écriture au XVIIIe siècle.

FREN 7890 Racine Cr.Hrs.3 (Formerly 044.789) Le débat suscité par la "nouvelle critique" servira de point de départ à une réflexion sur les théories contemporaines qui s'adonnent à l'interprétation d'une oeuvre - le théâtre de Racine - ayant toujours servi de contrefort aux définitions poussées du classicisme.

FREN 7900 Baudelaire: critique et traducteur Cr.Hrs.3 (Formerly 044.790) Une étude de Baudelaire, critique de la littérature, de la peinture et de la musique de son époque. Une étude de Baudelaire traducteur de Poe: les affinités et la qualité de la traduction sous l'optique de quelques théoriciens contemporains de la traduction.

FREN 7910 Baudelaire: poésie Cr.Hrs.3 (Formerly 044.791) Une étude de la poésie et de la poésie en prose de Baudelaire. Une étude de l'évolution poétique des Lesbiennes aux Limbes aux éditions de 1857 et de 1861 des Fleurs du mal. Une étude des Petits poèmes en prose et de leur contribution au genre.

Section 33: Geological Sciences

Head: I. Ferguson

General Office: 240 Wallace Building

Telephone: (204) 474 9371

Fax: (204) 474 7623

E-mail: brenda_miller@umanitoba.ca

Website: umanitoba.ca/geoscience

Academic Staff

Distinguished Professor and Canada Research Chair

Hawthorne, F.C., O.C., B.Sc. (Spec.) (Imperial College), A.R.S.M. (Royal School of Mines), Ph.D. (McMaster), F.R.S.C., F.G.A.C., F.M.S.A., Killam Fellow, P. Geo.

Professors Emeriti

Brisbin, W.C., B.Sc. (Geol.Eng.) (Manitoba), Ph.D. (UCLA); **Cerny, P., B.Sc., M.Sc. (Brno), Ph.D. (Czechoslovak Academy of Sciences)**, F.R.S.C.; **Ferguson, R.B., B.A., M.A., Ph.D. (Toronto)**, F.R.S.C.; **Hall, D.H., B.Sc. (Alberta), M.Sc. (Toronto)**, Ph.D. (UBC).

Senior Scholars

Ayres, L.D., B.A. (Saskatchewan), Ph.D. (Princeton); **Clark, G.S., B.Sc., M.Sc. (New Brunswick), Ph.D. (Columbia)**; **Moon, W., B.Sc. (Seoul), B.A.Sc. (Elec.Eng.) (Toronto)**, M.Sc. (Columbia), Ph.D. (UBC), F.R.A.S.; **Turnock, A.C., B.Sc., M.Sc. (Manitoba), Ph.D. (Johns Hopkins)**.

Professors

Chow, N., B.Sc. (Hons.) (Calgary), Ph.D. (Memorial), P. Geo.; **Elias, R.J., B.Sc. (Hons.) (Manitoba), M.Sc., Ph.D. (Cincinnati), P. Geo.**; **Ferguson, I.J., B.Sc., Ph.D. (Australian National), P. Geo.**; **Halden, N.M., B.Sc. (Hons.), Ph.D. (Glasgow), P. Geo.**; **Last, W.M., B.Sc. (Wisconsin), M.Sc., Ph.D. (Manitoba), F.G.S.A., P. Geo.**; **Sherriff, B.L., B.Sc. (Leicester), M.Sc. (Brock), Ph.D. (McMaster), P. Geo.**; **Sokolova, E., Dipl. (Hons.), Ph.D., D.Sc. (Moscow State)**; **Teller, J.T., B.Sc. (Cincinnati), M.Sc. (Ohio State), Ph.D. (Cincinnati), P. Geo.**

Associate Professor

Chakhmouradian, A., M.Sc., Ph.D. (St. Petersburg); **Frederiksen, A., B.Sc. (Hons.) (McGill), M.Sc., Ph.D. (UBC)**; **Fayek, M., B.Sc. (Hons.) (Carleton), Ph.D. (Saskatchewan), Canada Research Chair.**

Assistant Professors

Bekker, A., Dipl. (Leningrad Mining Institute), M.Sc. (Minnesota), Ph.D. (Virginia Polytechnic); **Camacho, A., B.Sc. (Hons.), M.Sc. (La Trobe), Ph.D. (Australian National).**

Adjunct Professors

Corrigan, D., B.Sc. (Hons.) (Ottawa), M.Sc. (Dalhousie), Ph.D. (Carleton); **Grice, J.D., B.Sc. (Toronto), M.Sc., Ph.D. (Manitoba)**; **Milne, B., B.A. (Hons.) (Waterloo), M.A. (Trent), Ph.D. (McMaster)**; **Palace, V., B.Sc., M.Sc., Ph.D. (Manitoba)**; **Reist, J.D., B.Sc. (Hons.) (Calgary), M.Sc. (Alberta), Ph.D. (Toronto)**; **Sidenko, N., B.Sc., M.Sc. (Novosibirsk State), Ph.D. (Russian Science Academy)**; **Young, G.A., B.Sc. (Hons.) (New Brunswick), M.Sc. (Toronto), Ph.D. (New Brunswick), P. Geo.**

Program Information

The department consists of a dynamic group interested in a wide variety of topics in the geological sciences. Research is focused on understanding Earth materials and materials analysis. The department is recognized internationally for minerals research and isotope geochemistry. The department has developed numerous multidisciplinary approaches in the assessment of modern and past surface and near-surface environments, and imaging of deep continental structure and crystal dynamics. Research programs have a significant component of international collaboration and a substantial partnership with industry. To support these research efforts, the department maintains well-equipped state-of-the-art analytical facilities and has ready access to other regional and national facilities outside the department. Students regularly receive NSERC, Commonwealth and University of Manitoba Graduate Fellowships and Scholarships.

The department offers a wide variety of research programs leading to degrees of Master of Science (M.Sc.) and Doctor of Philosophy (Ph.D.). Support for research projects is typically received from NSERC, the Geological Survey of Canada, the Province of Manitoba, the University of Manitoba, and a wide variety of industry sources such as energy resources exploration and production companies, and mining companies.

Fields of Research

The general fields of research of the department include: Carbonate sedimentology, Crystallography and mineralogy, Earthquake seismology, Environmental mineralogy and geochemistry, Evaporite sedimentology, Geochemistry, Geochronology, Igneous mineralogy and petrology, Invertebrate paleontology, Isotope geochemistry, Lithospheric and near-surface geophysics, Paleohydrology and Paleolimnology, Petroleum geology, Petrology, Quaternary geology, Sedimentology, Stratigraphy, Tectonics and geochronology.

Research Facilities

The department is equipped for a variety of field and lab-based research projects. In addition, the department maintains the research equipment and services listed below. Access to these facilities is coordinated through the student's thesis advisor.

X-Ray Diffraction Laboratories

- Bruker Apex II Ultra TXS single-crystal diffractometer comprised of a 6kW rotating anode x-ray generator (Mo), HELIOS Mo x-ray optics, SMART APEX II CCD area detector, low pressure diamond anvil cell and both high- and low-temperature attachments.
- Bruker P4 four-circle single crystal diffractometer on a 3kW sealed-tube (Mo) x-ray generator with SMART APEX CCD area detector.
- Bruker D8 Discover TXS micro-powder diffractometer comprised of a 6kW rotating anode X-Ray generator (Cu), extremely fine beam collimation optics, an X-Y-Z sample stage with attached phi-rotation stage, laser/video sample alignment and a Hi-Star 2D area detector.
- Siemens/Bruker D5000 powder diffractometer with rotating sample holder, graphite monochromator, scintillation detector and a 3kW sealed-tube (Cu) x-ray generator.
- A broad assortment of crystallographic and mineralogical software (eg. MDI JADE+, SHELXTL, ATOMS, SHAPE, MIN-IDENT, etc.) as well as licensed databases (eg. ICDD PDF-4, ICSD, etc.) and including molecular mechanics and molecular dynamics software.
- Single-crystal optics setup consisting of a Nikon E-600 POL polarizing microscope with trinocular head and digital camera, an assortment of bandpass filters, Supper spindle stage and Cargill refractive index oils ranging from 1.400 – 1.800.
- Full sample preparation facilities including Nikon binocular microscopes, Leitz optical microscope, precision balances, Buehler Isomet Low speed saw, Buehler Isomet 1000 Precision saw, Buehler MetaServ 2000 Grinder/polisher, Buehler HandiMet II Roll grinder, Mitutoyo precision thickness measuring device, etc.

Spectroscopy Laboratories

- Horiba Jobin Yvon LabRAM ARAMIS Raman Microscope equipped with 532, 633 and 785nm internal lasers plus external "Super Head", Linkham 1500 Heating stage (ambient to 1500×C), and Linkham 600 Heating and Cooling stage (-196 to 600×C).
- One Wissel M⁺ssbauer system and one SEECO MS4 M⁺ssbauer system both with Co₅₇ point sources.
- Bruker Tensor 27 FTIR with Hyperion 2000 IR Microscope includes IR polarizers, horizontal ATR attachment, low-pressure diamond anvil cell for single-xtl IR and a Spex X-PRESS 35 ton hydraulic pellet press.

Geochemistry Laboratory

- A wet chemical laboratory fully equipped for sediment, rock and mineral analyses.
- Mitsubishi CA-06 moisture meter with a VA-21 high temperature furnace.
- Leco induction furnace sulphur analyzer.
- Accumet 950 specific ion analyzer.

Stable Isotope Mass Spectrometry Facilities

- Thermo Finnigan Delta V Plus IRMS coupled to GasBench II (with PAL system and heating block), Costech ECS 4010 EA (with Zero-Blank autosampler: mainly for C and N analysis) and Thermo Finnigan TC/EA (with Zero-Blank autosampler).
- Thermo Finnigan Delta V Plus IRMS coupled to Costech ECS 4010 EA (with Zero-Blank autosampler: mainly for S analysis).
- Thermo Finnigan ConFlo III and ConFlo IV open-split interfaces.
- Sartorius CP2P microbalance.
- New Wave Micromill Sampling System.
- Microdrill Sampling System.
- Various sample preparation facilities including water saws, grinders, polishers, pulverizers, furnaces, ovens, and pipettes.
- Extensive rock collection of Precambrian carbonates, black shales, and iron formations.

Microbeam and Image Analysis Laboratory

The Microbeam Facility in Geological Sciences is set up as a Regional Facility to serve the needs of universities, industry and government institutions in Canada with a state-of-the-art electron microprobe and LAM-HR-ICP-mass spectrometer, and a scanning electron microscope and image analysis system, and includes the following equipment:

- CAMECA SX100 electron microprobe with PGT EDS and 5WDS spectrometers equipped with windows based operating system.
- Thermo-Finnigan Element2 HR-ICP-MS with MerchanteK LUV213 laser.
- Cambridge Stereoscan 120 Scanning Electron Microscope with back scattered electron detector, energy dispersive X-ray detector, and digital image store facility.
- Technosyn cold cathode luminescence system.
- Fluid inclusion stage.

Secondary Ion Mass Spectrometer (SIMS)

- CAMECA MS 7f SIMS for trace element determination, isotopic measurements and depth profiles.
- Resistive Anode Encoder (RAE) for elemental mapping.

Sedimentological, Petroleum Geology, and Quaternary Studies Laboratories

- Automated size analyzers (Sedigraph and Galai PSA Laser 2010).
- RoTap sieve shaker, Soil-Test sieve shaker.
- Drying ovens, muffle furnaces.
- Nikon epi-fluorescence microscope.
- Mettler analytical balances.
- Fisher Accumet pH-Eh meters.
- Carbonate analyzer, centrifuges, water chemistry field analytical kits, conductivity meters, specific ion electrodes.
- Galai Image Analysis system (IAS) with colour and monochrome monitors, video camera, digitizing tablet, and statistical and GIS software.
- Two complete Livingston piston sediment corers, including 80 m of Mg-alloy connecting rods and 6 extra core barrels.
- Vibracorer and associated sampling equipment.
- Complete Acker sediment sampling system, including 3 m tripod derrick, motorized cathead hoist, 60 kg drive weight, split tube sampler, solid tube sampler, connecting rods, and a variety of bits and augers.
- Extensive subsurface well log library for all of western Canada, including all hard copy logs for Alberta, Saskatchewan, and British Columbia, and a microfilm/reader-printer system for all logs in Manitoba and Saskatchewan, and subsurface well cuttings and cores from Manitoba and Saskatchewan.

Invertebrate Paleontology Laboratory

- Complete Nikon stereoscopic plus petrographic microscope/ photomicrographic systems, and photography facilities with Nikon and Minolta camera systems.
- Adjacent sample preparation room/darkroom with various saws, grinders, and a Hillquist thin section machine.

Geophysical Laboratories

- Larger-scale research geophysical instrumentation includes a seven-instrument broad-band portable seismograph facility, a three-component down-hole seismic system, and a Geonics PROTEM47 time-domain EM system.
- Smaller-scale equipment including Geonics EM31 and EM34 instruments, Bison DC-resistivity system, Scintrex magnetometer-VLF system, Scintrex magnetic susceptibility meter, Exploranium gamma-ray spectrometer, Worden gravimeter, and Bison hammer seismograph.
- Computing facilities including GEOTOOLS and WinGLink magnetotelluric software, VISTA 2D seismic processing software, earthquake data processing software, and a high resolution colour graphics imaging system supporting satellite and multispectral geophysical imaging.
- Seismograph station with equipment including three-component long-period seismometers, three-component short period seismometers, amplifier system, and helicorder display
- The University of Manitoba is a founding member of the Canadian POLARIS university-government-industry consortium which has geophysical equipment including satellite telemetered broad-band seismographs, broad-band magnetotelluric, and long-period magnetotelluric instruments.

Other Equipment and Facilities

- Star Lake Field Station, southeast Manitoba.
- R.B. Ferguson Museum of Mineralogy.
- Ed Leith Cretaceous Menagerie.

M.Sc. in Geological Sciences

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. An Honours B.Sc. degree in geological sciences (or equivalent) is the normal prerequisite for entering a program leading to the graduate degrees. Students with Honours degrees in physics, mathematics, engineering physics, or electrical engineering may take graduate work in geophysics provided they make up certain deficiencies in undergraduate geology and geophysics. In some cases, students with B.Sc. or B.A. degrees in other areas such as geography, soil science, biology, chemistry, or environmental science, may be accepted providing certain Honours-equivalent deficiencies are completed. Please contact the Department for details.

Application Deadlines

The Department of Geological Sciences allows students to begin the program on September 1, January 1, or July 1. Canadian/U.S. students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than three (3) months before the intended start date. International students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than seven (7) months before the intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Course GEOL 7760 plus a minimum of 12 credit hours must be selected to fulfil the course requirements of the M.Sc. thesis in Geological Sciences.

The M.Sc. (Comprehensive) requires GEOL 7760 plus a minimum of 24 credit hours to fulfil the course requirements, plus a comprehensive examination.

Reports (proposals, results and timetable of thesis work) in writing must be submitted to the Head on or before February 1 annually.

Second language reading requirement: none
Expected time to graduate: two years

Ph.D. in Geological Sciences

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

The Department of Geological Sciences allows students to begin the program on September 1, January 1, or July 1. Canadian/U.S. students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than three (3) months before the intended start date. International students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than seven (7) months before the intended start date.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Reports (proposals, results and timetable of thesis work) in writing must be submitted to the Head on or before February 1 annually.

Second language requirement: none

Expected time to graduation: four years

Course Descriptions

NOTE: Only a limited number of the following courses are offered annually.

GEOL 7230 Geophysics of the Earth's Crust and Mantle Cr.Hrs.3 Processes in crust-mantle evolution and geophysical methods used to study this region of the earth. Prerequisites: (GEOL 4320 (007.432)), and (GEOL 4330 (007.433)).

GEOL 7260 Geophysical Information Cr.Hrs.3 The application of the Fourier approach in geophysics and information theory to geophysical interpretation. Prerequisites: (GEOL 4320 (007.432)), and (GEOL 4330 (007.433)). and (third-year standing in Mathematics).

GEOL 7310 Quaternary Geology Cr.Hrs.3 Seminars and lectures on sedimentary aspects of the Quaternary Epoch with emphasis on glaciation. The glacial and interglacial stratigraphic record on the continents and in the ocean basins. Three-day field trip in mid-September. Prerequisites: (GEOL 3490 (007.349)), and (GEOL 3900 (007.390)).

GEOL 7350 Remote Sensing in the Earth and Planetary Sciences Cr.Hrs.3 Selected topics in remote sensing with emphasis on geophysical and geologic problems. Prerequisite: B.Sc. (Honours Geology, Geophysics, or Geological Engineering), or permission of instructor for graduates of other disciplines.

GEOL 7440 Principles of Paleoclimatic Reconstruction Cr.Hrs.3 An interdisciplinary course which examines the sedimentological, biological, and human response to climatic change; the history of Quaternary climate and its stratigraphic expression. Prerequisite: permission of instructor.

GEOL 7470 Advanced Petroleum Geology and Geochemistry Cr.Hrs.3 An interdisciplinary course which examines the sedimentological, biological, and human response to climatic change; the history of Quaternary climate and its stratigraphic expression. Prerequisite: permission of instructor.

GEOL 7480 Advanced Seismology 1 Cr.Hrs.3 Theory of wave propagation; source mechanisms; other selected topics. Prerequisite: GEOL 7260 (007.726).

GEOL 7490 Advanced Seismology 2 Cr.Hrs.3 Seismic surface waves and normal modes of Earth, Earth tides and dynamic evolution. Prerequisite: GEOL 7480 (007.748) or equivalent.

GEOL 7520 Advanced X-Ray Crystallography Cr.Hrs.3 (Formerly 007.752) Seminar and laboratory course covering symmetry theory, point groups and space groups, x-ray diffraction theory, the powder method, single-crystal precession photography, derivation of unit cell dimensions and space group. Prerequisite: GEOL 4280 (007.428).

GEOL 7530 Structural Crystallography Cr.Hrs.3 Seminar and laboratory course covering course data collection and reduction methods, crystal structure solution by Patterson and Fourier synthesis, and by direct methods, crystal structure refinement, analysis of errors, and crystal-chemical topics of interest to the participants. Prerequisite: GEOL 7520 (007.752).

GEOL 7540 Isotope Geology and Geochronology Cr.Hrs.3 The principles and methods of isotopic age determination and the measurement of geological rate processes using certain radioactive nuclides and the variations of the isotopic compositions of their daughter products. The evolution of the earth's mantle, continental and oceanic crust. The application of light, stable isotope fractionation to understanding geological processes.

GEOL 7550 Hydrothermal Petrochemistry Cr.Hrs.3 The chemistry, mineralogy, and petrology of mineral deposits and alteration zones of the hydrothermal type, and their association with igneous and tectonic events. Theory and experimental data on metasomatic processes.

GEOL 7570 Advanced Mineralogy 1 Cr.Hrs.3 Detailed seminar study of important

rock-forming and ore minerals based on current research publications, covering crystal structure and chemistry, origin and paragenesis. Lab introduction to principal chemical and physical methods of analyzing minerals.

GEOL 7580 Advanced Mineralogy 2 Cr.Hrs.3 Detailed seminar study of selected minerals related to students' interests based on current research publications, covering crystal structure and chemistry, origin and paragenesis. Lab assignments to examine diverse properties of the discussed species.

GEOL 7590 Advanced Paleontology 1 Cr.Hrs.3 Topics in paleobiology of the invertebrates, and principles of paleontology. Upon request, course may be adapted to individual requirements of students in other disciplines (for example, specific groups of invertebrates, paleoecology, trace fossils, etc.). Prerequisites: (GEOL 3310 (007.331)), and (GEOL 4310 (007.431)), or permission of instructor.

GEOL 7600 Advanced Paleontology 2 Cr.Hrs.3 Topics in paleobiology of the invertebrates, and principles of paleontology. Upon request, course may be adapted to individual requirements of students in other disciplines (for example, specific groups of invertebrates, paleoecology, trace fossils, etc.). Prerequisite: GEOL 3310 (007.331), or GEOL 4310 (007.431), or permission of instructor.

GEOL 7610 Advanced Igneous Petrology Cr.Hrs.3 The origin of magmas, and their association with tectonic regimes, and earth structure. Crystallization and differentiation of magmas, and the distribution of elements and isotopes.

GEOL 7620 Advanced Metamorphic Petrology Cr.Hrs.3 Natural mineral assemblages and their association with igneous and tectonic events. Theory of variable pressure regimes, heterogeneous equilibrium, and reaction processes.

GEOL 7630 Ductile Strain in Geologic Minerals Cr.Hrs.3 The theory, mechanics and interpretation of naturally occurring ductile strain in consolidated and semi-consolidated rocks. Applications of analysis to engineering geology and structural geology.

GEOL 7640 Folding of Rocks Cr.Hrs.3 Ideal fold theory and mechanisms; experimental folding; fold geometry and styles; fold families; interference folding; interpretation of areas that have undergone folding.

GEOL 7650 Fracturing of Rocks Cr.Hrs.3 Experiments on, theory and properties of, fractures ranging in scale from micro-rocks to large scale fault zones; mechanisms of fracturing; interpretation of stress conditions leading to fracturing.

GEOL 7680 Physical Volcanology Cr.Hrs.3 Forms and environments of lava extrusion and flow; mechanics of pyroclastic eruptions and transport; nature of pyroclastic deposits; magma chambers; volcano development and destruction.

GEOL 7690 Precambrian Geology Cr.Hrs.3 Examination of the major lithologic components of the Precambrian Shields of Canada, Australia, and South Africa. Emphasis will be on the origin of these components, discussion of early crustal development, and similarities and differences of Precambrian and younger processes.

GEOL 7700 Advanced Clastic Sedimentology Cr.Hrs.3 Lectures and seminars on clastic depositional environments. Critical evaluation of accepted facies models followed in each case by examination of the ancient record. One week field trip and core logging required. Prerequisite: GEOL 3900 (007.390), or permission of instructor.

GEOL 7720 Geophysical Imaging and Data Processing Cr.Hrs.3 Advanced frequency filter design; deconvolution methods for seismogram; velocity and wavefield stacking; various digital methods for potential field data; principles of tomography and geophysical imaging techniques. Prerequisite: (GEOL 3740 (007.374)), and (GEOL 7260 (007.726)), or permission of instructor

GEOL 7740 Workshop in the Geological Sciences 1 Cr.Hrs.3 Critical, in-depth group study of problems and new concepts in the geological sciences; discussion of current research by staff and visiting scientists; students will pursue individual research interests and will work with staff on specific topics.

GEOL 7750 Workshop in the Geological Sciences 2 Cr.Hrs.3 Critical, in-depth group study of problems and new concepts in the geological sciences; discussion of current research by staff and visiting scientists; students will pursue individual research interests and will work with staff on specific topics.

GEOL 7760 Seminar in Geological Sciences Cr.Hrs.3 A discussion of topics of current interest from the whole spectrum of geological sciences to inform students on research work outside their specialty. Required of all graduate students. For ancillary credit only. Geological Sciences Colloquium. Weekly discussion of topics of current interest. Presentation of recent research from geological literature, the department, and visitors. Required of all graduate students who have received credit for GEOL 7760 (007.776).

GEOL 7770 Distribution of Ores: Metallogeny Cr.Hrs.3 Distribution of geological metal accumulations in space and time. Brief introduction to existing organizational frameworks, followed by a systematic review of metalliferous environments and associations. Offered in alternate years. Prerequisite: GEOL 4300 (007.430), or permission of instructor.

GEOL 7780 Advanced Carbonate Sedimentology Cr.Hrs.3 Lectures and seminars on selected topics of carbonate sedimentology, including depositional environments, lithofacies sequences and diagenesis. Offered in alternate years. Prerequisite: GEOL 3900 (007.390), or permission of instructor.

GEOL 7790 Advanced Instrumental Techniques in Geology Cr.Hrs.3 Lectures and laboratory course covering the application of microbeam, mass spectrometer, diffraction and wet geochemical analytical techniques in mineralogy and geochemistry. Includes coverage of ICP, PIXE, powder and single crystal diffraction and electron microprobe analysis.

GEOL 7800 Evaporite Sedimentology Cr.Hrs.3 Lectures and seminars on evaporite sedimentology, including depositional environments, diagenesis and stratigraphy of evaporitic sequences. One week field trip immediately before or during fall term required.

GEOL 7810 Electromagnetic Methods in Geophysics Cr.Hrs.3 Examination of the theory and application of electromagnetic methods in geophysics. Topics include: electrical properties of earth materials, review of EM methods, EM theory for layered media, EM responses of simple structures and case studies.

GEOL 7820 Environmental Geophysics Cr.Hrs.3 Examination of the application of geophysics to environmental targets. Topics will vary according to student interest and may include aspects of new-surface geophysics, engineering geophysics, geophysics of global climate change and geophysical risk assessment.

Section 34: German and Slavic Studies

General Office: 328 Fletcher Argue Building

Telephone: (204) 474-9370

Fax: (204) 474-7601

E-mail: german_slavic@umanitoba.ca

Website: umanitoba.ca/arts/departments/german_and_slavic

Head: Cheryl Dueck

Graduate Chair: Stephan Jaeger

Graduate Program Assistant: Rose Fiorillo

Academic Staff

Professors Emeriti

Doerksen, V., M.A. (Manitoba), Ph.D. (Zurich); **Glendinning, R.J.**, Dr. Phil. (Freiburg).

Senior Scholar

Rozumnyj, J., M.A., Ph.D. (Ottawa).

Professor

Shkandrij, M., M.A., Ph.D. (Toronto).

Associate Professors

Aponiuk, N., M.A., Ph.D. (Toronto); **Dueck, C.**, M.A. (Saskatchewan), Ph.D. (McGill); **Heberger, A.**, M.A. (Waterloo), M.A./Staatsexamen (Mannheim), Ph.D. (Waterloo); **Jaeger, S.**, Staatsexamen (Bielefeld), Dr. Phil. (Bielefeld).

Assistant Professor

Baraban E., M.A. (Budapest), Ph.D. (British Columbia).

Program Information

The department offers programs of study leading to the Master of Arts degree in the fields of German Language and Literature and Slavic Languages and Literatures. Programs must be arranged in consultation with the Graduate chair of the department.

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulation Section of this Calendar. Students with other degrees or backgrounds may be eligible for admission to a pre-Master's program to the satisfaction of the department. Please contact the department for further information.

Pre-Master's Year

Students without a four-year degree or without an undergraduate major in the discipline to be studied must complete a pre-Master's year as approved by the chair of the appropriate graduate studies committee or his/her delegate before they can enter the Master's program. This year is intended to bring the student's standing to approximately the level of a four-year degree with a major in the appropriate discipline. It will normally consist of 24 credit hours of coursework, of which at least 12 are in the major discipline. At most, one grade of "C+" in a course of six credit hours, or two grades of "C+" in courses of three credit hours, will be permitted.

Master of Arts

Students fulfil the requirements for the Master's degree by doing a combination of coursework and thesis. A minimum of 15 credit hours of coursework is required, including GRMN 7200 / SLAV 7200, GRMN 7210 / SLAV 7210, and 3 other credit hours at the 7000 level in the student's ma-

for discipline. The remaining 6 credit hours, designated as ancillary credit, may be taken at the 7000, 4000, 3000 (or in exceptional circumstances the 2000) level and may be in courses in the student's major discipline, or in another program or department, at the discretion of the chair of the Graduate Studies Committee. A thesis prospectus must be submitted to the candidate's M.A. advisor a minimum of two months before the thesis is submitted to the M.A. Committee.

Students for the M.A. in German who received credit for the course GRMN 4200 have already fulfilled the requirement for GRMN 7200; they replace GRMN 7200 with 3 other credit hours on the 7000 level. Students for the M.A. in German who received credit for the course GRMN 4210 have already fulfilled the requirement for GRMN 7210; they replace GRMN 7210 with 3 other credit hours on the 7000 level.

Expected time to graduation: Two Years; all requirements for the Degree of M.A. must be fulfilled within five years of the original date of entry into the program. Time extensions for completion of the program may be permitted on an individual basis.

Application Deadlines

The Department of German and Slavic Studies allows students to begin their program on either 1 September or 1 January. For admission for each of these start dates, Canadian/U.S. students should send their applications with complete supporting documentation to Faculty of Graduate Studies no less than four (4) months prior to their intended start date. International students should send their applications with complete supporting documentation to arrive no later than seven (7) months prior to their intended start date.

Course Descriptions

German Studies

GRMN 6000 Reading Language Test

GRMN 7200 Literary and Cultural Theory Cr.Hrs.3 A survey of the major theoretical approaches to German and Slavic literature and cultures. Discusses the aesthetics of Enlightenment and Idealism, Nietzsche, Freud, Russian Formalism, Prague Structuralism, hermeneutics, semiotics, dialogism (Bakhtin), the Frankfurt School, collective memory, gender studies, post-colonialism, and multi-culturalism.

GRMN 7210 Introduction to Second Language Acquisition and Methods of Language Teaching Cr.Hrs.3 This course provides a general introduction to theories and approaches in second language acquisition (SLA) and methods of language teaching specifically designed for MA students of German and Slavic languages.

GRMN 7240 Colloquium in German Studies 1 Cr.Hrs.3 A detailed study of theoretical and methodological questions in German literature and culture. Course contents will vary from year to year depending on the needs and interests of students and staff.

GRMN 7242 Colloquium in German Studies 2 Cr.Hrs.3 A detailed study of German stylistics, German as a Second Language, or the structure of the German language. Course contents will vary from year to year depending on the needs and interests of students and staff.

GRMN 7300 Special Topics in German Literature and Culture 1750-1945 1 Cr.Hrs.3 Topics dealing with German literature and culture focusing on an author, a systematic topic or period between 1750 and 1945. Contents will vary from year to year depending on the needs of students and staff. As the course content will vary from year to year, students may take this course more than once for credit.

GRMN 7330 Seminar in Contemporary German Literature and Culture Cr.Hrs.3 Topics dealing with German literature and culture in the second half of the 20th and in the 21st century. Contents will vary from year to year depending on the needs of students and staff.

GRMN 7340 Seminar in German Film and Media Studies Cr.Hrs.3 Studies a variety of German media theories and sources, including newspaper, television and film in the 20th and in the 21st centuries.

GRMN 7350 Seminar in German and European Literature and Culture Cr.Hrs.3 Topics dealing with German literature and culture within a European comparative context. Contents will vary from year to year depending on the needs of students and staff.

GRMN 7360 Independent Studies in German Cr.Hrs.3 Each student will work with an instructor to prepare a reading program in an appropriate area, depending on the needs of students and staff. The student will present written assignments as required. As the course content will vary from year to year, students may take this course more than once for credit.

Slavic Studies

SLAV 7200 Literary and Cultural Theory Cr.Hrs.3 A survey of major theoretical approaches to German and Slavic literatures and cultures. Discusses the aesthetics of Enlightenment and Idealism, Nietzsche, Freud, Russian Formalism, Prague Structuralism, hermeneutics, semiotics, dialogism (Bakhtin), the Frankfurt School, collective memory, gender studies, post-colonialism, and multi-culturalism.

SLAV 7210 Introduction to Second Language Acquisition and Methods of Language Teaching Cr.Hrs.3 This course provides a general introduction to theories and approaches in second language acquisition (SLA) and methods of language teaching specifically designed for MA students of German and Slavic languages.

SLAV 7400 Selected Topics in Slavic Literatures Cr.Hrs.3 Seminar discussions of various problems in Slavic literatures as related to the students' field of research. As the course content will vary from year to year, students may take this course more than once for credit.

SLAV 7410 Seminar in Contemporary Slavic Literatures Cr.Hrs.3 Selected problems in contemporary Slavic literatures as related to the students' field of research.

SLAV 7420 Studies in Modernism Cr.Hrs.3 A study of the representative works of modernism in Slavic countries with a focus on the years 1890-1930. The styles and movements that characterized the period will be examined. References will be made to the art of the period.

SLAV 7430 Special Topics in Slavic Studies Cr.Hrs.3 An independent study course in Slavic literatures, cultures, or folklore. Topics will be selected to meet students' research or study interests. As the course content will vary from year to year, students may take this course more than once for credit.

Section 35: History

Head: M. Gabbert

General Office: 403 Fletcher Argue Building

Telephone: 204 474 8401

Fax: 204 474 7579

E-mail: history@umanitoba.ca

Website: umanitoba.ca/faculties/arts/departments/history

Graduate Assistant: Carol Adam

Academic Staff

Distinguished Professors

Anna, T.E., B.A., M.A., Ph.D. (Duke), F.R.S.C.; **Friesen, G.A., B.A.** (Hons.) (Saskatchewan), M.A., Ph.D. (Toronto), F.R.S.C.

Professors Emeriti

Bailey, P.C., B.A. (Hons.), M.A. (Oxford), Ed.Cert. (Manchester), Ph.D. (UBC); **Carroll, F.M., B.A., M.A.** (Minnesota), Ph.D. (Dublin); **Lebrun, R.A., B.A.** (St. John's), M.A., Ph.D. (Minnesota); **Sandiford, K.A.P., B.A.** (Hons.) (University College of the West Indies), M.A., Ph.D. (Toronto); **Wortley, J.T., B.A., M.A.** D.D. (Durham), Ph.D. (London), F.R.Hist.S.

Senior Scholars

Kendle, J.E., B.A. (Manitoba), Ph.D. (London), F.R.Hist.S.; **Kerr, I.J., B.A.** (Pennsylvania), Ph.D. (Minnesota); **Kinnear, E.M., B.A.** (Hons.), Dip.Ed., M.A. (Oxford), Ph.D. (Oregon), F.R.S.C.; **Moulton, E.C., B.A.** (Ed.), M.A.

(Memorial), Ph.D. (London); **Steiman, L.B., B.A.** (Hons.) (Manitoba), M.A., Ph.D. (Pennsylvania).

Professors

Ferguson, B.G., B.A. (Hons.) (UBC), M.A. (Carleton), Ph.D. (York); **Finlay, J.L., B.A., M.A.** (Cambridge), Ed.Cert. (Nottingham), Ph.D. (Manitoba); **Gerus, O.W., B.A., M.A.** (Manitoba), Ph.D. (Toronto); **Heller, H., B.A.** (Michigan), Ph.D. (Cornell); **Kinnear, M.S.R., B.A.** (Saskatchewan), M.A. (Oregon), D.Phil. (Oxford); F.R.Hist.S.

Associate Professors

Brownlie, R.J., B.A., M.A., Ph.D. (Toronto), **Chen, T.M., B.A.** (Toronto), M.A., Ph.D. (Wisconsin); **Churchill, D., B.A.** (Trent), M.A. (OISE), Ph.D. (Chicago); **Cossar, R., B.A.** (Hons.) (McGill), M.A., Ph.D. (Toronto); **Elvins, S., B.A.** (Hons.) (Queen's), M.A., Ph.D. (York); **Friesen, J., B.A.** (McGill), Ph.D. (UBC); **Gabbert, M.A., B.A.** (Lewis and Clark), M.A., Ph.D. (UC Santa Barbara); **Nesmith, T.C., B.A.** (Hons.), M.A. (Queen's), Ph.D. (Carleton); **Perry, A., B.A.** (Simon Fraser), M.A., Ph.D. (York); **Smith, G.T., B.A.** (Hons.) (UBC), M.A., Ph.D. (Toronto); **Vaitheespara, R., B.Sc.** (Calgary), M.A., Ph.D. (Toronto).

Assistant Professors

Baader, B.M., M.A., M.Phil., Ph.D. (Columbia); **Chadya, J.M., B.A.** (Hons.) (Zimbabwe), M.A. (Zimbabwe), Ph.D. (Minnesota); **Frank, C., B.A.** (Hons.) (Portland State), M.A., Ph.D. (York); **Jones, E.W., B.A.** (Hons.) (Saskatchewan), M.A. (McGill) M.A. (Manitoba/Winnipeg), Ph.D. (Manitoba);

Kuffert, L., B.Ed., B.A.(Hons.) (Saskatchewan), M.A. (UBC), Ph.D. (McMaster); N'Ilm, J.A., Lic., Prof. History (Cuyo National University, Argentina) M.A., Ph.D. (Pittsburgh); Thomason, E., B.A.H. (First class), (Queen's), M.A., Ph.D. (The Johns Hopkins).

Adjunct Professor

Cook, T., B.A., M.A. (Alberta), Ph.D. (Queen's).

University of Winnipeg Department of History

Professors Emeriti

Young, R.J., Ph.D. (London)

Professors

Brown, J.S.H., Ph.D. (Chicago); Burbank, G., Ph.D. (Berkeley); Burley, D., Ph.D. (McMaster); Loewen, R., Ph.D. (Manitoba); McCormack, A.R., Ph.D. (Western Ontario); Reilly, N., Ph.D. (Dalhousie); Topper, D., Ph.D. (Case Western).

Associate Professors

Abreu-Ferreira, D., Ph.D. (Memorial); Freund, A., Ph.D. (Bremer); Hanley, J., Ph.D. (Yale); Keshavjee, S., Ph.D. (Toronto); Majzels, C., Ph.D. (Pennsylvania); Meuwese, M., Ph.D. (Notre Dame); Sibanda, E., Ph.D. (Colorado), Ph.D. (Denver); Yaremko, J., Ph.D. (Manitoba).

Assistant Professors

Alexander-Mudaliar, E., Ph.D. (Cambridge); Bohr, R., Ph.D. (Manitoba); Caudano, A-L., (Cambridge); McCallum M.J., Ph.D. (Manitoba); Seyhun, A., Ph.D. (McGill); Wall, S., Ph.D. (York); Zayarnyuk, A., Ph.D. (Alberta).

Program Information

The department offers programs leading to both the Master of Arts and Doctor of Philosophy Degrees. The MA program (referred to as the Joint Master's Program or JMP) is a joint degree program offered by the History departments of the University of Manitoba and the University of Winnipeg. Students have available the educational and financial resources of both institutions.

Fields of Research

Research interests of faculty are reflected in the fields offered for graduate study in the department. These include: The Americas, Britain including the Commonwealth and Empire, Canada, Medieval Europe, Modern Europe, Asia, Africa, as well as in Social History, Modern World, History of Science and Archival Studies.

Research Facilities

There are excellent archival and library facilities in Winnipeg. The most important research libraries are located at The University of Manitoba and the Manitoba Legislative Library, both of which are official repositories for Canadian publications and which support original research in most areas of Canadian history. The Hudson Bay Company Archives is a world-renowned institution for the study of imperialism, first nations and western and northern North America. Other major archival facilities include: The Provincial Archives of Manitoba, The University of Manitoba Archives and Special Collections, The Manitoba Office of the National Archives, United Church Archives, Western Canada Pictorial Index, the Centre du Patrimoine and the City of Winnipeg Archives.

M.A. in History

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

The application deadline is January 15. Please refer to the History Department website for application requirements.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students may choose among three versions of the program: first, a course-based M.A.; second, a thesis-based M.A.; and third, an M.A. in Archival Studies. The course-based M.A. requires four courses, three of which should be 7000-level History courses. In addition, the student is required to select a major field, and must pass both a written and oral comprehensive examination in that field. The thesis-based M.A. requires two 7000-level courses and the presentation of a thesis. The Archival Studies M.A. requires three graduate courses, an Internship and a thesis.

Second Language Reading Requirement: All graduate students in History are required to demonstrate a reading knowledge of a second language. Candidates who specialize in Canadian History must display a reading knowledge of French and English. Texts for translations are chosen by the History department. Examinations are conducted by faculty in the language departments at the University of Manitoba.

Expected Time to Graduate: All requirements for the degree of M.A. in History must be fulfilled within five years of the original date of entry to the Program.

Ph.D. in History

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

The application deadline is January 15. Please refer to the History Department website for application requirements.

Program Requirements

The minimum course requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Doctoral candidates are required to complete at least three 7000-level courses, take candidacy exams in three fields of historical inquiry, and present an original dissertation which makes a distinct contribution to historical knowledge, based on primary sources.

Second Language Requirement: All graduate students in History are required to demonstrate a reading knowledge of a second language. Candidates who specialize in Canadian History must display a reading knowledge of French and English. Texts for translations are chosen by the History department. Examinations are conducted by faculty in the language departments at the University of Manitoba.

Expected time to graduation: All requirements for the degree of Ph.D. in History must be completed within seven years of the original date of entry to the program.

Course Descriptions

NOTE: The first HIST number listed below is offered at the University of Manitoba; the second HIST number is the number assigned by the University of Winnipeg. Not all courses are offered every year. Please check the Aurora catalogue to find out when a course is offered (https://aurora.umanitoba.ca/banprod/bwckclg.p_disp_dyn_ctlg)

African and Asian

HIST 7280/HIST 7708 Tropical Africa in the 19th and 20th Centuries Cr.Hrs.6 Emphasis will be placed on the development of the European-African relationship from the need of the slave trade to independence. Specific topics considered will be imperialism, African nationalism, colonialism, independence movements, revolutionary wars, and the European legacy in Africa.

HIST 7820 Issues in Modern Asian History: Selected Topics Cr.Hrs.3 Emphasis will be on the analyses of important issues and recent developments in the history and historiography of modern Asia. Consult the History Department for particulars. As the course content will vary from year to year, students may take this course more than once for credit.

American

HIST 7180/HIST 7608 Studies in American History to 1877 Cr.Hrs.6 An examination of selected topics in American history from colonial beginnings to Reconstruction. Particular topics will be announced each year. As the course content will vary from year to year, students may take this course more than once for credit.

HIST 7190/HIST 7609 Studies in American History since 1877 Cr.Hrs.6 An examination of selected topics in American history from Reconstruction to the present. Particular topics will be announced each year. As the course content will vary from year to year, students may take this course more than once for credit.

HIST 7240 State and Society in Latin American History since 1877 Cr.Hrs.6 Readings focused on state/society relations in the history of Latin America since colonial times. After considering different theoretical approaches, the course will analyze recent works that cover different historical periods, countries, issues, and social factors.

HIST 7650/HIST 7605 American Diplomatic History Cr.Hrs.6 An examination of selected topics in American foreign relations.

HIST 7730/HIST 7701 Modern Latin America Cr.Hrs.6 An examination of selected themes such as economic and social change, political modernization, and external influences and intervention in Latin America during the 19th and 20th centuries.

Archival Studies

HIST 7370 History of Recorded Communication Cr.Hrs.6 An examination of aspects of the history of recorded communication from antiquity to the present. The aim of the course is better understanding of the nature of archival records. Emphasis is placed on Canadian examples from the 19th and 20th centuries.

HIST 7380 Selected Problems in Archival Studies Cr.Hrs.6 An examination of selected problems in archival theory and administration. The aim of the course is better understanding of the administration of records in archival institutes. Archival theory and administration are studied in relation to the history of recorded communication and records keeping. Emphasis is placed on Canadian examples from the 19th and 20th centuries

HIST 7390 Internship in Archival Studies Cr.Hrs.3 The internship provides an introductory work experience in a Canadian archives to students who have successfully completed the first year of archival studies. The internship will be no less than three months in duration. It is done in the summer after the first year of study.

British and Commonwealth

HIST 7220 Selected Topics in British History Cr.Hrs.6 A detailed examination of selected topics and problems in British history. As the course content will vary from year to year, students may take this course more than once for credit.

HIST 7230/HIST 7304 Nineteenth-Century Britain Cr.Hrs.6 A study of British culture, politics, and diplomacy, 1830-1900.

HIST 7740 England in the Long Eighteenth Century Cr.Hrs.6 Selected themes in the history of England's long eighteenth century from 1660-1840. Specific topics will vary from year to year but will generally include the transformation of political culture, the consequences of war, the question of national identities, the emergence of commercial society and the changes to social structure.

Canadian

HIST 7290/HIST 7509 Reading Seminar in Canadian History, 1860 to the Present Cr.Hrs.6 The general approach shall be to ensure a broad sampling of the secondary literature in Canadian history. Political, social and economic themes will be emphasized and particular concern shall be taken with historiographical controversy. As the course content will vary from year to year, students may take this course more than once for credit.

HIST 7330/HIST 7503 History of Western Canada Cr.Hrs.6 A research course in western Canadian history. The range of subjects will vary from year to year depending on the interests of the students. The subjects range from the fur trade to modern political, social, and economic issues.

HIST 7360/HIST 7506 Canadian-American Relations Cr.Hrs.6 A historical survey in which the student may concentrate on such periods and aspects (political, economic, cultural, diplomatic, etc.) as may be of particular interest.

HIST 7600/HIST 7510 Northern Historical Studies Cr.Hrs.6 This course is based upon a number of studies of various aspects of the North. Particular emphasis is given to the North in relation to the fur trade, exploration, and Canadian development.

HIST 7640 Social History of Health and Disease in Modern Canada Cr.Hrs.6 This course explores the history of health and health care in Canada, with a focus on the late 19th and 20th century. Topics will include colonization, infectious disease, and Aboriginal health; the evolution of medical and nursing professions and the modern hospital; mental health; cancer; alternative therapies; childbirth; and old age. Analytical categories of gender, race, ethnicity, class, and sexuality will run throughout the material.

HIST 7670/HIST 7517 Studies in Canadian History, 1870-1919 Cr.Hrs.6 This seminar will focus on social, intellectual, political, and economic themes, with particular emphasis on the western experience. Specific topics will vary from year to year depending upon the interests of students and instructors. As the course content will vary from year to year, students may take this course more than once for credit.

HIST 7750 Gender History in Canada Cr.Hrs.6 Explores the roles, images and experiences of masculinity and femininity in the past. Will familiarize students with the changing theoretical and historiographical terrain of gender history. It will draw on the international literature but focus on the history of gender in Canada, examining how historians analyse masculinity, femininity, the family, sexuality, politics, race/ethnicity, moral regulation, class, nation, and colonialism.

HIST 7810/HIST 7511 Studies in the Social History of British North America, 1760-1867 Cr.Hrs.6 Themes may include the fur trade, Euro-Aboriginal relations, immigration, rural and urban social patterns, the instruments of culture (religion, education, the family, etc.), and the social implications of political and economic development.

Medieval

HIST 7410/HIST 7201 The Crusades Cr.Hrs.6 An inquiry into the origins of the Crusading movement in the West and into its impact in the East, with special reference to the role it played in hastening the end of the East Roman Empire.

HIST 7420/HIST 7202 Medieval Monasticism Cr.Hrs.6 Reading and research assignments in the history of Western monasticism.

HIST 7440/HIST 7204 Europe in the Fourteenth Century Cr.Hrs.6 Reading and research assignments in the principal developments of the 14th century.

HIST 7460/HIST 7901 Scientific Studies in the Middle Ages Cr.Hrs.6 The seven liberal arts in Greek, Roman, and European school literature and practice will be reviewed with emphasis on arithmetic, geometry, astronomy, and harmonics, and the development of experimental science.

HIST 7470/HIST 7207 The Later Middle Ages Cr.Hrs.6 Selected topics in economics, social, cultural, art and religious history of the later medieval world. Students may

not hold credit for both HIST 7470 (or 011.747) and the former 011.743 .

HIST 7480/HIST 7208 The Early Middle Ages Cr.Hrs.6 A detailed examination of selected aspects of the early medieval world during the period 313-800 A.D.

Modern European

HIST 7510/HIST 7210 Early Modern European History Cr.Hrs.6 A seminar which studies early modern Europe from the perspective of new approaches to historiography.

HIST 7520/HIST 7302 The Age of Enlightenment Cr.Hrs.6 Emphasis on 18th century French intellectual history and its relationship to the origins and course of the French Revolution. Some reading knowledge of French is almost essential.

HIST 7550/HIST 7305 Twentieth-Century Europe Cr.Hrs.6 An analysis of selected problems in the recent history of Europe.

HIST 7580 The Intellectual History of Modern Europe Cr.Hrs.6 A reading course intended to introduce the student to some of the main figures and themes in the intellectual history of late nineteenth- and early twentieth-century Europe.

HIST 7660/HIST 7306 Nineteenth Century Europe Cr.Hrs.6 An analysis of selected problems in 19th century European history.

HIST 7690/HIST 7902 Post-Newtonian Scientific Thought Cr.Hrs.6 Selected topics in the history of the physical, geological and biological sciences from the time of Newton through to the early 20th century. The relationships of scientific ideas to other philosophical, religious and social developments will be emphasized throughout.

HIST 7560/HIST 7301 The Russian Revolution Cr.Hrs.6 The events constituting the Revolution proper (1917-21) will be studied in relation to their historical background and in the light of their subsequent impact both nationally and globally.

HIST 7570 The Political Institutions of Imperial Russia Cr.Hrs.6 An examination of the nature of the Czarist autocracy with some reflections on the Soviet period.

HIST 7590 Eastern Europe in the Age of the Reformation Cr.Hrs.6 An intensive study of cultural, national, and religious turmoil in selected regions of Eastern Europe in the sixteenth and seventeenth centuries.

HIST 7680/HIST 7318 Modern East Central Europe Cr.Hrs.6 A study of nationalism and communism in the 19th and 20th centuries. "Western" attitudes towards the area will also be discussed. Excludes the Soviet Union.

HIST 7800/HIST 7310 Imperial Russia Cr.Hrs.6 A study of selected problems in Russian Imperial history covering the 18th and 19th centuries.

Modern World

HIST 7910/HIST 7108 Studies in Modern World History Cr.Hrs.6 A seminar emphasizing the period since 1945. With the agreement of the instructor and depending on the needs of their degree programs, students may select a reading or research option.

HIST 7920/HIST 7106 Popular Radicalism in the Modern World Cr.Hrs.6 Selected topics in the history of popular movements of social and political protest in the modern world. The course considers problems such as the conditions and motivations that give rise to social movements, the development of radical theory and political practice, and the culture of dissent. Students may not hold credit for both HIST 7920 (or 011.792) and the former 011.726 .

HIST 7930 Imperialism, Decolonization and Neo-Colonialism 1700-Present Cr.Hrs.6 An exploration of theoretically informed literature that has attempted to engage with and understand Imperialism and Colonialism, Anti-colonial nationalism, National liberation movements and Neo-Colonialism. *Prerequisite:* permission of instructor.

Social

HIST 7270/HIST 7004 Special Studies in Social History Cr.Hrs.6 A seminar course, the content of which will vary from year to year. As the course content will vary from year to year, students may take this course more than once for credit.

HIST 7610/HIST 7101 National States and National Minorities Cr.Hrs.6 A historical approach to the development of nationalism in Canada and Europe. Special attention paid to the treatment of minority groups in the 19th and 20th centuries in educational and cultural fields.

HIST 7630 History of Health and Disease Cr.Hrs.6 An introduction to principal issues and approaches in the history of health and disease. It is not meant to be a strictly chronological survey. Topics and themes may include the development of nursing and medical professions; the transformation of the hospital; mental health; alternative therapies; colonization, infectious disease and aboriginal health; and health and the state.

HIST 7710/HIST 7107 History and Cultural Studies Cr.Hrs.6 A working guide to interdisciplinary approaches of the new field of Cultural Studies, examining its principal theoretical bases and existing and potential applications for the historian.

HIST 7760 History of Aboriginal Rights Cr.Hrs.6 A study of Aboriginal rights from early contact to the present with a particular emphasis on treaties, the courts, and Aboriginal efforts to enforce specific forms of rights.

General

HIST 7700/HIST 7005 Historical Method Cr.Hrs.6 A seminar and workshop in historical method. The topics covered will encompass conventional research, analysis and writing, as well as the application of social science techniques to the analysis of historical problems, the fundamentals of data processing, and computer applications.

HIST 7900/HIST 7090 Introduction to Documentary Editing Cr.Hrs.6 Examination of the major problems of editing documents, including transcription procedures, paleography, textual collation, editorial apparatus, computer text processing, permissions and copyrights, and publications.

HIST 7930 Imperialism, Decolonization and Neo-Colonialism 1700-Present Cr.Hrs.6 An exploration of theoretically informed literature that has attempted to engage with and understand Imperialism and Colonialism, Anti-colonial nationalism, National liberation movements and Neo-Colonialism. Prerequisite: permission of instructor.

Other

HIST 7770/HIST 7003 Selected Topics Cr.Hrs.6 A program of independent reading and/or research on selected topics, undertaken and arranged by a student in consultation with his prospective instructor, upon the approval of the Graduate Chair. As the course content will vary from year to year, students may take this course more than once for credit.

Section 36: Human Anatomy and Cell Science

Head: T. Klonisch, Head

General Office: 130 Basic Medical Sciences Building,
745 Bannatyne Avenue

Telephone: (204) 789 3652

Fax: (204) 789 3920

E-mail: anatomycellsci@umanitoba.ca

Website: umanitoba.ca/medicine/anatomy

Academic Staff

Professors Emeriti

Cooper, J., Dip.P., O.T. (Toronto); B.O.T., M.Sc., Ph.D. (Manitoba); **Per-saud, T.**, M.D., D.Sc. (Rostock), Ph.D. (West Indies), F.R.C.P. (London), F.R.C.P.I.; **Thliveris, J.**, B.A. (Colorado), M.S. (Utah), Ph.D. (Oregon);

Senior Scholars

Bruni, J., B.Sc. (Prince Edward Island), M.Sc., Ph.D. (Western Ontario); **Pa-terson, J.**, M.Sc., Ph.D. (McGill)

Professors

Anderson, J., B.Sc.(Med.), Ph.D. (Manitoba); **Del Bigio, M.**, M.D., B.Sc.(Med.), Ph.D.; **Kardami, E.**, D.B. (Athens), Ph.D. (London); **Klonisch, T.**, M.D., Ph.D. (Germany); **Li, X-M.**, M.D., Ph.D. (China), F.R.C.P.C. (Canada); **Mai, S.**, B.Sc., M.Sc., M.D., Ph.D. (Germany); **Scott, J.**, B.Sc. (Brandon), M.Sc.; Ph.D. (Manitoba); **Vriend, J.**, B.A. (Calvin), M.Sc. (Alberta) Ph.D. (San Antonio).

Associate Professors

Bergen, H., B.Sc. (Hons.) Ph.D. (UBC); **Eisenstat, D.**, M.D., M.A., F.R.C.P.C., F.A.A.P.; **Kong, J.**, M.D., Ph.D. (China); **Krcek, J.**, B.A., M.Sc. (Western Ontario), M.D., Ph.D. (Calgary), F.R.C.S.C.; **Kriellaars, D.**, B.P.E. (Manitoba), M.Sc. (Dalhousie), Ph.D. (Manitoba); **Lyons, E.**, B.Sc., M.D., B.Sc.(Med.), F.R.C.P.C.; **Torchia, M.**, M.Sc., Ph.D. (Manitoba); **Vrontakis-Lautatzis, M.**, M.D. Ph.D. (Athens).

Assistant Professors

Hannila, S., B. Sc. (Hons.) Ph.D., (Queens) **Hombach-Klonisch, S.**, M.D., Ph.D. (Germany); **Namaka, M.**, B. Sc., (Pharm.), M. Sc., Ph.D. (Manitoba); **Peeler, J.**, B.P.E., M.Sc., Ph.D. (Manitoba).

Adjunct Professors

Cheng, K., M.Sc. (Manitoba), M.D. (China); **Smith, I.**, B.Sc. (Hons.), M.Sc. (Manitoba), Ph.D. (Cambridge).

Program Information

The Department of Human Anatomy and Cell Science offers graduate training at both the M.Sc. and Ph.D. levels. The purpose is to prepare students for careers in biomedical research, for teaching in selective areas of anatomy and admission to clinical programs. It is the only department to offer basic and advanced courses in gross, microscopic and developmental anatomy. It also offers courses in neuroscience, cell biology, electron microscopy and cardiac lipids. These have now become particularly important tools in assessing outcomes associated with use of transgenic and gene knockout animals as models of human disease. Graduate students are also provided with opportunities to teach in various sub-disciplines of anatomy. In addition to transmitting knowledge, they must also generate new knowledge by undertaking meaningful research. The department also provides a fine milieu for cross-fertilization of ideas, and more personalized attention; benefits of a smaller department. The department offers a multidisciplinary program in biomedical applications of imaging and spectroscopy in conjunction with Institute for Biodiagnostics – National Research Council. Various members of the department are affiliated with the Faculty of Dentistry, School of Medical Rehabilitation, and St. Boniface General Hospital Research Centre. The department also provides continuing medical education to the allied health science community.

Fields of Research

The Department consists of a number of faculty, each of which are experts in one or more sub-disciplines of anatomy. Quality teaching programs are enriched by scholarly pursuits of department members who are engaged in research of the highest quality in the following areas: muscle repair, developmental anatomy and biology, cardiology, neuroendocrinology, cell and molecular biology and neuroscience. Graduate students are provided with the opportunity to use a variety of contemporary techniques such as autoradiography, light and electron microscopy, morphometrics, tissue culture and transplantation, high performance liquid chromatography, immunocytochemistry, in situ hybridization, radioimmunoassay, electrophoresis, transgenics, molecular biology, magnetic resonance imaging and spectroscopy.

Research Facilities

The department is spacious, has excellent facilities and is well equipped for research. The department houses an electron microscopy suite equipped with scanning and electron microscopes, a communal tissue culture, histology, and autoradiography facility, and a satellite animal facility. Individual research laboratories are equipped with microscopes (fluorescence, transmitted light, dissecting), photomicrography apparatus, high performance liquid chromatography, and radioimmunoassay capabilities, polymerase chain reaction (PCR), DNA sequencing, genomic cloning and other molecular biology facilities. Personnel also have access to magnetic resonance imaging and MR spectroscopy facilities.

M.Sc. in Human Anatomy and Cell Science

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. The following categories of students may be accepted for graduate study in this department:

² 4-year undergraduate Science degree with a minimum GPA of 3.0.

² Students who have completed a 3-year general undergraduate degree may be admitted following completion of the required pre-Master's courses. Contact the Department for details.

² Graduates in medicine or dentistry holding M.D., D.M.D. (D.D.S.), or equivalent degrees.

² Other suitable graduates will be considered.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students are required to take Methodology of Research (ANAT 7090) and one of Cell Biology (IMED 7090), Human Microscopic (Histology) Anatomy (ANAT 7360); Human Macroscopic (Gross) Anatomy (ANAT 7370); Neuroscience 1 (ANAT 7270) or Human Developmental (Embryology) Anatomy (ANAT 7380) plus an appropriate course in statistics (Biostatistics 1, CHSC 7470) or equivalent. Students must then complete a thesis.

For supplementary regulations and other information please contact the Department of Human Anatomy and Cell Science.

Second language reading requirement: none

Expected time to graduate: three years

Ph.D. in Human Anatomy and Cell Science

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Department at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Department at least 7 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Stu-

dents are required to take Readings in Anatomy (ANAT 7330) and one of Cell Biology (IMED 7090), Human Microscopic (Histology) Anatomy (ANAT 7360); Human Macroscopic (Gross) Anatomy (ANAT 7370); Neuroscience 1 (ANAT 7270) or Human Developmental (Embryology) Anatomy (ANAT 7380) not already completed at the Master's level. Before receiving the Ph.D. degree, students must have taken an appropriate statistics course (Biostatistics 1 CHSC 7470 or equivalent) if not already completed.

For supplementary regulations and other information please contact the Department of Human Anatomy and Cell Science.

Second language requirement: none

Expected time to graduation: five years

Course Descriptions

ANAT 7060 Advanced Human Macroscopic (Gross) Anatomy Cr.Hrs.6 (Formerly 080.706) Dissection, with special emphasis on regions relative to the research projects and interests of students concerned. Both terms. *Prerequisite:* ANAT 7370 or equivalent; consent of instructor.

ANAT 7090 Methodology of Research Cr.Hrs.3 (Formerly 080.709) Theoretical and practical instruction in scientific investigation, research design, data analysis and presentation, and writing research proposals.

ANAT 7250 Experimental Teratology Cr.Hrs.3 (Formerly 080.725) Basic principles of experimental teratology in lectures, seminars, and practical work. The causes, embryological basis, and mechanisms of developmental defects will be covered.

ANAT 7270 Neuroscience I Cr.Hrs.6 (Formerly 080.727) Basic anatomical and clinical aspects of the nervous system.

ANAT 7280 Neuroscience II Cr.Hrs.6 (Formerly 080.728) Application of basic neurological sciences to the general practice of medicine. Lectures, seminars, clinics. *Prerequisite:* ANAT 7270 (or 080.727).

ANAT 7320 Introduction to Scanning and Transmission Electron Microscopy Cr.Hrs.3 (Formerly 080.732) Designed to provide general theoretical aspects of electron microscopy and practical knowledge of electron microscopic laboratory procedures. 3 hours lecture/lab per week, one term. Minimum enrolment: 5 students. *Prerequisite:* written consent of instructors.

ANAT 7330 Readings in Anatomy Cr.Hrs.3 (Formerly 080.733) Regular tutorials on selected topics in Anatomy and research related to student's research work. The tutorials will be incorporated into the Department's seminar program.

ANAT 7350 Cardiac Lipids and Membrane Function Cr.Hrs.3 (Formerly 080.735) Provides detailed account of the role of cardiac bioactive lipids on membrane properties and functions. Two hour tutorials per week, one term. *Prerequisite:* written consent of instructor.

ANAT 7360 Human Microscopic Anatomy (Histology) Cr.Hrs.6 (Formerly 080.736) Microscopic structure correlated to function, of tissues and organs of the human body. Lecture and laboratory course.

ANAT 7370 Human Macroscopic Anatomy (Gross) Cr.Hrs.8 (Formerly 080.737) Dissection, living anatomy, and radiographic anatomy.

ANAT 7380 Human Developmental Anatomy (Embryology) Cr.Hrs.3 (Formerly 080.738) Human development as it is of practical application to medical subjects.

ANAT 7390 Structural Organization in Human Anatomy Cr.Hrs.3 (Formerly 080.739) A course for students participating in physics, chemistry, computer science, engineering, architecture, and mathematics (non-biological areas). A conceptual approach to Human Anatomy, for direct application to information obtained with current and developing techniques for detection, diagnosis, treatment and management of human lifestyle and disease. *Prerequisite:* consent of instructor(s). Minimum enrolment: 3

ANAT 7400 Morphological Techniques Cr.Hrs.3 (Formerly 080.740) Designed to develop advanced morphological techniques such as immunohistochemistry, in situ hybridization, immunogold, in situ PCR, cell culture, autoradiography, antero- and retro-grade tracing techniques.

Section 37: Human Nutritional Sciences

Head: J.D. House

General Office: Rm 407 Human Ecology Building

Telephone: (204) 474 9901

Fax: (204) 474 7593

E-mail: FNGrad@umanitoba.ca

Website: umanitoba.ca/faculties/human_ecology/programs/hns/88.htm

Academic Staff

Professor Emeritus and Senior Scholar

McDonald, B.E., B.Sc., M.Sc. (Alberta), Ph.D. (Wisconsin).

Senior Scholar

Watts, B.M., B.Sc. (H.Ec.), M.Sc., Ph.D. (Manitoba).

Professors

Aukema, H.M., B.Sc., M.Sc., Ph.D. (Guelph); **Eskin, N.A.M., B.Sc., Ph.D.** (Birmingham); **Friel, J.K., B.Sc. (Loyola), M.Sc.** (Saskatchewan), Ph.D. (Guelph); **House, J.D., B.Sc. (Agr), Ph.D.** (Guelph); **Jones, P.H., B.Sc., M.Sc.** (British Columbia), Ph.D. (Toronto); **Ogborn, M.R., M.B.B.S., C.R.C.P.C., F.R.C.P.C. (Adelaide); Sevenhuysen, G.P., B.Sc., Ph.D.** (London); **Taylor, C.G., B.H.Ecol.** (Manitoba), Ph.D. (Guelph); **Zahradka, P., B.Sc., Ph.D.** (Western Ontario).

Associate Professors

Aluko, R.E., B.Sc. (Lagos), Ph.D. (Guelph); **Moghadasian, M.H., D.V.M.** (Shiraz University, Iran), M.Sc., Ph.D. (British Columbia).

Assistant Professors

Aliani, M., Eng. (France), Ph.D. (Queen's – Belfast); **Eck, P.K., Dipl., Ph.D.** (Giessen University- Germany); **Lengyel, C.O., B.Sc.** (Alberta), Ph.D. (Sas-

katchewan); **Myrie, S. B., B.Sc., M.Sc.** (Alberta), Ph.D. (Newfoundland); **Slater, J., B.S.H.Ec.** (Saskatchewan), M.Sc., Ph.D. (Manitoba); **Suh, M., B.Sc., M.Sc.** (Korea), Ph.D. (Alberta); **Thiyam, U., M.Sc.** (India), Ph.D. (Germany).

Adjunct Professors

Ames, N., B.Sc., M.Sc. (Manitoba), Ph.D. (Guelph); **Barthet, V. J., B.Sc.** (Universite Paul Sabatier-France), DEA, Universite Nancy-France), Ph.D. (McGill); **Becker, A., MD** (Manitoba); **Bezabeh, T., B.Sc.** (Asmara University), M.A., Ph.D. (Washington); **Embil, J. M. A., B.Sc., MD.** (Dalhousie), FRCPC, FACP; **Fieldhouse, P., B.Sc.** (Surrey), M.Phil. (Leeds), Ph.D. (Manitoba); **Harding, S. V., BSc, MSc** (Memorial), PhD (McGill); **Harvey, D., B.A.** (Bemidji State), M.Sc. (Western Illinois University), P.E.D., (Indiana University); **Lukow, O.M., B.Sc., M.Sc., Ph.D.** (Manitoba); **Malcolmson, L.J., B.H.Ec., M.Sc., Ph.D.** (Manitoba); **Rideout, C.A., B.A., B.Sc.** (Queen's – Ontario), Ph.D. (UBC); **Rideout, T. C., B.Sc.** (Cape Breton), M.Sc. (Guelph), Ph.D. (Guelph); **Solomons, N., MD** (Harvard); **Tappia, P.S., B.Sc.** (Sunderland, U.K.), Ph.D. (Wolverhampton, U.K.); **Utioh, A., B.A.Sc.** (Ottawa), M.Sc. (Saskatchewan).

Program Information

The Department of Human Nutritional Sciences is one of the largest in Canada and the University of Manitoba is the only university in the province to offer graduate programs leading to the MSc. and Ph.D. degrees in the area of nutrition and food sciences. Graduate programs in Human Nutritional Sciences integrate concepts in metabolism, food and community nutrition. Research in experimental nutrition explores the role of nutrients and food components in basic biological processes from the whole organism to the molecular level. Community and clinical nutrition research focuses on policy development, food choice behaviour and novel approaches to disease management. Research related to foods includes in-

vestigations of the quality and stability of ingredients, development of functional and nutraceutical components from grains, oilseeds and legumes, and consumer preference and sensory characteristics of foods.

A multidisciplinary approach to research is common, with linkages to university departments such as medicine, agricultural and food sciences, management, dentistry, nursing and physical education and recreation studies, as well as with the Richardson Centre for Functional Foods and Nutraceuticals and the Canadian Centre for Agri-food Research in Health and Medicine. Collaborations outside the University also exist with organizations such as the Canadian International Grains Institute, the Grain Research Laboratory, Agriculture and Agri-Food Canada, Manitoba Health, the Winnipeg Regional Health Authority and the Manitoba Institute of Child Health.

Courses offered in nutrition and metabolism address topics in phytochemicals, proteins, energy and carbohydrates, lipids, vitamins, minerals and trace elements. Community nutrition courses include topics in qualitative research, epidemiology, public policy, nutrition education and theoretical approaches to dietary change interventions. Topics related to food research include nutraceuticals, functional foods, lipids, flavour chemistry and sensory properties of foods.

An informal atmosphere exists with free interaction between faculty and graduate students. The department attracts local, national and international students, many of them holders of prestigious scholarships. Graduate student training in the Department of Human Nutritional Sciences has led to careers as: research scientists in academic, public and private sectors, technical specialists and research supervisors in food and pharmaceutical industries, food and nutrition policy analysts, food service managers, health and wellness specialists and educators, nutrition consultants, university and government employees, food quality assessment and research supervisors in government and agricultural laboratories.

Graduates of the M.Sc. program are qualified to meet the demands of the public, industry and government for food and nutrition specialists skilled in planning, administering and evaluating programs. The program also includes training in biochemical and analytical methods.

Training at the Ph.D. level is offered as an Interdepartmental Ph.D. in Food and Nutritional Sciences or as a Ph.D. in Applied Health Sciences. It is designed for individuals who design and execute major research projects, train other researchers, serve as senior advisors consultants in health, social or economic policy and planning, and teach in nutrition or foods areas.

Fields of Research

Specific areas of research interests include the following: role of diet in health and disease, community nutrition, including nutritional assessment, the study of consumer perceptions and food choices, and evaluation of nutrition education and programs; identification and development of functional foods and nutraceuticals, and evaluation of their health benefits; effect of nutrients on body defence and immune systems including those involved in cell damage and repair and detoxification of environmental pollutants; nutritional biochemistry and nutrient-gene interactions; functional and health aspects of nutrients and foods in pediatric and geriatric populations; application of the knowledge of functional foods and nutraceuticals in the design of food products for the general population and specific groups of individuals; effects of modification and processing of oilseeds and oils on quality, stability and performance of foods; relationship of sensory and chemical flavour properties of foods; food security and policy development, cultural and social aspects of food choice behaviours.

Research Facilities

Human Nutritional Sciences houses laboratories for basic as well as applied research. Laboratories such as the Canada Foundation for Innovation Nutritional Sciences Research Facility and the Richardson Centre for Functional Foods and Nutraceuticals are equipped with the tools to carry out research at the level of the whole human, animal, cell, and molecule. Facilities for diet preparation for human and animal dietary intervention studies are available as well as modern analytical instrumentation and cell culture facilities. The George Weston Ltd. Sensory and Food Research Laboratory, with controlled ventilation and lighting and a computerized sensory analysis system, provides a controlled setting for testing of food products. This facility is used to evaluate the effects of food ingredients and nutraceuticals, storage conditions and preservation on food quality and consumer acceptance as well as on the commercial viability of a food or food products.

M.Sc. in Human Nutritional Sciences

Admission

To be admitted to the M.Sc. program, a candidate must have a GPA of at least 3.0/4.5. A 4-year undergraduate degree from the Department OR another undergraduate degree with three credits of Physiology, three credits of Biochemistry and six credits in upper level foods or nutrition courses are required for unconditional admittance.

Students with a 3-year undergraduate degree enter at the Pre-Master's level, in which at least 18 credit hours of course work are required. Pre-Master's students are not eligible for graduate student stipends and do not carry out a research project.

Students applying to a Ph.D. program should hold a thesis-based Master's degree in nutrition or a related field. Alternatively, evidence of an extensive publication and research background also may be considered.

Application Deadlines

Canadian and U.S. students should send their application and all supporting documentation to the Faculty of Graduate Studies, **at least three months** prior to their intended start date. International students should send their application and all supporting documentation to the Faculty of Graduate Studies, **at least six months** prior to their intended start date.

Program Requirements

As part of the minimum 12 credit hrs required in the program, all students are required to take HNSC 7200 as well as 6 credit hours in Human Nutritional Sciences at the 700/7000 level. These 6 credit hours must comprise courses from at least two of the following three general subject areas: Foods (Flavour Chemistry and Sensory Properties of Food, Chemistry and Function of Food Lipids, Nutraceuticals in Human Health, Advanced Problems in Foods), Community Nutrition (Qualitative Research in Nutrition, Nutrition in Public Policy, Theoretical Approaches to Dietary Change Interventions, Nutritional Epidemiology, Advanced Problems in Nutrition) and Metabolic Nutrition (Vitamin Nutrition and Metabolism, Mineral and Trace Element Nutrition and Metabolism, Lipid Nutrition and Metabolism, Protein Nutrition and Metabolism, Phytochemical Nutrition and Metabolism, Energy and Carbohydrate Nutrition and Metabolism).

Note that in addition to the required courses in the M.Sc. program, if a student's background is weak in specific areas related to his/her area of research, additional courses may be required. Any additional course requirements beyond the minimum stated above and subject to the Faculty of Graduate Studies' maximum of 24 credit hrs will be determined by the student's thesis advisory committee and may include courses in statistics, communications, research methods or specialized courses in foods or nutrition. Students must also complete a thesis project in food and/or nutrition research.

Second language reading requirement: none, unless specified in program of study.

Expected time to graduate: two years.

Ph.D. in Food and Nutritional Sciences

Requirements for the Interdepartmental Ph.D. program in Food and Nutritional Sciences are given in the Interdisciplinary Programs Section (Section 34.3) and in the Regulations Section (Section 5).

Candidates for the Interdepartmental Ph.D. program will take courses in both the food sciences and nutritional sciences areas, and additional courses appropriate to the candidate's area of study and research.

Course Descriptions

HNSC 7070 Advanced Problems in Foods Cr.Hrs.3 Selected topics related to consumer acceptability of foods.

HNSC 7110 Advanced Problems in Nutrition Cr.Hrs.3 Studies of selected problems and programs in community nutrition emphasizing program planning and evaluation.

HNSC 7200 Seminar in Food and Nutrition Research Cr.Hrs.3 A critical study of selected topics in food and nutrition research involving oral presentations and discussions. This is a required course for all M.Sc. students in the department of Foods and Nutrition.

HNSC 7440 Protein Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the fields of protein nutrition and metabolism, pertinent to mammalian physiology. Also offered as ANSC 7440 by the Department of Animal Science.

HNSC 7450 Energy and Carbohydrate Nutrition and Metabolism Cr.Hrs.1.5 Lec-

tures and critical reviews will be used to discuss recent/significant research advances in the field of energy/carbohydrate nutrition and metabolism, pertinent to mammalian physiology. Also offered as ANSC 7450 by the Department of Animal Science.

HNSC 7460 Lipid Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of lipid nutrition and metabolism, pertinent to mammalian physiology. Also offered as ANSC 7460 by the Department of Animal Science.

HNSC 7470 Vitamin Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of vitamin nutrition and metabolism, pertinent to mammalian physiology. Also offered as ANSC 7470 by the Department of Animal Science.

HNSC 7480 Mineral and Trace Element Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of mineral nutrition and metabolism, pertinent to mammalian physiology. Also offered as ANSC 7480 by the Department of Animal Science.

HNSC 7490 Phytochemical Nutrition and Metabolism Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of phytochemical nutrition and metabolism, pertinent to mammalian physiology. Also offered as ANSC 7490 by the Department of Animal Science.

HNSC 7500 Chemistry and Function of Food Lipids Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of food lipid development, processing, analysis and function.

HNSC 7510 Flavour Chemistry and Sensory Properties of Foods Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of food flavour and off-flavour chemistry and in the mechanics of sensory assessment.

Section 38: Icelandic

Acting Head: Birna Bjarnadóttir

General Office: 357 University College

Telephone: (204) 474 8487

Fax: (204) 474 7591

E-mail: um_icelandic@umanitoba.ca

Website: umanitoba.ca/icelandic

Academic Staff

Bjarnadóttir, Birna, B.A., M.A., Ph.D. (Reykjavik)

Program Information

The Department of Icelandic offers innovative and challenging programs of study leading up to the M.A. degree. The aim of the program is to develop student knowledge of Icelandic language, literature and culture and to train students in the methods of scholarship. Graduate courses are offered on demand and can often be tailored to particular interests. Courses in the Icelandic language and literature allow students access to the fascinating world of medieval Icelandic culture, and constitute an important addition to the study of medieval, religious, literary and linguistic history of Western Europe. Iceland's size, geographical isolation, relatively homogeneous population, and history of documentation has made it a popular area for comparative research in a wide range of disciplines. Modern Icelandic provides access to the wealth of sources recorded in Iceland and North America relating to the realms of religion, law and politics, geology and culture, that allow for such comparative studies. Courses which focus on North American-Icelandic history, culture, literature, film and translation provide unique insights into Canadian culture and history, and allow access to sources which enable students to do comparative research in the context of Trans-Atlantic culture.

Fields of Research

The department actively pursues and promotes the study of the Icelandic language and literature as well as North American-Icelandic culture. Research activities in the department have served to examine the role of North American Icelanders as a cultural group in Canada and to highlight the contribution of Icelandic Canadians to Canadian and Icelandic culture and literature through publications, translations and conferences. Scholarship in the department has also focused on the history of aesthetics in Icelandic writings, the challenge of the saga heritage and the poetics of immigration. The department supports a strong program of scholarly publications, of which the Icelandic Studies Series of the University of Manitoba Press is an example. Publications include: *The Book of Settlements: Landnámabók* (1972); *A History of the Old Icelandic Commonwealth* (1974); *Edda: A Collection of Essays* (1983); and *Laws of Early Iceland: Grágás I & II* (1980, 2000).

HNSC 7520 Nutraceuticals in Human Health Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in the field of nutraceuticals and the impact of food and raw materials on nutrition and human health.

HNSC 7530 Nutrition in Public Policy Cr.Hrs.1.5 Focus on public policy related to the nutrition and health status of Canadians, including food and nutrition policies, health public policy, influence of trade regulations, context of health systems, social and economic environments. *Prerequisite:* permission of instructor

HNSC 7540 Nutritional Epidemiology Cr.Hrs.1.5 Focus on epidemiology principles and survey techniques for assessing and predicting individual nutritional status, assessing relevant community resources and reporting results to granting agencies and decision makers. *Prerequisite:* permission of instructor

HNSC 7550 Qualitative Research in Nutrition Cr.Hrs.1.5 A critical examination of methodological, analytical and interpretive issues in qualitative research as applied to nutrition and food-related issues. *Prerequisite:* permission of instructor

HNSC 7560 Current Topics in Human Nutrition Cr.Hrs.1.5 Lectures and critical reviews will be used to discuss recent/significant research advances in nutrition and foods research.

HNSC 7570 Theoretical Approaches to Dietary Change Intervention Cr.Hrs.1.5 Theoretical approaches to dietary behaviour change and critical analysis of their application in nutrition intervention programs for individuals and populations. *Prerequisite:* permission of instructor

HNSC 7580 Applied Nutrition Cr.Hrs.6 Experience in the application of nutrition theory to the management of nutrition related disease in a clinical setting supervised by registered dietitians. *Prerequisites:* Undergraduate coursework which meets the requirements for admission to Dietitians of Canada. An application is required for limited enrolment. Not to be used toward the fulfillment of the minimum 12 credit hours required in the program. Not to be held with the former 030.719.

Research Facilities

The Department of Icelandic is complemented by the Libraries Icelandic Collection, founded in 1936. It has been designated a selective depository by the Government of Iceland, receiving a limited number of the more important publications to come out in Iceland each year. This collection is the largest of its kind in North America excepting the Fiske collection at Cornell University, and includes books, periodicals, newspapers, manuscripts, microfilms and audio-visual materials. It is the main research facility for research on Icelanders in North America.

M.A. in Icelandic

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Students with other degrees or backgrounds may be eligible for admission to a pre-Master's program to the satisfaction of the department. Contact the Icelandic Department for further information.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, requirements for the M.A. degree include a thesis and three courses (18 credit hours) at the 700/7000 level in the Icelandic Department.

Second Language Reading Requirement: Yes

Expected Time to Graduate: Two years

Ph.D.

There is no Ph.D. Program in Icelandic.

Course Descriptions

ICEL 7040 Advanced Icelandic Cr.Hrs.6 (Formerly 012.704) Advanced modern Icelandic usage through translation (English-Icelandic/Icelandic-English), practical exercises, and free composition. Study of fictional and non-fictional texts.

ICEL 7050 Individual Modern Authors Cr.Hrs.6 (Formerly 012.705) Icelandic literature in the 20th century. Study of modern and contemporary Icelandic literature focusing on a major author.

Section 39: Immunology

General Office: 471 Apotex Centre, 750 McDermot Avenue

Telephone: (204) 789 3509

Fax: (204) 789 3921

E-mail: kmorrow@cc.umanitoba.ca

Website: umanitoba.ca/faculties/medicine/units/immunology/

Head: Dr. Redwan Moqbel

Graduate Chair: Dr. Aaron Marshall

Administrative Assistant: Karen Morrow

Office Assistant: Susan Ness

Academic Staff

Professor Emeritus

Froese, A., B.Sc. (Western Ontario), Ph.D. (McGill).

Distinguished Professor Emeritus

Sehon, A., B.Sc., M.Sc., Ph.D., D.Sc. (Manchester), F.R.S.C.

Senior Scholar

Berczi, I., Ph.D. (Manitoba), D.V.M. (Budapest); **Chow, D.,** M.Sc. (Toronto), Ph.D. (Manitoba)

Professors

Becker, A., M.D. (Manitoba), F.R.C.P.C.; **Choy, P.,** B.Sc. (McGill), Ph.D. (North Dakota); **El-Gabalawy, H.,** B.Sc., M.D. (Calgary), F.R.C.P.C.; **Gartner, J.,** B.A., M.D., C.M. (McGill); **Gibson, S.,** B.Sc. (Carleton), Ph.D. (Toronto); **HayGlass, K.,** B.Sc. (Queen's), Ph.D. (Western Ontario); **Moqbel, R.,** B.Sc. (Hons), MSc., (Baghdad); Ph.D. (London School of Hygiene & Tropical Medicine); **Nickerson, P.,** B.Sc.(Med.), M.D., F.R.C.P.C.; **Simons, F.E.R.,** B.Sc., M.D. (Manitoba), F.R.C.P.C.; **Warrington, R.,** M.B., B.S., B.Sc. (London), Ph.D. (Memorial); **Yang, X.,** M.D. (Shangdong), M.Sc. (Shanghai), Ph.D. (Manitoba).

Associate Professors

Kung, S.K.P., B.Sc., M.Sc. (Univ. Hong Kong), Ph.D. (Toronto); **Marshall, A.,** B.Sc.(Hons.) (Saskatchewan), Ph.D. (Toronto); **Peng, Z.,** M.Sc. (Shanghai), M.D.; **Soussi Gounni, A.,** B.Sc., M.Sc. (Paul Sabatier), Ph.D. (Institut Pasteur); **Uzonna, J. E.,** D.V.M. (Univ. Nigeria), Ph.D. (Saskatchewan).

Assistant Professors

Ball, T.B., B.Sc, M.Sc, Ph.D (Manitoba); **Berry, J.D.,** B.Sc. (Hons.), Ph.D. (Manitoba); **Ellison, C.** M.Sc., Ph.D, (Manitoba); **Mookherjee, N.** B.Sc., M.Sc. (Bombay), Ph.D. (Victoria); **Raouf, A.** B.Sc., Ph.D. (Toronto); **Rastegar, M.,** B.Sc., M.Sc. (Tehran); Ph.D. Universite Catholique de Louvain, Brussels); **Rempel, J.D.,** B.Sc., (Calgary), Ph.D. (Manitoba)

Adjunct Professors

Shawn Babiuk, S., B.Sc. (Hons.), Ph.D. (Saskatchewan); **Yang, M.,** Ph.D, M.Sc. (Manitoba).

Program Information

The Department was established at the University of Manitoba in 1969 as the first Department of Immunology in Canada. Today it is known and respected internationally as a centre for Immunology research and teaching. A major strength of the program is the excellent research environment, reflected in the strong research faculty, award-winning students, high levels of external research funding and availability of leading-edge research equipment. The Department offers a diverse program of graduate studies and research in Immunology, leading to M.Sc. and Ph.D. degrees. The main objectives of the Program are to: 1) facilitate development of a solid academic base and critical thinking skills in the field of immunology; 2) develop expertise in modern techniques of immunologic research, through a strong laboratory research training component; 3) provide students with exposure to a wide range of biomedical research areas to foster development of a broad scientific perspective and multi-disciplinary outlook; 4) provide opportunities for students to develop essential professional skills, such as oral and written scientific communications, grant-writing, mentorship, communicating science to the media and public, job searches, interpersonal skills and intellectual property. Traditional coursework is kept to a minimum, and alternative assessment approaches are used to reduce in-

class exams, such as student debates, student-led "mini-teaching" sessions or take-home exams based on experimental design and problem-solving. Our weekly seminar series brings in an excellent array of local, national and international speakers to provide students with exposure to a wide range of research topics and foster multi-disciplinary thinking. Our Department hosts a number of activities in which our students participate in teaching what they do to undergraduates or high school students. In addition to the academic program components, the laboratory research component of the program features an excellent range of unique technical resources and expertise. A culture of collaborative sharing of resources and expertise further facilitates development of students' research. Unique funding opportunities available to Immunology students include the Mindel and Tom Olenick Research Award in Immunology (administered by the Health Sciences Centre Foundation), the Mindel and Tom Olenick Research Award in Immunology Entrance Scholarship (administered by the University of Manitoba) and the Viventia Research in Immunology Travel Award. For more information consult our webpage: umanitoba.ca/faculties/medicine/units/immunology/.

Fields of Research

The research program of the over 20 Faculty members who participate in the Program in Immunology is strongly supported by peer-reviewed external funding from international, national and local sources. Immunology researchers at the University of Manitoba have as their main research interests: Allergy and asthma, antibody production, autoimmunity, including arthritis and colitis, cancers of the immune system, including leukemia and lymphoma, cancer stem cells, immune responses to vaccination, gene therapy of immune cells, immune regulation and immune memory, immune response to viral, bacterial and parasitic diseases, leukocyte cell biology and signal transduction, leukocyte receptors and adhesion molecules, molecular genetics of the immune system, proteomics and systems biology, and transplantation immunology. Numerous collaborations between those interested in fundamental and clinical immunology are in place, providing opportunities for translational research. For more information about ongoing research visit: <http://umanitoba.ca/faculties/medicine/units/immunology/research.htm>.

Research Facilities

The Department recently moved to new state of the art, open-concept laboratories in the Apotex Centre on the University's Bannatyne Campus. The Program offers extensive instrumentation for research in contemporary immunology. These include basic and clinical immunology research laboratories, core equipment for a broad range of molecular and cellular immunology techniques, housing for small animals (both conventional SPF and for creation of transgenic mice), instrumentation for flow cytometry analysis and high speed sorting, confocal microscopy, a proteomics centre, a student computer laboratory and access to departmental and University wide libraries. Strong scientific links exist with the Manitoba Institute of Child Health, Manitoba Institute of Cell Biology, Manitoba Centre for Proteomics, National Microbiology Laboratory, Health Sciences Centre, Children's Hospital and Canadian Blood Services, all in Winnipeg.

M.Sc. in Immunology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 9 months prior to their intended start date.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. IMMU 7110 and IMMU 7020 are the required core courses.

Students whose first language is not English must contact the University of Manitoba English Language Centre to register for the Canadian Test of English for Scholars and Trainees (CanTEST). This test must be taken while the student is in the first year of his/her graduate program.

Second language reading requirement: none
Expected time to graduate: typically 2 - 3 years.

The Department of Immunology Supplemental Regulations may be printed from their website:

umanitoba.ca/faculties/medicine/units/immunology/gradprog.html

Ph.D. in Immunology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Department at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Department at least 9 months prior to their intended start date.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. The candidacy examination required of all students in the Ph.D. program will be in the form of a research proposal. Details on this examination can be obtained from the department web site.

Students whose first language is not English must contact the University of Manitoba English Language Centre to register for the Canadian Test of English for Scholars and Trainees (CanTEST). This test must be taken while the student is in the first year of his/her graduate program.

Second language requirement: none
Expected time to graduation: 4 - 5 years

The Department of Immunology Supplemental Regulations may be printed from website:

umanitoba.ca/faculties/medicine/units/immunology/gradprog.html

Course Descriptions

In addition to offering or contributing towards immunology training at the undergraduate levels, and in Medicine and Pharmacy professional pro-

grams, the department offers the most extensive selection of graduate courses in immunology in Canada. Not all courses are offered every year. Please check the Aurora catalogue to find out when a course is offered: (https://aurora.umanitoba.ca/banprod/bwckctlg.p_disp_dyn_ctlg). These include:

IMMU 7020 Immunobiology Cr.Hrs.6 (Formerly 072.702) This course provides a broad perspective of the evolving concepts of the mechanisms underlying the regulation of the immune response. Students admitted to this course will be expected to have sufficient background knowledge of general biology. *Prerequisites:* IMMU 7070 (or 072.707) plus cognate courses in molecular biology, or by consent of instructors.

IMMU 7030 Seminars in Immunology Cr.Hrs.3 (Formerly 072.703) Presented by senior graduate students on advanced research topics not directly related to the student's thesis subject. The purpose of this course is to test the student's ability to evaluate critically a specialized topic both orally and in an essay form. This course is graded pass/fail. *Prerequisites:* IMMU 7110 (or 072.711) or IMMU 7020 (or 072.702), or by consent of instructors.

IMMU 7040 Immunological Methodology Cr.Hrs.3 (Formerly 072.704) This lecture course is provided to provide an understanding of modern methods used for basic research in Immunology or other biomedical disciplines utilizing immunological techniques. *Prerequisite:* IMMU 7070 (or 072.707), or by consent of instructors.

IMMU 7070 Introductory Immunology Cr.Hrs.3 (Formerly 072.707) This course provides a broad survey of modern immunology, covering such topics as molecular concepts of antigenic specificity, chemistry of antibodies and their interactions with antigens and cells, regulation of the immune response, transplantation and tumor immunology. *Prerequisites:* general courses in chemistry, biochemistry and biology, or by consent of instructors.

IMMU 7080 Immunological Methodology (Laboratory) Cr.Hrs.3 (Formerly 072.708) This laboratory course is designed to provide familiarity with a variety of modern techniques used for basic research in immunology or other biomedical disciplines. *Prerequisites:* IMMU 7040 (or 072.704) or by consent of instructors.

IMMU 7090 Selected Topics in Immunology Cr.Hrs.3 (Formerly 072.709) Lectures, tutorials and assigned reading on topics not normally covered in other courses such as IMMU 7110 (or 072.711) and IMMU 7020 (or 072.702) or 036.719. Course content will vary depending on the advances in the field and research interests of the Department. *Prerequisites:* Consent of instructors.

IMMU 7100 Advanced Topics in Immunology Cr.Hrs.3 (Formerly 072.710) Lectures, tutorials and assigned reading at an advanced level on topics which may have been covered in other courses offered by the Department and which require treatment at a higher level either due to advances in the field or changes in the research interests of the Department. *Prerequisites:* IMMU 7110 (or 072.711) and/or IMMU 7020 (or 072.702), or by consent of instructors. This course is graded on a pass/fail basis.

IMMU 7110 Molecular Immunology Cr.Hrs.6 (Formerly 072.711) This course covers in depth the structure, molecular biology and function of immunoglobulins, histocompatibility antigens, regulatory factors receptors and adhesion molecules on cells of the immune system; mechanisms of immunochemical reactions and the immunogenicity of antigens. *Prerequisites:* IMMU 7070 (or 072.707) plus undergraduate courses in organic chemistry, physical chemistry and biochemistry, or by consent of instructors. Not to be held with the former 072.701.

Section 40: Interdisciplinary Graduate Programs and Courses

Faculty of Architecture

The following courses are offered as interdisciplinary courses in the Faculty of Architecture

ARCG 6102 Topics in Environmental Processes Cr.Hrs.3 A detailed study of some special topics in architecture, city planning, landscape architecture or interior design.

ARCG 7070 Topics in Environmental Processes and Design I Cr.Hrs.3 A course designed for graduate students in the departments of Architecture, Landscape Architecture, and City Planning to pursue interdepartmental studies in environmental processes and design.

ARCG 7080 Topics in Environmental Processes and Design II Cr.Hrs.3 A course designed for graduate students in the departments of Architecture, Landscape Architecture and City Planning to pursue interdepartmental studies in environmental processes and design.

ARCG 7102 Studio Topics in Environmental Processes Cr.Hrs.6 A detailed studio study of some special topics in architecture, city planning, landscape architecture or interior design.

Faculty of Engineering

The following course is offered as an interdisciplinary course in the Faculty of Engineering

ENG 7010 The Engineering Design Process (3) Consideration of the Engineering Design process and the logic upon which it is based. Explores both the history and possible future directions of the process from technical, social and environmental points of view.

Faculty of Medicine

The following courses are offered as interdisciplinary courses in the Faculty of Medicine

IMED 7090 Cell Biology (6) Comprehensive introduction to the structure and function of cells. *Prerequisite:* consent of instructor.

IMED 7100 Fundamentals of Neuroscience (6) An interdepartmental multidisciplinary course providing a comprehensive overview of cellular, molecular, developmental and systems neuroscience, as well as the neurobiology of disease. Emphasis will be placed on the application of the fundamental principles of neuroscience to contemporary lab research. ANAT 7270 (offered in alternate years) will provide in-

struction in neuroanatomy and structure-function in the nervous system. *Prerequisite:* Permission of instructor.

IMED 7180 Molecular Approaches to Medical Research (3) For students who wish to understand advances made in medicine/biology through molecular and developmental approaches. Topics for discussion will be selected from the recent literature in consultation with participating students. The course will consist of lectures and discussions as well as written and oral presentation of papers by the student. (Offered alternate years. Consent of section coordinator required).

IMED 7190 Medical Immunology (3) This interdisciplinary course deals with the molecular and cellular mechanisms underlying immunologically mediated human diseases. *Prerequisites:* IMMU 7070 plus cognate courses in human biology or by consent of instructors.

IMED 7200 Cancer Biology (3) One hour per week on the basic (cellular and molecular) and clinical (diagnostic and treatment) aspects of cancer. Students will give one seminar and submit an essay on an assigned topic. *Prerequisite:* consent of instructor.

IMED 7240 Nucleic Acids: Manipulation, Structure and Function Three hours per week, one term. DNA technology; nucleic acid metabolism, including DNA replication, DNA repair, transcription, and RNA processing; gene/chromosome structure and rearrangement; mutation detection; gene therapy; positional cloning; transgenic animals.

IMED 7290 Developmental Biology (3) Emphasize current principles of organ system development and its application to transgenic approaches to gene function in the context of a whole, developing organism. *Prerequisite:* IMED 7090 or ZOOL 2150 and/or ZOOL 3070 or consent of instructor.

Interdepartmental Ph.D. in Food and Nutritional Sciences

Head: R.G. Fulcher

General Office: 250 Ellis Building

Telephone: (204) 474 9621

Fax: (204) 474 7630

E-mail: foodcas@ms.umanitoba.ca

Website: umanitoba.ca/afs/food_science

Academic Staff

See the academic staff lists in departments of Animal Science, Food Science and Human Nutritional Sciences.

Program Information

Programs at the doctorate level are administered through the Interdepartmental Ph.D. program in Food and Nutritional Sciences involving the departments of Human Nutritional Sciences, Food Science, and Animal Science. Admission usually requires a research Master's degree in an appropriate discipline (food science, human nutrition, biochemistry, microbiology, etc.).

Fields of Research and Research Facilities

See information in this Calendar under the three participating departments

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, a research Master's degree in the general areas of food or nutritional sciences is required.

Application Deadlines

Students may begin their program on either September 1, January 1, May 1 or July 1. For admission on each of these start dates, Canadian/U.S. students should send their application forms with complete supporting documentation to Faculty of Graduate Studies no less than six (6) months before the intended start date. Non-Canadian/US students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than 7 months before the intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. All students are required to take a minimum of 15 credit hours of courses at the 700/7000 level which will include FDNT 7120 Advanced Seminar in Food and Nutritional Sciences and at least one 700/7000 level course from each of the two participating food departments and complete a thesis research program. For additional information, candidates should contact the head of any of the three participating departments.

Second language reading requirement: none

Expected time to graduate: four years.

Course Descriptions

FDNT 7120 Advanced Seminar in Food and Nutritional Sciences (3) A critical review of selected topics in food and nutritional sciences presented in both verbal and written forms. This is a required course for all Ph.D. students in the interdepartmental food and nutritional sciences program and extends beyond the normal academic term.

Further course descriptions are available in the Calendar under Animal Science, Human Nutritional Science and Food Science. For additional information, candidates should contact the head of any of these participating departments.

Interdepartmental Graduate Program in Genetics

Graduate Co-Chairs: Dan Gietz, Biochemistry and Medical Genetics, and Brian Fristensky, Plant Science

Program Office: 336 Basic Medical Sciences

Telephone: (204) 789 3593

Fax: (204) 789 3900

E-mail: ggp@umanitoba.ca

Website: umanitoba.ca/medicine/units/biochem/gradprogram.html

Academic Staff

See academic staff lists in the departments of: Animal Science, Plant Science, Biochemistry and Medical Genetics, Microbiology and Zoology.

Program Information

A broad knowledge in the field of genetics requires a study program of an interdisciplinary nature. Courses in genetics and directly related fields are currently offered in many different departments, and although the term "genetics" may not always appear as such in the course title, the subject matter is largely genetic in content.

To accommodate students wishing to do graduate work in genetics and in recognition of the multidisciplinary nature of genetics, an interfaculty graduate program in genetics has been established which is organized by the Genetics Program Committee comprising representatives from the faculties of Agricultural and Food Sciences, Medicine, and Science. The broad base of the Genetics Program Committee will provide the student with the best possible advice on program selection for a career in genetics. The Department of Biochemistry and Medical Genetics is administratively responsible for students registered in the human genetics component of the Genetics Graduate Program. Students wishing to undertake graduate studies in human genetics should seek advice directly from the chair of the graduate studies committee of the Department of Biochemistry and Medical Genetics.

Admission

The first step in the application process is for the applicant to contact directly the professor with whom he or she wishes to study. If a professor can be identified who is willing to supervise the student's research, and if funding for the student is available, a formal application should be submitted. Students wishing to undertake studies in human genetics should apply directly to the Department of Biochemistry and Medical Genetics. Students wishing to enter the Graduate Genetics Program in areas other than human genetics should apply to the chair of the Genetics Program Committee. Admission will be competitive and acceptance will be based on academic credentials and subject to availability of space and resources. The normal entrance requirements will be an Honours B.Sc. with emphasis on genetics. Students not fulfilling the entrance requirements will be required to undertake a pre-Master's program designed specifically to fulfil deficiencies in their background.

Application Deadlines

The Genetics Graduate Program allows students to begin their program on either 1 September, 1 January or 1 May. For admission for each of these start dates, Canadian students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than four (4) months before the intended start date. Non-Canadian students should send their applications with complete supporting documentation to arrive no later than seven months (7) before the intended start date.

Interdepartmental M.Sc. in Genetics

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. A minimum of 12 credit hours exclusive to IMED 7130 Graduate Seminar in Genetics 1, will be required. A minimum of six credit hours must be obtained in courses listed in the Genetics course list. A thesis demonstrating proficiency in the field of study chosen by the student will be required.

Interdepartmental Ph.D. in Genetics

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. A minimum of 12 credit hours of coursework at the 700/7000 level, exclusive of IMED 7140 Graduate Seminar in Genetics 2, beyond the Master's level will be required. At least six of the 12 credit hours must be obtained for courses in the Genetics course list.

A qualifying examination may be held upon the recommendation of the selection committee and/or supervisor and the advisory committee. The format of the examination will be determined by the examining committee and the student notified no less than three months before the date of the examination.

A candidacy examination will be required of all students registered for a Ph.D. examination as specified by the Faculty of Graduate Studies. The majority of members of the examination committee will be members of the Genetics Program Committee.

Course Descriptions

IMED 7130 Graduate Seminar in Genetics 1 (3) Seminars covering areas of interest to faculty and students in the Graduate Genetics Program and current development in the broad field of genetics. Requirement for all students enrolled for Master's degrees in the Graduate Genetics Program. Open to other qualified students by permission of Graduate Genetics Program Committee.

IMED 7140 Graduate Seminar in Genetics 2 (3) Seminars covering areas of interest to faculty and students in the Graduate Genetics Program and current developments in the broad field of genetics. Requirement for all students while enrolled for Ph.D. degrees in the Graduate Genetics Program. Open to other qualified students by permission of Graduate Genetics Program Committee.

Faculty of Agricultural and Food Sciences

Animal Science

ANSC 7220 Genetic Principles of Animal Improvement
ANSC 7400 Quantitative Genetics in Animal Science
ANSC 7410 Advanced Animal Genetics
ANSC 7520 Special Topics in Animal Improvement

Plant Science

PLNT 7160 Advanced Genetics
PLNT 7670 Quantitative Genetics and Plant Breeding
PLNT 7680 Plant Molecular Genetics
PLNT 7690 Bioinformatics

Faculty of Medicine

Biochemistry and Medical Genetics

BGEN 7040 Seminars in Human Genetics
BGEN 7070 Special Topics in Human Genetics
BGEN 7090 Principles and Practice of Human Genetics
BGEN 7100 Mammalian and Human Cytogenetics
BGEN 7110 Human Biochemical and Molecular Variation
BGEN 7120 Laboratory Methods in Human and Medical Genetics
BGEN 7130 Genetics Epidemiology of Human Populations
BGEN 7140 Clinical Genetics
BGEN 7160 Theory and Practice of Genetic Counselling
BGEN 7170 History of Human Genetics

Faculty of Science

Microbiology

MBIO 7100 Advanced Concepts in Molecular Biology
MBIO 7110 Advances in Microbial Genetics
MBIO 7170 Current Topics in Mammalian Cell Culture

Zoology

ZOOL 7340 Problems in Developmental Zoology 1
ZOOL 7350 Problems in Developmental Zoology 2

Interdepartmental

IMED 7090 Cell Biology
IMED 7240 Nucleic Acids: Manipulation, Structure and Function

Individual Interdisciplinary Programs

The Faculty of Graduate Studies provides the special opportunity to students, with a proven track record, of registering in an Individual Interdisciplinary Program¹. Such a program combines substantial aspects of the existing programs of at least two departments into a unique syllabus which lies outside of established department boundaries. Since the Individual Interdisciplinary Program places additional demands and responsibilities upon the student to assemble a committee, to formulate a research proposal in advance of admission and, to negotiate a program of studies with his/her committee, the eligibility requirements are more stringent than those for discipline based graduate programs. The regulations presented below and all general regulations of the Faculty of Graduate Studies (e.g., admission requirements, registration procedures, thesis regulations, minimum course requirements, advance and transfer credit, time limits, requirements for graduation, oral examinations, academic performance and the like) apply to Individual Interdisciplinary Programs. These regulations can be accessed from the Faculty of Graduate Studies web site: http://umanitoba.ca/graduate_studies/programs/masters/iip/regulations.htm. Each department currently offering a discipline-based graduate level program is eligible to offer an individual interdisciplinary stream² in which the subject area of that department is the major focus³ of the Individual Interdisciplinary Program⁴. The department is thus considered the "home" department of the IIP student⁵. (Note: the department should be contacted ahead of time to ensure their participation in the IIP) Because of the individuality of each program and the need for special guidance, an Advisory Committee is required for all IIP students.

The "home" Department Head (or designate) will ensure that the student and the advisor receive information regarding scholarship and relevant Faculty procedures and the like (i.e., information that would normally be distributed to Department heads and/or Chairs of graduate programs).

Eligibility for Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, applicants for an Individual Interdisciplinary Program are required to have a superior academic record (3.5 GPA or equivalent) with a substantial grounding in at least one of the disciplines⁶ of the proposed Individual Interdisciplinary Program. The application procedures and regulations, as determined by the Faculty of Graduate Studies, can be found on the Faculty of Graduate Studies web site:

http://umanitoba.ca/graduate_studies/programs/masters/iip/regulations.htm Please be aware that the home department may have additional application requirements and procedures and should be contacted directly for further information.

Application Deadlines

Contact the home department for applicable deadlines for submission of application materials.

Master's Individual Interdisciplinary Programs

Admission

Students should normally have an Honours Bachelor degree or equivalent in one of the disciplines of the proposed IIP.

Program Requirements

In addition to the minimum program requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, please consult the Faculty of Graduate Studies web site: http://umanitoba.ca/graduate_studies/programs/masters/iip/degree_req.htm

Ph.D. Individual Interdisciplinary Programs

Admission

Students should normally⁷ have a Master degree or equivalent in one of the disciplines of the proposed IIP.

Program Requirements

In addition to the minimum program requirements of the Faculty of Graduate Studies that are found in the Graduate Studies Regulations Section of this *Calendar*, please consult the web: http://umanitoba.ca/graduate_studies/programs/phd/iip/degree_req.htm

¹ Where the word department appears, the word Faculty or Institute is to be assumed where appropriate.

² A department's eligibility to offer an Individual Interdisciplinary Program is limited to the level of the degree currently being offered by the department. For example, if only a Master's level program is offered by the department, then that department is eligible to be the home department for students in a Master's level Individual Interdisciplinary Program, only. Although this particular department may participate as a minor department in a Ph.D. IIP, it is not eligible to be the home department of a Ph.D. IIP student. A Faculty member in a department without a graduate program at the level he/she wishes to supervise an IIP student may do so providing that the Faculty member is a member of the Faculty of Graduate Studies and has the approval to supervise from the "Home" department. Note: the supervisor may or may not need to be appointed as an adjunct to the home department.

³ "Major Focus" refers to the subject area/discipline of a department in which the credit hours of instruction to be taken are more than or equal to those to be taken in any other participating department. In a two-department combination, assuming a 15 credit hour program, 9 credit hours of course work would be taken in the major focus area, with a minimum of 6 to be at the 700/7000 level.

⁴ The intent of an IIP is to bring together existing discipline-based programs in such a way as to form a unique program tailored to an individual research project and/or study aim that cannot otherwise be accommodated by existing programs. Masters programs are used to construct a Masters level IIP and Ph.D. programs are the building blocks for a Ph.D. level IIP. While there is some flexibility in the actual programs used to construct an IIP, it is imperative that a Masters level IIP contain mostly existing Masters level programs, and Ph.D. programs must make up the majority if not all the component programs in a Ph.D. IIP.

⁵ The "home" department counts this student as part of their complement for statistics purposes and would indicate them as "IIP Stream" students.

⁶ It is anticipated that substantial grounding will be in the major focus area; if not, then justification must be given for consideration.

⁷ Students who have completed an IIP Masters, may be considered for entry into an IIP PhD, provided that their proposed course work and research in the PhD program is a clear extension or follow up of the Masters program. The determination of the appropriateness of the masters work as a prerequisite to the proposed PhD study will be made by the PhD Selection (Admission) Committee. The Dean of Graduate Studies (or delegate) must be present at such meetings.

Ph.D. Studies for Aboriginal Scholars

Contact: Dr. Deo H. Poonwassie

General Office: 500 University Centre

Telephone: (204) 474 7070

Fax: (204) 474 7553

E-mail: poonwass@ms.umanitoba.ca

The University of Manitoba takes pride in providing world-class education to many of Canada's best and brightest students. By recognizing the potential in all who have a desire to learn and by offering students an exceptional education in a supportive environment, the university is proud to open its doors to a cohort of Aboriginal students at the Ph.D. level. The University of Manitoba is committed to recruiting and graduating Aboriginal students at all levels and areas of studies.

The University recognizes that the province has a large Aboriginal population. While strides are being made at the undergraduate level with a significant number of teachers, social workers, lawyers and medical doctors as evidence, there is an urgent need for expertise at the graduate level. This opportunity for those holding Masters degrees or honours Bachelor's degrees will fill a major void that currently exists in areas including university and college leadership positions in an environment of perpetual change. This is the university's contribution to growing our own expertise.

Who Is Eligible

The University of Manitoba invites applications for Ph.D. studies from First Nations, Inuit and Metis scholars. Priority will be given to Manitobans.

The Cohort

The Faculty of Graduate Studies is committed to facilitating the admission of a cohort of 15 Aboriginal students for doctoral studies. The cohort model of delivery will serve Aboriginal Ph.D. students to focus on common critical issues that deserve in-depth research and investigation. Though not a homogeneous group, students will have enough common experiences and goals to meld into a viable learning community. The Aboriginal context is important as a glue that will allow for peer cooperation and support. It will be possible to offer students common courses (if needed) such as indigenous research methodologies, critical paper writing and analysis; and spiritual guidance. The intent is to create a firm foundation that will work for success. With this heightened confidence and awareness, Aboriginal students will be able to contribute to the education of other persons in academia as well. Interdisciplinary and interpersonal communications will promote cohort cohesion for Aboriginal Leadership in a changing globalized community.

Admission Requirements

The minimum requirement for admission to the Ph.D. program is normally a Master's degree or equivalent from a recognized university and a cumulative GPA of 3.0 or equivalent in the last two years of full time study (60 credit hours). With special recommendation of the department concerned, applicants with an honours Bachelor's degree may be considered for entry to Ph.D. studies. Applicants must meet the specified requirements of a department or faculty. Some departments may require admission tests such as the Graduate Record Examination (GRE), the Graduate Management Aptitude Test (GMAT) or a qualifying research paper.

For further information applicants may contact the faculty or department in which they wish to study. Students may apply to any department or faculty that offers a Ph.D. program of studies.

For more details you may also consult:

http://umanitoba.ca/faculties/graduate_studies/admissions/programs/programs_list.htm

Application forms can be downloaded from:

http://umanitoba.ca/faculties/graduate_studies/media/newapp.pdf

Program Requirements

For students admitted with a Master's degree the normal minimum requirement is 12 cr.hr at the 7000 level or higher plus a thesis. A maximum of 24 cr.hr. is allowed toward the Ph.D. program. Note: some departments may require more or less credit hours.

After initial registration, the student is expected to complete the program within 7 years.

A residency requirement, consisting of two academic terms at the University of Manitoba, is required as part of the requirements of a Ph.D. program. Please consult specific department/faculty requirements. The student shall be geographically available to visit the campus regularly during this residence period.

Advance and Transfer Credit

- Students may apply for advance credit for up to half the number of credit hours in their approved programs. These courses will have been taken before the student is admitted into the Ph.D. program.

- Students may receive transfer credit by taking courses at another institution while studying at the University of Manitoba.

- In both of the above cases the student must follow the procedures and regulations as outlined in the current U of M Graduate Calendar.

Financial Assistance

A fundraising effort is in place to ensure that all students may receive up to \$20,000 in financial assistance. Those who qualify may apply for regular Ph.D. assistance on a competitive basis (see the Faculty of Graduate Studies website for more information). Students are encouraged to explore other sources of funding.

If you wish to obtain funding, please provide a statement of needs with your application.

Women's Studies Courses

The following courses are offered as interdisciplinary courses

WOMN 7170 Directed Readings in Women's Studies Cr.Hrs. 3 (Formerly 156.726) Advanced study of selected topics in Women's Studies from an interdisciplinary perspective. The content of the course may vary from year to year and will be arranged by the coordinator of the Women's Studies Program in consultation with the appropriate representatives of departments. **Prerequisite:** consent of the Women's Studies coordinator and the instructor. **Students must complete a Reading Course Application Form available from the Women's Studies office.**

WOMN 7270 Advanced Topics in Women's Studies Cr.Hrs. 3 (Formerly 156.727) Advanced study of selected topics in Women's Studies from an interdisciplinary perspective. The content of the course may vary from year to year and will be arranged by the coordinator of the Women's Studies Program in consultation with the appropriate representatives of departments. Interdisciplinary analysis of contemporary issues, debates and theories in Women's Studies. Topics will vary from year to year and may include, for example, gender theory, sexualities, or feminist pedagogy. **Prerequisite:** consent of the Women's Studies coordinator and course instructor.

Section 41: Interior Design

For information regarding programs offered by the following units:

Architecture

City Planning

Design and Planning Ph.D.

Landscape Architecture

Please see the table of contents for page numbers.

Head and Graduate Chair: Beecher, Mary Anne

General Office: 201 Russell Building

Telephone: (204) 474 9458

Fax: (204) 474 7532

E-mail: interiordesign@umanitoba.ca

Website: umanitoba.ca/interiordesign

Academic Staff

Dean Emeritus

Cox, Michael, B.I.D. (Manitoba), M.Ed. (Toronto), P.I.D.I.M., I.D.C., I.D.E.C.

Professor Emeritus

Harland, J., B.Arch. (Manitoba), M.A. (Columbia), F.P.I.D.I.M., F.I.D.E.C.

Associate Professors

Beecher, Mary Anne, B.A., M.A. (Iowa State University, Ames Iowa), M.A., Ph.D. (University of Iowa, Iowa City), I.D.E.C., P.I.D.I.M., VAF; **Chalmers,** L., Dip.Int.Des. (Royal Melbourne), M.Des., (South Australia) P.I.D.I.M., I.D.C., I.D.E.C.; **Karpan,** C., B.I.D., M.Ed., Ph.D. (Manitoba); **Maruca,** N.E., B.I.D. (Manitoba), P.I.D.I.M., I.D.C., A.C.I.D..

Assistant Professors

Beaverford, K. B.I.D. (Manitoba), M. Arch. (Calgary); **Close,** S., B.F.A. (Saskatchewan), M.A. (Carleton), Ph.D. (Amsterdam); **Mallory-Hill,** S. B.E.S., M.Arch. (Manitoba), Ph.D. (Eindhoven) LEED A.P.; **Roshk,** T., B.Sc. (Middle East Tech.), B.I.D., M.Sc. (Manitoba), N.I.C.D.Q., LEED[®] A.P., P.I.D.I.M., I.D.C.

Adjunct Professors

Isaac, K., B.I.D., M.I.D. (Manitoba), N.C.I.D.Q. Cert.

Program Information

The Department of Interior Design at the University of Manitoba has a long-established reputation for excellence and leads Canada in the development of the first Master of Interior Design program.

The Department is part of the Faculty of Architecture, along with professional Masters-level programs in Landscape Architecture, City Planning and Architecture.

The Department offers two streams within the Master of Interior Design:

- The First-professional program is directed towards those interested in pursuing a career in Interior Design practice. The program emphasizes the creation of human-centred and context-based design solutions that respond to the needs of contemporary life. The course of studies consists of the design studio and support courses that develop the methods, processes, technical and theoretical foundations of Interior Design. There are opportunities for international and cross-cultural study through exchange programs and intercession studios. The program requires a minimum of two full years of study to complete.

- The Post-professional program is directed to those who already hold a First-professional qualification in Interior Design. The program has a research orientation and is intended to further the knowledge base in specific

areas of the discipline. The program requires a minimum of one and one half years of full-time study to complete.

The First-professional program is accredited by the Council for Interior Design Accreditation. Graduates normally proceed to certification from the National Council of Interior Design Qualification (N.C.I.D.Q.) and membership in a professional Interior Design association. Master of Interior Design graduates are qualified to work nationally and internationally at the forefront of their profession, with a skill-set that includes strategic thinking, entrepreneurship, a research orientation and an ethical and environmentally responsible frame of reference

Research expertise and individual interests of the faculty include the following: Workplace environments, universal design, lighting and colour, aesthetics and ethical theory, design education and profession-based research.

Facilities

The Faculty of Architecture is housed in two main buildings on the Fort Garry campus- the John A. Russell Architecture Building (JAR) and the Architecture 2 Building.

The Architecture and Fine Arts Library serves both the Faculty of Architecture and the School of Art. The library contains an extensive collection of books, journals, periodicals, maps and plans and videos and slides. The Product Catalogue Collection provides current product information on interior and architectural materials. The Faculty of Architecture has two open area computer labs (CADlab) along with a new media research area. A fully staffed and equipped Woodshop and assembly room is available for student and faculty use.

Admission

All applicants must meet the general admission and entrance requirements of the Faculty of Graduate Studies found in this calendar.

First-Professional Masters Program:

Applicants with the undergraduate degree in Environmental Design (Interior Environment Option) from the Faculty of Architecture are eligible for direct admission. Applicants with degrees in other fields of study are assessed on a case-by-case basis and may be eligible for admission to a Pre-masters program of study, lasting 2-3 terms.

Post-Professional Masters Program:

A first-professional degree in Interior Design is required for admission.

Application Deadlines:

Applicants from outside Canada and the United States: December 1

Canadian citizens and American citizens: January 15

For further information contact the Graduate Student Advisor, Department of Interior Design.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. The Department offers two streams within the Master of Interior Design:

Post-Professional Stream

IDES 7050	Graduate Seminar	3
IDES 7170	Design Research Methods	3
IDES 7180	Theory Seminar 1	3
IDES 7190	Theory Seminar 2	3
	Electives	9

Total 21 Credit Hours 21

Professional Stream

IDES 7050	Graduate Seminar	3
IDES 7170	Design Research Methods	3
IDES 7180	Theory Seminar 1	3
IDES 7190	Theory Seminar 2	3
IDES 7200	Masters Studio 1	6
IDES 7210	Masters Studio 2	6
IDES 7220	Masters Studio 3	6
IDES 7230	Sensory Technology 4	3
IDES 7240	Sensory Technology 5	3
IDES 7250	Professionalism and Practice	3
IDES 7260	The Business of Interior Design	3
	Electives	6

Total 48 Credit Hours 48

Second language reading requirement: none

Expected time to graduation: Post-Professional Stream, 1.5 years; Professional Stream, 2 years.

Ph.D.

A Ph.D. in Design and Planning is offered.

Course Descriptions

Courses required by all students in the Master of Interior Design program:

IDES 7050 Graduate Seminar Cr.Hrs.3 The seminar will include discussion of pertinent research and writing on topics under study in theses/practica. Guest lecturers appropriate to the topics under discussion will be included. Students will finalize their theses/practica topics and their appropriate research design.

IDES 7170 Design Research Methods Cr.Hrs.3 Building on EVIE 3640 (or 079.364) Design Inquiry, this course addresses the role of quantitative and qualitative research methods in interior design. The subject will address the principles of quantitative and qualitative research methodologies; focusing on the relationship between research and interior design. Specifically identifying gaps in existing research; critical analysis and interpretation of existing research; representation of research intentions, methodologies, and results.

IDES 7180 Theory Seminar 1 - Contemporary Issues in Design Cr.Hrs.3 A theoretical exploration of contemporary design issues as they apply to Interior Design. Theory Seminar 1 introduces and supports the strategic interventions of the design studio. Historical precedent in relation to human activity, sensory stimulus, technological and social change, ecological awareness, and aesthetic judgment will form the context for discussion and debate.

Section 42: Kinesiology and Recreation Management

Dean: E. Jane Watkinson

Graduate Program Chair: Michelle Porter

Graduate Program Assistant: Janis McGonigle

Graduate Office: 307 Max Bell Centre

Telephone: (204) 474 7493

Fax: (204) 261 4802

Email: kinrecgrad@umanitoba.ca

Website: umanitoba.ca/faculties/kinrec/grad_programs

Academic Staff

Professor Emeritus

Hrenchuk, E., B.P.H.E. (Toronto), M.A. (Minnesota).

Director Emeritus

MacDiarmid, J.A., B.P.E. (Manitoba), M.P.E. (Minnesota).

Professors

Alexander, M.J.L., B.P.E. (UBC), M.Sc. (Washington), Ph.D. (Alberta); Campbell, M., B.A., M.A. (Manitoba), Ph.D. (Waterloo); Gardiner, P.F., B.P.H.E., M.P.E. (Windsor), Ph.D. (Alberta); Giesbrecht, G., B.P.E., M.P.E., Ph.D. (Manitoba); Halas, J., B.P.E. (Manitoba), M.Sc. (Ottawa), Ph.D. (Alberta); Hrycaiko, D.W., B.P.E., Cert.Ed. (Manitoba), M.P.E., Ph.D. (Alberta); MacKay, K., B.A. (Acadia), M.Sc. (Texas A and M), Ph.D. (Illinois); Mactavish, J., B.P.E. (UBC), M.Sc. (Manitoba), Ph.D. (Minnesota); Porter, M.M., B.P.H.E. (Laurentian), M.Sc. (Toronto); Ph.D. (Western Ontario);

IDES 7190 Theory Seminar 2 - Critical Perspectives Cr.Hrs.3 An examination of theoretical and philosophical approaches to design. Examines the practice of interior design through a variety of critical and historical perspectives. Different modes of thought and manners of questioning will be used to debate issues which may include gender, ethics, diversity, materiality, technology & representation, and changing spatial typologies.

Courses required by Master of Interior Design professional stream students:

IDES 7200 Masters Studio 1 - Strategic Issues Cr.Hrs.6 Master Studio 1 focuses on developing strategic approaches to design, which address complex contextual issues and adaptive reuse of large-scale public space. Studio explorations responding to a range of complex contextual design issues. The studio focuses on methods of strategic analysis such as mapping and scenario planning to inform the configuration and resolution of new interior spatial forms. Large scale public space and the changing nature of contemporary culture will form the basis for the design projects.

IDES 7210 Masters Studio 2 - Events and Making Cr.Hrs.6 Master Studio 2 is focused on the Event: exploring the nature of temporary inhabitation through the creation of a unique place/installation as the site for cultural/community celebration. Design/build studio explorations focussed upon issues of temporality, technology, and design intention. Small-scale public places and cultural context will form the basis for design studio projects.

IDES 7220 Masters Studio 3 Cr.Hrs.6 Focuses on the creation of specialized interior environments informed by traditional and emerging forms of research. Research into Practice: a research-focused, problem based, studio bridging Studio 3 will examine specialized interior professional design issues and diverse research sources. Master projects in areas such as: work environments, healthcare, education or hospitality, through precedent and research. The studio may be run as a collaborative program and may be delivered as an International studio experience.

IDES 7230 Sensory Technology 4 Cr.Hrs.3 Examination of the influences and effects of emerging communication systems and building technologies; building and furniture systems; in the context of human well being and environmental concerns. The study of the design consequences and environmental impact of interior services and systems; communication technologies; building regulations, codes and infrastructure; detailing and specification of projects drawn from design studio.

IDES 7240 Sensory Technology 5 Cr.Hrs.3 A self-directed exploration of new and/or divergent technologies, with significance to the design of interior environments. Students will propose a self-directed design or research project, nominating a full time staff advisor; for the subject instructors' approval. The proposal will clearly establish learning objectives and outcomes, and assessment criteria.

IDES 7250 Professionalism and Practice Cr.Hrs.3 Introduction to the profession and practice of Interior Design; types of practice; regulating bodies; education; career development; professional and social responsibilities; examination and critique of practice, projects and design issues.

IDES 7260 The Business of Interior Design Cr.Hrs.3 (not offered this year) Management principles, administration, communication strategies and practice structures in the design process; development of skills in communication and procedures. The interior design business environment; ethics, responsibilities; related industries; job search techniques.

Ready, A.E., B.A. (Hons.), M.A. (Western Ontario), Ph.D. (Alberta); Watkinson, E.J., B.P.E., B.A. (McMaster), M.A. (Western Ontario), Ph.D. (Michigan).

Associate Professors

Butcher, J., B.P.E., Cert. Ed. (Manitoba), M.Sc. (Dalhousie), Ph.D. (Alberta).

Assistant Professors

Duhamel, T., B.Sc., M.Sc., Ph.D. (Waterloo); Field, R., B.A, M.B.A. (Queen's), M.A., Ph.D. (Toronto); Strachan, L., B.P.E., B.Ed. (Manitoba), M.He. (Windsor), Ph.D. (Queen's); Teetzel, S., B.Sc., M.A., Ph.D. (Western Ontario); Van Winkle, C.M., B.R.S., M.A. (Manitoba), Ph.D. (Clemson).

Adjunct Professors

Gregg, M. B.P.E., M.Sc. (Manitoba), Ph.D. (Western Ontario); Heine, M., Staatsexamen (Ruhr-Universität Bochum, Germany), M.A. (Western Ontario), Ph.D. (Alberta); Kerr, R., B.Sc., Ph.D. (Oregon), Cert.Ed. (Exeter), Dip.P.E. (Saint Luke's College); McGavock, J., B.P.E. (Manitoba), M.A. (McGill), Ph.D. (Alberta).

M.Sc. (Kinesiology)

Fields of Research

The Master of Science provides advanced education and research training in kinesiology, physical education, health, and human performance.

Research Facilities

Resources and supports for M.Sc. related research are jointly provided by the Faculty of Kinesiology and Recreation Management (FKRM) and the Health, Leisure and Human Performance Research Institute (HLHPRI).

Admission

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. In addition, students require:

The completion of a four-year BKIN/BPE degree (or equivalent).

or

Completion of a four-year undergraduate degree other than a BKIN/BPE (or equivalent), with a suitable academic background in the area of study.

or

Completion of the Pre-Master's program. Please visit the website listed above for details.

Application Deadlines

Students seeking fall (September) admission should submit their applications, with complete supporting documentation, directly to the Faculty of Graduate Studies by February 1. Applications received after this deadline will be considered on a case-by-case basis. Applications from students interested in commencing their program in January or May will also be considered on a case-by-case basis. Please contact the FKRM Graduate Program Office for further information.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar.

Students must:

- Complete a minimum of 12 credit hours of course work approved by the faculty advisor. Of these 12 credit hours, a minimum of nine credit hours must be at or above the 7000 level; six credit hours must be selected from the graduate course offerings in Kinesiology of which PERS 7000 Research in Kinesiology and Recreation Studies (3) is compulsory; and
- Enter the program with, or complete as part of the approved program of study, a minimum of six credit hours in research methods and/or statistics. The required course, PERS 7000 Research in Kinesiology and Recreation Studies, may be considered for credit towards this requirement.

In addition to course work requirements, a student must engage in research and scholarship leading to the completion of a thesis, and attend a minimum of eight research seminars sponsored by the Health, Leisure and Human Performance Research Institute within the first two years of their program. NOTE: Seminar attendance is a supplementary regulation.

Second language reading requirement: None

Expected time to graduate: Two years

M.A. in Recreation Studies

Fields of Research

The Master of Arts in Recreation Studies provides a diverse range of advanced education and research training in recreation and leisure studies.

Research Facilities

Resources and supports for M.A. related research are jointly provided by the Faculty of Kinesiology and Recreation Management and the Health, Leisure and Human Performance Research Institute.

Admission

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. In addition, students require:

Completion of a four-year B.R.M.C.D. degree (or equivalent)

or

Completion of a four-year undergraduate degree other than a B.R.M.C.D. (or equivalent), with a suitable academic background in the area of study.

or

Completion of the Pre-Master's program. Please visit the website listed above for details.

Application Deadlines

Students seeking fall (September) admission should submit their applications, with complete supporting documentation, directly to the Faculty of Graduate Studies by February 1. Applications received after this deadline will be considered on a case-by-case basis. Applications from students interested in commencing their programs in January or May will also be considered on a case-by-case basis. Please contact the FKRM Graduate Program Office for further information.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar.

Students must:

- Complete a minimum of 12 credit hours of course work approved by the faculty advisor. Of these 12 credit hours, nine credit hours must be taken from the 7000 level course offerings in Recreation Studies with REC 7010 Leisure and Recreation: Concepts and Theory (3) and PERS 7000 Research in Kinesiology and Recreation Studies (3) being compulsory; and,
- Enter the program with, or complete as part of the approved program of study, a minimum of six credit hours in research methods and/or statistics. The required course, PERS 7000 Research in Kinesiology and Recreation Studies, may be considered for credit towards this requirement.

In addition to the course work requirements, a student must engage in research and scholarship leading to the completion of a thesis, and attend a minimum of eight research seminars sponsored by the Health, Leisure and Human Performance Research Institute within the first two years of their program. NOTE: Seminar attendance is a supplementary regulation.

Second language reading requirement: None

Expected time to graduate: Two years

Ph.D. in Applied Health Sciences

The Faculty of Kinesiology and Recreation Management, along with the Faculty of Nursing, Faculty of Human Ecology, and School of Medical Rehabilitation, offers a multi-unit Ph.D. in Applied Health Sciences. Information on this program may be found in another section of this calendar.

Course Descriptions

PERS 7000 Research in Kinesiology and Recreation Studies Cr.Hrs.3 Concepts and issues in designing, implementing, and disseminating research in areas broadly related to kinesiology and leisure. It is recommended that students complete this compulsory course within their first year of enrolment in the Master's program.

PERS 7002 Community Development: Qualitative Methods Cr.Hrs.3 Students will be introduced to the traditions in the qualitative field, explore the theoretical foundations that underpin qualitative inquiries, and develop their capacity to think critically about ethical issues involved in the research process (e.g. working with marginalized groups and conducting community-based research).

PERS 7004 Current Research in Physical Activity, Health and Leisure: Physical Aspects Cr.Hrs.3 This course will include the presentation of research evidence-based current thought on physical activity, health and leisure. *Prerequisites:* courses in anatomy, physiology/exercise physiology, and biomechanics, or permission of course coordinator.

PHED 7050 Motor Development and Characteristics of Atypical Children Cr.Hrs.3 Motor development and motor characteristics of various groups of atypical children. Program design and activity prescription for atypical children. *Prerequisite:* PHED 3390 or 057.339.

PHED 7060 Social and Psychological Components of Sports and Physical Education Cr.Hrs.3 The socio-psychological components of movement and the role of physical activity in the socio-psychological development of children. *Prerequisite:* PHED 3460 or 057.346 plus consent of instructor.

PHED 7080 Individual Study in Selected Area Cr.Hrs.3 Provides opportunities for in-depth individualized study within a specific area of interest. Can be completed twice (different topic) for a maximum of 6 credits.

PHED 7100 Developmental Human Kinetics Cr.Hrs.3 The development of human movement from conception to adulthood with particular reference to the effects of development on activity and the effects of activity on development. *Prerequisites:* PHED 2550 or 057.255 plus additional 3 credit hours of approved coursework in human development.

PHED 7110 Biomechanical Analysis of Movement Cr.Hrs.3 The theory and techniques of biomechanical analysis of movement and application of the techniques to movement analysis. *Prerequisites:* PHED 4360 or 057.436.

PHED 7120 Sociological Perspectives of Children's Physical Activity Cr.Hrs.3 Sociological factors which influence children's physical activity. *Prerequisite:* PHED 3460 or 057.346 plus consent of instructor.

PHED 7130 Anatomical Biomechanics Cr.Hrs.3 A study of the biomechanical aspects of muscle and joint forces during human movements as they relate to the mechanics of athletic injuries and injury prevention. *Prerequisite:* PHED 3060 or 057.306 plus consent of instructor.

PHED 7140 Mechanisms of Athletic Injuries Cr.Hrs.3 The study and analysis of the causes and mechanisms of injuries in sports and exercise situations, including methods of prevention and rehabilitation. *Prerequisite:* PHED 7130 or 057.713.

PHED 7150 Current Topics in Exercise Physiology Cr.Hrs.3 Current research pertaining to factors that affect exercise performance, as well as the physiological adaptations which occur with acute and chronic exercise. *Prerequisite:* PHED 4410 or 057.441. May not be held for credit with former 57.703.

PHED 7160 Special Topics Cr.Hrs.3 The study of the contemporary research and theory in a selected area. Topics will vary, depending on faculty expertise and student need.

REC 7010 Leisure and Recreation: Concepts and Theories Cr.Hrs.3 Critical analysis of the dominant concepts, theories, and research associated with the development of basic and applied knowledge in recreation and leisure studies. *Prerequisite:* instructor's permission.

REC 7030 Issues in Leisure and Recreation Management Cr.Hrs.3 Current trends and issues in the management of leisure and recreation resources and services. *Prerequisite:* instructor's permission.

REC 7040 Issues in Leisure for Persons with Disabilities Cr.Hrs.3 Contemporary issues and research in recreation and leisure services for individuals with disabilities across the lifespan. *Prerequisite:* instructor's permission.

REC 7050 Issues in Outdoor Recreation Cr.Hrs.3 Current trends and research related to the social and physical implications of leisure behaviour in the natural environment. *Prerequisite:* instructor's permission.

REC 7060 Issues in Tourism Cr.Hrs.3 Contemporary issues and research related to travel behaviour and sustainable tourism. *Prerequisite:* instructor's permission.

REC 7070 Leisure Across the Lifespan Cr.Hrs.3 Dominant concepts, theories, and research associated with the study of recreation and leisure across the lifespan. *Prerequisite:* instructor's permission.

REC 7080 Directed Study in Recreation and Leisure Studies Cr.Hrs.3 This course, which can be completed twice for a maximum of 6 credits, provides opportunities for in-depth individualized study within a specific area of interest.

REC 7090 Special Topics in Recreation and Leisure Studies Cr.Hrs.3 Contemporary research and theory in selected areas of recreation and leisure studies, the topics addressed in this course will vary depending on faculty expertise and student need. *Prerequisite:* instructor's permission.

Section 43: Landscape Architecture

For information regarding programs offered by the following units:

Architecture
City Planning
Design and Planning Ph.D.
Interior Design

Please see the table of contents for page numbers.

Head and Graduate Chair: Ted McLachlan

General Office: 201 Russell Building

Telephone: (204) 474 9458

Fax: (204) 474 7532

E-mail: landscapearch@umanitoba.ca

Website: umanitoba.ca/landscapearchitecture

Academic Staff

Professor Emeritus

Rattray, Alexander E., B.Arch. (Man.), M.Land.Arch. (Penn.), A.S.I.A., F.C.S.L.A., M.A.L.A.; **Thomsen**, C.H., B.F.A. in Land.Arch. (Illinois), M.Regional Planning (Pennsylvania), F.C.S.L.A.

Professors

McLachlan, E.B., B.E.S., M.Land.Arch. (Manitoba), F.C.S.L.A.; **Tate**, A., B.A.(Hons.), Dip.L.D. (Manchester), C.S.L.A., P.P.L.I.

Associate Professors

Eaton M., B.E.S. (Manitoba), Ph.D. (Edinburgh Coll. of Art, Heriot Watt); **Perron**, R. P., B.Sc., M.N.R.M. (Manitoba), Ph.D. (Victoria);

Assistant Professors

Brown, B., B.F.A.(HighHons.)(Virginia Commonwealth), M.A., M.F.A. (U. of Iowa), M.L.A. (Urbana-Champaign@ U. of Illinois); **Straub**, D., Dipl.-Ing. Univ. Landschaftsarchitekt and Stadtplaner (TU Munich), M.A.L.A.; **Trottier**, J., B.Land.Arch. (Montréal), M.Urban Planning (McGill); **Thurmayr**, A., Dipl.-Ing. Univ. Landschaftsarchitektin (TU Munich), M.A.L.A.; **Wilson Baptist**, K., B.F.A.(Hons.), M.E.D. (Manitoba).

Adjunct Professors

Cram, H., C.S.L.A.;

Part-time Staff

Lucas, D., B.F.A.(Hons.), B.F.A. (Manitoba), M.F.A. (Victoria)

Program Information

The Department of Landscape Architecture is in the process of introducing a new curriculum structure. Subject to Senate approval it is anticipated that this new structure will be in place for 2011-2012.

The program leading to the Master of Landscape Architecture degree at the University of Manitoba was the first graduate program in Canada. It is accredited by the Canadian Society of Landscape Architects, and the Depart-

ment is a member in good standing of the international Council of Educators in Landscape Architecture. Approximately 55-65 full-time students are enrolled in the program, representing all regions of Canada and other countries of the world.

Study is directed towards the analysis, planning and design of exterior spaces, both urban and rural. The program emphasizes the development and testing of physical forms intended to positively affect the quality of the designed environment; forms which are responsive to societal needs, while remaining expressive of the physiographic conditions associated with specific geographic locations.

The general objectives of the program are:

- the articulation of a theoretical basis for the design of the built environment
- the development of a practical design methodology
- the exploration of societal, technical and natural processes as form determinants
- regional resources analysis and activity allocation
- the investigation of issues associated with landscape architectural practice.

At all levels, the Department attempts to provide a sense of need and purpose for each student, through the investigation of contemporary urban and rural environmental problems from micro to regional scales.

Fields of Research

Faculty in the Department have a variety of research interests including: perception of the prairie landscape; landscape and infrastructure; the rural landscape; design and urban environments; the social and cultural landscape; cultural theory and design; design philosophy; design education; urban design; community design using ecological principles; the use of native plants in design; children's play environments; and public parks and urban space.

Research Facilities

The Faculty of Architecture has an excellent library, a slide library, a products catalogue library, a workshop, and a comprehensive CADLAB. The Department uses the Delta Marsh and Star Lake Field Stations for field ecology work.

Master of Landscape Architecture (M.Land.Arch.)

Admission

Candidates for the Master's degree in Landscape Architecture must normally possess, at the time of their registration, the degree of Bachelor of Environmental Design or another equivalent design degree.

Where the candidate has a non-design Bachelor or Master's degree they will be required to satisfy additional design, theory, history or technical course requirements prior to entry into the Master's program. Advance standing may be given to candidates whose prior training and experience are judged by the department to warrant such placement.

The Department of Landscape Architecture has additional application requirements. Contact the department for details.

Application Deadlines

The application deadline for September start is December 1 for all International applicants and January 15 for all Canadian/US applicants.

Applications received after January 15 will be considered if places are still available, but early application is strongly recommended.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar.

Degree Requirements: 54 credit hours

Second language reading requirement: none

Expected time to graduation: 2 years.

Course Descriptions

LARC 6120 Process and Form Cr.Hrs.3 (not offered this year) An investigation of the relationship between processes and physical form in natural and cultural environments.

LARC 6140 Principles of Site Planning Cr.Hrs.3 (not offered this year) An investigation of the relationship between natural and cultural processes and the landscape, with particular emphasis on the plains environment of Western Canada.

LARC 6150 Landscape Architecture Communication Cr.Hrs.3 The objectives of this course are to promote an awareness of the diversity of graphic expression and to encourage experimentation. Students are given the opportunity to practice drawing and graphic communication skills and techniques through studio exercises.

LARC 6152 Computer Aided Design in Landscape Architecture Cr.Hrs.3 This course provides an introduction to principles of computer aided design and computer graphics from a landscape architect's perspective. The course includes introductory computer applications, CAD and other design related software.

LARC 6160 Landscape Architecture Studio 1 Cr.Hrs.6 The study of structure and order in nature and in the built environment. Investigation into structuring space by design through the principles and elements of composition.

LARC 6170 Landscape Architecture Studio 2 Cr.Hrs.6 An introduction to the design of environments which are responsive to human need and expressive of physiographic conditions. The studio serves as a forum for the synthesis of academic coursework, and provides opportunities for the investigation of urban and regional problems associated with our northern continental environment.

LARC 6180 Landscape Architecture Studio 3 Cr.Hrs.6 (not offered this year) Exploration of analytical, conceptual, and developmental aspects of landscape design in

the experimental studio setting.

LARC 7120 Special Topics in Landscape Architecture Cr.Hrs.3 An assignment and conference course. A detailed study of some special topics in landscape architecture, including environmental sustainability, urban landscape technology, and housing form.

LARC 7130 Geographic Information Systems Cr.Hrs.3 The theory and application of GIS technology in the planning of urban and regional landscapes.

LARC 7160 Landscape Architectural Field Ecology Cr.Hrs.3 Field study of plant taxonomy and ecology. Approximately two weeks duration immediately prior to the beginning of fall term. For Landscape Architecture students or with consent of department head.

LARC 7170 Landscape Ecology in Design 1 Cr.Hrs.3 (not offered this year) The course complements LARC 7160 (or 031.716) Landscape Architectural Field Ecology and expands on the concepts of communities, ecosystems, and biomes and the interactions of organisms with each other and non-living components in the environment. For Landscape Architecture students or with consent of department head.

LARC 7180 Landscape Architecture Studio 6 Cr.Hrs.6 (not offered this year) Studies of the transformation of complex design problems from theoretical constructs into physical form. Context will focus on problem domains with the regions and/or town-landscape domains, in either a Canadian or foreign environment.

LARC 7190 Landscape Architecture Studio 4 Cr.Hrs.6 The study of design applications of highly complex problem domains of both the urban and rural landscape.

LARC 7200 Landscape Architecture Studio 5 Cr.Hrs.6 The examination of theories and their contemporary applications to regional scale landscapes with emphasis on environmental problem domains associated with land planning and design.

LARC 7210 Landscape Architecture Studio 7 Cr.Hrs.6 Advanced investigation of physical form within the context of urban and regional problem domains.

LARC 7220 Historic Landscape Preservation Cr.Hrs.3 (not offered this year) An investigation of strategies and techniques appropriate for the research, analysis, interpretation, and preservation of the cultural landscape.

LARC 7230 Professional Practice Cr.Hrs.3 A survey of the responsibilities of the professional in practice. The study includes examination of issues in professional ethics, office structure/organization, contract administration, and the scope and standards of current practice in Manitoba and in Canada.

LARC 7240 Research Methods in Landscape Architecture Cr.Hrs.3 This is a lecture-seminar course designed to structure and support preparation of a thesis or practicum proposal. The focus will be upon critical review of the literature and formulation of research methods appropriate to the securing, analysis, and interpretation of research in Landscape Architecture.

LARC 7250 Landscape Architecture Theory Cr.Hrs.3 Investigation of the theoretical foundations of landscape architecture in order to understand the complex nature of its practice, to identify its disciplinary boundaries, understand its multidisciplinary nature and to investigate assumptions and myths that permeate its limited discourse.

LARC 7260 Landscape Architecture since 1900 Cr.Hrs.3 (not offered this year) A study of significant works of landscape architecture since 1900, including those of Canada, within the context of cultural and ideological change over the period. *Prerequisite:* EVLA 3180 (or 079.318) or equivalent.

LARC 7270 Landscape Architecture Construction Cr.Hrs.3 A comprehensive introduction materials, methods and processes for Landscape Architecture projects. Looks at regulatory issues of human safety and techniques for communicating construction proposals and how this information is incorporated into contracts. *Prerequisite:* EVDS 1690 (or 079.169).

Section 44: Law

Dean: Axworthy, C., LL.B. (London), LL.M. (McGill), Q.C.

Associate Dean (LL.B. Program): Turnbull, L.A., B.A., (Queen's), LL.B. (Ottawa), LL.M. and J.S.D. (Columbia).

Associate Dean (Research and Graduate Studies): Schulz, J.L., B.A. (Gold Medal) and LL.B. (Manitoba), M.Phil. (Cambridge), S.J.D. (Toronto).

General Office: 303 Robson Hall

Telephone: (204) 474 6130

Fax: (204) 474 7580

Email: lawgrad@ms.umanitoba.ca

Website: umanitoba.ca/law

Academic Staff

Senior Scholars

Braid, E.A., LL.B. C.M., Q.C., (Manitoba), LL.M. (London).

Senior Scholar and Professor Emeritus

Harvey, D.A.C., Q.C., B.A. (Toronto), LL.B., LL.M. (Osgoode).

Secter, H.L., B.Comm., LL.B. (Manitoba), LL.M. (Harvard), LL.D. (Hon., Winnipeg).

Professors

Busby, K., LL.B. (Manitoba), LL.M. (Columbia); Deutscher, D.B., B.A., LL.B. (Manitoba), LL.M. (Harvard); Guth, D.J., B.A. (Marquette), M.A. (Creighton), B.A. Status (Clare College, Cambridge), Ph.D. (Pittsburgh); Irvine, J.C., B.A., M.A., B.C.L. (Oxford); McGillivray, A., B.A., LL.B. (Saskatchewan), LL.M. (Toronto); Osborne, P.H., LL.B.(Hons.) (Auckland), LL.M. (McGill); Penner, R., Q.C., B.A., LL.B. (Manitoba); Schwartz, B.P., LL.B. (Queen's), LL.M., J.S.D. (Yale).

Associate Professors

Gallant, M.M., B.A. (Prince Edward Island), LL.B. (New Brunswick), LL.M. (UBC), Ph.D. (London); MacPherson, D.L., LL.B. (Dalhousie); LL.M. (Cambridge); Parkes, D., B.A. (Trinity Western), LL.B. (U.B.C.), LL.M. (Columbia); Turnbull, L.A., B.A., (Queen's), LL.B. (Ottawa), LL.M. and J.S.D. (Columbia)

Assistant Professors

Asper, D.A., B.A. (Manitoba), J.D. (California Western), LL.M. (Toronto); Gunn, B., B.A., LL.M. (Arizona); Heckman, G.P., B.A., Sc. (Laval), M.A. Sc. (Waterloo), LL.B. (Toronto), LL.M. (Queen's), Ph.D. (Osgoode); Milward, D.L., B.A. (Calgary), LL.B., LL.M. (Alberta), Ph.D. (U.B.C.); Oshionebo, E.A., LL.B. (Ife, Nigeria), LL.M. (Lagos, Nigeria), LL.M. (Alberta), Ph.D. (Os-

goode); Schulz, J.L., B.A. (Gold Medal) and LL.B. (Manitoba), M. Phil. (Cambridge), S.J.D. (Toronto); Shariff, M.J., B.Sc. (Winnipeg); LL.B. (Manitoba); LL.M. (Dublin); Short, D., B.A. (Toronto), M.F.A. (York), J.D. (U.B.C.), Ph.D. (Osgoode).

Adjunct Professor

Pozios, J., B.A. (Hons., Western Ontario); LL.B. (Manitoba); M.B.A. (Toronto); NASD Series 7 and Series 63.

Program Information

The Faculty offers a structured and personal LL.M. experience designed for successful completion within one calendar year, beginning in September. In addition to course work, the student must complete a thesis of 90 to 120 pages. Each student is assigned a faculty advisor with expertise in the chosen area of study, who will direct thesis research and design and assist the student in course selection. Each student is also assigned an external reader who will review and evaluate the thesis. Early and regular contact with the advisor is advised.

In the first term, the student will complete a required seminar course entitled Legal Research and Theory. The seminar's focus on various theoretical approaches to legal scholarship and alternative approaches to legal study, legal research, and writing is designed to assist the student in approaching the thesis work, provide unity to the program, and facilitate the collegial exchange of ideas. The seminar is a privileged forum in which the student can discuss his or her research and legal experience. In addition to the graduate seminar course, the student will successfully complete a minimum of two courses, to be taken in either term, and selected with the approval of the advisor. One course may be taken in a faculty other than Law. The student will also take part in academic seminars and functions.

The Master of Laws degree enhances career prospects. This is evidenced by the fact that our international and Canadian graduates have secured positions in academia, international corporations, legal practice, and highly competitive doctoral programs.

Fields of Research

The Faculty of Law has many research interests and strengths. In addition to basic areas of common law — property, contract, tort, criminal, constitutional, evidence, administrative, tax, and family — faculty expertise includes Aboriginal law, ADR, administrative law, Charter, children and the law, corporate/commercial, legal history, human rights, intellectual property, international law, international trade, law and literature, law and film, money laundering, and prisoners' rights. The Faculty is home to the Asper Chair in International Business and Trade Law; the Marcel A. Desautels Centre for Private Enterprise and the Law; and the Centre for Human Rights Research.

Research Facilities

The E.K. Williams Law Library offers full time support and facilities for research, including state-of-the-art computer access. Graduate students have their own dedicated graduate research room, with individual desks, storage, and a private lounge. (International students should bring with them country-specific materials including statutes, codes, judgments and reference books needed for their thesis research).

Winnipeg is home to archival collections of materials relevant to legal studies. Collections include the Provincial Archives of Manitoba and its Government Records Centre, the Manitoba Legal-Judicial Archives, and the Legislative Library. The Provincial Archives house the Hudson's Bay Company Archive, which contains millions of mainly pre-1900 documents. This is a unique and important resource for law and society studies related to the fur trade, the Hudson's Bay Company, First Nations, Métis and Inuit cultures, and Canadian and English legal history.

Master of Laws (LL.M.)

Admission

In addition to the requirements of the Faculty of Graduate Studies set out in the Graduate Studies Regulations Section of this Calendar, candidates must show that they are equipped intellectually to engage in advanced legal study and research. The Faculty of Law anticipates that the prospective LL.M. student will have earned the LL.B. or equivalent degree in law with a first or high upper second (A or B+) standing. Applicants ordinarily hold a common law or Canadian civil law degree but applications from those whose legal education has been in another legal system will be given full consideration.

Please see our website: umanitoba.ca/law/newsite/research.php or contact the Faculty of Law at: lawgrad@ms.umanitoba.ca for additional information and application procedures.

Applicants from non-English speaking countries must have an English language proficiency of 600-plus TOEFL score and may be required by the Faculty of Law to demonstrate proficiency based on other tests accepted by the Faculty of Graduate Studies. Some international students have arrived six to twelve months in advance of applying for admission to the LL.M. program in order to enrol in English as a Second Language courses at the University of Manitoba.

The Faculty of Law offers the Dickson, Freedman, Kristjansson, Sgayias, Asper, and Desautels Graduate Fellowships. In partnership with the Faculty of Graduate Studies, the Faculty of Law may make additional awards. Applicants may wish to research other educational funding opportunities including support from the legal profession and awards, scholarships, and bursaries available from or tenable at the University of Manitoba. Canadian embassies offer basic information services and should be contacted early. Similarly, visa applications should be made early. Criteria for admission, awards and fellowships are found on the Graduate Studies and Law web sites.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students must attend the university full-time for a minimum of one academic year (normally September to May). Students are expected to complete the LL.M. program in one calendar year (normally, September to August for October convocation), although two years is permitted. Students must complete a satisfactory thesis on a subject approved by the advisor, to be submitted not later than eight weeks before the anticipated date of graduation. The student must successfully complete two courses in addition to the graduate Legal Research and Theory course. Courses will be chosen in consultation with the advisor.

Subjects of Graduate Study

A candidate's subject of study shall be approved by the Graduate Studies Committee of the Faculty of Law. Thesis design, refinement and research will be supervised by a member of the Law Faculty/the student's advisor.

Second language reading requirement: none

Expected time to graduate: one year, although two years is permitted.

Ph.D./S.J.D.

The Faculty of Law does not offer a Ph.D./S.J.D. Program.

Course Descriptions

LAW 7110 Graduate Legal Research and Theory Cr.Hrs.2 (Formerly 045.711) Begins with visits to the Law Library and to the Provincial Archives of Manitoba, Government Records Centre, then epistemological problems are studied to define each student's research questions for the thesis; and thereafter weekly seminars explore doctrinal, interdisciplinary, comparative, and theoretical research perspectives (natural law to legal positivism, critical legal studies and post-modernism).

Section 45: Linguistics

Head: Terry Janzen

General Office: 534 Fletcher Argue Building

Telephone: (204) 474 9596

Fax: (204) 474 7671

E-mail: lingdpt@cc.umanitoba.ca

Website: umanitoba.ca/linguistics

Academic Staff

Distinguished Professor

Wolfort, H.C., (Albert-Ludwigs-Universität, Freiburg im Breisgau), M.A. (Yale), M.A. (Cornell), M.Phil., Ph.D. (Yale), F.R.S.C.

Senior Scholar

Wade, W.D., B.A., M.A., Ph.D. (Colorado).

Professor

Nahir, M., B.A. (Bar-Ilan), M.A., Ph.D. (Pittsburgh).

Associate Professors

Ghomeshi, J., B.A.(Hons.) (York), M.A., Ph.D. (Toronto); **Janzen**, T., B.Ed. (Saskatchewan), M.A. (Manitoba), Ph.D. (New Mexico); **MacDonald**, L.A., B.A. (Hons.) (Trent), M.A. (Calgary), Ph.D. (Manitoba); **Pentland**, D.H., B.A.(Hons.) (Manitoba), M.A., Ph.D. (Toronto); **Russell**, K., B.Sc. (Manitoba), M.A., Ph.D. (Southern California).

Assistant Professor

Hagiwara, R.E., B.A. (Washington), M.A., Ph.D. (UCLA); **Wilkinson**, E., B.A. (Wellesley College), M.A. (Gallaudet), Ph.D. (New Mexico).

Program Information

The Department of Linguistics offers individualized and flexible graduate programs leading to both the Master of Arts and the Doctor of Philosophy degrees. For students who want to pursue in-depth and especially field-based research on language, the University of Manitoba, which is situated in a linguistically diverse region, is an ideal location. The research programs of most past and current graduate students in the department involve original fieldwork, either with the local indigenous languages or in such places as China and the South Pacific.

Fields of Research

The department has research strengths in both formal and functional/typological approaches to the core areas of linguistics (phonetics, phonology, morphology, and syntax), as well as historical linguistics, language planning and policy, text-based analysis and computational linguistics. The department's research draws on a wide range of languages, such as Hebrew, Persian, Tauya and American Sign Language, and the department is also a world centre for the study of the Algonquian family of languages. In addition to journal articles and monographs, department members produce reference grammars, dictionaries, and text collections for local languages.

Research Facilities

In addition to professional audio recorders (analogue, DAT and solid-state) available for fieldwork, the department maintains the Experimental Linguistics Laboratory, which features an anechoic audio recording chamber, professional audio and video recording equipment, and workstations for editing and analysis of recorded data.

M.A. in Linguistics

Admission

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The M.A. program in linguistics is strongly research-oriented; admission decisions are, therefore, based only in part on the applicant's academic record; the department's resources and interests also play an important role. A four-year B.A. in linguistics is the normal preparation for the M.A. program. Students without such preparation may be required to complete the pre-Master's year first. The department has additional application procedures beyond those of the Faculty of Graduate Studies. Contact the Linguistics department for information.

Application Deadlines

The M.A. program in linguistics starts September 1. Other start dates are possible only under exceptional circumstances. The deadline for applications to be received in the Faculty of Graduate Studies from International students is January 15. For Canadian/U.S. students, applications should be submitted to the Faculty of Graduate Studies by March 15th.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The Master of Arts program in Linguistics requires 18 credit hours of coursework at the graduate level, including Field Methods (LING 7590), Phonology (LING 7550), and Syntax (LING 7630). The remaining courses (6 credit hours) may be taken in either linguistics or related disciplines, subject to

approval by the department's graduate committee. In certain cases the graduate committee may require the student to take additional courses. Students are encouraged to complete their coursework by the end of the first year of the program. M.A. candidates must demonstrate proficiency in a second language. In addition to coursework and the language reading requirement, students must complete and successfully defend a thesis.

Second Language Reading Requirement: Yes

Expected time to Graduation: Two years

Ph.D. in Linguistics

Admission

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The Ph.D. program in linguistics is strongly research-oriented; admission decisions are, therefore, based only in part on the applicant's academic record; the department's resources and interests also play an important role. Students with a Master's degree in linguistics from the University of Manitoba or with an equivalent degree from elsewhere may be admitted into the Ph.D. program. Students who have a Master's degree but lack the specific course background for admission to the Ph.D. program may be admitted into the M.A. program. After completion of the M.A. course requirements with an average of B+ such students may apply to transfer directly to the Ph.D. program without completing the M.A. The department has additional application procedures beyond those of the Faculty of Graduate Studies. Contact the Linguistics department for further information.

Application Deadlines

The Ph.D. program in linguistics starts September 1. Other start dates are possible only under exceptional circumstances. The deadline for applications to be received in the Faculty of Graduate Studies from International students is January 15. For Canadian/U.S. students, applications should be submitted to the Faculty of Graduate Studies by March 15th.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Ph.D. students will normally complete 18 credit hours coursework at the graduate level. Courses are to be chosen in consultation with the advisor and students are encouraged to complete them by the end of the first year of the program.

Candidacy Exams

Candidacy Exams are normally written in the second year of the Program. These exams consist of two original research papers of publishable quality in distinct areas of linguistics. Students must pass an oral exam based on each of the two papers.

Ph.D. candidates must demonstrate proficiency in a second language. This will at the same time satisfy the language reading requirement of the Faculty of Graduate Studies. Students who have satisfied this requirement at the M.A. level will be deemed to have met this requirement at the Ph.D. level.

Students must complete and successfully defend a dissertation. In preparation for this step, a written dissertation proposal must be presented and defended orally, normally in the third year.

Second language requirement: yes

Expected time to graduation: four years

Course Descriptions

LING 7500 Linguistic Variation and Change Cr.Hrs.3 (Formerly 126.750) Focuses on sources, causes and patterns of linguistic change, spread of changes and the resulting relationships among languages.

LING 7510 Linguistic Typology Cr.Hrs.3 (Formerly 126.751) Highlights universals and differences in phonological, morphological and/or syntactic structures drawn from data from a wide variety of languages.

LING 7550 Phonology Cr.Hrs.3 (Formerly 126.755) Presents a theoretical approach to current issues in phonological analysis, building and testing hypotheses about phonological data.

LING 7570 Semantic Theory Cr.Hrs.3 (Formerly 126.757) A theoretical approach to current issues in semantics focusing on formal and logical aspects of meaning.

LING 7580 Computational Linguistics Cr.Hrs.3 (Formerly 126.758) Computational modelling of language and the use of computational tools in linguistic research.

LING 7590 Field Methods Cr.Hrs.6 (Formerly 126.759) Provides practical experi-

ence in techniques for data collection, analysis and interpretation of original data, through guided work with a speaker of a language unfamiliar to students. As the course content will vary from year to year, students may take this course more than once for credit.

LING 7620 Seminar in North American Indian Languages Cr.Hrs.3 (Formerly 126.762) The linguistic structure of a North American language or group of languages. As the course content will vary from year to year, students may take this course more than once for credit.

LING 7630 Syntax Cr.Hrs.3 (Formerly 126.763) Presents a theoretical approach to current issues in syntactic analysis, building and testing hypotheses about syntactic data.

LING 7920 Special Problems in Linguistic Research Cr.Hrs.3 (Formerly 126.792) Specialized topics in linguistics. As the course content will vary from year to year, students may take this course more than once for credit.

LING 7940 Graduate Reading and Research 1 Cr.Hrs.3 (Formerly 126.794) Independent reading and/or research on a selected topic. As the course content will vary from year to year, students may take this course more than once for credit.

LING 7950 Graduate Reading and Research 2 Cr.Hrs.3 (Formerly 126.795) Independent reading and/or research on a selected topic. As the course content will vary from year to year, students may take this course more than once for credit.

Section 46: Management / Business Administration

I.H. Asper School of Business

General Office: 324 Drake Centre

Telephone: (204) 474 8448

Fax: (204) 474 7544

E-mail: aspermba@umanitoba.ca or asper_PhD_MSc@umanitoba.ca

Website: umanitoba.ca/asper

Heads: S. James, Executive Director, MBA Program, and N. Turner, Graduate Chair

Academic Staff

Deans Emeriti

R. Grandpre, J. Gray, J. Mundie.

Accounting and Finance

Senior Scholar

Hilton, M.W., B.Comm (Saskatchewan), M.B.A. (Oregon State), F.C.A.

Professors

Abeysekera, S., B.A. (Simon Fraser), M.B.A. (Jackson State), Ph.D. (Texas A and M); **Feltham, G.,** B.A. (Alberta), B.S., M.B.A. (Montana), L.L.B. (Queen's), Ph.D. (Waterloo), CMA, FCMA; **Gould, L.L.,** B.S. (Pennsylvania), M.B.A. (New York), Ph.D. (Toronto); **Jacoby, G.,** B.A., M.A. (Hebrew), Ph.D. (York); **McCallum, J.S.,** B.Sc., B.A. (Montreal), M.B.A. (Queen's), Ph.D. (Toronto); **Mittoo, U.R.,** B.A., M.A. (Panjab), M.B.A. (Manitoba), Ph.D. (UBC); **Stangeland, D.A.,** B.Comm., Ph.D. (Alberta), CMA.

Associate Professors

Brabston, M., B.A. (Vanderbilt), M.B.A. (Alabama, Birmingham), Ph.D. (Florida State); **Morrill, C.K.J.,** B.A., Ph.D. (Alberta); **Morrill, J.B.,** B.Comm., Ph.D. (Alberta); **Mossman, C.E.,** B.A. (Hons.) (Royal Military College), M.B.A. (Queen's), Ph.D. (Western Ontario), FCGA; **Travica, B.,** B.A. (Belgrade), M. A. (State University of New York), Ph.D. (Syracuse);

Assistant Professors

Biscontri, R., B.Comm. (Australia), M.M., Ph.D. (Macquarie), FCPA; **Chen, F.,** B.A., M.A. (China), M.S. (Utah), Ph.D. (Arizona), C.A.; **Ge, W.,** MBA (China), Ph.D. (McGill); **Paseka, A.,** M.Sc. (Moscow), M.Sc. (N. Iowa), Ph.D. (Arizona); **Pazzaglia, F.,** B.Comm. (Italy), Ph.D. (Alberta); **Schultz, W.,** B.Comm. (Hons.) (Manitoba), Ph.D. (Queen's), CA; **Zheng, X.,** B.A. (China), M.A. (China), Ph.D. (SUNY).

Business Administration

Professor Emeritus

Bector, C.R., B.A. (Punjab), M.A. (Agra), Ph.D. (Kanpur), F.I.M.A.; **Frohlich, N.,** B.Sc.(Hons.) (Manitoba), M.S. (Rutgers), Ph.D. (Princeton); **Starke, F.A.,** B.A., M.B.A. (Southern Illinois), Ph.D. (Ohio State);

Senior Scholars

Atwell, J.F., B.Comm.(Hons.), M.A. (Manitoba); **Gray, J.L.,** B.Sc. (Evansville), M.Sc. (Southern Illinois), Ph.D. (South Carolina); **Hall, R.I.,** B.Sc. (Birmingham), D.I.C. (London), Ph.D. (Washington), C.I.T. (Harvard); **Hercus, T.F.,** B.A. (Manitoba), M.B.A. (Toronto); **Mundie, J.D.,** B.Comm. (Manitoba), M.B.A. (Ohio State), Ph.D. (Stanford); **Notz, W.W.,** B.S.(Hons.) (Colorado), M.B.A. (Denver), Ph.D. (Northwestern); **Starke, F.A.,** B.A., M.B.A. (Southern Illinois), Ph.D. (Ohio State); **Willborn, W.,** B.Ed., M.A. (Manitoba), Dip.rer.pol. (Hamburg), Dr.rer.soc.oec. (Innsbruck).

Professors

Bartell, M., B.A.(Hons.) (McGill), M.B.A. (Chicago), Ph.D. (Northwestern); **Bruning, N.S.,** B.A., M.A. (Arkansas), Ph.D. (Alabama); **Dyck, B.,** B.Comm.(Hons.) (Manitoba), Ph.D. (Alberta); **Godard, J.H.,** B.Comm.(Hons.), M.B.A. (Manitoba), Ph.D. (Cornell); **Lee, R.T.,** B.A., M.S. (San Francisco), Ph.D. (Wayne State); **Litz, R.A.,** B.Comm.(Hons.) (Manitoba), M.B.A. (Minnesota), Ph.D. (Pittsburgh)

Associate Professors

Dass, P., B.Sc., M.B.A. (Punjab), Ph.D. (Michigan State); **Fassina, N.,** B.Sc. (Calgary), Ph.D. (Toronto); **Turner, N.,** B.Comm., B.A., M.Sc. (Queen's), Ph.D. (Sheffield); **Uggerslev, K.,** B.Sc., M.Sc., Ph.D. (Calgary); **Wang, X.,** B.Ed., M.Ed. (Northeast Normal), Ph. D. (McGill).

Assistant Professors

Bayyavarapu, H., BE (Osmania University), MBA (Calcutta), Ph.D. (Western Ontario); **Gao, J.,** M.Ec. (Beijing Tech Business University), Ph.D. (Western); **Greidanus, N.,** B.A. (Alberta), B.Comm. (Calgary), M.B.A. (Calgary), Ph.D. (pending; Calgary); **Herschcovis, M.S.,** B.Comm (Calgary), M.Sc., Ph.D. (Queen's);

Marketing

Professors

Bruning, E.R., B.S. (Arkansas), M.A., Ph.D. (Alabama);

Associate Professors

Manchanda, R.V., B.Comm., M.B.A. (India), M.Sc. (Illinois), Ph.D. (Illinois); **Main K.,** B.A. (Hons.) (Winnipeg), M.A. (Manitoba), Ph.D. (British Columbia); **Sivaramakrishnan, S.,** B.Sc. (Madras), M.B.A. (Bharathiar), Ph.D. (Pennsylvania State); **Smith, M.C.,** B.Sc.(Hons.), M.B.A. (Queen's), Ph.D. (Oregon); **Wan, F.,** B.A. (Wuhan, China), M.A. (Chinese University of Hong Kong), Ph.D. (Minnesota).

Assistant Professors

Bhatnagar, N., M.Sc.Mgmt.Studies, M.Sc.(Hons) (India), Ph.D. (North Carolina at Chapel Hill); **Carvalho, S.,** B.B.A. (Brazil), MBA (Northeastern), Ph.D. (Baruch CUNY);

Warren Centre for Actuarial Studies and Research

Warren Chair

Cox, S.H., BA, M.Sc. (Texas Christian), Ph.D. (Louisiana State), F.S.A., C.P.C.U., C.F.A.

Professor

Pai, J.S., B.Comm. (Feng Chai), M.S., Ph.D. (Connecticut).

Assistant Professor

Hao, S., M.A. (Peking Univ.), M.A. (Toronto), Ph.D. (Iowa); **Pedersen, H.,** B.Sc. (Manitoba), M.Sc. (Stanford), Ph.D. (Washington);

Supply Chain Management

Senior Scholar

Rosenbloom, E.S., B.Sc. (Hons.), M.Sc. (Math), M.Sc. (Statistics) (Manitoba), Ph.D. (Waterloo);

Professors

Bhatt, S.K., B.Sc., M.Sc. (Agra), Ph.D. (Kanpur); **Larson, P.,** B.S.B., M.B.A. (Minnesota), Ph.D. (Oklahoma); **Prentice, B.E.,** B.A. (Western), M.Sc. (Guelph), Ph.D. (Manitoba);

Associate Professor

McLachlin, R.D., B.Sc. (Eng.), M.B.A. (Alberta), Ph.D. (Western Ontario).

Assistant Professors

Appadoo, S.S., Ph.D. (Manitoba); Earl, P.D., B.A.Sc., M.A.Sc. (Toronto), Ph.D. (Manitoba); **Foropon, C.**, M.Sc., Ph.D. (Paris); **Morris, M.**, B.A. (Old Dominion), Ph.D. (Maryland).

Transport Institute

Director of Transport Institute

Larson, P.D., B.S.B., M.B.A. (Minnesota), Ph.D. (Oklahoma)

Professor

Prentice, B.E., B.A. (Western), M.Sc. (Guelph), Ph.D. (Manitoba);

Associate Professor

McLachlin, R.D., B.Sc. (Eng.), M.B.A. (Alberta), Ph.D. (Western Ontario).

Assistant Professors

Earl, P.D., B.A.Sc., M.A.Sc. (Toronto), Ph.D. (Manitoba); **Morris, M.**, B.A. (Old Dominion), Ph.D. (Maryland).

Program Information

The University of Manitoba's Asper School of Business offers three graduate degrees for those interested in furthering their business and management understandings and skills. The AACSB accredited programs are:

- **Asper MBA;**
- **M.Sc. in Management;** and
- **Ph.D. in Management.**

The Asper MBA is a tightly integrated 60 credit hour program, led by internationally-recognized academics and professionals, and conducted in an interactive and dynamic face-to-face learning environment. The core of the program provides a common business leadership and managerial base for all students. Beyond the core exists a host of management electives and concentrations for individuals to choose from. All core courses are required, unless exemption, advance standing, transfer or course substitution is granted. The program can be taken either full- or part-time.

The M.Sc. Program in Management is designed to produce graduates who have an academically more in-depth, rigorous training in their chosen management field than is normally the case either for the B.Comm (Hons.) graduates or MBA graduates. In addition, the program seeks to develop strong research skills for the graduates in order to meet the needs of employers as well as to more effectively prepare Master's students for doctoral work within various areas of concentration in the departments of supply chain management, marketing, and business administration.

The Ph.D. Program in Management is designed to prepare individuals for teaching and research careers in universities, or for applied research positions in either the private or public sector. The program is based upon the premise that contemporary managerial problems are typically multi-faceted and need to be examined from a perspective that is not restricted by the boundaries of any single discipline. The inter-disciplinary nature of the program extends beyond the Asper School of Business to related disciplines across the University of Manitoba. Areas of concentration include: finance, marketing, organizational behaviour, organizational theory, human resource management, strategy and entrepreneurship.

Fields of Research

The Asper School of Business is one of the best equipped management schools in Canada for research in managerial issues of national and international interest.

Researchers in business administration are examining a wide range of issues including organizational change and conflict management, job stress, work role socialization, compensation structures, goal setting, employment equity and discrimination.

Researchers in marketing and entrepreneurship are studying issues of national loyalty in international air travel, the role of affect in consumer behaviour, the effect of body image portrayals on consumers, international marketing and country of origin issues, information processing and sales person behaviours, the nature of effective small firm niche strategies and a variety of social marketing issues, how the age of the consumer affects the impact of advertising, and the nature of effective small firm niche strategy.

In the accounting and finance area, research programs span issues in accounting standards, asset pricing, national, and international capital markets and international corporate finance.

In the supply chain management area, researchers are examining issues such as efficiency of transportation and logistics, production and operations.

Research Facilities

The Asper School of Business occupies the Drake Centre for Management Studies. The centre houses case rooms, lecture theatres, computer laboratories, a graduate study area, and research space.

The Albert D. Cohen Management Library holds approximately 40,000 volumes and subscribes to some 3000 current online and print periodicals. It maintains an annual report collection, specialized trade directories, and financial investment services. The Library subscribes to the major online services including ProQuest, Business Source Premier, Canadian Business and Current Affairs Complete, JSTOR, Mergent, Emerald, the Economist Intelligence Unit, and FinancialPost.infomart.ca. In addition, as a unit of the University of Manitoba Libraries, management students have access to some 200 additional online database services.

Academic and applied research is conducted in the Transport Institute, the Stu Clark Centre for Entrepreneurship, and the Centre for Accounting Research and Education which subscribes to the following databases: S & P Compustat, CRSP, TSX CMFRC, and NYSE TAQ.

ASPER MBA

The Asper MBA, operating year-round and welcoming to full and part-time study, is a face-to-face on-campus 60 credit hour program composed of three powerfully crafted and complementary program elements

- **Executive Leadership**—a mandatory series of three courses (9.0 credit hours) designed to have you explore the challenges, responsibilities, and everyday realities of leading an enterprise in today's ever demanding global context.
- **Business Management Essentials**—a balanced set of mandatory courses (39.0 credit hours) in marketing, accounting, finance, human resources and supply chain management designed to equip you with the latest business management understandings and practices.
- **Advanced Elective Concentrations**—a variety of four-course (12.0 credit hours) elective packages in Finance, Management Accounting, Marketing, Human Resource Management, Supply Chain Management, Business-Government Relations, and Health Administration designed to allow the opportunity to heighten your expertise in a specific management field or to further develop your own interdisciplinary interests.

An individual can complete the program in as short as one year or one can take up to six years on a part-time basis (three years being the average). If a student's circumstances change, he or she can adjust the pace to maintain a personal balance. Courses are offered once or twice per year, and are scheduled to optimize course progression.

Students can start the program in August or January. The academic year is composed of three terms—fall (August-December), winter (January-March), and summer (April-July). Depending on academic background, students may qualify for up to 30 credit hours of course exemptions, which can reduce one's program length and cost (exemption requests are reviewed on a case-by-case basis).

Admission

Admission decisions are made carefully. Not only is one's academic ability considered, but also one's professional and leadership experience. Admission is granted on a competitive basis with all selection criteria considered equally. With applicants normally exceeding the customary minimums, the Asper MBA admission criteria are:

- **Previous Academic Achievement**—a minimum of a baccalaureate degree or its equivalent from an accredited university, having attained in the most recent 60 credit hours of university-level work, a competitive grade point average (our average at admission is 3.4 on a 4.5 grading scale, or approximately equivalent to a "B+" or 75%). That said, the program is annually permitted to admit a small number of highly experienced and gifted individuals who do not hold the required baccalaureate, but who have demonstrated both the potential for leadership and an ability to meet the academic demands of an MBA. Such individuals must have meaningful work experience, outstanding performance in an alternate program of

study such as a professional designation or certificate program, and have a strong GMAT score;

- **Professional & Leadership Experience**—a minimum of three years of work experience is preferred, preferably in a professional or managerial role;

- **Graduate Study Readiness**—a competitive score on the Graduate Management Admissions Test (our average is 580). For further GMAT details, please visit www.mba.com; and, for students whose first language is not English,

- **English Language Proficiency**—a minimum score of 80 (internet-based) or 550 (paper-based) on the TOEFL, or comparable CanTEST, AEPUCE, IELTS, MELAB results.

Admission Deadline

One can apply at anytime through the year, and completed applications will be reviewed at a monthly admission meeting by the Asper MBA Admissions Committee. However, deadlines do exist for August and January program commencement purposes, and applications received after the deadline dates will be considered for the following entry gate:

- **For August start**—January 15th for International applicants and May 1st for North American/Permanent Resident applicants; and

- **For January start**—June 15th for International applicants and October 1st for North American/Permanent Resident applicants.

Program Requirements

The Asper MBA's 48 credit hours of mandatory courses are:

Required Core Courses

Course Title	Credit Hours
ACC 6050 Accounting 1*	3
ACC 6060 Accounting 2*	3
FIN 6072 Corporate Finance*	3
MIS 6150 Management of Information Systems & Technology*	3
GMGT 6030 Organization Theory and Behaviour*	3
GMGT 7010 Business Policy Seminar**	3
GMGT 7080 Research Methods	3
HRIR 7450 Industrial Relations/Human Resource Management*	3
IDM 7510 Strategic Leadership and Managing Change	1.5
GMGT 7710 Managerial Communications	1.5
IDM 7720 Business Conditions Analysis	1.5
INTB 7730 International Business*	1.5
GMGT 7740 Business/Government Relations*	1.5
IDM 7060 Professional Seminar	6
MKT 6080 Marketing*	3
ENTR 7240 Entrepreneurship and New Venture Formation*	1.5
MSCI 5010 Mathematics for Management***	3 Aux
MSCI 6070 Quantitative Analysis for Management*	3
OPM 6090 Production Management*	3
Total	48 (plus 3 Aux)

NOTES:

* Eligible for exemption.

** GMGT 7010 Business Policy Seminar constitutes the comprehensive examination. The course must be completed at the University of Manitoba normally in the final term (last 15 credit hours) of a student's program.

*** GMGT 5010 is an auxiliary or additional course required for those who don't have the requisite level of mathematical background at program start. Please contact Asper MBA office for details.

Elective Courses

In addition to the mandatory leadership and business courses, students are required to take 12 credit hours of graduate-level coursework from the I.H. Asper School of Business or, where approved, from other Faculties. Students will be able to choose a General Management option — completion of any 12 hours of MBA program electives in different areas — or to undertake an Individual Interdisciplinary concentration consisting of graduate courses in another faculty (with a management focus). As well, students can choose to concentrate all 12 credit hours of electives in a focused area.

These concentrations are currently offered in:

- Finance
 - Marketing
 - Human Resource Management and Organizational Behaviour
 - Supply Chain Management
 - Business Government Relations (with some courses from the MPA program)
 - Management Accounting (partnership with CMA Manitoba)
 - Health Administration (through select courses at the Faculty of Medicine)
- Courses required for each area of concentration are listed below (please note that not all electives are available each year):

Finance

Four courses from:

FIN 7070	Theory of Financial Management	3
FIN 7080	International Finance	3
FIN 7150	Investment Policy	3
FIN 7220	Advanced Seminar in Finance	3
FIN 7230	Seminar in Financial Intermediaries and Capital Markets	3
FIN 7260	Selected Topics in Finance	3
FIN 7240	Readings in Accounting and Finance	3

Management Accounting

In partnership with CMA Manitoba, a student can earn a "Management Accounting" concentration on successful completion of CMA's **Accelerated Program and CMA's National Entrance Exam**.

The Accelerated Program is a ten month intermediate and advanced accounting program that is offered annually by by CMA Manitoba. For details, please contact the Asper MBA Office.

Marketing

Four courses from:

MKT 7080	Selected Topics in Marketing	3
MKT 7200	Decisions and Concepts in Marketing	3
MKT 7210	Marketing and Competitive Behaviour	3
MKT 7220	Seminar in Marketing	3
MKT 7230	Seminar in Consumer Behaviour	3
MKT 7100	Readings in Marketing	3
MKT 7300	International Marketing	3

Human Resource Management and Organizational Behaviour

Two of the following are required:

HRIR 7162	Staffing	3
HRIR 7164	Training and Development	3
HRIR 7168	Management of Labour and Employee Relations	3
HRIR 7166	Compensation	3

Plus two courses from:

HRIR 7162	Staffing	3
HRIR 7164	Training and Development	3
HRIR 7168	Management of Labour and Employee Relations	3
HRIR 7166	Compensation	3
HRIR 7460	Collective Bargaining	3
GMGT 7090	Organizational Decision-Making	3
GMGT 7100	Interpersonal Processes	3
INTB 7032	Comparative Industrial Relations and Human Resource Management	3

INTB 7040 International Organizational Behaviour 3

GMGT 7350 Administration: Selected Topics 3

Supply Chain Management

Each of:

SCM 7010	Advanced Supply Chain Management (mandatory)	3
OPM 7300	Topics in Advanced Production and Operations Management (mandatory)	3

Plus two from:

GMGT 7370	Managing Innovation	3
IDM 7010	Industry Project	3

Other SCM or OPM electives

Business Government Relations

Each of:

POLS 7370	Seminar in Theory and Practice of Public Administration	6
MKT 7080	Business, Markets and Public Policy	3
Plus one of:		
POLS 7300	Public Finance	3
POLS 7340	Canadian Government	3
POLS 7550	Contemporary Issues in Canadian Politics	3
POLS 7300	Directed Readings in Public Administration	3

Health Administration

Four courses from:

CHSC 7130	Methods in Health Services Research and Evaluation	3
CHSC 7290	Economic Evaluation of Health Care	3
CHSC 7300	Health Policy and Planning	3
CHSC 7310	Epidemiology of Health Care	3
CHSC 7320	Organization and Financing of the Canadian Health Care System*	3
CHSC 7510	Current Topics in Community Health	3
CHSC 7520	Principles of Epidemiology 1*	3
IDM 7010	Industry Project**	3

NOTES:

* Required for Health Administration concentration.

** Can be used as a 3 credit hour elective course for field placements in health care organizations upon approval of the MBA Program Committee. Placements and supervision of the placements will be the responsibility of the Department of Community Health Sciences.

Health Administration courses are scheduled by the Department of Community Health Sciences and may not fit within the normal MBA elective schedule.

Readings/Research Option

With the approval of the MBA Program Committee and the academic area involved, a student can choose to undertake an industry project or a readings course. The industry projects and readings courses count as three credit hours of elective coursework. A student is allowed up to two readings courses or one readings course and one industry project during the program. An industry or readings proposal must be submitted to a faculty supervisor and the MBA Program Committee for approval prior to registration for the course. Projects and reading courses can normally only be taken within the Asper School of Business, and normally cannot be counted towards a concentration.

No thesis option available

Second language reading requirement: none

Expected time to graduate: 1 - 6 years

The MBA program curriculum and concentrations are subject to change upon appropriate approval.

Faculty Based M.Sc. in Management

Admission

Students admitted to the M.Sc. in Management degree program will pursue a research-focused degree in one of the departments of Marketing, Business Administration or Supply Chain Management. In addition to satisfying the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, applicants must possess at least a 4-year honours (or equivalent) degree from a recognized university in either a) management/business with a major in the same area or a similar area to be pursued in the M.Sc. or b) a degree from another Faculty with a closely related major. Applicants must provide the following prior to admission:

- A statement of goals and interests;
- An official transcript of academic record with a minimum grade point average of 3.0 on a 4.5 scale (approximately 70% or a "B") in the last 60 credit hours;
- A score on a graduate aptitude test, preferably the GMAT, with a minimum score of 550 (GRE will be accepted with a mean percentile score across the three areas similar to the current acceptable percentile level of the GMAT);
- Three letters of recommendation two of which are from persons who know the candidate's academic ability.

Admission Deadline

The deadline to apply is January 10 for International applicants and March 10 for North American/Permanent Resident applicants (for early consideration, all applicants are encouraged to apply by January 10). Applications received after the deadline date will be considered if space permits.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The basic program design assumes that students have completed an honours degree or its equivalent. Additional courses may be required subject to the discretion of the I.H. Asper School of Business Graduate Committee if it is deemed that the candidate's preparation is not sufficient in his/her area of specialization. The student's advisory committee will make recommendations regarding deficient background, and the final program will be approved by the Graduate Research Program Committee.

All students must complete the following course requirements:

A minimum of 18 credit hours plus a thesis/practicum. This minimum will include:

- a) at least 6 credit hours of required graduate level courses in the student's area of specialization;
- b) up to 12 credit hours of optional courses to the approval of the Graduate Committee;
- c) a thesis or a practicum.

Business Administration (Industrial Relations/Human Resource Management/Management of Organizations/Organizational Behaviour) Option

One of: GMGT 7440 Organizational Theory or GMGT 7410 Organizational Behaviour

One of: GMGT 7540 or GMGT 7080 Research Methods, or an equivalent graduate level course in quantitative methods from another Faculty*

Four additional optional courses but, among them, students are encouraged to take: 1) an additional research methods course (quantitative or qualitative) and either a statistics or econometrics course and 2) a philosophy of science course.*

Master's thesis or research practicum

*Students are advised to check with the Graduate Program Office at the I.H. Asper School of Business for a list of suggested courses.

Marketing Option

Any six credit hours from:

MKT 7100 Readings in Marketing

MKT 7110 Doctoral Seminar in Marketing

MKT 7120 Seminar in Buyer Behaviour or MKT 7230 Seminar in Consumer Behaviour

Six credit hours of approved research methods coursework at the graduate level.*

Additional six credit hours of approved coursework relevant to the chosen area of study.

*Students are advised to check with the Graduate Program Office at the I.H. Asper School of Business for a list of suggested courses.

Supply Chain Management Option

Nine credit hours in:

SCM 7010 Advanced Supply Chain Management

GMGT 7080 Research Methods

OPM 6090 Production Management

Nine credit hours of additional courses relevant to the area of specialization.

Second language requirement: none

Expected time to graduate: 1-3 years

Faculty Based Ph.D. in Management

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, an

earned Master's degree (MBA preferred), and in exceptional cases, a Bachelor's degree in a management or business discipline from a recognized institution, or a discipline sharing a common origin or a parallel discipline to the applicant's chosen area of concentration, is required.

Prior to admission, the candidate is to provide the following:

- A statement of goals and interests;
- An official transcript of academic record with a minimum grade point average of 3.0 on a 4.5 scale (3.5 preferred), (approximately 70% or a "B") in the last 60 credit hours;
- A score on a graduate aptitude test, preferably the GMAT, with a minimum score of 600 (GRE will be accepted with a mean percentile score across the three areas similar to the current acceptable percentile level of the GMAT);
- Three letters of recommendation from persons who know the candidate's academic ability;
- Evidence of research and teaching ability.

Admission Deadline

The deadline to apply is January 10 for all applicants.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The basic program design assumes that students have completed an MBA degree or its equivalent. The MBA degree constitutes the "core" of knowledge that is prerequisite to proceeding to Ph.D. study since it provides the breadth of knowledge necessary for Ph.D.'s in Management. Students who are deficient in this "core" may be required to take additional MBA-level courses. Decisions regarding deficient background will be made by the student's advisory committee, subject to the approval of the Graduate Research Program Committee.

All students must complete the following course requirements:

A minimum of 12 hours of study in the chosen area of specialization, as approved by the advisory committee. (See specific specialization requirements that follow).

Faculty-Based Doctoral Courses

- PHDM 7110 Doctoral Seminar in Management (3)
- PHDM 7120 Management Research Project I (3)
- PHDM 7130 Management Research Project II (3)

Research Methods

A minimum of 6 hours of research methods courses, as approved by the advisory committee.

Support Area

A minimum of 9 hours of study in a chosen support area, as approved by the advisory committee. A minimum of 3 of these hours must be taken outside the Asper School of Business.

Minimum total Credit Hours: 36

NOTE: The student's advisory committee may require additional coursework.

Area of Specialization Required Coursework:

Finance		
FIN 7500	Financial Theory and Corporate Policy	3
FIN 7510	Finance 1: Capital Markets	3
FIN 7520	Finance 2: Corporate Finance	3
FIN 7530	Advanced Topics in Finance	
Marketing		
MKT 7100	Readings in Marketing	3
MKT 7110	Doctoral Seminar in Marketing	3
Plus a minimum of 6 hours within the Marketing area		

Organizational Behaviour or Organizational Theory/Strategy/ Human Resource Management/ Entrepreneurship

GMGT 7410	Doctoral Seminar in Organizational Behaviour	3
GMGT 7440	Doctoral Seminar in Organizational Theory	3
Plus a minimum of 6 hours within Business Administration area of concentration.		

Second language requirement: none

Expected time to graduate: 4 - 5 years

Course Descriptions

Accounting and Finance

ACC 6050 Accounting 1 Cr.Hrs.3 Principles and concepts of accounting underlying the measurement of business income and evaluation of performance.

ACC 6060 Accounting 2 Cr.Hrs.3. The use of managerial accounting practices and reports in planning, budgeting, control, and decision making. *Prerequisite:* [ACC 6050 [009.605]] or IDM 7720.

FIN 6072 Corporate Finance Cr.Hrs.3. The financial management of businesses including agency problems, valuation, capital budgeting, risk/return relationships, the term structure of interest rates, market efficiency, long-term financing, capital structure, and the use of options and futures for risk management. *Prerequisite:* [ACC 6050 (009.605)] or IDM 7720. Not to be held with either of the former 009.607 or FIN 6070.

MIS 6150 Management of Information Systems and Technology Cr.Hrs.3 This course covers the frameworks and concepts of managing information systems and knowledge management, decision support, electronic commerce, systems development, management information systems strategy and strategic information systems. Not to be held with either of former 009.613 or 009.614.

FIN 7070 Theory of Financial Management Cr.Hrs.3 Study of selected topics in the various fields of financial management; emphasis on trends, current problems, and research in the fields. *Prerequisite:* [FIN 6072 or FIN 6070 (or 009.607) (C+)].

FIN 7080 International Finance Cr.Hrs.3 The theory and practice of financial management in an international context. Includes foreign currency markets, exchange rates, measurement and management of foreign currency risk, international financing, and foreign direct investment. *Prerequisite:* [FIN 6072 or FIN 6070 (or 009.607)(C+)].

FIN 7152 Investment Policy Cr.Hrs.3 The theory and practice of investment management. Topics include: portfolio theory and management; market efficiency, options and futures. This course cannot be held with FIN 7150, *Prerequisite:* [FIN 6072 or FIN 6070 (or 009.607)(C+)].

FIN 7220 Advanced Seminar in Finance Cr.Hrs.3 A case-oriented course that will require extensive preparation and presentation of selected cases in corporate financial management; emphasis on the application of theoretical models of finance to real problems. *Prerequisite:* [FIN 6072 or FIN 6070 (or 009.607)(C+) or consent of instructor].

FIN 7232 Financial Intermediaries and Capital Markets Cr.Hrs.3 Topics include: the major participants in the capital markets and their functions; the demand and supply of money and the structure of interest rates; non money financial instruments; recent developments and international factors in the capital markets and capital market risk issues. This course cannot be held with FIN 7230. *Prerequisite or concurrent requirement:* [FIN 6072 or FIN 6070 (or 009.607)(C+)].

FIN 7240 Readings in Accounting and Finance Cr.Hrs.3 Supervised readings in one of the areas of accounting and finance.

FIN 7260 Selected Topics in Finance Cr.Hrs.3 A study of selected topics in finance relating to advanced issues in theory or practice. Topics considered will depend on the interests and needs of the participants. *Prerequisite:* [FIN 6072 or FIN 6070 (or 009.607)(C+) and others if specified by the professor].

FIN 7500 Financial Theory and Corporate Policy Cr.Hrs.3 (Ph.D.) Explores the conceptual and theoretical foundations of finance and their applications to corporate financial policy. *Prerequisite:* [admission to the Ph.D. program in Management (Finance) or approval by instructor].

FIN 7510 Finance 1: Capital Markets Cr.Hrs.3 (Ph.D.) An understanding of the theory and empirical research in capital markets including theories and tests of financial asset valuation, portfolio analysis and market efficiency. *Prerequisite:* [admission to the Ph.D. program in Management (Finance) or approval by instructor].

FIN 7520 Finance 2: Corporate Finance Cr.Hrs.3 (Ph.D.) Theoretical issues in corporate finance. Issues covered will include investment choice and shareholder unanimity, capital structure, dividend irrelevancy, corporate and personal taxes, bankruptcy costs, agency cost, asymmetric information and signalling models, theory of the firm, and corporate takeovers. *Prerequisite:* [admission to the Ph.D. program in Management (Finance) or approval by instructor].

FIN 7530 Advanced Topics in Finance Cr.Hrs.3 (Ph.D.) Seminar emphasizing the mathematical tools necessary for financial decision making including an introduction to stochastic processes, stochastic dominance, and separation theorems. Applications in derivative markets, investment theory, and corporate finance. *Prerequisite:* [admission to the Ph.D. program in Management (Finance) or approval by instructor].

IDM 7720 Business Conditions Analysis Cr.Hrs.1.5 This course explores the key components of the economic/business environment, identifying critical money, and supply and demand concepts that affect daily business decision-making.

Business Administration

GMGT 6030 Organization Theory and Behaviour Cr.Hrs.3 An examination of current theories of structure and behaviour as they apply to organizations in the public and private sector. Emphasis upon research findings and their application in management situations.

GMGT 7010 Business Policy Seminar Cr.Hrs.3 The study of general management. Students shall integrate the concepts from the various functional areas of the organi-

zation covered in the program with the different environments: social, political, economic and technological. Students will analyze general management problems, shall formulate policies, and display ability to implement policies. Must normally be taken in final term in the program.

INTB 7032 Comparative Industrial Relations and Human Resource Management Cr.Hrs.3 The study of how and why industrial relations and human resources management differ across national environments and business systems, as illustrated by major national economies. Intended to develop an ability to manage effectively across different national environments. Not to be held with INTB 7150 (or 27.715).

GMGT 7040 Systems Analysis for Management Cr.Hrs.3 The concepts of systems analysis used to provide an analytical framework for study of management as the integrative process which cuts across functional divisions and operational activities.

INTB 7040 International Organizational Behaviour Cr.Hrs.3 The examination of dilemmas and opportunities that managers face when they work in a cross-cultural setting. The purpose of this course is to develop the necessary understandings and skills to effectively manage problems arising from the interaction of people from different cultures in work settings. Not to be held with INTB 7030 (or 027.703).ca

GMGT 7060 Readings in Business Administration Cr.Hrs.3 Supervised readings in one of the areas of business administration including human resource management, industrial relations, organizational behaviour, policy and environment.

GMGT 7070 Administrative Studies Research Project Cr.Hrs.6 Research in any one of the areas of administrative studies.

GMGT 7080 Research Methods Cr.Hrs.3 Principles of research design and data collection with examples drawn across the areas of marketing management, industrial relations, policy analysis, etc. Both cases and computer-based exercises are used. *Prerequisite:* [MSCI 5010 (164.501 or 027.501)(Pass)].

GMGT 7090 Organizational Decision-Making Cr.Hrs.3 A study of the goal-setting and decision-making processes in organizations and the implications for the growth and survival of such organizations.

GMGT 7100 Interpersonal Processes Cr.Hrs.3 An examination of theories of interpersonal behaviour and processes as they apply to managerial situations. Emphasis upon individual behaviour and change, group dynamics, leadership behaviour, and communications.

GMGT 7110 Business and Its Environment Cr.Hrs.3 Analysis of the environmental factors within which a business operates.

GMGT 7120 Organizational Power and Politics Cr.Hrs.3 An examination of personal, interpersonal and organizational power in the context of organizational politics. Topics covered include rational versus political models of organizations, the accumulation and management of personal power, the politics of decision-making, the politics of managerial succession, the politics of budgets, authority, intergroup conflict, and bargaining and negotiation processes.

HRIR 7140 Topics in Industrial Relations/Human Resource Management Cr.Hrs.3 An in-depth analysis of various topics in industrial relations and human resource management. *Prerequisite or Concurrent Requirement:* [HRIR 7450 (027.745)(C+)].

HRIR 7162 Staffing Cr. Hrs. 3 This advanced graduate seminar provides an understanding of the staffing function of Human Resources Management. The course focuses on how recruitment, selection, performance management, and retention management function within an organization to gain a competitive advantage through the management of work and people. *Prerequisite:* HRIR 7450.

HRIR 7164 Training and Development Cr. Hrs. 3 This advanced graduate seminar provides an understanding of the training and development functions of Human Resources Management. The course focuses on how to design, implement, and evaluate a training program, and employee development and career management. *Prerequisite:* HRIR 7450.

HRIR 7166 Compensation Cr. Hrs. 3 The review of the major concepts and design of compensation systems including: strategy, internal equity, external competitiveness, rewarding individual contributions, performance incentives, employee benefits, government regulations, union role in compensation, budgets in administration. *Prerequisite or concurrent requirement:* HRIR 7450.

HRIR 7168 The Management of Labour and Employee Relations Cr.Hrs.3 An examination of the systems of labour and employee relations in Canada as it compares with the systems of other countries. Emphasis upon understanding and managing labour and employee relations in a changing economy. Not to be held with HRIR 7500 (or 027.750).

ENTR 7240 Entrepreneurship and New Venture Formation Cr.Hrs.1.5 Entrepreneurship and enterprising behaviour with an emphasis on the identification and evaluation of viable new venture concepts and their development into successful enterprises.

GMGT 7350 Administration: Selected Topics Cr.Hrs.3 Topics in one of the areas of business administration including human resource management, industrial relations, organizational theory and behaviour, and business policy and strategic management.

GMGT 7360 Organizational Behaviour and Self Development Cr.Hrs.3 This course will operate in a seminar format with two goals. The first goal is to provide an environment in which the student can develop and manage to successful conclusion a project in which they have significant intrinsic interest. The second goal is to improve the student's understanding of the inner life of an organization by increasing his/her ability to discriminate between the organizational "ropes to skip and the ropes to know."

GMGT 7370 Managing Innovation Cr.Hrs.3 An examination of organizational design characteristics in the context of a competitive international perspective. Emphasis is on organizational and technological innovation to facilitate the development of new products or processes or to implement change in existing products or processes. Topics covered include Canadian experience and policy, facilitators and inhibitors in

the creative process, diffusion of innovations, and the aims of the patent process.

GMGT 7400 Readings in Organizational Behaviour (Ph.D.) Cr.Hrs.3 An examination of theory and research from the social and administrative sciences that focuses on the interaction between organizations and their environments. The evaluation and synthesis of theoretical and empirical work in this area will be emphasized. *Prerequisite:* [admission to the Ph.D. program in Management (Organizational Behaviour) or approval of instructor].

GMGT 7410 Doctoral Seminar in Organizational Behaviour (Ph.D.) Cr.Hrs.3 An examination of theory and research from the social and administrative sciences that is relevant to the behaviour of individuals and groups within organizations. Emphasis will be placed on evaluation and synthesis of theoretical and empirical work in this area. *Prerequisite:* [admission to the Ph.D. program in Management (Organizational Behaviour) or approval of instructor].

GMGT 7440 Doctoral Seminar in Organizational Theory (Ph.D.) Cr.Hrs.3 The major goal of this course is to familiarize students with central schools of thought within organization theory. As with other theories in the social sciences, these schools of thought tend to be based on differing assumptions about the nature of the organizational world, the operation of causality, epistemology, and the role of human actors. *Prerequisite:* [admission to the Ph.D. program in Management (Organizational Behaviour) or approval of instructor].

HRIR 7450 Industrial Relations/Human Resource Management Cr.Hrs.3 The process of valuing, employing, developing, motivating and maintaining human resources in an industrial society. An introduction to the study of labour relations in the social technical systems of the Federal Government, the Provincial Government and profit and non-profit organizations.

HRIR 7460 Collective Bargaining Cr.Hrs.3 The labour management relations in the negotiation and administration of the collective agreement. The analysis of conflict and the application of bargaining theories. *Prerequisite or Concurrent Requirement:* [HRIR 7450 (027.745)(C+)].

GMGT 7470 The Fundamentals of Public Policy Analysis Cr.Hrs.3 Introduction to the basic concepts and objectives of public policy analysis. Analytic tools and techniques of policy analysis: cost-benefit analysis, forecasting, design and application of program evaluations, implementation of evaluation results. Case studies in policy analysis.

GMGT 7480 Public Sector Decision Making Cr.Hrs.3 Analysis of models of collective action with emphasis on the supply of public goods. Examination of voting, coalition formation, and general choice procedures with regard to their impact on governmental programs. Discussion of the institutional setting of Canadian policy formation. Analysis of the role of bureaucracy.

GMGT 7490 Regulatory Processes and Policies Cr.Hrs.3 Analysis of the processes of regulation of private sector conduct and performance. Methods and effects of regulation. Purpose of regulatory statutes. Sources of initiative in the regulatory process. The effects of regulation. Formulation of general empirical rules for the behaviour of regulatory agencies. Politics and economics of regulatory reform.

IDM 7510 Strategic Leadership and Managing Change Cr.Hrs.1.5 An examination of the role of the manager as a change agent and processes associated with strategic vision and change. Analysis of factors affecting strategic decisions and how organizations adapt to their environment. Emphasis is upon the role of leaders: transformational leadership, charisma, organizational design and managing organizational culture change.

GMGT 7520 Issues in Managerial Communication Cr.Hrs.3 An examination of strategies and development of skills for effective oral, written, non-verbal, interpersonal, group, cross-cultural, and ethical communication in management.

GMGT 7530 Selected Topics Cr.Hrs.3 An examination of current issues in areas which could, for example, include: organizational behaviour, organizational theory, strategy, human resource management, and industrial relations. *Prerequisite:* consent of instructor.

GMGT 7540 Doctoral Seminar in Research Methods (Ph.D.) Cr.Hrs.3 Principles of research design and data collection appropriate for the areas of marketing, management, industrial relations, policy analysis, finance, management science, etc. Research problems and issues will be discussed from a number of perspectives. Conceptual material, statistical analyses, theoretical material and the utilization of statistical application software are used as the bases for seminar discussion. *Prerequisite:* [admission to the Ph.D. program in Management or approval of instructor].

GMGT 7670 Business Decision Analysis Cr.Hrs.3 Development and applications of quantitative methods to solve decision-making problems under uncertainty. Topics include the structuring of complex decision problems, utility theory, subjective probability, value of information, risk sharing, and group decisions. *Prerequisite:* [MSCI 6070 (164.607 or 027.607)(C+)].

GMGT 7710 Managerial Communication Cr.Hrs.1.5 Focus is on the interpersonal, intergroup, and intraorganizational communication skills required for effective leadership, and the objectives are to assist the participants in the following: increasing the clarity, correctness, and effectiveness of written and oral communication; recognizing and analysing communication dynamics at work in personal, group, and organizational interactions; increasing combination flexibility and proficiency in times of corporate challenge, change, and crisis.

INTB 7730 International Business Cr.Hrs.1.5 Develop an appreciation of business decision-making in an international/global context. Learning activities are focused towards developing intellectual and interpersonal skills in order for managers to function more effectively in international markets.

GMGT 7740 Business/Government Relations Cr.Hrs.1.5 Focuses on the logic of political-economic-business relations. The point of view is that of the manager. Specific tools of analysis are discussed that assist managers in understanding and working with

aspects of public policy which interface with their private sector decisions.

General Course Requirements for the Ph.D. Program

PHDM 7110 Doctoral Seminar in Management (Ph.D.) Cr.Hrs.3 Examination of the philosophy of science in management and overview of management research typologies, methods, and the role of research in the practice of management. *Prerequisite:* [admission to the Ph.D. program in Management or approval by instructor].

PHDM 7120 Management Research Project 1 (Ph.D.) Cr.Hrs.3 Examination of research designs and preparation of theoretical paper in management. *Prerequisite:* [admission to the Ph.D. program in Management or approval by instructor].

PHDM 7130 Management Research Project 2 (Ph.D.) Cr.Hrs.3 Departments in the faculty offer two types of graduate programs, those leading to Master of Science and Doctor of Philosophy degrees and those leading to specialization and certification in a clinical discipline. Combinations of such programs can be arranged on an individual basis for students wishing both clinical and basic science research experience. *Prerequisite:* [admission to the Ph.D. program in Management or approval by instructor].

Interdepartmental Courses

IDM 7010 Industry Project Cr.Hrs.3 Supervised study and research of a problem opportunity in business or management. Specific course requirements determined by the faculty member assigned to be the course coordinator. In addition, each project will be supervised by a faculty member expert in the area. Projects consist of written report(s) containing substantive, practical evidence and analytically structured comments, academic materials, and bibliographical references. Pass/Fail basis only. *Prerequisite:* [completion of all 600-level MBA courses (or equivalent experience) and consent of MBA program director].

IDM 7020 Managing for Sustainable Development Cr.Hrs.1.5 Strategic issues related to the manager's role in sustainable development, including enterprises in the renewable and non-renewable resource sectors, life-cycle analysis, and full cost accounting. Emphasis is placed on environmental management control systems, environmental performance measurement, reporting, and the impact of environmental management on strategic management decisions.

IDM 7030 Social and Community Awareness Project Cr.Hrs.0 An experiential project examining issues related to economically and/or socially disadvantaged individuals and groups with emphasis on corporate social responsibility.

IDM 7040 Leadership and Personal Development Seminar Cr.Hrs.0 Preparation in computer, technical, interpersonal, and team-building skills.

IDM 7050 International Study Trip Cr.Hrs.3 A supervised international experience to examine the relationship between corporations, senior managers, and social institutions in selected countries. Examination of the interplay between culture, economic development, management systems and strategies in other countries. Emphasis upon establishment of business networks on an international basis.

IDM 7060 Professional Seminar Cr.Hrs.6 A series of modules on executive leadership and professional management topics.

IDM 7070 Fundamental Professional & Leadership Seminar Cr.Hrs.1.5 Series of seminars covering fundamental topics essential for modern management including business ethics and managing diversity.

IDM 7080 Professional and Leadership Seminar Cr.Hrs.1.5 Series of seminars covering fundamental topics essential for modern management including such topics as: aboriginal business, managerial law, situational leadership, creating shareholder value, developing a business plan, and career management.

Marketing

MKT 6080 Marketing Cr.Hrs.3 Analysis of the evolution and characteristics of marketing systems; the various types of consumers and their behaviour; marketing activities of the firm; legislation at all levels which affect marketing decisions.

MKT 7080 Selected Topics in Marketing Cr.Hrs.3 A study of selected areas of recent development in the field of marketing. Topics may include the marketing of services, market research, business to business marketing, marketing channel systems, personal selling or sales management, and physical distribution. *Prerequisite:* [MKT 6080 (118.608)(C+)].

MKT 7100 Readings in Marketing (Ph.D.) Cr.Hrs.3 A survey of current literature in the major areas of marketing and marketing research. Emphasis upon empirical developments as they affect the application of marketing concepts. *Prerequisite:* [admission to the Ph.D. program in Management (Marketing) or approval of instructor].

MKT 7110 Doctoral Seminar in Marketing (Ph.D.) Cr.Hrs.3 Advanced study of marketing thought integrating the functional areas of marketing. Seminars on selected research topics and recent developments in the field. *Prerequisite:* [admission to the Ph.D. program in Management (Marketing) or approval of instructor].

MKT 7120 Ph.D. Seminar in Buyer Behaviour (Ph.D.) Cr.Hrs.3 Concepts and literature relating psychological and sociological perspectives to buyer behaviour in Marketing. *Prerequisite:* consent of instructor. *Prerequisite:* [admission to the Ph.D. program in Management (Marketing) or approval of instructor].

MKT 7200 Decisions and Concepts in Marketing Cr.Hrs.3 Application of the principles of marketing from a managerial viewpoint; emphasis on marketing planning, strategy, and control; and appraisal of the effectiveness of marketing activities. *Prerequisite:* [MKT 6080 (118.608)(C+)].

MKT 7210 Marketing and Competitive Behaviour Cr.Hrs.3 Designed to give the student a deeper understanding of the dynamics of marketing behaviour. Oriented towards theoretical conceptualizations of the problems and practices in marketing areas. *Prerequisite:* [MKT 6080 (118.608)(C+)].

MKT 7220 Seminar in Marketing Cr.Hrs.3 Study of selected topics in marketing with emphasis on recent theoretical developments and their application. *Prerequisite:* [MKT 6080 (118.608)(C+)].

MKT 7230 Seminar in Consumer Behaviour Cr.Hrs.3 Intensive study of consumer behaviour as it relates to the marketing function. *Prerequisite or concurrent requirement:* [MKT 6080 (118.608)(C+)].

MKT 7300 International Marketing Cr.Hrs.3 A study of problems and opportunities of marketing in foreign environments. It will focus on the cultural, economic and geographical problems encountered in managing the marketing function from a Canadian manager's perspective. *Prerequisite:* [MKT 6080 (118.608)(C+)].

MKT 7500 Readings in Marketing Cr.Hrs.3 Supervised readings in one of the areas of Marketing. *Prerequisite:* MKT 6080 (or 118.608) and at least one other graduate marketing course.

Supply Chain Management

MSCI 5010 Mathematics for Management Cr.Hrs.3 (AX) A remedial course in linear and matrix algebra and calculus; with applications to elementary management problems. **Note:** Will not be included in the calculation of the grade point average. Course evaluated on a pass/fail basis.

MSCI 6060 Quantitative Methods Cr.Hrs.3 Topics to be selected from quantitative aspects of business problem formulation. Sampling, time series analysis, linear regression and correlation; application to problems in business and government. *Prerequisite or Concurrent requirement:* [MSCI 5010 (164.501 or 027.501)(Pass)].

MSCI 6070 Quantitative Analysis for Management Cr.Hrs.3 Introduction to the use of quantitative techniques, and computers to solve management problems. Mathematical optimization models, network analysis, and probability models. *Prerequisite:* MSCI 5010. Not to be held with 27.607 or 164.607.

OPM 6090 Production Management Cr.Hrs.3 Analysis of the basic concepts of production systems, and operation and control of such systems.

SCM 7010 Advanced Supply Chain Management Cr.Hrs.3 Provides students at the graduate level with an in-depth examination of the major issues associated with the management of supply chains. The course content includes both managerial and technical matters, and addresses issues such as the importance of supply chain management in meeting global competition, internet and e-business application, supply chain integration and relationships, sharing of risks and rewards, and the reduction of variance in supply chain performance. *Prerequisite:* [A degree in business or discipline related to supply chain management or approval by instructor].

OPM 7300 Topics in Advanced Production and Operations Management Cr.Hrs.3 A study of recent developments in production systems and management. Topics include systems design, plant location and layout, inventory systems planning and control. *Prerequisite:* [OPM 6090 (164.609 or 27.609)(C+)].

MSCI 7550 Readings in Management Science (Ph.D.) Cr.Hrs.3 A study of recent literature in the Management Sciences and their applications, with emphasis on new developments.

MSCI 7560 Doctoral Seminar in Management Science (Ph.D.) Cr.Hrs.3 Seminars on the selected research topics of recent advances in the field of Management Science covering areas of current interests.

MSCI 7680 Mathematical Optimization Models Cr.Hrs.3 A specialized course in mathematical optimization. Linear programming, integer programming, Fritz John and Kuhn-Tucker theorems, quadratic programming, nonlinear programming, duality, network analysis. *Prerequisite:* [MSCI 6070 (164.607 or 027.607)(C+) or consent of instructor].

MSCI 7690 Probability Models and Games Cr.Hrs.3 A specialized course in probabilistic models. Topics include Markov chains, queues, inventories, simulation, games, search problems. *Prerequisite:* [MSCI 6070 (164.607 or 027.607)(C+) or consent of instructor].

MSCI 7700 Mathematical Control Models Cr.Hrs.3 Quantitative aspects of large-scale systems models. Design, implementation, maintenance, and use of such systems, including mathematical models of the firm, and information requirements; systems tests and evaluations. *Prerequisite:* [MSCI 6070 (164.607 or 027.607)(C+)].

Health Administration

See the Faculty of Medicine, Department of Community Health Sciences section of this *Calendar* for course descriptions.

CHSC 7130 Methods in Health Services Research and Evaluation (3)

CHSC 7290 Economic Evaluation of Health Care (3)

CHSC 7300 Health Policy and Planning (3)

CHSC 7310 Epidemiology of Health Care (3)

CHSC 7320 Organization and Financing of the Canadian Health Care System (3)

CHSC 7510 Current Topics in Community Health (3)

CHSC 7520 Principles of Epidemiology 1 (3)

Business Government Relations

See the Faculty of Arts, Public Administration section of this *Calendar* for course descriptions.

POLS 7370 Seminar in Theory and Practice of Public Administration

POLS 7300 Directed Readings in Public Administration

POLS 7340 Canadian Government

POLS 7550 Contemporary Issues in Canadian Politics

Section 47: Mathematical, Computational and Statistical Sciences

Institute of Industrial Mathematical Sciences (IIMS)

General Office: 420 Machray Hall

Telephone: (204) 474 6724

Fax: (204) 474 7602

E-mail: iims@umanitoba.ca

Web: umanitoba.ca/institutes/iims

Academic Staff

See academic staff lists for the departments of Mathematics, Computer Science and Statistics.

Program Information

The Master of Mathematical, Computational and Statistical Sciences is a joint program of the Departments of Mathematics, Computer Science and Statistics. The program is interdisciplinary both in concept and structure, and furthers the mission of the University of Manitoba in its intent to enhance contacts and partnerships with outside organizations.

Students enrolled in the program are employees of industry, business or government. A major component of a student's program is a practicum, which is intended to make an important contribution to a project at the student's place of employment. While working on the practicum the student will be jointly supervised by an Industry Advisor (from the student's workplace) and an Academic Advisor (from the University).

Fields of Research

All applied areas of mathematics, computer science and statistics are potential fields of research under this program.

Research Facilities

The Institute of Industrial Mathematical Sciences is a research institute within the Faculty of Science. The IIMS has the mandate to conduct applied research in the mathematical, computational or statistical sciences – either in collaboration with industry, or on problems motivated by industrial applications. The IIMS also facilitates collaboration between mathematical scientists and industrial partners, and among mathematical scientists in different disciplines. The director of the IIMS is the coordinator of the Master of Mathematical, Computational and Statistical Sciences program.

Master of Mathematical, Computational and Statistical Sciences

Admission

All applications will be reviewed on an individual basis, using the criteria for admission of the Faculty of Graduate Studies. Students are normally expected to have completed a four-year Bachelor's degree in Engineering, Management, Science or other related areas for entrance. In exceptional cases, industrial experience together with appropriate university courses may be considered to be equivalent to the completion of a four-year degree.

Application Deadlines

The following are the deadlines for submission of applications to the IIMS:

Start Date		Canadian/U.S.	Non-Canadian
Regular	(September)	June 1	March 1
Winter	(January)	October 1	July 1
Spring	(May)	February 1	November 1
Summer	(July)	April 1	January 1

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. A minimum of 18 credit hours of approved course work, and a practicum. The specific courses to be taken will depend upon the student's background and area of concentration. Normally, the courses to be taken will be selected from the three participating departments, although appropriate courses from the faculties of Engineering and Management may also be permitted. A required course of all students is a graduate level Industrial Modelling course. This course is currently under development, and will be team taught by members of the three departments.

Second language reading requirement: none

Expected time to graduate: 18 months

Course Descriptions

Courses listed under the departments of Mathematics, Computer Science and Statistics are potential courses in this program.

Section 48: Mathematics

Head: G. R. Krause

General Office: 342 Machray Hall

Inquiries: (204) 474 8703

Fax: (204) 474 7611

E-mail: mathematics_dept@umanitoba.ca

Website: umanitoba.ca/science/mathematics

Academic Staff

Distinguished Professor Emeritus

Cohen, H., B.Sc.(Hons.) (Manitoba), Sc.M. (Brown), Ph.D. (Minnesota), P.Eng., F.A.A.M

Distinguished Professors

Gratzer, G., B.Sc., Ph.D. (Hungarian Academy of Sciences), Dr. Rer. Nat., D.Sc. (Hungarian Academy of Sciences), F.R.S.C.; Gupta, C.K., B.A. (Kashmir), M.A. (Aligarh), M.A.(Hons.), Ph.D. (Australian National), F.R.S.C.;

Professor Emeritus

Woods, R.G., B.Sc.(Hons.), M.Sc. (Manitoba), Ph.D. (McGill).

Senior Scholars

Aitchison, P.W., B.Sc.(Hons.) (London), M.A. (Colorado), Ph.D. (Australian National); Clutton-Brock, M., B.A. (Cambridge), M.Sc. (Victoria), Ph.D. (Washington); Dowling, R.J., B.Sc.(Hons.) (Manitoba), M.A. (Minnesota); Finlayson, H.C., B.Sc., M.Sc. (Alberta), Ph.D. (Minnesota); Gerhard, J.A.,

B.Sc., M.Sc., Ph.D. (McMaster); Holens, T.F., B.Sc.(Hons.), M.Sc. (Manitoba); Kelly, D., B.A.Sc. (UBC), Ph.D. (Queen's); Lakser, H., B.Sc.(Hons.) (Manitoba), A.M. (Princeton), Ph.D. (Manitoba); Losey, N.E., B.A.(Hons.) (Toronto), M.Sc., Ph.D. (Wisconsin), S.U.A.C.; McClure, J.P., B.Sc., M.A. (Waterloo), Ph.D. (Newcastle, UK); Parameswaran, M.R., B.A., Dip. Ger. (Madras), B.Sc.(Hons.), M.A., M.Sc., D.Sc. (Annamalai), M.A. (Manitoba); Quackenbush, R.W., B.S. (M.I.T.), M.S., Ph.D. (Stevens Institute of Technology); Rayburn, M.C., B.A. (Evansville), M.S. (Auburn), Ph.D. (Kentucky); Venkataraman, R., B.A.(Hons.) (Loyola, India), Dip. French, M.Sc., Ph.D. (Madras)

Professors

Berry, T.G., B.Math.(Hons.), M.Math, Ph.D. (Waterloo); Doob, M., A.B. (Columbia), M.A., Ph.D. (CUNY); Ghahramani, F., B.Sc.(Hons.) (Tehran), M.Sc. (Tehran Teacher Training), Ph.D. (Edinburgh); Gumel, A.B., B.Sc. (Bayero), Ph.D. (Brunel); Guo, B., B.Sc. (Fudan), M.Sc., Ph.D. (Maryland); Kopotun, K., M.Sc. (Kiev), Ph.D. (Alberta); Krause, G.R., Dipl. Math., Dr. Phil. Nat. (Frankfurt); Padmanabhan, R., B.Sc., M.Sc. (Madras), Ph.D. (Madurai); Platt, C.R., B.Sc., M.Sc. (Iowa State), Ph.D. (Pennsylvania State); Shivakumar, P.N., B.Sc. (Mysore), M.Sc. (Banaras) (London), Ph.D., D.Sc. (London), C.Math., F.I.M.A.; Sichler, J.J., M.Sc., R.N.Dr., Ph.D. (Charles, Prague); Thomas, R.S.D., B.Sc.(Hons.) (Toronto), M.A. (Waterloo), Ph.D. (Southampton), C.Math., F.I.M.A.; Trim, D.W., B.Sc.(Hons.), M.Sc., Ph.D. (Waterloo); Williams, J.J., B.Sc., M.Sc., Ph.D. (Toronto); Zorboska, N., B.S., M.S. (Skopje), Ph.D. (Toronto).

Associate Professors

Chipalkatti, J. B.Tech (IIT – Bombay), M.S., Ph.D. (Purdue); **Craigien, R.**, B.Sc. (UBC), M.Math., Ph.D. (Waterloo); **Kucera, T.G.**, B.Sc.(Hons.), M.Sc. (Manitoba), Ph.D. (McGill); **Lui, S.H.**, B.Sc., M.Sc. (Toronto), Ph.D. (California Inst. of Tech); **Schippers, E.D.**, B.Sc., M.Sc., Ph.D. (Toronto); **Zhang, Y.**, M.Sc. (Shandong), Ph.D. (Manitoba).

Assistant Professors

Arino, J. B.Sc. (Paris 5), M.Sc. (Paris 6), Ph.D. (Grenoble 1); **Gunderson, D.** B.Sc., M.Sc. (Calgary), Ph.D. (Emory); **Lukcs, G.** B.Sc., M.Sc. (Technion-Israel Institute of Technology), Ph.D. (York); **Portef, S.** B.Sc., M.Sc., Ph.D. (Paris); **Prymak, A.** B. Math, M. Sc., Ph. D. (Kyiv National Taras Schevchenko); **Zhang, Y.** B. Sc. (Henan), M. Sc., Ph. D. (Jilin), Ph. D. (Western Ontario).

Adjunct Professors

Roddy, S., B.Sc. (Lakehead), M.Sc., Ph.D. (McMaster); **Shevchuk, I.A.** B. Sc. (Kyiv State), Ph.D, Doctor of Science (Physics and Mathematics), (Institute of Mathematics, National Academy of Sciences of Ukraine); **Stokke, R.**, B.Sc.(Hon), M.Sc. (Manitoba), Ph.D. (Alberta); **Stokke, A.** B.Sc. (Brandon), M.Sc. (Manitoba), Ph.D. (Alberta)

Program Information

The department offers Master's and Ph.D. programs at the graduate level, which cover many areas of mathematics. Graduates find work in industry or in academia.

Fields of Research

The department has people working in the areas of algebra, analysis, computational mechanics, computer graphics, differential equations, discrete mathematics, finite-element methods, foundations, geometry, matrix computations, numerical analysis and topology. More information about specific individuals and their current graduate students can be found on the department web pages.

The department operates several seminars in addition to graduate courses. Faculty, graduate students and visitors from all over the world participate in such research seminars. Regular seminars are held in discrete mathematics, functional analysis, rings and modules, mathematical biology, topology and universal algebra/lattice theory. There is also a weekly graduate student seminar in which graduate students give talks on topics of their choice.

Research Facilities

The department provides each graduate student with an office (shared) and access to computers, laser printers, mail, photocopier, fax machine, mathematical journals, a reading room and a lounge.

The computer room has several Macintosh and Windows computers running the operating systems - Mac O/S, Windows. Software programs include Maple, Mathematica, MathCad, Matlab, Scientific Workplace, word processing/spreadsheet programs, web access and network access to UNIX servers.

M.Sc. in Mathematics

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, students should generally have a strong background in Mathematics with courses leading to an Honours or four-year Major in Mathematics in a B.Sc., B.A., or equivalent degree. The department's Graduate Studies Committee will evaluate the student's background. Admission to the program will be based on this evaluation. Students with other degrees or backgrounds may be eligible for admission to a pre-Master's program to the satisfaction of the department. Courses will be prescribed on an individual basis to help the student qualify for graduate work in Mathematics. Contact the department for information.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 4 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 9 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The program consists of approved coursework and a thesis or practicum. Students are required to take 15 credit hours of coursework, of which at least 6 hours must be at the graduate level and at least 6 hours in an area of mathematics clearly different from the area of specialization of the thesis or practicum. Particular programs of study within Mathematics may require courses outside the Department of Mathematics.

Second language reading requirement: none

Expected time to graduate: two years

Ph.D. in Mathematics

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Students entering the Ph.D. program must have either an Honours degree or a M.Sc. degree in Mathematics.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 4 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 9 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Particular programs of study within mathematics may require courses outside the Department of Mathematics. In addition to the course work, the student is required to take a candidacy examination, which will consist of three comprehensive exams from the following areas: Algebra, Analysis, Combinatorics, Differential Equations, Geometry, Computational Mathematics, Topology, at least one of which must be Algebra or Analysis. The candidate's supervisor must approve the choice of subjects. To proceed to a Ph.D. degree a student must have a grade of "A" on each of the three parts.

Second language requirement: yes

Expected time to graduation: 3-5 years

Course Descriptions

MATH 8010 Advanced Matrix Computations Cr.Hrs.3 (Formerly 136.801) Matrix computation, decomposition of matrices, iterative methods, sparse matrices, eigenvalue problems. *Prerequisites:* linear algebra, computing, numerical analysis, and approval of department.

MATH 8110 Applied Finite Element Analysis Cr.Hrs.3 (Formerly 136.811) Theory and practice of the finite element method of the solution of partial differential equations and its application to engineering and scientific problems. It includes the h, p and h-p versions, a priori and posteriori error estimates, adaptability and the structure of finite element software. *Prerequisite:* numerical analysis and partial differential equations or approval of department.

MATH 8150 Numerical Solution of Partial Differential Equations Cr.Hrs.3 (Formerly 136.815) Finite-difference and finite-element methods for parabolic, elliptic and hyperbolic partial differential equations. *Prerequisites:* partial differential equations, numerical analysis, and approval of department.

MATH 8210 Topics in Combinatorics 1 Cr.Hrs.3 (Formerly 136.821) Topics will be chosen from the areas of algebraic combinatorics, coding theory, design theory, enumerative combinatorics, graph theory, *Prerequisite:* approval of department.

MATH 8220 Topics in Combinatorics 2 Cr.Hrs.6 (Formerly 136.822) Topics will be chosen from the areas of algebraic combinatorics, coding theory, design theory, enumerative combinatorics, graph theory. *Prerequisite:* approval of department.

MATH 8310 Partial Differential Equations of Applied Mathematics Cr.Hrs.3 (Formerly 136.831) Complex-variable methods, perturbation methods, variational methods, discontinuities. *Prerequisites:* partial differential equations, complex variables, and approval of department.

MATH 8410 Seminar in Applied and Computational Mathematics 1 Cr.Hrs.3 (Formerly 136.841) Designed to accommodate special topics in applied or computational areas of mathematics not included in other course offerings. Students are advised to consult the department as to availability.

MATH 8420 Seminar in Applied and Computational Mathematics 2 Cr.Hrs.6 (Formerly 136.842) Designed to accommodate special topics in applied or computational areas of mathematics not included in other course offerings. Students are advised to consult the department as to availability.

MATH 8430 Seminar in Mathematics 1 Cr.Hrs.3 (Formerly 136.843) Designed to

accommodate special topics not included in topics courses. *Prerequisite:* approval of department.

MATH 8440 Seminar in Mathematics 2 Cr.Hrs.6 (Formerly 136.844) Designed to accommodate special topics not included in topics courses. *Prerequisite:* approval of department.

MATH 8510 Topics in Algebra 1 Cr.Hrs.3 (Formerly 136.844) Designed to accommodate special topics not included in topics courses. *Prerequisite:* approval of department.

MATH 8520 Topics in Algebra 2 Cr.Hrs.6 (Formerly 136.852) Topics will be chosen from the areas of associative and non-associative algebras, Boolean algebra and lattice theory, category theory, group theory, ring theory and universal algebra. *Prerequisite:* approval of department.

MATH 8610 Topics in Analysis 1 Cr.Hrs.3 (Formerly 136.861) Topics will be chosen from the areas of asymptotics, functional analysis, operator theory, real and complex variables, summability theory, topological vector spaces. *Prerequisite:* approval of department.

MATH 8620 Topics in Analysis 2 Cr.Hrs.6 (Formerly 136.862) Topics will be chosen from the areas of asymptotics, functional analysis, operator theory, real and complex variables, summability theory, topological vector spaces. *Prerequisite:* approval of department.

MATH 8710 Topics in Foundations 1 Cr.Hrs.3 (Formerly 136.871) Topics will be

chosen from the areas of logic, model theory, recursive functions, set theory. *Prerequisite:* approval by department.

MATH 8720 Topics in Foundations 2 Cr.Hrs.6 (Formerly 136.872) Topics will be chosen from the areas of logic, model theory, recursive functions, set theory. *Prerequisite:* approval by department.

MATH 8810 Topics in Geometry 1 Cr.Hrs.3 (Formerly 136.881) Topics will be chosen from the areas of algebraic curves, combinatorial geometry, Euclidean geometry, fractal geometry, groups and geometrics, projective geometry. *Prerequisite:* approval of department.

MATH 8820 Topics in Geometry 2 Cr.Hrs.6 (Formerly 136.882) Topics will be chosen from the areas of algebraic curves, combinatorial geometry, Euclidean geometry, fractal geometry, groups and geometrics, projective geometry. *Prerequisite:* approval of department.

MATH 8910 Topics in Topology 1 Cr.Hrs.3 (Formerly 136.891) Topics will be chosen from the areas of compactifications and related extensions, covering properties, rings of continuous functions, set-theoretic topology, topological groups, uniformities and related structures. *Prerequisite:* approval of department.

MATH 8920 Topics in Topology 2 Cr.Hrs.6 (Formerly 136.892) Topics will be chosen from the areas of compactifications and related extensions, covering properties, rings of continuous functions, set-theoretic topology, topological groups, uniformities and related structures. *Prerequisite:* approval of department.

Section 49: Mechanical and Manufacturing Engineering

Head: D.C.S. Kuhn

General Office: E2-327 Engineering Bldg

Telephone: (204) 474 6540

Fax: 204 275 7507

E-mail: me_graduate@umanitoba.ca

Website: umanitoba.ca/engineering/departments/mechanical

Academic Staff

Professors Emeriti

Cahoon, J.R., B.Sc. (Met.E.), M.Sc., Ph.D. (Alberta), P.Eng., FASM; **Hawaleshka, O.**, B.Eng. (McGill), M.Eng. (McGill); **Sims, G.E.**, B.Sc. (M.E.) (Manitoba), M.Sc. (Birmingham), Ph.D. (London), C.S.M.E., P.Eng; **Tangri, K. K.**, B.Sc. (Punjab), B.Sc. (Met. Eng.) (B.H.U., India), M.Sc., Ph.D. (Missouri), P.Eng.

Distinguished Professor and Canada Research Chair

Chaturvedi, M.C., B.Sc. (Met.) (Banara) M.Met., Ph.D. (Sheffield), P.Eng.

Chair Professors: **Bibeau, E. L.**, B.Sc. (McGill), M.Sc., Ph.D. (British Columbia); **Wang, Q.**, B.Sc. (Zhejiang), M.Sc., Ph.D. (Peking).

Professors

Balakrishnan, S., B.Tech., M.Tech. (IIT, Madras), Ph.D. (M.E.) (Manitoba), P.Eng.; **Bassim, M.N.**, B.Sc. (Cairo), M.Sc., Ph.D. (Virginia), P.Eng.; **Chaturvedi, M.C.**, B.Sc. (Met.) (Banara) M.Met., Ph.D. (Sheffield), P.Eng.; **Kuhn, D.C.S.**, B.Sc., M.Sc., Ph.D. (Queens); **Ormiston, S.J.**, B.Sc. (Manitoba), M.A.Sc., Ph.D. (Waterloo), P.Eng.; **Popplewell, N.**, B.Sc.(Hons.) (Math.) (Leeds), M.Sc., Ph.D. (Southampton), P.Eng.; **Richards, N.L.**, Ph.D. (Aston), Dip.Met.Class I (West Glamorgan); **Ruth, D.W.**, B.Sc. (M.E.), M.Sc. (M.E.) (Manitoba), Ph.D. (Waterloo), P.Eng.; **Sepehri, N.**, B.Sc. (SUT, Iran), M.A.Sc., Ph.D. (UBC), P.Eng.; **Soliman, H.M.**, B.Sc. (M.E.) (Assiut), M.S., Ph.D. (M.E.) (Kansas), P.Eng.; **Tachie, M. F.**, M.Sc., Ph.D. (M.E.) (Saskatchewan); **Wang, Q.**, B.Sc.(Zhejiang), M.Sc., Ph.D. (Peking); **Wu, C.Q.**, B.Sc. (Beijing), M.A.Sc. (UBC), Ph.D. (Manitoba), P.Eng.

Associate Professors

Bibeau, E. L. M.A.Sc., Ph.D. (UBC); **Birouk, M.**, M.Sc., Ph.D. (M.E.) (Orlèans); **Chatoorgoon, V.R.**, M.S. (California), B.Sc. (Manchester, UK), Ph.D. (Toronto); **Derksen, R.**, B.Sc., M.Sc., Ph.D. (Manitoba), P.Eng.; **Elmekkawy, T.**, B.Sc., M.Sc. (Cairo U.Egypt), Ph.D. (U. of Windsor); **Jayaraman, R.**, M.Sc. (Wayne State), Ph.D. (Northwestern); **Ojo, O.A.**, B.Sc. (OAU), M.Sc., Ph.D. (Manitoba); **Peng, Q.** B.Eng. M.Eng. (Xian Jiaotong Univ.), Ph.D. (Birmingham, UK); **Singh, M.N.**, B.Sc. (Calgary), M.A.Sc. (Waterloo), Ph.D. (Waterloo);

Assistant Professors

Bartley, J.T., B. Eng. (Lakehead), M.Sc., (M.E.), (Manitoba), Ph.D. (M.E.), (Manitoba); **Luo, Y.**, B.Eng., M.Eng. (Beijing), Ph.D. (Stockholm); **Telichev,**

I., B.Sc., M.Sc., Ph.D. (Russia), Ph.D. (Calgary); **Wang, B. C.**, B.Eng. (China), M.Sc. (China), Ph.D. (Saskatchewan), P.Eng.

Adjunct Professors

Bai, H., B.Sc. (Beijing), M.Eng. (China); Ph.D. (Manitoba); **Bartley, J.T.**, B. Eng. (Lakehead), M.Sc., (M.E.), (Manitoba), Ph.D. (M.E.), (Manitoba); **Caley, W. F.**, B.Sc. (Queens), Ph.D. (Toronto); **Feitosa, E.**, B.Sc. (Brasil), M.Sc. (Brasil), Ph.D. (Southampton); **Naterer, G.F.**, B. Math, M.A.Sc. (M.E.), Ph.D. (M.I.E.) (Waterloo); **Shanker, K.**, B.Tech (Indian Inst Tech), M.S. (Denver), Ph.D. (Florida); **Strong, D.**, B.Sc., M.Sc., Ph.D. (Toronto); **Wang, G.**, B.Sc. (H.U.S.T.) (China), M.Sc. (H.U.S.T.) (China), Ph.D. (Victoria) P.Eng.; **Yee, E.**, Ph.D. (Saskatchewan).

Program Information

The graduate program in the Department of Mechanical and Manufacturing Engineering at the University of Manitoba is well-recognized amongst Mechanical Engineering Departments across and outside Canada. We are proud to deliver a world-class graduate experience leading to degrees in Doctor of Philosophy (Ph.D.), Master of Science (M.Sc.) and Master of Engineering (M.Eng.). All programs are led by well-established professors and adjunct professors engaged with local industry or hospitals with interlocking specializations and the professors are actively engaged in fundamental and cutting edge research in various fields. Our graduate students have access to state of-the-art research facilities and we value the importance of challenging and relevant course work, effective supervision and high quality meaningful research.

Field of Research

Fluid Mechanics: Active research in this area is performed in turbulence, computational fluid dynamics, multiphase flow with droplets and engineering calculations of fluid flow. Droplets vaporization and burning, premixed and non-premixed swirling and non swirling turbulent flames, liquid-fuel -jet break-up and atomization, turbulent measurement and modelling, underwater kinetic turbines.

Thermal Sciences: Concerned with the application of heat and work to engineering problems. Active research is performed in two phase flow, pool boiling simulation, enhanced heat transfer, solid-liquid phase change, entropy analysis/optimization, combined heat transfer and heat transfer in porous media, acoustic wave propagation and supercritical flow stability, ocean hydrothermal energy and minerals research, super-critical properties of ocean hydrothermal fluids, runout table cooling in the steel processing industries.

Material Science and Engineering: Concerned with the behaviour of engineering materials. Active research is focused on deformation studies, joining of aerospace materials, acoustic emission, solidification and diffusion in microgravity, phase transformation in solids, wear and wear protection, processing of polymer composites, durability and interfaces in polymer composites.

Applied Mechanics and Design: Concerned with the analysis and conception of machine and structural components. Active research is performed in biomechanics, solid mechanics, fracture mechanics, fatigue analysis, experimental and finite element analysis of stresses, stress analysis, vibrations and acoustics, kinematics and dynamics of linkage and mechanisms and computer aided design.

Manufacturing and Production: Concerned with analysis, design and operation of automated and feedback control systems. Active research is conducted in robotics, sensor technology, system integration, automatic controls, information systems, human-machine control systems, fluid power systems, teleoperation, virtual design and manufacturing, web-based manufacturing systems. Planning, design and operation of production using queuing theory, networks, scheduling, facilities planning and inventory planning models are also other areas of research.

Research Facilities

Typical research facilities are: Fully equipped facility for turbulence measurements; apparatus to study porosity and multiphase flow in porous media; laser-induced fluorescence capabilities; Unix workstations and several high resolution graphics terminals; apparatus for measurement of pressure drop and heat transfer; two-phase flow regimes during condensation and many more; computer controlled x-ray diffractometer, TEM, SEMs, optical image analyzer, mechanical testing systems, constant stress creep machines, Hopkinson bar high-strain rate deformation systems; corrosion testing and research facilities; photo stress plus system facilities related to processing and manufacture of polymeric composites; laser optics laboratory comprising a vibration-free optical bench; a 10 ton high frequency resonant fatigue machine; analog-digital facilities for the analysis of acoustic and vibration signals; advanced manufacturing cells under full control of personal computers; a rapid prototyping system with a SLA3500 Stereolithography machine; a teleoperated hydraulic MK-II Unimate manipulator; a hydraulic test station for force/motion control studies; a measurement system for human dynamics including a Qualysis motion measurement system with 4-CCD infra red cameras and 3 Kistler Force Plates, in-house designed and built bipedal walking robots and Electromyography (EMG) systems; high speed computer workstations for computational simulations, water and spray/wind tunnels with Particle Image Velocimetry and flow visualization, pulsed and continuous wave laser systems, high-pressure combustion test facility, subsonic wind-tunnel facility, 2D laser Doppler velocimetry (LDV) system, high-speed imaging system.

Degrees

M.Eng.

The M.Eng. program mainly provides working engineers and internationally trained engineers an opportunity to continue their studies and specialize in an area of interest. Applicants must have a minimum of B.Sc. degree in Engineering. In exceptional cases, based on the candidate's professional experience, this requirement may be waived by the department.

The minimum requirement for the award of the M.Eng. degree is 30 credit hours of coursework with at least nine credit hours at the 700/7000 level. Of the 30 credit hours, six credit hours will be assigned to an approved project and report (069.705 M.Eng. Project and Report). The maximum time allowed for completion of the degree requirements is six years.

M.Sc.

Applicants are normally required to hold a Bachelor's degree in Mechanical Engineering or related field from a recognized university. Applicants with other engineering degrees or with honours degrees in related areas may also be accepted at the discretion of the department. In certain cases (e.g., non-engineering graduates), acceptance may be subject to satisfying certain requirements. Contact the department for more information.

A minimum of 18 credit hours of coursework will be required with at least nine credit hours at the 700/7000 level as approved by the student's advisor. The minimum time is one calendar year of full-time study and research and must be spent on campus. The maximum time limit is five years. All candidates for the M.Sc. degree are required to register in MECC 7890, M.Sc. Graduate Research Seminar. The M.Sc. degree will not be awarded without a passing grade in MECC 7890.

Ph.D.

Admission to the Ph.D. program is normally from the Master's degree level. Master's students making exceptional progress while enrolled in their program may be transferred to the Ph.D. program upon the consent of the department head based on recommendations from the student's advisor

and an appointed selection committee who investigate the student's qualifications and suitability for Ph.D. study.

Minimum Program requirements set by the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of the Calendar. All candidates of the Ph.D. are required to register in MECC 7900, Ph.D. Graduate Research Seminar. The Ph.D. will not be awarded without a passing grade in MECC 7900. In addition, the department has supplementary regulations and students should consult with the department regarding Supplementary Regulations.

Application Deadlines

The Department of Mechanical and Manufacturing Engineering allows graduate students to begin their program in January, May, July or September of each year. Canadian and US students should send their applications with supporting documentation directly to the Faculty of Graduate Studies no less than three (3) months before the intended start date. International students should send their applications no later than seven months (7) before the intended start date.

Course Descriptions

Interdisciplinary Courses

MECC 7890 M.Sc. Graduate Research Seminar Cr.Hrs.1 (Formerly 025.789) Seminar presentation and discussion of current research topics in mechanical, manufacturing and materials engineering research.

MECC 7900 Ph.D. Graduate Research Seminar Cr.Hrs.1 (Formerly 025.790) Seminar presentation and discussion of current research topics in mechanical, manufacturing and materials engineering research.

Thermal Sciences

MECC 7150 Conduction Heat Transfer Cr.Hrs.3 (Formerly 025.715) Steady and unsteady state heat transfer by conduction, single and multidimensional systems. Conduction with moving boundaries and computer uses of finite difference techniques.

MECC 7160 Convective Heat Transfer Cr.Hrs.3 (Formerly 025.716) Conservation principles and flux laws. Differential and integral equations of the boundary layer. Momentum and heat transfer for laminar and turbulent flow inside tubes and over external surfaces.

MECC 7170 Radiation Cr.Hrs.3 (Formerly 025.717) Thermal radiation properties, blackbody radiation, heat exchange by radiation among surfaces in the presence or absence of participating media. Theory and measurement techniques, network methods, solar energy utilization.

MECC 7460 Topics in Heat Transfer 1 (3) Selected topics in heat transfer based on 025.715, 025.716, and 025.717. Topics will be chosen from the following: conduction with and without internal heat generation, combined mode heat transfer problems, boiling and condensation heat transfer, heat exchanger design, propulsion systems heat transfer problems, special problems in forced, free and mixed convection, and two-phase flow.

MECC 7470 Topics in Heat Transfer 2 (3) A continuation of certain topics of 025.746 to include the most recent advances in these areas.

MECC 7810 Computational Thermofluids Cr.Hrs.3 (Formerly 025.781) An introduction to the solution of thermofluids problems. Computational techniques (finite difference, finite element, boundary element). Modelling of turbulent flow. Spectral methods.

Fluid Mechanics

MECC 7190 Classical Fluid Mechanics 1 Cr.Hrs.3 (Formerly 025.719) Bernoulli's equation, equations of motion, two-dimensional motion, streaming motions, aerofoils, sources and sinks, moving cylinders, theorem of Schwartz and Christoffel, jets and currents.

MECC 7200 Classical Fluid Mechanics 2 Cr.Hrs.3 (Formerly 025.720) Helmholtz motions, right linear vortices, waves, Stokes stream function, spheres and ellipsoids, solid moving through a fluid, vortex motion, viscosity.

MECC 7220 Boundary Layer Theory Cr.Hrs.3 (Formerly 025.722) Basic concepts of boundary layer and separation. Navier-Stokes equations, exact solutions. Momentum and energy equations, approximate solutions; boundary layer control, and thermal boundary layers.

MECC 7240 Turbomachinery Cr.Hrs.3 (Formerly 025.724) Generalized flow relations in rotating machinery, velocity triangles, limitation on work done per stage and Mach number effects, vortex flow, flow in cascades, blade temperatures and stresses, performance of turbomachines.

MECC 7410 Theory of Turbulence Cr.Hrs.3 (Formerly 025.741) Development and application of statistical theories to isotropic, nonisotropic, and homogeneous turbulent fluid motion.

MECC 7420 Selected Topics in Turbulence Cr.Hrs.3 (Formerly 025.742) An extension of MECC 7410 (or 025.741) to investigate the specialized problems of turbulence such as space-time correlation functions and spectral transfer in constrained and unconstrained fluid flows.

MECC 7430 Stability of Flow Cr.Hrs.3 (Formerly 025.743) Methods of solution of the Orr-Sommerfeld Equation by analytic and computer techniques. Application to

jets, wakes, and boundary layers, including nonlinear effects.

MECG 7500 Topics in Aerodynamics Cr.Hrs.3 (Formerly 025.750) A course dealing with special types of air flows potential, boundary layer, and mixed flows.

MECG 7790 Transport Phenomena in Porous Media Cr.Hrs.3 (Formerly 025.779) Single and multiphase flow in porous media. Porosity, permeability, capillary pressure, relative permeability, electrical properties.

MECG 7800 Topics in Porous Media Cr.Hrs.3 (Formerly 025.780) An extension of MECG 7790 (or 025.779) to allow investigation of special topics; e.g., computational methods, experimental techniques, mixed transport phenomena (diffusion/dispersion, conductive/convective heat transfer), advanced concepts, etc.

MECG 7940 Experimental Methods in Fluid Mechanics Cr.Hrs.3 (Formerly 025.794) Topics will be chosen from: Review of fluid mechanics, combustion and turbulence theory; role of experiments; conventional measurement methods for temperature, pressure and velocity; laser-based techniques for local and global velocity measurements (Laser Doppler Anemometry (LDA), Phase-Doppler Anemometry (PDA), Particle Image Velocimetry (PIV)); other laser-based techniques for imaging and concentration measurements in reacting and non-reacting single and two-phase flows.

Manufacturing and Production

MECG 7510 Industrial Engineering Systems Cr.Hrs.3 (Formerly 025.751) Production engineering, equipment procurement decisions, plant layout and materials handling, optimization methods, models and simulation, control of engineering operations, data processing. *Prerequisites:* MECG 7520 (or 025.752) or 013.361.

MECG 7520 Industrial Engineering Cr.Hrs.4 (Formerly 025.752) Industrial engineering topics, such as value engineering, work measurement, quality control, inventory control scheduling. *Prerequisite:* MECH 4480 (or 025.448).

MECG 7590 Design of Motor Vehicles to Reduce Accident Severity Cr.Hrs.3 (Formerly 025.759) Application of principles of mechanics to the analysis of vehicle accidents; design and performance of tires, brakes, steering, suspension, and bodies; study of passenger injuries; designing of vehicles to minimize passenger injury; human factors in vehicle accidents.

MECG 7600 Selected Topics in Engineering Design Cr.Hrs.3 (Formerly 025.760) Lectures and seminars on selected advanced topics in the field of mechanical engineering design.

MECG 7660 Measurement Systems - Application and Design Cr.Hrs.3 (Formerly 025.766) A sufficiently broad coverage will be provided in both the use and the design of instruments in mechanical engineering and related fields. Analytical treatment of measurement methods and systems will also be covered. Analog-digital processing of measurements with special reference to modern computer-based instruments and computer-aided manufacturing will be provided. *Prerequisite:* MECH 3430 (or 025.343) Measurements and Control.

MECG 7670 Industrial Engineering Research Methods 1 Cr.Hrs.3 (Formerly 025.767) The course consists of assigned, appropriate Industrial Engineering R and D projects of applied nature, targeted to the needs of local industry, an in-depth review of the state of the art in the problem area under consideration. Close supervision is provided by the advisor and the representative of the industry involved. A detailed analysis and report will be presented.

MECG 7680 Advanced Operations Research Cr.Hrs.3 (Formerly 025.768) Formulations and algorithms for the following problems, set partitioning, set covering, clustering, location, layout, order picking, vehicle routing, vehicle scheduling. Applications of these problems to planning of manufacturing systems, scheduling of production, systems, materials handling systems and planning for warehouse and storage systems. *Prerequisite:* MECH 4760 (or 025.476) or consent of instructor.

MECG 7690 Computer Integrated Manufacturing Cr.Hrs.3 (Formerly 025.769) Basic concepts of microcomputer hardware and software with special emphasis on different manufacturing applications. These include data acquisition and analysis, machine monitoring and diagnostics, process control, robotics, machine tool control, automatic testing and quality control.

MECG 7700 Analysis and Design of Industrial Information Systems Cr.Hrs.3 (Formerly 025.770) Analysis of information flow for selected systems: production planning, engineering, warehouse operation, flight scheduling and garment industry. Analysis of user interface for information and decision support systems. Design of selected information and decision support systems. Integrating optimization models with information systems. Analysis and design of modern material requirements planning systems. *Prerequisite:* consent of instructor.

MECG 7710 Modelling and Design of Flexible Manufacturing Systems Cr.Hrs.3 (Formerly 025.771) Components of Flexible Manufacturing Systems (FMS), formulating and solving FMS design and operational problems. Interfacing FMS components and software design. Management of FMS project planning, design and implementation. Stochastic approach to FMS design and operation.

MECG 7720 Industrial Applications of Artificial Intelligence Cr.Hrs.3 (Formerly 025.772) Overview of artificial intelligence components and techniques. Analysis and design of intelligent systems for fabrication, machining, assembly and handling systems. *Prerequisite:* consent of instructor.

MECG 7730 Sequencing and Scheduling Cr.Hrs.3 (Formerly 025.773) Single and multiple machine unconstrained scheduling problems. Constructive algorithms for flow shops and job shop problems. Scheduling problems with due dates, start times and precedence constraints. Optimal and heuristic algorithms for solving scheduling problems. Application of scheduling and sequencing theory for solving a number of practical problems. *Prerequisite:* MECH 4760 (or 025.476).

MECG 7740 Selected Topics in Robot Technology Cr.Hrs.3 (Formerly 025.774) The role of digital computers and digital interface equipment in the control and operation

of robots. Fundamentals of robot kinematics and coordinate systems. Various robotic sensing systems such as vision, tactile, proximity, ultrasonic. The selection of topics may change from time to time depending on student interest and advances in the field of robotic technology. *Prerequisite:* MECH 3350 (or 025.335) or consent of instructor.

MECG 7820 Queueing Systems in Engineering Cr.Hrs.3 (Formerly 025.782) Markov Process, renewal theory, birth-death process. Birth-death queueing systems in equilibrium; Markovian queues in equilibrium; the M/G/1 queue; Jackson networks; numerical methods in queueing; applications of queueing models to production, service, communication and traffic systems.

MECG 7840 Systems Modelling and Simulation Cr.Hrs.3 (Formerly 025.784) Topics may include: Models and Model Building. Mathematical Models: analytical solutions, numerical solutions, steady-state solutions. Modeling techniques: state models, linear graphs, bond graphs, transfer functions, large-scale models, linear vs nonlinear models. Simulation of Systems (discrete/continuous) on digital computers; numerical operations and algorithms. Simulation Languages (discrete/continuous) applied to analysis and design of dynamic and control systems, or, services and manufacturing systems. *Prerequisite:* consent of instructor.

MECG 7870 Human Factors: Theory, Dynamics and Design Cr.Hrs.3 (Formerly 025.787) Dynamics in Human Factors, Theoretical Fundamentals of Ergonomics, Law of Transformations, Dynamics of Cognitive strategies, Information Systems: Ergonomic Analysis and Design, Transformation and Main Ergonomic Problems in Dynamic Manufacturing Technologies. *Prerequisite:* instructor's approval.

MECG 7880 Network Flow Problems in Engineering Cr.Hrs.3 (Formerly 025.788) Notations and Definitions, Network Representations and Transformations, Algorithm Design and Analysis, Shortest Paths, Maximum Flows, Minimum Cost Flows, Assignment and Matchings, Minimum Spanning Trees, Lagrangian Relaxation and Network Optimization, Multi-Commodity Flows, computational Testing of Algorithms, Applications. *Prerequisites:* MECH 3410 (or 025.341) and MECH 4760 (or 025.476).

MECG 7910 System Design for Robots and Teleoperators Cr.Hrs.3 (Formerly 025.791) Definitions and classification. Kinematics: transformations, forward and inverse kinematic solution methods, differential kinematic equations, motion trajectories. Dynamics: energy method vs. Newton-Euler formulation. Actuators; electric, hydraulics and pneumatics. Control: requirement and methods for control of robots and teleoperators. *Prerequisites:* MECH 3430 (or 025.343), MECH 3480 (or 025.348) or equivalent.

MECG 7950 Selected Topics for Productivity Improvement in Manufacturing Cr.Hrs.3 (Formerly 025.795) Will address techniques that can assist North American manufacturing and improve productivity in the global market place in the 21st century. Topics include: productivity techniques, quality, cost, manufacturing control and other pertinent issues.

Materials Science and Engineering

MECG 7280 Advanced Structural Metallurgy Cr.Hrs.3 (Formerly 025.728) Electronic structure of the elements and the periodic table, binding energy and atom arrangements in crystals, solid solution and intermediate phases (valency, electron and size factor compounds). Electron theories of metals, Brillouin Zones and Fermi Surface.

MECG 7290 Diffusion in Solids Cr.Hrs.3 (Formerly 025.729) Diffusion equations, atomic theory of diffusion, diffusion in dilute alloys, diffusion in a concentration gradient, diffusion in non-metals, high diffusivity paths, thermal diffusion, and electrolysis in solids.

MECG 7320 Defects in Crystals and Their Relation to Mechanical Properties of Metals Cr.Hrs.3 (Formerly 025.732) Dislocations and point defects in crystals and their role in the anelastic behaviour, plastic yielding, strain and alloy hardening, ductile and brittle fracture, recovery and recrystallization creep, fatigue, and radiation damage in metals.

MECG 7330 Phase Transformation in Solids Cr.Hrs.3 (Formerly 025.733) Advanced treatment of phase transformations in solids such as precipitation, eutectoid decomposition, and martensitic reactions.

MECG 7340 Corrosion and Oxidation of Metallic Materials Cr.Hrs.3 (Formerly 025.734) Topics include the electromechanical basis of corrosion, corrosion prevention by inhibitors, alloying and heat treatment passivity, stress corrosion cracking and fatigue, crack initiation and propagation, solid state chemistry including ionic and electronic conduction, and oxidation of metals and alloys.

MECG 7350 Research Topics in Physical Metallurgy and Metal Physics Cr.Hrs.3 (Formerly 025.735) Topics selected from recent researches in physical metallurgy and metal physics.

MECG 7370 Modern Research Techniques Cr.Hrs.3 (Formerly 025.737) Laboratory course designed to introduce the research student to a wide variety of equipment and techniques useful in metallurgical research, discussion, and laboratory.

MECG 7380 Electron Microscopy of Materials Cr.Hrs.3 (Formerly 025.738) Theory and practice of electron microscopy, with emphasis on the application of transmission technique to materials research.

MECG 7390 Dislocation Theory Cr.Hrs.3 (Formerly 025.739) Description of a dislocation; the stress field around a dislocation; forces on a dislocation; dislocation reactions in crystals, dislocation multiplication, pole mechanisms, twinning, stacking fault tetrahedron. Peierls force and related topics; image forces, interactions with point defects and other topics.

MECG 7400 Solidification of Metals and Alloys Cr.Hrs.3 (Formerly 025.740) The theory of solidification with respect to microstructure and solute distribution. Practical applications such as casting semiconductors and zone refining.

MECG 7610 Engineering Properties of Polymers Cr.Hrs.3 (Formerly 025.761) A survey of the physics of crystalline and amorphous polymers, including molecular weight distribution measurements, physics of rubber elasticity, theories of the glass

transition, crystallinity measurements, crystallization kinetics, mechanical properties of crystalline and amorphous polymers.

MECG 7620 Fracture of Materials and Structures Cr.Hrs.3 (Formerly 025.762) Griffith criterion for crack propagation, stress intensity factors, plasticity effects, experimental methods for evaluation of criteria, J-integral, crack opening displacement. Microscopic aspects, dislocations at the crack tip, cleavage fracture, nil ductility temperature. Fatigue, creep, stress corrosion cracking.

MECG 7630 Metal Forming Theory and Practice Cr.Hrs.3 (Formerly 025.763) Study of the mechanics of different metal forming processes and general equipment design considerations.

MECG 7920 Engineering Mechanics of Composite Materials Cr.Hrs.3 (Formerly 025.792) Brief overview of composites; constituents; properties; processing and application; micro-mechanics of reinforcement; elastic behaviour of unidirectional lamina; strength of unidirectional lamina; elastic behaviour of multi-directional laminates; stress and failure analysis of multidirectional laminates; hygrothermal effects and durability; introduction to textile composites.

Applied Mechanics

MECG 7260 Theory of Vibrations Cr.Hrs.3 (Formerly 025.726) The formulation of vibration problems using variational principles; matrix formulation of the free and forced vibrations of discrete and continuous systems; the effect of damping; approximate methods for solving the equations of motion; numerical techniques.

MECG 7270 Advanced Vibrations Cr.Hrs.3 (Formerly 025.727) Random vibrations. *Prerequisite:* MECG 7260 (or 025.726).

MECG 7280 Advanced Structural Metallurgy Cr.Hrs.3 (Formerly 025.728) Electronic structure of the elements and the periodic table, binding energy and atom arrangements in crystals, solid solution and intermediate phases (valency, electron and size factor compounds). Electron theories of metals, Brillouin Zones and Fermi Surface.

MECG 7360 Instrumentation Cr.Hrs.3 (Formerly 025.736) A seminar course to provide students in departments other than Electrical Engineering with background knowledge necessary to make effective use of electronic instrumentation in research.

MECG 7450 Biomechanics Cr.Hrs.3 (Formerly 025.745) Topics in kinematics related to normal gait and prosthetic devices; properties of materials used for prostheses;

arterial, bone, and composite materials, including design and manufacturing methods. *Prerequisite:* the former courses 025.213 or ECE 2090 (or 024.209) or consent of instructor.

MECG 7760 Advanced Solid Mechanics Cr.Hrs.3 (Formerly 025.776) Selected advanced topics in solid mechanics; e.g., relationship between solid physics and solid mechanics, mechanical properties for static, low- and high-cycle fatigue, failure theories and mechanisms, theory of shell structures, numerical methods, applications.

MECG 7770 Computer-Aided Engineering Cr.Hrs.3 (Formerly 025.777) Principles and mathematical formulation of computer-aided design, manufacturing and database management systems; related topics pertinent to computer integrated design and manufacturing systems.

MECG 7780 Selected Topics in Engineering Mechanics Cr.Hrs.3 (Formerly 025.778) Lectures and seminars on selected advanced topics in engineering mechanics current problems, implications in current research.

MECG 7830 Computational Mechanics Cr.Hrs.3 (Formerly 025.783) Continuum Mechanics, Hyperelasticity, Theory of Plasticity, Finite element modelling of nonlinear problems and time-dependent material representation. *Prerequisites:* consent of instructor.

MECG 7850 Applied Finite Element Method Cr.Hrs.3 (Formerly 025.785) Weighted Residuals, Boundary versus Finite Element Method, Conventional and Special elements, Equality and Inequality Constraints, Error Estimates, Self-adaptive Techniques and Mixed Formulations. *Prerequisites:* CIVL 4240 (or 023.424) or instructor approval.

MECG 7930 Advanced Non-Linear Systems Analysis Cr.Hrs.3 (Formerly 025.793) Topics may include (i) Modelling of Constrained Dynamic Systems, including derivation of dynamic equations for constrained systems using Lagrangian equations and/or Newton-Euler equations; (ii) Advanced Stability Theories, including construction of Lyapunov functions and Lyapunov's stability control; and (iii) Introduction to Analysis of Non-smooth Systems, including Filippov's solution analysis and extended Lyapunov's stability theory to non-smooth systems. Applications to computer modelling of bipedal locomotion, analysis of robotic contact tasks and stability analysis of power systems will be addressed.

Section 50: Medical Microbiology

General Office:

543 Basic Medical Sciences Building, 745 Bannatyne Avenue

Telephone: (204) 789 3444

Fax: (204) 789 3926

E-mail: nelsonak@ms.umanitoba.ca

Website: umanitoba.ca/faculties/medicine/departments/medicalmicrobiology

Head: Dr. Joanne Embree

Graduate Studies Committee Chair: Dr. Keith Fowke

Graduate Program Assistant: Angela Nelson

Academic Staff

Professor Emeritus

Ronald, A., O.C., M.D., F.R.C.P.C., F.A.C.P., F.R.C.P.C.

Professors

Alfa, M., B.Sc., M.Sc. (NSW), Ph.D. (Alberta); Aoki, F., M.D.(Hons.) (Manitoba), F.R.C.P.C.; Bow, E., B.A.(Hons.), M.Sc. (McMaster), M.D. (Calgary), F.R.C.P.C.; Butler-Jones, D, M.D. (Ontario); Coombs, K., B.A. (University College, Genesio, NY), Ph.D. (Texas); Embree, J., B.Sc. (New Brunswick), M.Sc., M.D. (Dalhousie), F.R.C.P.C.; Fowke, K., Ph.D. (Manitoba); Hammond, G., B.Sc., M.D.C.M. (McGill), F.R.C.P.; Harding, G. M., B.Sc., M.D. (Manitoba), F.R.C.P.C.; Hayglass, K., B.Sc.(Hons); Hoban, D., B.Sc., M.Sc., Ph.D. (Manitoba); Jackson, A., M.D.(Ontario); Jay, F., B.Sc. (McGill), M.Sc. (New Brunswick), Ph.D. (Liverpool); Johnson, W., B.Sc.(Hons.), Ph.D. (Alberta); Klonisch, T., M.D., Ph.D. (Giessen); Light, R., B.A. (Saskatchewan), M.D. (Alberta); McClarty, G., B.Sc.(Hons.), Ph.D. (Manitoba); Moses, S., M.D. (Toronto), M.P.H. (Johns Hopkins); Nicolle, L., B.Sc., B.Sc.(Med.), M.D. (Manitoba), F.R.C.P.C., Certificate of Special Competence in I.D.; Orr, P., M.D. (Toronto), F.R.C.P.C.; Peeling, R., B.Sc. (Toronto), M.Sc., Ph.D. (Manitoba); Plummer, F., M.D. (Manitoba), F.R.C.P.C.; Rubinstein, E., M.D. (Basel); Solbrig, M., M.D. (New York); Yang, X., B.Sc., M.Sc., Ph.D. (Manitoba), M.D. (China); Zhanel, G. B.Sc. (Pharm.), Pharm.D. (Minn.), Ph.D. (Manitoba).

Associate Professors

Artsob, H., B.Sc. (McGill), M.Sc. (McDonald College), Ph.D. (McGill); Blanchard, J., B.Sc., M.D., M.P.H. (Johns Hopkins), Ph.D.(Johns Hopkins);

Elliott, L., M.Sc. (Manitoba), M.D. (Manitoba), F.R.C.P.C.; Embil, J., B.Sc.(Hons.) (Dalhousie), M.D. (Dalhousie), D.A.B.I.M., F.R.C.P.C.; Fast, M., B.Sc.(Med.), M.D. (Manitoba); Feldmann, H., B.Sc.(Hons), Ph.D., M.D. (Germany); Gelmon, L., B.A., M.D. (Saskatchewan); Kabani, A., M.B.Ch.B. (Bristol), F.R.C.P.S., F.A.A.P., F.R.C.P.C. (Med. Micro.); Karlowsky, J., Ph.D. (Manitoba); Krause, D., B.Sc. (Stellenbosch), M.Sc., Ph.D. (Illinois); Kumar, A., M.D. (Toronto), F.R.C.P.C.; Manickam, K., Ph.D.(India); Nagelkerke, N., M.Sc. (Leiden), Ph.D. (Amsterdam); Plourde, P., M.D. (Ottawa); Van Caesele, P., B.Sc., M.D. (Manitoba), F.R.C.P.C.

Assistant Professors

Avery, L., M.D. (Manitoba); Becker, M., M.D. (Manitoba); Crockett, M., M.D. (Queen's); Dawood, M., B.Sc. (Alexandria), M.Sc. (Egypt), Ph.D. (Purdue); Fleming, F., M.D. (Queen's); Gin, A., B.Sc. (Manitoba), Pharm. D. (New York); Joseph, T., Ph.D. (Prince Edward Island); Kasper, K., M.D. (Manitoba); Kimani, J., M.B., Ch.B. (Nairobi); Lagace-Wiens, P., M.D. (Manitoba); Larcombe, L., Ph.D. (Manitoba); Lo, E., M.D. (Toronto); Mburu, D., Ph.D. (Newcastle); Mulvey, M., B.Sc., Ph.D. (Manitoba); Schweizer, F., Ph.D. (Alberta); Severini, A., M.D. (Italy); Skinner, S., M.D. (Saskatchewan); Songok, E., Ph.D. (Japan); Strong, J., M.D. (Calgary); Tipple, G., B.Sc.(Hons.), Ph.D. (Manitoba); Wylie, J., B.Sc., M.Sc. (Ottawa), Ph.D. (Manitoba); Yao, X.J., M.Sc. (Beijing), M.D. (Suzhou), Ph.D. (Montréal); Zhong, W., Ph.D. (China).

Adjunct Professors

Alimonti, J., Ph.D. (B.C.); Andonov, A., M.D. (USSR); Ball, B., Ph.D. (Manitoba); Bernard, K., M.Sc. (McGill); Berry, J., Ph.D. (Manitoba); Booth, S., Ph.D. (Oxford); Booth, T., B.Sc., Ph.D. (U.K.); Cao, J., Ph.D. (Surrey); Carpenter, M., Ph.D. (Manitoba); Clark, C., Ph.D. (Alberta); Corbett, C., Ph.D. (Calgary); Drebot, M., Ph.D. (Dalhousie); Gilmour, M., B.Sc., Ph.D. (Alberta); Graham, M., Ph.D. (Guelph); Gruwel, M., Ph.D. (Dalhousie); He, R., M.D. (Beijing), Ph.D. (Dalhousie); Jones, S.M., Ph.D.(Plymouth, UK); Jones, S.J.M., Ph.D. (Cambridge); Knox, D., Ph.D. (Ontario); Kobasa, D., Ph.D.(Alberta); Kobinger, G., Ph.D. (Montreal); Li, Y., B.Sc., Ph.D. (China), Ph.D. (Ottawa); Luo, M., Ph.D. (Manitoba); Nadon, C., Ph.D.(New York); Ng, L.K., B.Sc., M.Sc., Ph.D. (Alberta); Osiowy, C., B.Sc., M.Sc. (Manitoba), Ph.D. (Calgary); Saward, L., Ph.D. (Manitoba); Sharma, M., Ph.D.(India); Ströher, U., Ph.D. (Germany); Wagener, S., M.Sc., Ph.D. (Germany); Weingartl, H., M.Sc., Ph.D. (Ontario).

Program Information

The Department of Medical Microbiology offers programs of studies leading to the MSc and PhD degrees with research and academic experience suitable for a career in Basic Microbiology or Infectious Diseases.

The department has nationally recognized strengths in several areas, particularly epidemiology. It also enjoys extensive collaborative projects with both the University of Kenya in Nairobi, Kenya, and with the new federal laboratories for disease research. The Nairobi project uses epidemiologic, biologic, and molecular biologic studies to better understand sexually-transmitted diseases in the African population. Similar studies are being instituted in India. Numerous opportunities for collaborative work with members of other departments as well as with various affiliated research organizations (including the Clinical Microbiology Laboratories of the Health Sciences Centre, the Infectious Diseases programs of the Health Sciences Centre, the Cadham Provincial Laboratory, the federal laboratories, and St. Boniface Hospital) exist.

Recent graduates of the program have been highly successful in academia, industrial, medical, and veterinary careers.

Fields of Research

Scientific interests of the Department are broad and research projects range from the basic understanding of gene regulation and molecular basis of cellular functions to the development of vaccines and diagnostics for human health and veterinary diseases. The Department has active research programs in cell and molecular biology, immunology, virology, bacterial genetics, microbial pathogenicity, Chlamydial biology, and clinical microbiology. Many research projects are oriented to human diseases and many are carried out in collaboration with physicians who have access to patients.

Research Facilities

Medical Microbiology occupies the 5th Floor of the Basic Medical Sciences Building on the Bannatyne Campus of the university and includes modern research laboratories. Teaching and research are also conducted within the Clinical Microbiology Laboratories of the Health Sciences Centre and within the infectious diseases programs of the Health Sciences Centre, National Research Council, Cadham Provincial Laboratory, St. Boniface Hospital, and the Canadian Science Centre for Human and Animal Health. The department's equipment, much of which is shared, supports research ranging from molecular biology to clinical microbiology. It includes ample biohazard containment facilities, controlled environment equipment, ultracentrifugation, spectrophotometric, chromatographic and electrophoretic equipment, a transmission electron microscope, fluorescent microscopes, liquid scintillation counters, personal computers and computer terminals for direct access to the main frame computer. A library and a number of other ancillary facilities are available.

M.Sc. in Medical Microbiology

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, graduates in Medicine, Dentistry, Veterinary Medicine, or general Science may apply for entry into this graduate program. The department requires that an incoming student have a minimum Grade Point Average of 3.0, or its equivalent, in the two years immediately preceding first registration. Students with a three-year B.Sc. degree must normally enrol in a pre-Master's course arranged in consultation with the Graduate Studies Committee and the head of the department.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the **Faculty of Graduate Studies** as follows:

Session	Start Date	Canadian/US	International
Regular	(September)	June 1	March 1
Winter	(January)	October 1	July 1
Spring	(May)	February 1	November 1
Summer	(July)	April 1	January 1

Please note that the name or names (up to 3) of a potential supervisor must be indicated on the application (page 2). For faculty researcher information please visit the Department link under the Faculty of Medicine on the University of Manitoba website.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Second language reading requirement: none

Expected time to graduate: 2 - 3 years

Ph.D. in Medical Microbiology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

As listed above in Master's Program section.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Second language requirement: none

Expected time to graduation: 5 to 6 years

Course Descriptions

The following courses may be taken for major or ancillary credit (except for MMIC 7180). Students in any category may apply for registration, with the consent of the department, but those doing research in the department concurrently must restrict their coursework to 12 credit hours, unless special permission is obtained to the contrary. **Not all courses are offered in every session.**

MMIC 6010 Biological Safety Cr.Hrs.3 Critical Analysis of biological safety in the research, diagnostic and hospital environment; assessment of the underlying causes of laboratory acquired infections and the administrative, engineering and personal protective control measures available; analysis of current and new bio-containment technologies, risk assessment tools, the need for scientific based decision making and the public perception versus real risk.

MMIC 7010 Virology Cr.Hrs.6 Fundamental properties of viruses of bacteria, animals and plants. *Prerequisite:* permission of instructor.

MMIC 7020 Medical Mycology Cr.Hrs.3 Characteristics of pathogenic fungi of humanity. Relevant laboratory work.

MMIC 7040 Clinical Bacteriology Cr.Hrs.6 Scientific basis of routine laboratory methods used in the diagnosis of bacterial infection: specimen handling techniques; laboratory organization.

MMIC 7050 Microbial Pathogenicity Cr.Hrs.6 Comparative structure of virulent and avirulent bacteria, biochemical basis of virulence; host defenses.

MMIC 7140 Clinical Parasitology Cr.Hrs.3 The course will consist of a series of lectures on the epidemiology, molecular pathogenesis, clinical features, diagnosis (clinical and laboratory), treatment and prevention of human disease; each class is followed by a laboratory period in which the student obtains some practical experience.

MMIC 7160 The Molecular Basis of Antibiotic Action Cr.Hrs.3 Historical development, mechanism of action, principles of antimicrobial susceptibility testing and molecular and genetic basis for antibiotic resistance transfer. *Prerequisite* courses include Microbial Physiology or Biochemistry and at least an introductory course in Genetics and the consent of instructor.

MMIC 7170 Molecular Biology of Animal Viruses Cr.Hrs.3 Lecture and conference course. Recent advances in molecular aspects of virus structure, replication, genetics, and spectrum of virus-host cell interaction. *Prerequisites:* MMIC 7010 (or 097.701), or consent of instructor.

MMIC 7200 Host Defence Responses Cr.Hrs.3 Aspects of the cellular responses during inflammation and infection. Topics will include inflammatory cell function, mechanisms of cell accumulation and activation, roles of cytokines in these processes. Selected examples will be discussed in detail. The course will involve some student presentations.

MMIC 7210 Clinical Virology Cr.Hrs.3 Overview of the association between viruses and human diseases; biology of host and virus interaction and role of immune system to control infection; understanding the role of laboratory services and patient management; create appreciation for role of molecular-based diagnostic methods in the detection of new human pathogens. Lecture/laboratory components.

MMIC 7220 The Ecology of Infectious Diseases Cr.Hrs.6 Explores the study of infectious diseases in a global context from the perspective of biomedical, clinical, health systems/services and social, cultural and environmental determinants of health and disease. The course features didactic, self-directed reading and interactive small group sessions.

Section 51: Medical Rehabilitation

General Office: R106-771 McDermot Avenue

Telephone: (204) 789 3259

Fax: (204) 789 3927

E-mail: msc_med_rehab@umanitoba.ca

Website: umanitoba.ca/medrehab

Director: Emily Etcheverry, PhD

Graduate Chair: Brian MacNeil, PhD

Academic Staff

Professor Emeritus

Cooper, J.E., Dip. P. and O.T. (Toronto), B.O.T., M.Sc., Ph.D. (Manitoba)

Professors

Etcheverry, E., Dip O.T., B.O.T., M.Ed, Ph.D. (Manitoba); Pasterkamp, H., MD (Lubeck), FRCPC

Associate Professors

Collins, D., B.Sc.(O.T.) (Queen's), M.Sc. (Manitoba); Kriellaars, D., B.P.E. (Manitoba), M.Sc. (Dalhousie), Ph.D. (Manitoba); MacNeil, B.J., B.Sc.(P.T.) (Dalhousie), Ph.D. (Waterloo); Shay, B, BMR (P.T) (Manitoba), BA (Winnipeg), MPT (Manitoba), Ph.D (Manitoba); Swinamer, J., B.P.T. (Manitoba), M.S.A.(Health) (Central Michigan); Szturm, T.J., B.Sc.(P.T.) (Western), Ph.D. (Manitoba).

Assistant Professors

Barclay-Goddard, R., B.M.R.(P.T.) (Manitoba), M.H.Sc. (McMaster), Ph.D. (Manitoba); Friesen, M., Dip.O.T. (Alberta), B.O.T., M.Ed., Ph.D. (Manitoba); Giesbrecht, E., B.S.W., B.M.R.(O.T.), M.Sc. (Manitoba); Leclair, L., B.A. (Manitoba), B.H.Sc.(O.T.) (McMaster), M.Sc. (Manitoba); Lee, C.E., B.Sc.(P.T.) Alberta, Ph.D. (Texas Woman's); Quanbury, A., B.Sc. (Queen's), M.A.Sc. (Toronto); Restall, G., BMR(O.T.) (Manitoba), M.Sc. (Alberta); Ripat, J., BMR (O.T.), M.Sc. (Manitoba); Sullivan, T., B.Sc.(O.T.) (Western Ontario), M.A. (Columbia); Weinberg, L., Certificate in Gerontology, B.P.T., M.Sc., Ph.D. (Manitoba); Wener, P., B.M.R. (O.T.), M.Ed. (Manitoba).

Program Information

The School of Medical Rehabilitation currently offers an M.Sc. (Rehabilitation) degree program. The purpose of this program is to conduct and promote basic and clinical research in the prevention and rehabilitation fields. The research conducted at the School of Medical Rehabilitation can be framed within the International Classification of Function. This framework emphasizes the interactions between body structures and functions, the ability to perform various activities, and participation in society.

The diverse research programs and facilities of the School offer opportunities for graduate education in the areas of neuroscience, cardiorespiratory function, exercise physiology, musculoskeletal function, and human occupation. Through proximity to a range of clinical settings and strong collaborative links the program offers particular opportunities to engage in clinically relevant research. Graduates of this program have gone on to advanced clinical practice and administrative positions within the health care system. In addition, graduates have also pursued research careers through various doctoral programs including the PhD in Applied Health Sciences program.

Fields of Research

The School has several diverse but complimentary programs of research in the areas listed above which are directed to: assessing outcomes of therapeutic interventions by single centre clinical trials; furthering understanding of the physiological basis of current rehabilitation clinical practice; developing new strategies to restore function or to substitute for functional losses, as well as to improve mobility and enhance physical adaptation to functional losses; developing new strategies to manage functional impairment; developing rehabilitation-related interventions to minimize secondary impairments and promote life long health; developing innovative rehabilitation interventions, including novel physical therapies and rehabilitation engineering products; and understanding the mechanisms of workplace injury, developing strategies to prevent injury and decrease morbidity consequent to work-related injury developing interventions for primary prevention of disease related to physical inactivity.

Research Facilities

The School of Medical Rehabilitation is located at the Bannatyne Campus in downtown Winnipeg. This campus is adjacent to the Health Sciences Centre, a major teaching hospital complex, with rehabilitation-related facilities for pediatric, adult and geriatric patients including physiotherapy, occupational therapy, rehabilitation engineering, prosthetics and orthotics. The school has a number of world-class research laboratories conveniently located in the Rehabilitation Hospital of the Health Sciences Centre and the Bannatyne Campus of the University of Manitoba.

M.Sc. (Rehabilitation)

Admission

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, admission requirements include a baccalaureate degree in Physical Therapy, or Occupational Therapy, or Respiratory Therapy, or a baccalaureate degree in an area related to rehabilitation, and an academic record which meets the entrance requirements of the Faculty of Graduate Studies.

Application Deadlines

The School of Medical Rehabilitation allows students to begin their program on either September 1 or January 1. For admission for each of these start dates, Canadian/U.S. students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than three (3) months before the intended start date. Non-Canadian students should send their applications with complete supporting documentation to the Faculty of Graduate Studies to arrive no later than six months (6) before the intended start date.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Second language reading requirement: None

Expected time to graduate: Two years

Ph.D. (Applied Health Sciences)

The School of Medical Rehabilitation, along with the Faculty of Physical Education and Recreation Studies, Faculty of Human Ecology, and Faculty of Nursing, offers a multi-faculty Ph.D. in Applied Health Sciences. Information on this program may be found in another section of this calendar.

Course Descriptions

REHB 7010 Neurosciences Cr.Hrs.3 (Formerly 068.701) To provide the student with a comprehensive understanding of the neurophysiological basis of motor behaviour including: motor control mechanisms, pathophysiological correlates, and clinical manifestations of central nervous system lesions involving motorcentres.

REHB 7050 Ergonomics Cr.Hrs.3 (Formerly 068.705) This course shall examine the basic tenet of ergonomics, "the modification of the environment to meet the needs of the individual," and contrast this to "the adaptation of the individual to meet the constraints of the environment."

REHB 7060 Gerontology Cr.Hrs.3 (Formerly 068.706) Designed to increase knowledge and understanding of geriatric/gerontology research related to the biological, physical, psychological and sociological health and function of older adults in society. A particular focus will be on social cognition and the role of perceived control in the rehabilitation of older adults.

REHB 7070 Exercise Rehabilitation for Persons with Disabilities Cr.Hrs.3 (Formerly 068.707) The student shall acquire a better understanding and increased knowledge of: the application of endurance exercise testing and training principles with disabled individuals; and the practical application of these skills.

REHB 7130 Advanced Ergonomics Cr.Hrs.3 (Formerly 068.713) This course is designed to enhance the student's understanding and application of ergonomic principles in the clinical setting. The student will choose from a selected list of current ergonomic topics and will research this topic under the guidance of the supervisor. The research will be formally presented at the end of the course.

REHB 7160 Rehabilitation Research Techniques Cr.Hrs.3 (Formerly 068.716) Introduction to techniques used in rehabilitation research including bioelectrical signal recording such as electro-myography, strength assessment using isovelocity dynamometry, acquisition, processing and storage of experimental data.

REHB 7170 Topics in Rehabilitation Cr.Hrs.3 (Formerly 068.717) A readings, tutorial and practical course designed to enhance the student's knowledge of basic science and clinical investigations within a topic area relevant to the student's research inter-

ests.

REHB 7180 Readings in Rehabilitation Cr.Hrs.3 (Formerly 068.718) Readings course covering recent advances in an area of rehabilitation related to a student's field of research.

REHB 7190 Structure and Function of the Musculoskeletal System Cr.Hrs.3 (Formerly 068.719) Tutorial and laboratory course providing in-depth study of the structure and function of a specific musculoskeletal region pertinent to rehabilitation. Synthesis of subject material in anatomy, physiology, biomechanics, pathology and rehabilitation. *Prerequisites:* REHB 1450 (or 068.145), REHB 1460 (or 068.146), REHB 1530 (or 068.153) or REHB 2890 (or 068.289), and REHB 3470 (or 068.347) or equivalent courses.

REHB 7200 Dynamometry Cr.Hrs.3 (Formerly 068.720) A comprehensive study of dynamometry and the use of dynamometers for the assessment of strength, endurance and passive properties of soft tissues.

REHB 7210 Dynamics I Cr.Hrs.3 (Formerly 068.721) To understand the relationship between neuro-physiological and biomechanical factors in the production of functional multi-segmented motion in clinical motor disorders encountered in medical rehabilitation.

REHB 7220 Dynamics II Cr.Hrs.3 (Formerly 068.722) This course is designed to enhance the student's understanding and application of biomechanical principles to the clinical setting. The student will choose from a selected list of current kinesiological topics and will research this topic under the guidance of the supervisor. The research will be formally presented at the end of the course. *Prerequisite:* REHB 7210 (or 068.721).

Section 52: Microbiology

Head: P.C. Loewen

General Office: 418 Buller Building

Telephone: (204) 474 9372

Fax: (204) 474 7603

E-mail: sberg@ms.umanitoba.ca

Website: umanitoba.ca/science/microbiology

Academic Staff

Professor Emeritus

Suzuki, I., B.Sc. (Tokyo), Ph.D. (Iowa).

Distinguished Professor

Butler, M., B.Sc. (Birmingham), M.Sc. (Waterloo), Ph.D. (King's College)

Professors

Loewen, P.C., B.Sc., Ph.D. (Alberta), Canada Research Chair in Protein Chemistry.

Associate Professors

Court, D.A., B.Sc.(Hons.) (Regina), Ph.D. (Guelph); **de Kievit, T.** B.Sc. (Waterloo), B.Sc. (Spec.Hons.) (Guelph), Ph.D. (Guelph); **Dibrov, P.,** M.Sc., Ph.D. (Moscow State); **Hausner, G.,** B.Sc. (Winnipeg), M.Sc., Ph.D. (Manitoba); **Oresnik, I.J.,** B.Sc., M.Sc. (McMaster), Ph.D. (Queen's); **Sparling, R.R.M.,** B.Sc. (McGill), Ph.D. (Iowa); **Worobec, E.A.,** B.Sc. (Winnipeg), Ph.D. (Alberta); **Yurkov, V.,** M.Sc. (Moscow State), Ph.D. (Moscow Academy of Sciences).

Assistant Professors

Brassinga, A.K., B.Sc., Ph.D. (McGill); **Cardona, S.,** B.Sc. (Buenos Aires), Ph.D. (Chile); **Mark, B.L.,** B.Sc. (Hons.) (Winnipeg), M.Sc. (Manitoba), Ph.D. (Alberta).

Adjunct Professor

Theriault, S., B.Sc., M.Sc., Ph.D. (Manitoba).

Program Information

Microbiological research is one of the most dynamic areas of scientific endeavour. Concern over the impact of society's activities on the environment is increasing and there is a strong need for research in environmental microbiology. Biotechnology, molecular genetics, and biochemistry show tremendous promise in many areas of medicine, agriculture, industry and basic microbiological research. Technological advances are continually expanding in these areas of research. They all depend heavily on basic research and a supply of highly trained individuals. Graduates from the microbiology department take up positions in industry, universities, and the public sector. The demand for these graduates continues to be high.

REHB 7230 Independent Study Cr.Hrs.6 (Formerly 068.723) Students complete an in-depth study of evidence for practice in an area of interest. Students will work with an assigned faculty advisor to define and evaluate a particular area of interest in rehabilitation practice, particularly in occupational or physical therapy.

REHB 7240 Theoretical Foundations of Occupational Therapy Cr.Hrs.3 (Formerly 068.724) An in-depth study of the theory base in Occupational Therapy. The focus of the course is models of occupation and their impact on occupational therapy practice. *Prerequisite:* Previous degree in Occupational Therapy.

REHB 7250 Facilitating Client-Centred Processes Cr.Hrs.3 (Formerly 068.725) Theory and practical course designed to develop an advanced understanding of the principles of client-centred practice. The course will focus on the development of the requisite knowledge, skills and attitudes to evaluate and implement client-centred approaches and facilitate environments conducive to client-centred practice. *Prerequisite:* Consent of instructor

REHB 7260 Assistive Technology Cr.Hrs.3 (Formerly 068.726) A theory and practice course designed to develop an advanced understanding of the application of technology for individuals with disabilities as a means to occupation. Particular emphasis will be on evaluating the impact and understanding the theory guiding the use of assistive technology, and developing an understanding of the contexts in which assistive technologies are used.

REHB 7270 Pain and Rehabilitation Cr.Hrs.3 (Formerly 068.727) Designed to enhance the student's knowledge of basic science and clinical investigations related to pain, as well as the clinical relevance of pain transmission and modulation in rehabilitation. The course is delivered in small group tutorial format to facilitate student interaction and exchange of information.

Fields of Research

The department offers M.Sc. and Ph.D. programs of study. The research interests of the faculty and students are concentrated in several main areas: microbial ecology and geochemistry; molecular biology/genetics; metabolism of autotrophic bacteria; microbial biotechnology and biochemistry; microbial pathogenicity.

Research Facilities

Microbiology program faculty members are engaged in active research projects. The department has all the facilities needed to conduct research in areas of specialization and the inventory of modern equipment is one that would be expected in any active research unit. In addition, close ties with other departments allow for the use of their facilities.

M.Sc. in Microbiology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Application and supporting documentation are submitted to the Faculty of Graduate Studies. International students must submit this material at least 5 months before their intended starting date, i.e. April 1st for September start, August 1 for January start; December 1 for May start and February 1 for July start. Canadian and U.S. students should submit two months in advance.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar and the departmental supplementary regulations.

Second language reading requirement: none

Expected time to graduate: 2 - 3 years

Ph.D. in Microbiology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Application and supporting documentation are submitted to the Faculty of Graduate Studies. International students must submit this material at least 5 months before their intended starting date, i.e. April 1st for September start, August 1 for January start; December 1 for May start and February 1

for July start. Canadian and U.S. students should submit two months in advance.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar and the departmental supplementary regulations.

Second language requirement: none

Expected time to graduation: 4 - 6 years

Course Descriptions

MBIO 7010 Graduate Seminar in Microbiology 1 Cr.Hrs.3 (Formerly 060.701) Seminars covering areas of interest to the faculty and students in the graduate Microbiology program, and current developments in the broad field of microbiology (including microbial physiology, environmental microbiology, virology, pathogenicity, genetics, molecular biology, biochemistry, biotechnology, and cell culture). Open to all qualified students by permission of the Microbiology department head.

MBIO 7020 Graduate Seminar in Microbiology 2 Cr.Hrs.3 (Formerly 060.702) Seminars covering areas of interest to the faculty and students in the graduate Microbiology program, and current developments in the broad field of microbiology (including microbial physiology, environmental microbiology, virology, pathogenicity, genetics, molecular biology, biochemistry, biotechnology, and cell culture). Open to all qualified students by permission of the Microbiology department head.

MBIO 7030 Graduate Seminar in Microbiology 3 Cr.Hrs.3 (Formerly 060.703) Seminars covering areas of interest to the faculty and students in the graduate Microbiology program, and current developments in the broad field of microbiology (including microbial physiology, environmental microbiology, virology, pathogenicity, genetics, molecular biology, biochemistry, biotechnology, and cell culture). Open to all qualified students by permission of the Microbiology department head.

MBIO 7040 Graduate Microbiology Cr.Hrs.3 Topics and current developments in the field of microbiology will be covered. A combined discussion, seminar and written exam format may be used. Inquire at the department for availability.

MBIO 7050 Environmental Microbiology Cr.Hrs.3 Topics and current developments in the field of environmental microbiology will be covered. A combined lecture, discussion, assignment and seminar format may be used. Inquire at the department for availability.

MBIO 7060 Microbial Interactions Cr.Hrs.3 Topics and current developments in the field of microbial interactions will be covered. A combined discussion, seminar and

written exam format may be used. Inquire at the department for availability.

MBIO 7080 Biochemical Mechanisms Cr.Hrs.3 (Formerly 060.708) A treatment of current concepts of biochemical mechanisms in selected areas of investigation, including multifunctional enzyme complexes and membrane-associated systems. Prerequisite: consent of instructor. Inquire at department for availability.

MBIO 7090 Biological Oxidations and Bioenergetics Cr.Hrs.3 (Formerly 060.709) A treatment of current concepts of biological oxidations, and bioenergetics in microorganisms including autotrophic bacteria. Inquire at the department for availability. Currently not offered.

MBIO 7100 Advanced Concepts in Molecular Biology Cr.Hrs.3 (Formerly 060.710) Recent advances in the molecular basis and control of gene activity; information transfer and molecular evolution. Currently not offered.

MBIO 7110 Advances in Microbial Genetics Cr.Hrs.3 (Formerly 060.711) Developmental genetics; recombination; bacteriophages; fine structure analysis; biochemical genetics and specialized genetic systems. Inquire at the department for availability

MBIO 7120 Enzymology Cr.Hrs.6 (Formerly 060.712) Lectures and reading assignments on the structure and function of enzymes and on enzyme kinetics. Each student will isolate, purify, and study the kinetics of a particular enzyme reaction. Currently not offered.

MBIO 7130 Advanced Physiology of Bacteria Cr.Hrs.3 (Formerly 060.713) An assignment and conference course. Selected topics covering recent advances in the energy relationships of bacteria and the growth and death of bacteria. Currently not offered.

MBIO 7160 Special Problems in Microbiology Cr.Hrs.3 (Formerly 060.716) An assignment and conference course to be taken only through consultation with the head of the department. The topics will vary, depending upon student needs and interests, and will include specialized topics not available in regular course offerings.

MBIO 7170 Current Topics in Mammalian Cell Culture Cr.Hrs.3 (Formerly 060.717) A lecture and discussion course based on current research problems involving mammalian cells in culture. Prerequisite: consent of instructor. Inquire at the department for availability.

MBIO 7180 Bioprocessing Cr.Hrs.3 This course allows students with a background in either biological sciences or engineering an understanding of biochemical engineering process that lead to important chemical conversions by biological processes. These will be related to present or potential industrial applications. Inquire at the department for availability.

MBIO 7190 Microbial Ecology Cr.Hrs.3 (Formerly 060.719) Topics and current developments in the field of microbial ecology will be covered with emphasis on aquatic ecosystems. A combined lecture, discussion, and seminar format will be used. Currently not offered.

Section 53: Music

Marcel A. Desautels Faculty of Music

General Office: Room 206 Music Building

Telephone: (204) 474-9310

Fax: (204) 474-7546

E-mail: music@umanitoba.ca

Web site: umanitoba.ca/music

Dean: Edmund Dawe

Associate Dean: Joan E. Linklater

Graduate Chair: Michael Matthews

Registrar: Susan Leeson

Academic Staff

Professors Emeriti

Engbrecht, H., A.R.C.T., B.Mus. (Bethel College), M.Mus. (Southern Methodist); **Turner, R.**, B.Mus. (McGill), M.Mus. (Peabody), D.Mus. (McGill).

Senior Scholar

Rempel, U., B.Mus., Ed.Cert.(British Columbia), M.A.(California, Santa Barbara)

Professors

Dawe, E., B.Mus., B.Mus.Ed. (Memorial), M.Mus. (Western Ontario), D.M.A. (British Columbia); **Jensen, K.**, B.Mus. (Saskatchewan), L.Mus. (Saskatchewan), Recital Dip. (Royal Academy of Music), L.R.A.M., Ph.D. (London); **Matthews, M.**, B.Mus. (California State, Northridge), M.A. (California State, Sacramento), Ph.D. (North Texas State).

Associate Professors

Braun, M., B.Mus., M.Mus. (Toronto); **Burleson, R.**, B.Mus. (Hartford), M.A. (Washington); **Gillis, R.**, B.Mus.Ed. (Saskatchewan), M.Mus., D.M.A.

(Michigan); **Horton, C.**, B.Mus. (Redlands), M.Mus. (North Carolina); **Kehler Siebert, J.**, B.A. (Winnipeg), M.Mus. (Toronto), D.M.A. (Eastman); **Kirby, S.**, B.Mus. (Webster), M.Mus. (Manhattan); **Linklater, F.**, B.Mus. (Brandon), M.Mus. (North Texas), Ph.D. (Michigan); **Markstrom, K.**, B.Mus., M.Mus, M.Lib.Sc. (Alberta), Ph.D. (Toronto); **Moroz, D.**, B.Mus., M.Mus. (Juilliard), D.Mus. (Montreal); **Pokhanovski, O.**, B.Mus. (Moscow), D.Mus. (Montreal); **Sandred, Ö.**, M.F.A., Diplom i Komposition (Royal College of Music, Stockholm).

Assistant Professors

Chung, M., B.M. (Oberlin), M.M. (Northwestern), D.M.A. (Stony Brook); **Colligan, G.**, B.Mus. (Peabody), M.Mus. (Queens College); **Fitzell, G.**, B.Mus. (Brandon), M.Mus. (Alberta), Ph.D. (British Columbia); **Friesen, E.**, B.Mus., B.Ed., M.Mus. (Manitoba); **Greene, J.**, B.Mus. (Hartt); **Harrington, A.**, B.Mus. (Saskatchewan), M.Mus. (Northwestern); **Linklater, J.**, B.Mus. (Brandon), M.Mus. (Michigan); **Loewen, L.**, B.Mus. (Brandon), M.Mus. (Montreal), D.M.A. (Minnesota).

Program Information

The Marcel A. Desautels Faculty of Music offers a Master of Music (M.Mus.) in three major areas: performance, composition and conducting. The emphasis is upon full professional preparation in a strong academic context. Students in the string component of the program are eligible for adjunct training by a special agreement with the Winnipeg Symphony Orchestra. Students in the voice component are eligible to be considered for training and solo professional activities with Winnipeg operatic companies, choral organizations and chamber groups. Students in the collaborative piano component are eligible to be considered for training with Winnipeg operatic companies and choral organizations or with professional chamber ensembles.

Fields of Creative Work and Research

The Faculty fosters an active, integrated performance environment which provides the broadest possible professional training. This is complemented by a program of research in musicology, ethnomusicology, jazz, music theory and related fields. Students with interests outside of the M.Mus. have the option of pursuing advanced studies in music via the Individual Interdisciplinary Program (IIP) of the Faculty of Graduate Studies.

Research Facilities

Of particular interest to students in the M.Mus. (composition) is our Electroacoustic Music Studio. Our library resources support a wide variety of performance studies in various historical eras.

Master of Music program

Admission

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Persons who have completed (1) a four-year undergraduate degree program in music with a minimum 3.0 GPA in the last two full years or (2) a conservatory diploma which is offered in residence, may apply for admission to the M.Mus. program.

Application Deadlines

All applications should be sent to the Faculty of Graduate Studies on or before December 10th to begin study in September, or June 15th for a January start date.

Application procedures vary, according to the area of desired study: please see our website for detailed information

umanitoba.ca/music under "Future Music Students".

- Performance applicants will perform an audition and will submit a curriculum vitae which includes details of performance experience and repertoire. Except in special circumstances, the audition will be in person, at the Marcel A. Desautels Faculty of Music. String players wishing to apply for the Winnipeg Symphony Orchestra partnership will be required to perform a separate audition according to the standard procedures of the W.S.O.
- Composition applicants will present a portfolio of works and will submit a curriculum vitae detailing experience in both the areas of composition and in the field, in general. Instrumental submissions should include both scores and recordings.
- Conducting applicants will present a current curriculum vitae, a preliminary DVD, a list of repertoire they have conducted and an analysis of a specified piece of music.

Diagnostics

Students admitted to the Master of Music program at the University of Manitoba are expected to possess the same breadth and depth of knowledge of music history and music theory as our own undergraduate students. To help ensure this, all incoming graduate students will be given diagnostic examinations to evaluate their knowledge of music history and the theoretical aspects of tonal and post-tonal music. These diagnostic examinations will normally be given during the week preceding the first week of classes in the Fall. The material on these examinations will correspond to that studied in our undergraduate courses in music history and music theory. Details of suitable review materials will be mailed to all incoming graduate students, and are also available on our website or by request from the music office.

Incoming graduate students who do not achieve satisfactory results on any portion of these tests may be required to do remedial work as a co-requisite or pre-requisite to their graduate program; such work, in the form of course or other requirements, will not count for credit toward the Master of Music degree. Since remedial coursework may be specified as a pre-requisite to a required graduate course, incoming graduate students will not be permitted to register for courses in the Faculty of Music until these diagnostics exams have been taken.

Program Requirements

The Faculty offers three program areas leading to the M.Mus. As part of each program, all M.Mus. students are required to take: MUSC 7000, MUSC 7050, MUSC 7110, MUSC 7180, MUSC 7400, MUSC 7410 and complete program requirements for areas of study, as follows:

Second Language Reading Requirement:

Reading knowledge of one language other than English is required. The language required will normally be French, German or Italian. Other languages will be accepted if more appropriate to the student's program. The specific requirement will be determined in consultation with the student's committee. This requirement may be met through one of the following:

- Evidence of the completion of an undergraduate language course at the 1000 level or above in the five years preceding acceptance into the program.
- The translation, using a dictionary, of a passage in the major area of study.
- Completion of a course at the 0900 or higher level after registration in the Masters Degree program.
- Determination by the student's committee that the requirement has been met through previous education and/or experience.

M.Mus. in Performance

Electives: 6 credit hours

(String students participating in the Winnipeg Symphony Orchestra will take one Topics in Music course (3CH) in Orchestral Performance.)

Total: 24 credit hours

The Performance thesis/practicum requires either: (a) one recital, normally consisting of solo repertoire, accompanied by a paper which provides historical or analytical program annotation; or (b) two recitals, one of which is solo repertoire and the other of which may include solo and ensemble repertoire. No paper is required under option (b).

A proposal for this project will be developed by the student in consultation with the Major Practical Study instructor and must be approved by the student's committee. The committee will consider the stylistic and technical appropriateness of the program in its adjudication.

M. Mus. in Composition

Electives: 3 credit hours

Total: 24 credit hours

The Composition thesis/practicum requires the production of a substantial body of work accompanied by a significant analytical paper which explains the structure of the piece(s) and the compositional processes. Normally, a performance of the piece(s) is required.

A proposal for this project will be developed by the student in consultation with the composition instructor and must be approved by the student's committee. The committee will consider the extent of the performance forces, the proposed length and the technical requirements of the body of work in adjudicating appropriateness.

M. Mus. in Conducting

Electives: 6 credit hours

Total: 24 credit hours

The Conducting thesis/practicum requires a significant repertoire of performance which is chosen, rehearsed, scheduled and conducted by the student. The performance of this body of work will be accompanied by historical or analytical program annotation.

A proposal for this project will be developed by the student in consultation with the conducting instructor and must be approved by the student's committee. The committee will consider the stylistic and technical appropriateness of the repertoire in its adjudication.

Expected Time to Graduate: Two years.

Ph.D. in Music

The Faculty of Music does not offer a Ph.D. Program at this time.

Course Descriptions

Not all courses are offered every year.

MUSC 7000 Music History Seminar Cr.Hrs.3 The study of the nature of past and current concepts and practices in the discipline of music history.

MUSC 7050 Bibliography and Research Methods Cr.Hrs.3 The techniques of bibli-

ography and research methods in music are studied through research projects in selected areas relevant to each student's major field of study. Skill is developed in the use of primary and secondary sources, expository writing and documentation.

MUSC 7060 Advanced Diction 1 Cr.Hrs.1 Advanced training in rules of pronunciation, language use and translations skills in Italian and German. Lab Required.

MUSC 7070 Advanced Diction 2 Cr.Hrs.1 Advanced training in rules of pronunciation, language use and translations skills in French and English. Lab Required.

MUSC 7110 Music Theory Seminar Cr.Hrs.3 A comprehensive survey of 20th century analytical methodologies of tonal and post-tonal music.

MUSC 7180 Ensemble Cr.Hrs.3 Studio instruction and monitored pre-professional training activities in chamber music, leading to the presentation of ensemble performance.

MUSC 7380 Piano Repertoire Seminar Cr.Hrs.2 Advanced study of the repertoire for solo piano up to the early 20th century.

MUSC 7390 Piano Chamber Music Literature Seminar Cr.Hrs.2 Advanced survey of piano chamber music.

MUSC 7400 Major Practical Study 1 Cr.Hrs.3 Private studio instruction and monitored pre-professional training activities in one of the following: composition, conducting, or any one of the standard instruments or voice.

MUSC 7410 Major Practical Study 2 Cr.Hrs.3 A continuation of Major Practical

Study 1.

MUSC 7490 Advanced Piano Pedagogy Cr.Hrs.2 Consideration of advanced approaches to the teaching of styles and techniques through an examination of piano repertoire.

MUSC 7520 Coaching Skills Cr.Hrs.2 Advanced training in philosophies and techniques of vocal coaching including both song and operatic repertoire.

MUSC 7530 Operatic Piano Cr.Hrs.2 Development of skills required of an operatic pianist, including standard Arias, operatic scores, working with conductors and developing orchestral sound. May include participation in community opera events (by audition only).

MUSC 7600 Advanced Orchestration Cr.Hrs.3 Advanced practical work in orchestration for various-sized large ensembles up to and including full orchestra. Detailed study of selected scores and work on individual orchestration projects.

MUSC 7630 20th to 21st Century Piano Repertoire Cr.Hrs.2 Advanced study of piano repertoire since 1900.

MUSC 7810 Electroacoustic Music Cr.Hrs.3 A study of the techniques of electroacoustic music.

MUSC 7860 Topics in Music Cr.Hrs.3 Course orientation will vary according to the needs and interests of students. A specific topic will be chosen for each offering of the course.

Section 54: Native Studies

General Office: 204 Isbister Bldg

Telephone: (204) 474 9899

Fax: (204) 474 7657

E-mail: native_studies@umanitoba.ca

Website: umanitoba.ca/faculties/arts/native_studies

Head: Wanda Wuttunee

Graduate Program Chair: Renate Eigenbrod

Graduate Program Assistant: Shirley McFaren

Academic Staff

Professors

Kulchyski, P., B.A. (Winnipeg), M.A., Ph.D. (York); **LaRocque, E.**, B.A. (Goshen), M.A. (Assoc. Mennonite Seminary), M.A., Ph.D. (Manitoba).

Associate Professors

Eigenbrod, R., B.A. R. Staats Examen (Gottingen, Germany), M.A. (Alberta), Ph.D. (Greifswald Germany); **Wuttunee, W.**, B.Comm., LL.B., M.B.A. (Calgary), Ph.D. (Manitoba).

Assistant Professors

Shore, F., B.A. (Brandon), M.A., Ph.D. (Manitoba); **Trott, C.**, B.A. (Toronto), B.Th. (McGill), Ph.D. (Toronto).

Adjunct Professors

Simmons, D., B.A. (Mount Alison), M.A. (York), Ph.D., (York); **Tester, F.**, B.Sc. Hons. (Western Ontario), M.E.Des., (Calgary), M.S.W. (Calgary), Ph.D. (Waikato)

Program Information

The graduate program in Native Studies offers students the opportunity to complete the advanced study (M.A.) of issues relating to Aboriginal peoples in a manner that reflects their commitment to the Aboriginal community and sensitivity to Aboriginal perspectives. The core nature of the Master's of Arts in the Native Studies program at the University of Manitoba is based on a notion of the inherent interdisciplinary nature of the field of Native Studies. This program is rooted in a unique position between Aboriginal and Western worldviews; it fosters a broad understanding of Aboriginal issues in the university community and beyond. The graduate program in Native Studies is committed to the principles of academic excellence, inclusivity, creativity, and leadership in the field of Native Studies.

A high degree of interaction occurs between faculty members and graduate students because of the small size of the program. While in the program, graduate students have opportunities such as: presenting their research at conferences; publishing in refereed journals; celebrating Aboriginal scholarship; and competing for awards, bursaries, scholarships and fellowships. Graduates from this program work at a wide range of jobs in private industry, government agencies, Aboriginal organizations, education, health, environment, management, and other related fields.

Fields of Research

Areas of expertise in Native Studies at the University of Manitoba which are readily available to graduate students include: Indigenous literatures, urban issues, women's issues, culture (history, material culture, contemporary issues), self-government and land claims, economic development (including sustainable formal and informal economies), the environment, Métis studies, Inuit studies, Aboriginal identity, resource management, wildlife management, political science, law, education, Aboriginal wisdom and Aboriginal ways of knowing, traditional ecological knowledge, critical theory, colonization, ethics, and other related fields.

Research Facilities

Students access research facilities including: Churchill Northern Studies Centre, Hudson's Bay Company Archives, St. Boniface Métis Museum collection, Museum of Man and Nature collection, and facilities in First Nations, Inuit, and Métis communities.

Master's of Arts in Native Studies

Admission

For students to be admitted directly into the Master's program, they are required to have the equivalent of an advanced/honours degree with a major in Native studies. Students with majors in other fields may apply if they have 30 credit hours (including an equivalent to NATV 1200) in courses relating to Indigenous/Aboriginal/Native studies. Students who do not meet this equivalency will be required to take additional courses to meet the requirement for 30 credit hours of Native Studies courses.

Application Deadlines

The department accepts applications for the Winter (January) and Regular (September) Terms only. The deadlines for submission of an application and supporting documentation to the Faculty of Graduate Studies are as follows:

Winter (January)	September 15
Regular (September)	March 15 – Canadian citizens January 15 – International students

Program Requirements

The program requirements include twelve credit hours of required and six credit hours of additional course work at the 400 level or above for a total of 18 credit hours. A thesis is also required. Students should consult the Supplementary Regulations, available through the Native Studies Graduate Office, for more details regarding requirements.

Twelve credit hours must include NATV 7230 Methodology and Research Issues in Native Studies; NATV 7240 Issues in Colonization; NATV 7250 Culture: Theory and Praxis; and NATV 7280 Native Studies Colloquia (3 terms). NATV 7220 Selected Topics in Native Studies may be taken more than once.

Second Language Reading Requirement: none

Expected Time to Graduate: two years

Ph.D.

Students in the field of Native Studies prepare individual interdisciplinary program proposals and may apply for admission into the Individual Interdisciplinary PhD programs. It is anticipated that the Native Studies Department will have received approval for its own Ph.D. program shortly.

Course Descriptions

NATV 7220 Selected Topics in Native Studies Cr.Hrs.3 A critical examination of issues in selected areas of Native Studies designed to meet the special needs of graduate students interested in exploring interdisciplinary perspectives in Native Studies. *Prerequisite:* consent of instructor. As the course content will vary from year to year, students may take this course more than once for credit.

NATV 7230 Methodology and Research Issues in Native Studies Cr.Hrs.3 A review of research methods, such as oral histories, and research issues, such as ethics and intellectual property rights, within the context of Native Studies. *Prerequisite:* consent of instructor.

NATV 7240 Issues in Colonization Cr.Hrs.3 An examination of the factors influencing colonization, assimilation and indigenization. Explores the colonization and decolonization processes, theories of colonization and ways of promoting indigenization without assimilation.

Section 55: Natural Resources Management

Natural Resources Institute

Director: C. Emdad Haque

General Office: 303 Sinnott Building

Enquiries: (204) 474-8373

Fax: (204) 261-0038

E-mail: nriinfo@umanitoba.ca

Website: umanitoba.ca/institutes/natural_resources

Graduate Program Assistant: Dalia Naguib

Academic Staff

Professors

Berkes, F., B.Sc., Ph.D. (McGill); **Haque, C. Emdad**, B.A. (Hons.), M.A. (Jahangirnagar), M.A., Ph.D. (Manitoba); **Sinclair, A.J.**, B.A. (Hons.), M.A. (Carleton), Ph.D. (Waterloo).

Associate Professors

Henley, T.J., B.A. (Hons.), M.N.R.M. (Manitoba); **Manseau, M.**, B.Sc. (Quebec), M.Sc., Ph.D. (Laval).

Assistant Professors

Davidson-Hunt, I., B.Sc. (Guelph), M.N.R.M. (Manitoba), Ph.D. (Manitoba); **Koper, N.**, B.Sc. (Hons), M.Sc. (Guelph), Ph.D. (Alberta); **Thompson, S.**, B.Sc. (Hons.) (Waterloo), M.C.E., B.Ed., Ph.D. (Toronto).

Adjunct Professors

Alcorn, J., B.S. (Texas), M.A. (Vanderbilt), Ph.D (Texas); **Armitage D.**, B.E.S. (Waterloo), M.Sc.(Guelph), PhD (Waterloo); **Castilla, J.**, B.Sc., M.Sc. (Chile), Ph.D. (North Wales); **Diduck, A.**, B.Sc., L.L.B., MNRM (Manitoba), Ph.D (Waterloo); **Enarson, E.**, B.A. (California), M.A. Ph.D. (Oregon); **Fast, H.B.**, B.A. (Winnipeg), M.N.R.M., Ph.D. (Manitoba); **Fisk, A.**, B.Sc (Hons), M.Sc (Windsor), Ph.D (Manitoba); **Gibson, R.**, B.A. (Hons) (York), M.A. (Toronto), Ph.D (Toronto); **Hutton, D.**, B.A. (Hons.) (Manitoba), M.Ed. (Manitoba), Ph.D (Manitoba); **Johnson, D.**, B.A. (Minnesota), M.Sc. (Wisconsin), Ph.D (North Dakota); **Kalikoski, D.**, B.Sc, M.Sc. (Rio Grande), Ph.D (British Columbia); **Khan, M.**, M.Sc. (Moscow), Ph.D (Maryland); **King, L.**, B.A. (Hons) (British Columbia), M.Ed. (Toronto), M.ES. (York), Ph.D (London); **Levy, J.K.**, B.A.Sc., M.A.Sc., Ph.D. (Waterloo); **Merino, L.**, B.A., M.A. (Mexico), M.A. (Nehru), Ph.D (Mexico); **Miller, P.**, B.A., M.A., Ph.D. (Yale); **Nicholson, B.**, B.A. (Brandon), M.A., Ph.D. (Simon Fraser); **O'Flaherty, M.**, B.A. (Toronto), M.A. (Toronto), Ph.D. (Toronto); **Ross H.**, B.A. (Hons) (Tasmania), M.Sc. (London), PhD (London); **Rutherford, P.**, B.Sc. (Toronto), M.Sc. (Western Ontario), Ph.D (Victoria); **Simmons, D.**, B.A. (Mount Allison), M.A. (York), Ph.D (York); **Turner, N.**, B.Sc (Hons.) (Victoria), Ph.D. (British Columbia); **Ulloa, A.**, B.A. (Colombia), M.A., Ph.D. (California); **Venema, H.**, B.Sc (Winnipeg), B.Sc. (C.E.) (Manitoba), M.A.Sc. (Ottawa), Ph.D. (Waterloo); **Wilson, P.**, B.Sc., M.Sc., Ph.D. (McMaster);

NATV 7250 Culture: Theory and Praxis Cr.Hrs.3 A study of selected material in Métis, Aboriginal, or Inuit studies, designed to meet the special needs of graduate students interested in exploring interdisciplinary perspectives in Native Studies. *Prerequisite:* consent of instructor. This course pertains to the student's area of research and may only be taken once.

NATV 7280 Native Studies Colloquia Cr.Hrs.3 Theoretical, methodological, ethical and contextual issues in Native Studies are explored from the perspectives of formally and informally trained experts using a colloquia format. The 3 credits for this course are divided into attendance (1 cr. hr), participation in seminars (1 cr hr) and presentation of research (1 cr hr).

NATV 7290 Seminar in Aboriginal Economy Cr.Hrs.3 This seminar deals with a variety of specific topics in Aboriginal Economy. As the course content will vary from year to year, students may take this course more than once for credit.

NATV 7310 Critical Theory in Native Studies Cr. Hrs.3 This course will assess the relevance of the concepts produced by recent social theory to the situation of Aboriginal peoples and the contribution made by 'fourth world' contexts to social theory. Marxism, feminism, post-structuralism, post-colonial theory, and cultural theory will be among the perspectives examined.

NATV 7320 Trauma Theory in Indigenous Writing in Canada and Australia Cr. Hrs. 3 This course will compare selected texts by Indigenous authors from Canada and Australia as trauma literature. The respective texts will be analyzed with the help of trauma theories as developed in relation to the Holocaust. *Pre-requisite:* written consent of instructor.

Professor Emeritus

Gardner, J., B.Sc. (Hons) (Alberta), M.Sc., Ph.D (McGill)

Program Information

The Natural Resources Institute (NRI) is one of the pioneering academic units in Canada active in natural resources and environmental management research and teaching. As such, it has contributed to the training of over 800 academics, professionals, administrators, and practitioners who are now active in the natural resources and environment fields in Manitoba and throughout the world, in both the public and private sectors.

The institute's academic activities are interdisciplinary and are focused upon local and global problem solving linked to the strength and expertise of faculty members and the interests of students. Full-time faculty work closely with an outstanding cadre of adjunct professors from other university disciplines, from the universities of Brandon and Winnipeg, from several government departments (such as the Canadian Department of Fisheries and Oceans and the Manitoba Department of Conservation), as well as from non-governmental agencies and the private sector.

Natural resources and environmental policy and decision-making provide the context for most academic activities. NRI is noted for the identification of novel approaches to establish the necessary linkages between the environment, economy, and the social well being of people. Thus, the institute uses a three-dimensional approach to natural resources and environmental policy and decision-making as it continues to search for innovative solutions that will be good for the environment as well as for poverty alleviation.

This holistic interdisciplinary approach is pursued in teaching, research and outreach. The institute's strength and expertise cut across a number of resource fields; human dimensions of natural resources management; natural resources policy; institutions, decision-making processes; water resource management; environmental governance; environmental hazards and risk assessment; climate change impact and adaptation; community based resource management; traditional ecological knowledge; habitat, wildlife, and ecological management and multi-stakeholder processes/public involvement; and conservation of biodiversity.

Institute faculty and students continue to make contributions to resources management locally, nationally and internationally. Locally: City of Winnipeg waste management; province of Manitoba water strategic plan; province of Manitoba sustainable development (SD) initiatives; wildlife habitat with Ducks Unlimited and Delta Waterfowl. Nationally: First Canadian national hazards research assessment; coastal zone management work, monitoring of project impacts; review of Canadian Environmental Assessment Act (CEAA). International: impacts of urban development in high mountains in northern India; co-management of resources in Costa Rica, Bangladesh, Turkey, Stewardship initiatives in the EU, in particular, in

Germany; building environmental governance capacity in Bangladesh; international disaster prevention and mitigation; sustainable floodplain management in Bangladesh and Canada. The institute is the focal point at the University of Manitoba for interdisciplinary education, research, and outreach in resources and environmental issues. In the latter context the institute sees itself as having a major responsibility to the University of Manitoba, the City of Winnipeg and to the Province of Manitoba in the solution of problems involving natural resources and the environment. Institute staff takes their obligation to assist in the solution of global problems just as seriously.

The master's program in natural resources management combines a broad commitment to sustainability with development of well-focused, practical expertise in natural resources management. The program recognizes that pursuit of sustainability requires attention to ecological, economic, and social issues at all levels—from the local to the global. But it also expects that most gains are made through specific practical management application. Therefore, the program is designed around two main elements: an interdisciplinary examination of sustainability concerns and defined management project examinations undertaken in this broader context.

The doctoral program is aimed at developing independent researchers in the areas of natural resources and the environment. Students enter the program from a variety of academic backgrounds and disciplines.

Fields of Research

NRI's graduate programs are interdisciplinary, responding to the need to educate professionals in integrative thinking and problem solving. The programs cut across conventional disciplinary lines to emphasize linkages between social and natural systems, environmental policy and decision-making. The research is focused on integrating the environment with the economy and the well being of people. Research areas include resource and environmental sustainability; environmental governance; environmental hazards and risk assessment; water resource management; climate change impact and adaptation; community-based resource management; wildlife habitat and landscape ecology; northern resources and development, ecosystem management, conservation of biodiversity, and multi-stakeholder planning and decision-making.

Research Facilities

Facilities on site include a fully equipped computer laboratory with appropriate software. Many of the NRI's interdisciplinary research projects are carried out jointly with a variety of agencies in various locations. Recent projects include those with Manitoba Conservation, Manitoba Hydro, Manitoba Model Forest, the City of Winnipeg, Fisheries and Oceans Canada—Central and Arctic Region, Parks Canada, Ducks Unlimited, and the International Institute for Sustainable Development. A significant number of NRI projects are carried out cooperatively with First Nations and many are completed overseas with a variety of international agencies. For those research projects requiring physical facilities, students and faculty have access to the Delta Marsh Field Station, the Fort Whyte Centre and the Experimental Lakes Area of Fisheries and Oceans Canada.

Master of Natural Resources Management

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Session	Start Date	Canadian/U.S.	International
Regular	(September)	June 1	February 1
Winter	(January)	October 1	July 1
Summer	(May)	February 1	November 1

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students in the Master's program follow an individual study plan that includes 12 credit-hours of required courses, a minimum of 15 credit-hours of elective courses and a Master's thesis.

The central academic agenda of the required set of courses includes: Assessment of the theoretical foundations and practical applications of progress toward sustainable management of natural resources; understanding of ecosystems as self-organizing and responding systems; examination of conventional and alternative social arrangements, including institutions and tools of governance, as a means of improving human well-being and

environmental responsibility; and exposure to theories of resource and environmental management processes and tools.

Second language reading requirement: none

Expected time to graduate: two years

Ph.D. in Natural Resources and Environmental Management

This program provides studies in the environment and natural resources through a holistic and interdisciplinary approach. Students' programs and research will prepare them to pursue independent research aimed at solving the complex issues facing the world environment learning about varied approaches and using a variety of tool and methods.

A hallmark of the program is the collaboration with other University of Manitoba academic units and other Manitoba universities through an extensive cadre of adjunct professors and cross-appointments. This cadre is further strengthened by the appointment of adjunct professors from a variety of agencies external to the University of Manitoba, including the Freshwater Institute, the International Institute for Sustainable Development, Delta Waterfowl, and Ducks Unlimited, to name a few.

Admission

Admission to the program is as in the Faculty of Graduate Studies Regulations Section of this Calendar. An applicant should have a high academic standing in previous university work, a Master's degree in a related discipline, as determined by the NRI Selection Committee, and an area of research interest that may be supported by an NRI faculty member. Students must be accepted by an advisor prior to submitting an application to enter the program. A 3.5GPA (or equivalent) in their most recent 60 credit hours of course work and evidence of scholarly ability are required.

Application Deadlines:

Session	Start Date	Canadian/U.S.	International
Regular	(September)	June 1	February 1
Winter	(January)	October 1	July 1
Summer	(May)	February 1	November 1

Program Requirements

All Ph.D. students will be required to complete a minimum of 12 and a maximum of 21 credit hours of course work at the 700/7000-level or above, beyond the Master's degree (or its equivalent). A minimum of 6 credit hours of courses must be completed within the Natural Resources Institute and must include NRI 7310 Ph.D. Thesis Research Seminar (3).

Individual programs of study will vary from student to student depending on each student's research interest and the recommendations of each student's advisor and Ph.D. advisory committee. Students will be encouraged to use the pool of Natural Resources Institute required and elective courses as well as appropriate graduate courses available outside of the Natural Resources Institute in order to select the best set of courses to complement their programs.

Student academic progress will be reported annually to the Faculty of Graduate Studies. A minimum Grade Point Average of 3.0, with no grade below C+, must be maintained in order to continue in the program.

Second language reading requirement: required only in special circumstances determined at the time of admission.

Expected time to graduate: three years

Course Descriptions

The required courses for the Master's program include the following. Each course requires consent of the instructor.

NRI 7222 Human Dimensions of Natural Resources and Environmental Management Cr.Hrs.3 (Formerly 056.722) The human dimensions of NREM will be considered through the following thematic units: definitions, history, and paradigms of management; intersection of science with politics, actors, groups and participatory processes; TEK, communications and environmental perception; institutions, commons theory and adaptive co-management.

NRI 7232 Ecological Dimensions of Resource and Environmental Management Cr.Hrs.3 (Formerly 056.723) Current concepts and theories in landscape ecology, plant and animal ecology, life-history strategies, food webs, and population and community ecology are discussed and related to management. Common themes throughout the course include the importance of scale, the influence of science on

management, adaptive management and critical thinking.

NRI 7262 Master's Thesis Research Seminar Cr.Hrs.3 (Formerly 056.726) Designing a research project, setting goals and objectives, choosing appropriate methods for data collection, analyzing data and communicating results of research; qualitative analysis and reporting of questionnaire and qualitative data; policy and regulatory research; budgeting and scheduling; research administration; application of computers.

NRI 7182 Sustainability, Economics and Natural Resources Cr.Hrs.3 (New course) Economic aspects of sustainability are a critical component of sustainable development and the sustainability mandate of graduate programming at the Natural Resources Institute. The relationship between environment, economy, and the human dimensions of natural resources comprise the primary focus of the course. Specific topics include environmental/ecological economics, externalities, project assessment, benefit cost analysis, the economics of renewable and non-renewable resource management and economic aspects of globalization.

Elective courses for the Master's program

The elective set of courses provides opportunity for in-depth examination of different issues related to sustainable management of natural resources. Selection of elective courses by students will be aimed at strengthening particular areas of expertise. Although only NRI elective courses are listed below, students may also choose electives from courses offered in other departments at the university.

NRI 7070 Readings in Natural Resources Management 1 Cr.Hrs.3 (Formerly 056.707) Student planned research in an area of interest. Course syllabus designed by student and approved by NRI faculty.

NRI 7080 Readings in Natural Resources Management 2 Cr.Hrs.3 (Formerly 056.708) Student planned research in an area of interest. Course syllabus designed by student and approved by NRI faculty.

NRI 7110 Field Seminar Cr.Hrs.3 (Formerly 056.711) Exploration of selected issues in resource and environmental studies in field settings, arranged for groups of students. This course is subject to a field trip fee.

NRI 7120 Mineral Resources Management and Policy Cr.Hrs.3 (Formerly 056.712) This course provides an interface between managers and mineral resources, focusing on a selection of practical topics related to minerals and mining. Role of mining activities in the development process; global, national, and provincial distribution of resources; policy issues relating to environmental, economic, and political consequences of non-renewable resource exploitation.

NRI 7130 Energy Resources Management and Policy Cr.Hrs.3 (Formerly 056.713) This course covers global energy issues, objectives, strategies, and policies, and the environmental impacts of alternative energy sources; Canadian energy issues, objectives, strategies, and policies. The course stresses the need for a sound understanding of energy issues of fundamental importance, ability to assess alternatives, appreciation of policy strategies and instruments, and the ability to formulate an energy policy for a region.

NRI 7160 Projects in Natural Resources Management 1 Cr.Hrs.3 (Formerly 056.716) Team research project in an area of interest. Application of problem-solving skills to current issues in natural resources management.

NRI 7170 Projects in Natural Resources Management II Cr.Hrs.3 (Formerly 056.717) Team research project in an area of interest. Application of problem-solving skills to current issues in natural resources management

NRI 7180 Sustainable Development and Natural Resources Cr.Hrs.3 (Formerly 056.718) An examination of the context, concepts, principles, and applications of sustainable development and natural resources at the international, national, and regional levels. Sustainable development is considered from three perspectives - environment, economy, and peoples' well-being. Particular attention is focused upon the implications of sustainable development for natural resources and environmental management. Permission of the instructor required. Students are advised to consult with Institute faculty prior to admission.

NRI 7190 Natural Resources Administration and Law Cr.Hrs.3 (Formerly 056.719) This course, after an introduction to Law in general, canvasses various areas of the law relating to natural resources.

NRI 7200 The Role of Information Management in Sustainable Resource Use Cr.Hrs.3 (Formerly 056.720) This course reviews some of the key concepts of spatial analysis including geographic information systems, remote sensing, image processing, and cartography. The second part of the course is based on the application of these concepts to a resource management issue using a case study approach. Students will gain familiarity with the following software: Idrisi for GIS; Adobe Photoshop for image processing; and Adobe Illustrator for cartography. Classes will have three components, discussion/presentation; lecture; and lab.

NRI 7242 Resource & Environmental Management Policy Cr.Hrs.3 (Formerly 056.724) The complexity of natural resources and environmental policy formulation, implementation, and analysis is the primary focus. Specific topics include: modern state, government and policy development processes; policy community and stakeholders, and role of pressure and interest groups; policy analysis, research and evaluation are examined from a variety of perspectives. Theory and practice are linked in addressing course objectives.

NRI 7252 Environmental Management Practice Cr.Hrs.3 (Formerly 056.725) Environmental Management systems (e.g. 14001 and Natural step), best management practices and project management. Tools: Awareness (Environmental Policy, Environmental Impacts, Risk Assessment, Life Cycle Assessment), Action (Objectives, Targets, Risk Reduction, Indicators, Monitoring, Activities), Advance (Sustainability Report, Triple Bottom Line, Environmental Audit).

NRI 7280 Northern Resource Management Cr.Hrs.3 (Formerly 056.728) A comprehensive examination of natural resources, socio-economic conditions, and institution-

al structures forms the basis for an evaluation of long-term sustainability and developmental strategies for Manitoba's North. Permission of the instructor required. Students are advised to consult with Institute faculty prior to admission.

NRI 7290 Environmental Impact Assessment Cr.Hrs.3 (Formerly 056.729) Course is a fundamental tool of decision making regarding natural resources and the environment and will provide students with an understanding of how environmental assessment is designed, administered and operates in the field.

NRI 7302 Conservation Biology & Biodiversity Management Cr.Hrs.3 (Formerly 056.730) An examination of the study, management and conservation of biodiversity at the genetic, species, and ecosystem levels of biological organization and at the local, regional, national and global scale. Emphasis to be placed on understanding human impacts on biodiversity, and critically evaluating the importance of biodiversity conservation.

NRI 7320 Environmental Risk and Hazards Cr.Hrs.3 (Formerly 056.732) Environmental Risk and Hazards are viewed in terms of complex processes of natural systems and social formation. Analysis of processes and events is assisted by theoretical formulation, development of models and examination of site-specific or type-specific empirical cases.

NRI 7330 Water Resources: Analysis, Planning and Management Cr.Hrs.3 (Formerly 056.733) Considering fresh water as a resource, this course initially examines theoretical models and management approaches and practices; water supply requirement, measurements, and management; demand management; and environmental sustainability. The second part encompasses selected aspects of watershed hydrology and management; water and ecosystem health; and river basin management strategies and policies. The final part evaluates institutional arrangements and jurisdictional responsibilities; transboundary issues, opportunities and implications

NRI 7340 Environmental Justice and Ecosystem Health Cr.Hrs.3 (Formerly 056.734) Explores Ecosystem health and environmental justice issues to realize both the possibilities and barriers to sustainability. Risk, resource distribution and power/decision-making are analyzed across race, gender and class differences. Diverse views, theories and methods on community health consider well-being, quality of life, vulnerability and ecological integrity.

NRI 7350 Study Design and Quantitative Methods for Resource and Environmental Management Cr.Hrs.3 This course addresses the quantitative analysis of environmental and natural resources data, emphasizing strong study design to prevent analytical difficulties. Focus is on preparing graduate students in environmental and resources management for dealing with the typical characteristics of environmental data, and for analyses specific to resources data.

NRI 7360 Qualitative Methods in Community-Based Natural Resources & Environmental Management Cr.Hrs.3 This course addresses the knowledge and skills necessary to undertake qualitative research relevant to community-based resource management. The course will be offered in a studio format with an emphasis on student participation in a research team and the practical application of data collection procedures in a field setting.

Course Descriptions

The required course for the PhD program is:

NRI 7310 Ph.D. Thesis Research Seminar Cr.Hrs.3 (Formerly 056.731) Designing research and methodology specific to a project; reviewing the philosophy of interdisciplinary approaches to Natural Resources and environmental management and trends in the field; analyzing appropriateness of a project with trends and directions in interdisciplinary research; conducting and administering research; communicating and disseminating results of research.

Elective courses for the PhD program

The elective set of courses provides opportunity for in-depth examination of different issues related to the PhD thesis research. Selection of elective courses by students will be aimed at strengthening particular areas of expertise. Although only NRI elective courses are listed below, students may also choose electives from courses offered in other departments at the university.

- NRI 7070 Readings in Natural Resources Management 1 Cr.Hrs.3
- NRI 7080 Readings in Natural Resources Management 2 Cr.Hrs.3
- NRI 7110 Field Seminar Cr.Hrs.3
- NRI 7120 Mineral Resources Management and Policy Cr.Hrs.3
- NRI 7130 Energy Resources Management and Policy Cr.Hrs.3
- NRI 7160 Projects in Natural Resources Management 1 Cr.Hrs.3
- NRI 7170 Projects in Natural Resources Management II Cr.Hrs.3
- NRI 7180 Sustainable Development and Natural Resources Cr.Hrs.3
- NRI 7190 Natural Resources Administration and Law Cr.Hrs.3
- NRI 7200 The Role of Information Management in Sustainable Resource Use Cr.Hrs.3
- NRI 7242 Resource & Environmental Management Policy Cr.Hrs.3
- NRI 7252 Environmental Management Practice Cr.Hrs.3
- NRI 7280 Northern Resource Management Cr.Hrs.3
- NRI 7290 Environmental Impact Assessment Cr.Hrs.3
- NRI 7302 Conservation Biology & Biodiversity Management Cr.Hrs.3
- NRI 7320 Environmental Risk and Hazards Cr.Hrs.3

NRI 7330 Water Resources: Analysis, Planning and Management Cr.Hrs.3
NRI 7340 Environmental Justice and Ecosystem Health Cr.Hrs.3
NRI 7350 Study Design and Quantitative Methods for Resource & Environmental

Management Cr.Hrs.3

NRI 7360 Qualitative Methods in Community-Based Natural Resources & Environmental Management Cr.Hrs.3

Section 56: Nursing

Head and Graduate Chair: Judith Scanlan

General Office: 280 Helen Glass Centre for Nursing

Telephone: (204) 474 6216

Fax: (204) 474 7682

E-mail: nursing_grad@umanitoba.ca

Website: umanitoba.ca/nursing

Academic Staff

Dean Emerita

Beaton, J.I., B.N. (Manitoba), M.A. (Washington), Ph.D. (Texas)

Professor Emeritus

Glass, H., B.Sc., M.A., M.Ed., Ed.D. (Columbia), LL.D. (Memorial), LL.D. (Western Ontario), LL.D. (St. Francis Xavier), LL.D. (Montreal), D.Sc. (McGill) Dean Emerita

Senior Scholars

Cameron, C.F., B.A. (Queen's), M.Sc. (Boston), Ph.D. (Wayne State); **Gupton, A.**, B.S. (California), M.N., Ph.D. (Manitoba)

Professors

Crooks, D., B.Sc.N. (Toronto), M.Sc.N. (Western Ontario), D.N.Sc. (State U of New York); **Degner, L.F.**, B.N. (Manitoba), M.A. (Washington), Ph.D. (Michigan); **Heaman, M.**, B.N., M.N., Ph.D. (Manitoba); **Woodgate, R.**, B.N., M.N., Ph.D. (Manitoba).

Associate Professors

Ateah, C.A., B.N. (Manitoba), M.Ed. (Alberta), Ph.D. (Manitoba); **Chernomas, W.**, B.Sc. (Bridgeport), M.A. (New York), Ph.D. (Maryland); **Clarke, D.E.**, B.Sc., B.N., M.A., Ph.D. (Manitoba); **Diehl-Jones, W.**, B.Sc. (Brandon), M.Sc., Ph.D. (Manitoba), B.Sc.N. (Western Ontario); **Guse, L.W.**, B.N., M.N., Ph.D. (Manitoba); **Hack, T.**, B.Comm., B.Sc., M.A., Ph.D. (Manitoba); **Lobchuk, M.**, B.N., M.N., Ph.D. (Manitoba); **McClement, S.**, B.Sc.N. (Victoria), M.N., Ph.D. (Manitoba); **McMillan, D.**, B.A., B.Sc.N. (Queens), M.N. (Manitoba), Ph.D., (Washington); **Sawatzky, J.V.**, B.N., M.N., Ph.D. (Manitoba); **Scanlan, J.**, B.N., M.Ed., Ph.D. (Manitoba);

Assistant Professors

Cohen, B.E., B.A., B.N., M.Sc., Ph.D. (Manitoba); **Edwards, M.**, B.Sc. (Waterloo), B.N., M.N. (Manitoba), Ph.D. (Toronto); **Martin, D.**, B.N., M.N. (Manitoba) Ph.D. (British Columbia); **Mordoch, E.**, B.N., M.N. (Manitoba), Ph.D. (British Columbia); **Schultz, A.**, B.Sc.N., M.N. (Victoria), Ph.D. (British Columbia); **Scrubby, L.S.**, B.N. (McGill), M.S. (Minnesota), Ph.D. (Manitoba); **Temple, B.A.**, B.N. (Brandon), M.N. (Manitoba), Ph.D. (British Columbia).

Adjunct Professors

Fallis, W., B.Sc.N. (Windsor), M.N. (Manitoba), Ph.D. (Washington); **Fraser, D.**, B.N., M.N. (Manitoba); **Hamelin, K.**, M.N. (Manitoba), B.A. (Winnipeg); **Hawranik, P.**, B.N., M.N., Ph.D. (Manitoba); **Katz, A.**, B.N. M.N., Ph.D. (Manitoba); **Shapiro, C.** B.N., M.N. (Manitoba); **Sword, W.A.**, B.Sc.N, M.Sc. (McMaster), Ph.D. (Guelph).

Program Information

The Faculty of Nursing currently offers programs leading to the Master of Nursing (MN) degree and a Ph.D. in Cancer Control offered by the Faculty of Nursing and the Department of Community Health Sciences, Faculty of Medicine. The MN program streams are Education, Administration, Clinical, and Nurse Practitioner. The MN program provides students with expertise which enables them to respond in an ever-changing, dynamic, and fluid practice setting, as well as prepares students for possible doctoral study.

Graduates of the program over the past 10 years have gone on to function as middle and senior managers and administrators, clinical nurse specialists, nurse practitioners, government health policy bureaucrats, nursing educators, directors of research in institutions, and other roles. Over 20 percent of graduates have gone on to pursue doctoral education.

Fields of Research

The Faculty of Nursing has areas of established research excellence and emerging research specialties. Nursing is an 'applied' profession and the nurse research conducted at the University of Manitoba emphasizes the development of knowledge as a basis for evidence-based practice.

The research area of cancer care of individuals and families has gained international recognition with the establishment of the Research Chair in the 'Development of Evidence-Based Nursing Practice in Cancer Care, Palliative Care, and Cancer Prevention'. The awarding of this Research Chair to the Faculty of Nursing has facilitated the creation of the joint Ph.D. in Cancer Control with the Faculty of Medicine. It has also acted as the stimulus for the growth of research and scholarship by faculty members and students.

The Canadian Institutes of Health Research (CIHR) Chair in Gender and Health has a program of research that is specifically aimed at examination of inequities and disparities in women's prenatal health; access to prenatal care, and quality of care; exploration of how these disparities intersect with other health determinants such as income, ethnicity, migration, and geography; and study of the association of disparities in women's prenatal health and inequities in access to prenatal care and quality of care with adverse pregnancy outcomes. This Chair award includes funding to support and train full-time graduate students.

Other areas of research strength include primary health care, children's health, aging, women's health, mental health, administration, and teaching. Many graduate faculty conduct research with other disciplines broadening the possibilities in identifying ways to improve the quality of life of individuals, families, and communities.

The Faculty of Nursing has formal linkages with the University of Manchester. Collaborate research is being conducted with the Mayo Clinic in Rochester, Minnesota. Research, consultation, and practice are also being conducted at many health facilities in the province. These relationships provide graduate students with endless possibilities and vast opportunities to pursue their areas of interest and expand their understanding of health and health care.

Research Facilities

The Manitoba Centre for Nursing and Health Research (MCNHR) is located within the Faculty of Nursing. The MCNHR supports and advances the research and scholarly activities of its members who include faculty and affiliated nursing and health researchers within the community. Available supports to graduate students include methodological and statistical consultation, qualitative and quantitative data analysis programs, and information on research grant initiatives. Opportunities are available for graduate students to work with MCNHR members as research assistants.

Master of Nursing

Admission

In addition to the minimum admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, applicants must possess:

A baccalaureate degree in nursing, mental health nursing or psychiatric nursing or its equivalent from an approved or accredited university. In exceptional circumstances, applicants with a degree in another discipline may be considered on a case by case basis. RPN applicants are not eligible for the Nurse Practitioner stream;

Completion of a Research Methods course and an Introductory Statistics course with a minimum grade of C+ in each course. The content of specific courses may be reviewed to determine whether these criteria are met; and

Proof of active practicing nurse registration in Canada. Applicants from other countries may apply provided they have active practicing nurse status in their home country. After admission, the following is required:

- Canadian Students – Students must maintain Active Practicing Status with the College of Registered Nurses of Manitoba while enrolled in the MN Program.
- Foreign Students – Students in the Graduate Program from outside Canada must provide proof of active practicing nurse status in their home country. Students who do not interact with clients/patients in their clinical practice (i.e., administration and education foci) will not be required to obtain registration in Manitoba. Students who interact with clients/patients (clinical practice) will be required to obtain active practicing membership with the College of Registered Nurses of Manitoba (approved by the Graduate Studies Committee, November 20, 2008).

The Faculty of Nursing has additional application requirements and procedures. Check the Faculty of Nursing website for details and the link to the application form on the Faculty of Graduate Studies website: umanitoba.ca/faculties/nursing/programs/graduate/admission.html. Completed applications must be received in the Faculty of Graduate Studies by April 1st for the year in which admission is sought.

Students admitted to the Master of Nursing program must be fully immunized as prescribed by the Faculty of Nursing Immunization Policy and submit a completed Immunization Record.

Application Deadlines

Students in the Faculty of Nursing normally begin their program on 1 September. For admission for this start date, Canadian and International students should send their applications with complete supporting documentation to the Faculty of Graduate Studies by April 1st.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The Master's Program in Nursing includes 21 credit hours for students completing a thesis, and 27 credit hours for students completing comprehensive exams. The Nurse Practitioner stream consists of 36 credit hours plus the Clinical Consolidation course.

Second language reading requirement: none
Maximum time to graduate: six years

Ph.D. in Cancer Control

The Faculty of Nursing offers a Ph.D. in Cancer Control. Information on this program may be found in another section of this calendar.

Ph.D. in Applied Health Sciences

The Faculty of Nursing, along with the Faculty of Physical Education and Recreation Studies, Faculty of Human Ecology, and School of Medical Rehabilitation, now offers a multi-faculty Ph.D. in Applied Health Sciences. Information on this program may be found in another section of this calendar.

Course Descriptions

NURS 7030 Foundations, Issues and Trends in Nursing Cr.Hrs.3 (not currently offered) Explores how social forces have influenced the evolution of nursing, its place in society, and the health care system today. Examines issues and trends affecting present and future development of nursing.

NURS 7040 Curriculum Development in Nursing Cr.Hrs.3 (not currently offered) The course is designed to explore the developmental phases of curriculum design in a variety of educational settings and types of programs. Students will have the opportunity to engage in the planning and the structuring of educational programs.

NURS 7050 Restorative Nursing Cr.Hrs.6 (not currently offered) Advanced study of the scientific foundations of human functioning as it applies to individuals and families in the context of altered health status. Nursing theories and therapeutic interventions will be applied to the restoration of the health status of individuals and families. Practice is an integral part of the course.

NURS 7080 Special Topics in Nursing Research II Cr.Hrs.3 (not currently offered) Seminar discussion of topics related to current issues and problems in the development, implementation, and evaluation of knowledge utilization programs in nursing practice. Required of all practicum students. Offered when student demand warrants and on a rotating basis.

NURS 7090 Science and Theory in Nursing Cr.Hrs.3 The course includes an exploration of nursing's theoretical evolution. Issues related to the development and application of theory in a practice discipline will be discussed with a focus on the role of research. Particular emphasis will be placed upon analysis and evaluation of nursing's conceptual and theoretical systems.

NURS 7100 Administration in Nursing Cr.Hrs.6 (not currently offered) Exploration and analysis of the roles and responsibilities of the nursing administrator in today's health care system. Examination of the organizational structure and culture of nursing

services in relation to conflict resolution, interdisciplinary relationships and union negotiation. Includes preceptorship experience. Offered on a rotating basis and currently under review.

NURS 7110 Readings in Selected Topics Cr.Hrs.3 An intensive readings course for graduate students in nursing. Topics may be selected within the general field of nursing to suit the special needs and research interests of students, for example, transcultural nursing, women's health, or palliative care. Students must have a faculty member agree to advise them before registering.

NURS 7140 The Older Adult: Advanced Nursing Assessment Cr.Hrs.3 (not currently offered) Advanced study and practice integrating theory, concepts, research and skills related to nursing assessment of the strengths and vulnerabilities of older adults and their families. Emphasis is on health promotion for the elderly. Clinical practice in the community and/or the institution is a component of the course. Offered on a rotating basis.

NURS 7150 The Older Adult: Clinical Decision-Making and Intervention in Nursing Cr.Hrs.3 (not currently offered) Emphasis is on advanced study and practice in evaluation of clinical data and subsequent selection of appropriate nursing interventions to promote health of older adults and their families. Development of skills related to consultation and supervision is integral to the course. Clinical practice settings include the community and institutions. Offered on a rotating basis.

NURS 7160 Cancer Nursing Research Cr.Hrs.3 Focuses on recent advances in cancer nursing research with an emphasis on research methodologies, ethical concerns, and design issues pertinent to research with cancer populations. Approaches to utilization of research findings in clinical practice will be addressed. Offered on a rotating basis.

NURS 7170 Community Health Nursing: Assessment of Aggregate Needs Cr.Hrs.3 Furthers theoretical and practical knowledge of key components of community health nursing within the primary health care model. Focus is on community health nursing systems and their relationship to the total health care system. Factors influencing past, current, and future community health nursing practice are examined. Emphasis is on assessing aggregate needs and developing advanced skills in working with a target group in the community. Practice in the community is an integral part of the course. Offered on a rotating basis.

NURS 7180 Community Health Nursing: Community Level Interventions Cr.Hrs.3 (not currently offered) Furthers theoretical and practical knowledge in community wide interventions that promote health. Focus is on the community health nurse's role in program development and evaluation for targeted groups in the community, and the role of influencing health policy through lobby efforts. Practice in the community is an integral part of the course. *Prerequisite:* NURS 7170 or permission of instructor. Offered on a rotating basis.

NURS 7200 Human Responses to Illness Cr.Hrs.6 (not currently offered) Consists of a series of seminars, case studies and clinical practice on human responses common to ill individuals across the lifespan. The emphasis of the course is on synthesis and application of relevant principles of the Human Response to Illness Model, on the development of proficiency in advanced assessment and decision-making, and on initiating, planning and evaluation of nursing interventions. Clinical practice is a course component. Offered on a rotating basis.

NURS 7210 Qualitative Research Methods in Nursing Cr.Hrs.3 The purpose of this course is to advance knowledge of qualitative methodology and understanding of the ways in which qualitative methodology can be used to understand phenomena of interest in nursing and health care. This course is designed to provide opportunities for developing specific qualitative research skills, while gaining familiarity with theories, issues, and challenges in qualitative research. Students are exposed to the philosophical assumptions of the qualitative paradigm, ethical issues specific to qualitative research, qualitative sampling strategies, qualitative data collection techniques, and processes associated with the analysis, interpretation, and knowledge translation and utilization of qualitative data.

NURS 7220 Quantitative Research Methods in Nursing Cr.Hrs.3 The purpose of this course is to advance understanding of the ways in which quantitative approaches can be applied to solve nursing problems. The quantitative research process will be described including literature review, conceptual frameworks in nursing sampling, data collection strategies, analysis of research data, and communication of results. Included are exploration of the status and development on nursing knowledge through quantitative research methods.

NURS 7250 Foundations of Advanced Practice Nursing Cr.Hrs.3 A study of the theoretical underpinnings surrounding the development of a variety of advanced practice nursing roles. The focus will be on the issues shaping role development in Manitoba and Canada including economic, political and sociologic factors determining health care policy and delivery will be examined.

NURS 7260 Health Care in Advanced Practice Nursing 1 Cr.Hrs.6 An examination of the assessment and intervention strategies for individuals from birth to adolescence, including sexuality and reproductive health. Designed to provide the necessary knowledge and experience to assist individuals and their families with the most common health problems. Concepts of health promotion and health maintenance are integrated throughout the course. Integrated clinical practicum (12 hrs/week). *Prerequisites:* PHAC 2100, NURS7250, NURS 7280, NURS 7300.

NURS 7270 Health Care in Advanced Practice Nursing 2 Cr.Hrs.6 A study of assessment and intervention strategies for individuals from young adult through older adult. The course is designed to provide the necessary knowledge and experience to assist individuals and their families with the most common health problems. Concepts of health promotion and health maintenance are integrated throughout the course. Integrated clinical practicum (12 hrs/week). *Prerequisites:* NURS 7250, NURS 7280, NURS 7300.

NURS 7280 Applied Physiology and Pathophysiology for Nurses Cr.Hrs.6 (not cur-

rently offered) This is a clinically-applicable systems approach to normal and altered physiological regulation, and is of specific application to advanced nursing practice. Lectures in physiology and pathophysiology as well as student-led case studies will be used to provide synthesis and application of concepts to common health care problems seen in clinical practice.

NURS 7290 Woman, Child and Family Health: Nursing Perspectives Cr.Hrs.6 (not currently offered) Detailed study of the theory, concepts, current research and nursing care related to the health needs of women, children and their families. Students will focus their theoretical learning and clinical practice within selected areas of woman, child or family health. Clinical management of selected clients is an integral part of the course. Offered in 2003 and alternate years thereafter.

NURS 7300 Advanced Health Assessment and Diagnostic Reasoning Cr.Hrs.6 Designed to develop health assessment and critical thinking skills appropriate for clinical practice at an advanced level. The collection and in-depth analysis of subjective and objective health information and the use of diagnostic reasoning are emphasized. All students engage in practice with fellow students, clinical teaching associates and consenting patients. Required for students in the APN major. *Prerequisites:* NURS 2110 or NURS 2120 plus NURS 3270 or NURS 4160 or equivalent or permission from instructor.

NURS 7310 Health Care Policy: Implications for Nursing Practice Cr.Hrs.3 (not currently offered) Examines the inter-relationships of knowledge development, research utilization, policy formation, health services decision-making, and nursing systems. The selected topics are based on current nursing practice issues in community and institutional settings and their impact in individuals, families and aggregates. A major focus is the analysis of the process of knowledge development and application to health care and nursing systems. Not to be held with the former 049.719 or NURS 7240.

NURS 7320 Philosophy of Nursing Science Cr.Hrs.3 Advanced seminar to explore philosophies of science which have influenced the development of nursing knowledge. Nursing epistemological traditions are analysed and criticized as they relate to nursing theory development and research. The relationship between nursing science and practice is emphasized.

NURS 7330 Clinical Consolidation Cr.Hrs. Provides an opportunity to consolidate clinical skills, apply theoretical knowledge and research, and synthesize theory and practice in the final year of the Nurse Practitioner stream (10 weeks of 400 clinical hours). Preparation of a final paper that illustrates scholarly endeavour suitable for publication is required.

NURS 7340 Evidence Informed Practice Cr.Hrs.3 This course will provide a foundation for students to evaluate the theory of evidence informed practice and its rela-

tionship to health care delivery. Students will be exposed to the principles of evidenced informed practice, basic epidemiological statistics, systematic reviews, critical appraisal techniques, application of implementation science, and health care intervention evaluation in order to acquire the analytical and questioning skills necessary to review their own work and other literature relevant to health care practices. Asking the right clinical question, searching the literature, critically appraising primary studies, making recommendations(s) for changing clinical practice, and evaluation of the effects of a practice innovation or newly developed program are essential components of evidenced informed practice.

NURS 7350 Role development in Advanced Nursing Practice Cr.Hrs.3 The purpose of this course is to understand the role of advanced nursing practice. The context, complexity, and scope of the roles within professional nursing practice will be explored. Particular emphasis will be placed on the knowledge base and skill set required to be an effective leader in a variety of advanced practice nursing roles. In this course, nursing graduate students for all streams will come together to discuss and debate issues related to advanced nursing practice on a local, regional, national and international level.

NURS 7360 Integrative Focus Cr.Hrs.6 The purpose of this course is to allow the student to focus in-depth in a substantive area of nursing practice: clinical practice, education or administration. Students will engage in practice in the area of focus, and be guided by the faculty adviser with respect to the goals and direction of the practicum and associated readings. Students will participate in seminars facilitate by the faculty at designated times throughout the practicum.

NURS 7370 Pathophysiologic Concepts & Therapeutics I Cr.Hrs.3 Introducing principles of cell signaling, physiological feedback systems, adaptive and non-adaptive cellular responses, receptor-ligand interactions, drug kinetics, dynamics and therapeutics. Pathophysiology and treatment of disorders of immunity and inflammation, including hypersensitivity reactions, will also be covered in this course.

NURS 7380 Pathophysiologic Concepts & Therapeutics II Cr.Hrs.3 This course entails a systems-based analysis of disease states commonly seen in primary care, including cardiovascular, hematological, respiratory, neurologic and renal disorders and their treatment. Problem and case-based scenarios will be used to encourage critical thinking and integration of pathophysiologic and management principles.

NURS 7390 Pathophysiologic Concepts & Therapeutics III Cr.Hrs.3 This covers pathophysiology and management of disorders of the musculoskeletal, gastrointestinal, dermatology, reproductive and urogenital systems. One module will focus on disorders of the head, eyes, ears, nose and throat. A case study approach to instruction will be used almost exclusively in this course, which culminates in a mock 'grand rounds' presentation.

Section 57: Occupational Therapy

General Office

R106-771 McDermot Avenue, Bannatyne Campus

Telephone: (204) 789-3897

Fax: (204) 789-3927

E-mail: SMR_Information@umanitoba.ca

Website: umanitoba.ca/medrehab/ot

Head: Donna Collins

Academic Fieldwork Co-ordinator: Margaret Anne Campbell-Rempel

Graduate Program Assistant: Lori Muzychka

Registration Assistance: Doris Weigel

Academic Staff

Professor Emerita

Cooper, J.E., Dip. P. and O.T. (Toronto), B.O.T., M.Sc., Ph.D. (Manitoba).

Professor

Etcheverry, E., Dip.O.T., B.O.T., M.Ed., Ph.D. (Manitoba).

Associate Professors

Collins, D., Dip.O.T., B.Sc.(O.T.), M.Sc.(Community Health Sciences) (Manitoba); **Wener, P.,** B.M.R.(O.T.), M.Ed. (Manitoba).

Assistant Professors

Friesen, M., Dip.O.T. (Alberta), B.O.T., M.Ed., Ph.D. (Manitoba); **Giesbrecht, E.,** B.S.W., B.M.R.(O.T.), M.Sc.(Rehab) (Manitoba); **Leclair, L.,** B.A. (Manitoba), B.H.Sc.(O.T.) (McMaster), M.Sc. (Manitoba); **Quanbury, A.,** B.Sc. (Queen's), M.A.Sc. (Toronto); **Restall, G.,** B.M.R.(O.T.) (Manitoba), M.Sc.(O.T.) (Alberta); **Ripat, J.,** B.M.R.(O.T.), M.Sc.(Rehab) (Manitoba); **Sullivan, T.,** B.Sc.(O.T.) (Western Ontario), M.A. (Columbia).

Adjunct Professor

Edwards, J.M., Dip.O.T., B.M.R.(O.T.) (Manitoba), M.A.(Health Care Admin.) (Minnesota).

Academic Fieldwork Co-ordinator and Instructor 2

Campbell-Rempel, M., B.Sc. (Brandon), B.M.R.(O.T.) (Manitoba).

Instructor 2

Mendez, L., B.M.R.(O.T.) (Manitoba).

Instructors

Bergen, C., B.M.R.(O.T.) (Manitoba), M.A.(Marriage, Family and Child Counselling) (California); **Booth, A.D.,** B.Sc.(O.T.) (Pennsylvania), M.B.A. (Manitoba); **Borton, B.,** B.M.R.(O.T.) (Manitoba); **Brown, C.,** B.M.R.(O.T.) (Manitoba); **Davis, E.,** B.A., B.M.R.(O.T.) (Manitoba); **Diamond-Burchuk, L.,** B.M.R.(O.T.) (Manitoba); **Hales, S.,** B.M.R.(O.T.) (Manitoba); **Johnson, L.,** B.H.Sc.(O.T.) (McMaster), M.Sc.(Rehab) (Manitoba); **MacLeod-Schroeder, N.,** B.Sc.(O.T.), M.Sc. (Western Ontario); **Miller, K.,** B.Sc.(O.T.) (Western Ontario); **Ross, C.,** B.M.R.(O.T.) (Manitoba); **Siemens, B.,** Dip.O.T., B.M.R.(O.T.) (Manitoba).

Program Information

The Master of Occupational Therapy (M.O.T.) is a professional practice degree that can be obtained through participation in either a Regular program or an Accelerated program option. The Regular program is for individuals who do not have a previous degree in occupational therapy. The Accelerated program is for occupational therapists who have a B.M.R.(O.T.) degree or equivalent.

The Occupational Therapy program maintains accreditation through the Canadian Association of Occupational Therapists and a 7-year accreditation was received in 2005.

Admission

The following is a summary of the admission requirements. Equivalent academic courses completed at the University of Manitoba or recognized universities elsewhere will be considered. All admission requirements, as well as application deadline dates and forms, are included in applicant information packages that are available from the School of Medical Rehabilitation General Office, R106-771 McDermot Ave., Bannatyne Campus.

This information is also posted on the School of Medical Rehabilitation's website.

Regular Program

Completion of a previous undergraduate degree, minimum B average in last 60 credit hours of study, completion of all program prerequisite courses or approved alternates with no grade in prerequisites below a C. Prerequisite courses include all of the courses listed below or equivalents approved by the M.O.T. Admissions Committee:

SOC 1200 Introduction to Sociology
PSYC 1200 Introduction to Psychology
PSYC 2290 Child Development
PSYC 2370 Developmental Psychology from Adolescence to Old Age
STAT 1000 Basic Statistical Analysis 1
BIOL 1410 Anatomy of the Human Body
BIOL 1412 Physiology of the Human Body

Accelerated Program

Completion of a B.M.R.(O.T.) degree or equivalent, minimum B average in the last 60 credit hours of the degree, completion of an additional 42 credit hours of non-O.T. degree credits, and evidence of having passed the Canadian Association of Occupational Therapists (CAOT) certification examination and/or eligibility for registration in Manitoba by the College of Occupational Therapists of Manitoba (COTM).

Application Deadlines

Regular Program: The final date for receipt of applications for admission is **March 1 for Canadian applicants**; January 15 for non-Canadian applicants.

Accelerated Program: Students may begin their program on either September 1 or January 1. For admission for each of these start dates, Canadian students should send their applications with complete supporting documentation to arrive no less than three (3) months before the intended start date. Non-Canadian students should send their applications with complete supporting documentation to arrive no less than seven (7) months before the intended start date.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies, found in the Graduate Studies Regulations section of this Calendar. M.O.T. program Supplemental Regulations are available on the School of Medical Rehabilitation's website.

Second language reading requirement: None

Expected time to graduate: Regular program - 2 years; Accelerated program - 1 year.

Students in the M.O.T. **Regular program** must complete 107 credit hours of course work. All academic and fieldwork courses and a professional portfolio must be successfully completed in order to graduate.

Students in the M.O.T. **Accelerated program** will be required to take 12 credit hours of academic course work from the M.O.T. program or equivalent. Six of these credit hours are to be OT 7750 Independent Study or equivalent.

Fieldwork education is an integral part of the M.O.T. Regular program. Field placement experiences are integrated throughout the program and include 1 four-week, 2 eight-week and 1 six-week experience. Field placements normally occur in Manitoba and Saskatchewan. All students should be prepared to travel out of Winnipeg for a minimum of one placement during the course of the program.

Occupational Therapy students are required to provide a health history and immunization record. A student will not be permitted to attend fieldwork placements until all health, immunization, CPR and records check requirements are met.

Health Requirements: Standard Health Record Form Packages are sent to new occupational therapy students upon acceptance into the program. New students in Occupational Therapy are required to return forms to their department by dates published yearly in the Health Record Form Packages. Second year students are required annually to review and update immunizations as necessary.

Cardiopulmonary Resuscitation Certification: All students of the Department of Occupational Therapy are required to obtain certification in cardiopulmonary resuscitation. Certification must be at the Basic Rescuer Level. New students in the program must provide proof of certification within the first 2 weeks of classes of the academic year in which they commence

classes. This certification must have an issue date on or after July 1 of the year the student commences classes in the program. Second year students must provide proof of re-certification by October 1 of their second year in the program. This certification must have an issue date during or after the last week of August of the current year. Certification must remain current for all fieldwork experiences.

Criminal Records Checks and Child Abuse Registry Checks: Students are advised that clinical/fieldwork education sites require that students complete a Criminal Record Check and/or a Child Abuse Registry Check. New students in the Master of Occupational Therapy program must provide results of a Child Abuse Registry Check and a Criminal Record Check within the first 2 weeks of classes of the academic year in which they commence classes. Both checks must have an issue date after July 1 of the year the student commences classes in the program. Second year students must provide updated results by October 1 of their second year in the program. Both checks must have an issue date during or after the last week of August of the current year.

Course Descriptions

OT 6XXX – year 1 courses

OT 7XXX – year 2 courses

OT 6100 Human Determinants of Occupational Performance Cr.Hrs.6 Students study the anatomical, physiological, biomechanical, and psychosocial factors that underlie the physical, cognitive and affective components of human capacities. Content is presented in the context of understanding the relationship between human capacities and occupational performance, the ability to carry out activities and tasks of self-care, productivity and leisure throughout the lifespan.

OT 6110 Theoretical and Philosophical Foundations of Occupational Therapy Cr.Hrs.3 Students study the theoretical and philosophical foundations of occupational therapy and the relationship between occupation and health and well-being. A case based introduction to the processes and approaches that guide practice with clients of various ages and in a variety of practice settings.

OT 6120 Health and Disability Cr.Hrs.3 Students study definitions of health, factors influencing health, and systems that relate to health in populations. Students are also introduced to classification of diseases and disorders and impairments and the disablement process.

OT 6130 Occupational Therapy Practice Skills 1 Cr.Hrs.3 Through instruction, case illustration and practice laboratory sessions students are introduced to practice skills related to the occupational therapy process. Occupational therapy skills and approaches used to identify occupational performance issues are introduced and practiced. Basic assessment of physical, cognitive, and affective performance components are taught. Students participate in problem solving and basic interventions around issues of occupational performance.

OT 6140 Enabling and Professional Development Skills Cr.Hrs.7 An introduction to the development of personal knowledge, skills and attitudes related to enabling occupation in clients, and to promoting professional behaviours for safe, reliable and ethical practice. Emphasis will be placed on the development of a variety of verbal and written communications skills, and clinical/professional reasoning.

OT 6190 Fieldwork Preparation Cr.Hrs.1 This course provides foundational knowledge and skills required to participate effectively in the fieldwork component of the Occupational Therapy Program. Course evaluated on a pass/fail basis.

OT 6200 Basic Fieldwork Cr.Hrs.4 Students are placed in practice settings for four weeks of field experience under the supervision of a registered occupational therapist. Experiences are offered in a wide variety of field sites in Manitoba, Saskatchewan and northwestern Ontario. Evaluated at an introductory level. Course evaluated on a pass/fail basis. *Prerequisite:* OT 6190.

OT 6300 Occupational Analysis and Adaptation Cr.Hrs.4 An in-depth examination of the relationship between components of human performance and engagement in occupations throughout the lifespan. Students analyze self-care, productivity and leisure occupations to identify physical, cognitive and affective components required for function. Principles and methods of adaptation and grading of occupation, task, activity, equipment and environment will be introduced.

OT 6310 The Environment and Occupational Performance Cr.Hrs.4 An examination of physical, social, cultural and institutional aspects of the environment and their relationship to occupational performance throughout the lifespan. Students will begin to identify the environment in terms of enablers and obstacles to function for individuals with variable capacities.

OT 6320 Health Conditions and Occupational Performance Cr.Hrs.4 An introduction to diseases, disorders and impairments as barriers to human occupational performance including an introduction to occupational therapy management approaches to enabling function.

OT 6330 Occupational Therapy Practice Skills 2 Cr.Hrs.4 This course builds on OT Practice Skills 1. With a focus on practice skills related to the occupational therapy process, students gain further practice in assessment of occupational performance issues and physical, cognitive, and affective performance components. Students are introduced to assessment of environmental factors that influence occupational performance and participate in problem solving and interventions around occupational performance issues.

OT 6350 Research Methods for Evidence-Based Practice Cr.Hrs.4 This course is a theory and practical course designed to provide a basic understanding of research principles and methods, evidence-based practice, outcome measures, program evaluation and their applications in occupational therapy.

OT 6400 Intermediate Fieldwork 1 Cr.Hrs.8 Students are placed in practice settings for eight weeks of field experience under the supervision of a registered occupational therapist. Experiences are offered in a wide variety of field sites in Manitoba, Saskatchewan and northwestern Ontario. Evaluated at an intermediate 1 level. Course evaluated on a pass/fail basis.

OT 7540 Advanced Enabling and Professional Development Skills 1 Cr.Hrs.4 Builds on Enabling and Professional Development Skills. Emphasis is placed on the integration and consolidation of professional practice knowledge, skills and attitudes.

OT 7560 Occupational Therapy Process Across the Lifespan 1 Cr.Hrs.6 Using problem-based learning methods and self-directed learning, students study and apply the occupational therapy process as it relates to selected learning scenarios involving children, adolescents, adults and older adults. Students work in small group tutorials exploring and discussing a variety of issues frequently faced by individuals who may benefit from occupational therapy services.

OT 7570 Advanced Practice in OT 1 Cr.Hrs.6 Building on knowledge, skills and attitudes learned in Practice Skills 1 & 2, students are introduced to advanced concepts, theories and models that guide client-centred occupational therapy evaluation and intervention. Students learn to apply theory to practice and continue developing required skills for the evaluation and intervention of occupational performance issues across the lifespan.

OT 7600 Intermediate Fieldwork 2 Cr.Hrs.8 Students are placed in practice settings for eight weeks of field experience under the supervision of a registered occupational therapist. Experiences are offered in a wide variety of field sites. Evaluated at an inter-

mediate 2 level. Course evaluated on a pass/fail basis.

OT 7740 Advanced Enabling and Professional Development Skills 2 Cr.Hrs.4 Builds on previous Enabling and Professional Development Skills courses. Emphasis is placed on leadership skills and preparation for entry into the professional community.

OT 7750 Independent Study Cr.Hrs.6 Students complete an in-depth study of evidence for practice in an area of interest. Students will work with an assigned faculty advisor or clinical research consultant to define and evaluate a particular area of interest in occupational therapy practice.

OT 7760 Occupational Therapy Process Across the Lifespan 2 Cr.Hrs.6 Using problem-based learning methods and self-directed learning, students study and apply the occupational therapy process as it relates to selected learning scenarios involving children, adolescents, adults and older adults. Students work in small group tutorials exploring and discussing a variety of issues frequently faced by individuals, groups and communities who may benefit from occupational therapy services.

OT 7770 Advanced Practice in OT 2 Cr.Hrs.6 Building on knowledge, skills and attitudes learned in Advanced Practice in OT 1, students employ and evaluate concepts, theories and models of client-centred occupational therapy. Students develop skills that enable them to select, justify, and interpret appropriate evaluation methods and interventions to address occupational performance issues across the lifespan.

OT 7800 Advanced Fieldwork Cr.Hrs.6 Students are placed in practice settings for a six week period which can occur in a flexible time frame (i.e. students may initiate this placement at different points in time from July 1 to mid August depending upon availability of placements. Students may participate in part-time experiences over a longer period or other types of flexible arrangements as may arise and are determined to be appropriate learning experiences to meet educational standards). Experiences are offered in a wide variety of field sites. Evaluated at an advanced level. Course evaluated on a pass/fail basis.

Section 58: Oral Biology

For information about graduate programs in the following units: Dental Diagnostic and Surgical Sciences, or Preventive Dental Science please refer to the table of contents for page numbers.

Head: R. Bhullar

General Office: 780 Bannatyne Avenue

Telephone: (204) 789 3705

Fax: (204) 789 3913

E-mail: oral_biology@umanitoba.ca

Website: umanitoba.ca/dentistry/oral_biology

Academic Staff

Professors Emeriti

Bowden, G.H.W., M.Phil., Ph.D. (London); **Dawes**, C., B.Sc., B.D.S. (Manchester), Ph.D. (Durham); **Hamilton**, I.R., B.S.A., M.S.A. (Toronto), Ph.D. (Wisconsin).

Senior Scholar

Fleming, N., B.Sc. (Belfast), Ph.D. (East Anglia); **Karim**, A.C., B.Sc. (Sir George Williams), M.Sc., Ph.D. (McGill); **Lavelle**, C.L.B., B.Sc., B.D.S., Ph.D., M.D.S., D.Sc. (Birmingham), F.R.C.D.(C), M.R.C.(Path.) (London), Ph.D. (California) D.D.S (Birmingham) F.R.C.P., M.B.A. (London), F.I.C.D.(C).

Professors

Bhullar, R.P., B.Sc. (McMaster), Ph.D. (Manitoba); **Birek**, C., D.D.S. (Turku-Mures), Ph.D. (Toronto), Dip.Oral Path. (Toronto), F.R.C.D.(C); **Gilchrist**, J.S.C., B.Sc. (Liverpool), M.Sc. (Alberta), Ph.D. (British Columbia); **McNicol**, A., B.Sc., Ph.D. (Glasgow); **Scott**, J.E., B.Sc. (Brandon), M.Sc., Ph.D. (Manitoba).

Associate Professor

Kirouac, G.J., B.A., M.Sc., Ph.D. (Manitoba)

Assistant Professor

Chelikani, P.K., B.Sc., M.Sc. (Andhra), Ph.D. (Manitoba); **Schroth**, R., D.M.D., M.Sc. (Manitoba).

Program Information

The Department of Oral Biology was the first of its kind in North America and reflects the longstanding philosophy that dental education should include a strong science base provided by academic staff with major commitments to undergraduate dentistry and basic dental/medical research. This approach fosters not only the teaching of material relevant to dentistry, but serves to integrate the sciences into the various clinical programs. Associated with this philosophy is the concept that such committed faculty would

also foster Faculty research supporting a graduate program in Oral Biology, as well as providing research and teaching expertise for the clinical graduate and postgraduate programs. Today, Oral Biology at Manitoba is recognised nationally and internationally as an outstanding basic science research department.

The Department of Oral Biology offers graduate instruction and research leading to MSc and PhD degrees in a unique environment. Because of the size of the department, individual instruction and direction in research is a cornerstone of the graduate experience. The graduate programme is designed to accommodate students seeking career opportunities in oral biology or in related basic dental and medical science disciplines. At the heart of the Oral Biology program is the requirement in both degrees for the completion of a substantial and original research project in the laboratory of a faculty member. In most cases, the research undertaken will fall within the area of expertise of the faculty member and will employ the most up-to-date techniques available in the field. In addition students are required to complete a number of formally instructed courses in oral biology and/or related disciplines. The diversity of scientific areas within the Department of Oral Biology allows students to be accepted with either an appropriate professional degree or a B.Sc. (Hons.) with satisfactory background in the biological sciences. In addition, the Department of Oral Biology offers a Pre-Master's Program for selected students with general undergraduate degrees.

The Department of Oral Biology, as a leader in oral biology research, has established connections with numerous researchers and institutes all over the world. Ongoing research collaborations include those with universities in the United States, Sweden, and the United Kingdom. The Faculty of Dentistry consistently ranks among the top three dental faculties in Canada for basic science research. Basic science and clinical/basic science research has received high levels of funding from the Medical Research Council of Canada for more than 30 years.

Recipients of higher degrees from the Department of Oral Biology have been extremely successful following graduation. Recent graduates have either secured positions, or are completing further training, at the universities of Toronto, Dalhousie, British Columbia, Florida, Harvard, Laval and with the federal government.

Fields of Research

Cell biologists are studying the molecular/genetic mechanisms involved in the development and function of orofacial tissues in the healthy and disease states. Studies are also proceeding on the effects of tobacco smoke components on the structure and function of fetal lung cells and lung surfactant. Researchers in the department are investigating interactions in the brain that regulate neurotransmitter molecules in the progression of such disorders as depression and schizophrenia. Others, with an interest in nat-

ural medicine, are examining the effects of plant extracts in countering ear infections and hearing loss. Cell signaling/regulation studies continue on a number of fronts, including the role of the calcium-activated protease, calpain, in cell proliferation; the generation and action of membrane phospholipid-associated second messengers in exocrine secretion; and the central role/mechanisms of GTP-binding regulatory proteins and protein kinases in platelet function. The use of nanobiotechnology in diagnosis and therapy is also being explored. A study on gene expression in enamel formation in normal and abnormal teeth is being carried out.

Research Facilities

The faculty has modern laboratories with state-of-the-art equipment for research in microbiology, physiology, biochemistry and molecular biology. Excellent tissue and cell culturing facilities are present as is unique equipment for such specialities as atomic absorption spectroscopy, chemostat bacterial culture and Fourier transform infrared spectroscopy through collaborations with NRC. Excellent clinical facilities also provide opportunities for graduate students to carry out orthodontic and periodontal work. These facilities, when combined with basic science and biomaterials laboratories, allow for the effective integration of research and clinical practice.

M.Sc. in Oral Biology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Students should possess an appropriate professional degree or B.Sc. (Hons.) degree with a satisfactory background in biological sciences or satisfactory completion of a pre-master's program in the Department of Oral Biology. The qualifications of all students applying for admission to the M.Sc. programs in Oral Biology will be assessed by the Department of Oral Biology Committee on Graduate Studies and Research and a recommendation made to the head of the department. Students with other degrees or backgrounds may be eligible for admission to a pre-Master's program to the satisfaction of the department. Contact the department for information.

Application Deadlines

Applications should be received in the Faculty of Graduate Studies by the dates indicated below:

Start Date	Canadian/U.S.	Non-Canadian	
Regular	(September)	June 1	March 1
Winter	(January)	October 1	July 1
Spring	(May)	February 1	November 1
Summer	(July)	April 1	January 1

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The M.Sc. program requires satisfactory completion of course requirements as specified by each student's supervisory committee and a thesis based on original research. Minimum course requirements are 12 credit hours **which must include** course ORLB 7190 Communication Skills in Dental Research (unless students have previous credit for this or an equivalent course). **Courses taken during the pre-Master's program cannot be transferred as credits towards the Master's program.** M.Sc. students are expected to attend all departmental seminars. Students shall present one seminar on their research to the department each year, updating it each year. In addition, students must pass an oral examination on the subject of the thesis and matters relating thereto. The examination shall be open to all members of the university community who wish to attend. The form of the oral examination shall be the same as that for the Ph.D. thesis oral examination described in the Faculty of Graduate Studies Regulations governing the Ph.D. program.

Second Language Reading Requirement: none
Expected Time to Graduate: dependent on progress

Ph.D. in Oral Biology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. A M.Sc. degree is required, although students of exceptional or proven ability holding an appropriate professional degree or a B.Sc. (Hons.) degree may be admitted. The qualification of all students applying for admission to the Ph.D.

program will be assessed by the Department of Oral Biology Committee on Graduate Studies and Research and a recommendation made to the head of the department.

A student whose knowledge of the field of Oral Biology is in doubt, after first registration for the degree, may be required to take a qualifying examination within the first 12 months of study at the discretion of the advisory committee. It is the responsibility of the committee to organize this examination.

The qualifying examination, which will consist of a written and an oral component, will be administered as in the candidacy examination. The result will be indicated as "pass" or "fail." A student who fails will be required to withdraw.

Application Deadlines

Applications should be received in the Faculty of Graduate Studies by the dates indicated below:

Start Date	Canadian/U.S.	Non-Canadian	
Regular	(September)	June 1	March 1
Winter	(January)	October 1	July 1
Spring	(May)	February 1	November 1
Summer	(July)	April 1	January 1

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The Ph.D. program requires satisfactory completion of course requirements as determined by each student's advisory committee and a thesis based on original research. Minimum course requirements shall be 12 credit hours at the 7000 level beyond the Master's degree, **and must include** course ORLB 7190 Communication Skills in Dental Research (unless students have previous credit for this or an equivalent course). **Courses taken during the pre-Master's and Master's programs cannot be transferred as credits towards the Ph.D. program.** Ph.D. students are expected to attend all departmental seminars. Students shall present at least one seminar on their own research to the department each year.

Second language requirement: none
Expected time to graduation: dependent on progress

Course Descriptions

ORLB 7090 Pharmacology and Therapeutics Cr.Hrs.3 A combined lecture and seminar course on the pharmacological basis of therapeutics. Special attention will be paid to drugs used commonly in the practice of dentistry, their side effects and their interaction.

ORLB 7100 Oral Microbial Ecology Cr.Hrs.3 Study of principles of ecology in relation to the various ecosystems in the oral cavity. In depth examination of the taxonomic relationships of oral bacterial species. Emphasis will be placed on the growth and metabolic activities of oral bacteria which lead to successful colonization of the mouth.

ORLB 7110 Infectious Diseases and the Oral Cavity Cr.Hrs.3 The description of the aetiology of microbial infections in the mouth and infections elsewhere in the body which involve oral bacteria. The control of such infections by vaccines, antibiotics and antimicrobial drugs. Treatment of infections in the immuno-suppressed, post operative infections and nosocomial infections. The relationships of host immune system to the oral flora.

ORLB 7120 Special Problems in Oral Biology Cr.Hrs.3 Each student will be required to carry out a minor research project in an area of oral biology other than that of their thesis work. The results of this project will be presented in a seminar and submitted as a written report.

ORLB 7130 Macromolecular Interactions of Connective Tissue in Health and Disease Cr.Hrs.6 A comprehensive study of the macromolecular constituents of connective tissue, of their synthesis, metabolism, macromolecular interaction in health and disease, and of their regulatory mechanisms.

ORLB 7140 Cell Membrane and Cell Signaling Cr.Hrs.3 The course will cover the structure and function of cell membrane and membrane receptors and deal with the mechanisms and regulation of membrane-coupled signal transduction pathways including those stimulated by neurotransmitters, hormones and drugs.

ORLB 7180 Recent Advances in Oral Biology Cr.Hrs.6 This course is given by staff in the form of lectures and tutorials. Additional lectures may be given by visiting scientists. Students are expected to familiarize themselves with the relevant literature and are examined for an in-depth appreciation of the topics covered.

ORLB 7190 Communication Skills in Dental Research Cr.Hrs.3 A course to develop written, visual and oral communication skills in scientific and clinical disciplines related to dentistry.

Section 59: Pathology

Head: Dr. John G. Gartner

General Office: 401 Brodie Centre, 727 McDermot Avenue

Telephone: (204) 789 3538

Fax: (204) 789 3931

E-mail: patholog@ms.umanitoba.ca

Website: umanitoba.ca/medicine/pathology/education.html

Academic Staff

Professors Emeriti

Adamson, I., B.Sc., Ph.D. (Glasgow); **Bowden, D.**, M.B., Ch.B., M.D. (Bristol), F.R.C.P. (UK), F.R.C.P.C.; **Carr, I.**, M.B.Ch.B., Ph.D. (Glasgow), M.D. (Sheffield), F.R.C.P. (UK), F.R.C.P.C.

Professors

Choy, P.C., B.Sc. (McGill), M.Sc., Ph.D. (North Dakota); **Del Bigio, M.**, M.D. (Manitoba), Ph.D., F.R.C.P.C.; **Gartner, J.**, M.D., C.M. (McGill), F.R.C.P.C., Dip. A.B.(Path.); **Pettigrew, N.**, M.B.Ch.B. (Glasgow), F.R.C.P.(UK); **Ravinsky, E.**, B.Sc., M.D., C.M. (McGill), D.A.B., F.R.C.P.C.; **Quinonez, G.**, M.D. (El Salvador), M.Sc. (Ohio State), F.R.C.P.C.; **Watson, P.**, M.A., M.B.B.Ch.(Hons.) (Cambridge), F.R.C.P.C.

Associate Professors

Baker, P.M., B.Sc., B.M.R.(P.T.), M.D. (Manitoba), F.R.C.P.C.; **Balachandra, T.**, M.B.B.S. (Ceylon), F.R.C.P.C., F.A.C.P., D.A.B. (Forensic Path); **Gibson, I.**, B.Sc., M.B.Ch.B., M.D.(Hons.) (Glasgow), F.R.C.P.(UK); **Littman, C.**, M.B.Ch.B. (Glasgow), F.R.C.P.C.; **Morales, C.**, M.Sc. (Manitoba), M.D. (Madrid), F.R.C.P.C.; **Myal, Y.**, B.Sc., M.Sc., Ph.D. (Manitoba); **Williams, G.**, B.Sc., D.Phil. (Sussex), M.D. (Manitoba), F.R.C.P.C.

Assistant Professors

Ahing, S., B.Sc. (Sir George Williams), D.D.S. (McGill), M.S.D. (Indiana); **Ahsanuddin, A.**, B.Sc., M.D., M.M.S (Brown); **Aljada, I.**, M.B., B.S. (Jordan), F.R.C.P.C.; **Buksak, R.**, B.Sc., M.D. (Manitoba), F.R.C.P.C.; **Curtis, M.**, B.Sc. (Winnipeg), B.Sc.(Med.), M.D. (Manitoba), F.R.C.P.C.; **Ellison, C.**, B.Sc., Ph.D. (Manitoba), D.(A.B.H.I.); **Fischer, G.**, M.D., Ph.D. (Medical School of Pecs); **Frost, E.**, B.Sc., Ph.D. (Cambridge); **Gheorghe, R.**, M.D. (Cluj-Napoca); **Grynspan, D.**, B.Sc.(Hons.), M.D. (Toronto), F.R.C.P.C.; **Hamza, S.**, M.D. (Syria); **Hussain, N.**, M.B., B.S. (Pakistan), F.R.C.P.C.; **Klein, J.**, B.Sc. (Winnipeg), B.Sc.(Med.), M.D. (Manitoba), F.R.C.P.C.; **Krawitz, S.**, B.A., B.Sc., M.D., Ph.D. (Manitoba), M.A. (McGill); **Lane, D.**, M.D. (Calgary), F.R.C.P.C.; **Liu, K.-Z.**, M.D., M.Sc. (Jiangsu), Ph.D. (Manitoba); **Lucman, L.**, M.D. (Santo Thomas); **Ludwick, C.**, B.Sc., M.D. (Manitoba); **Misztal, Margaret**, M.D. (Lodz); **Moltzan, C.**, M.D., B.M.S. (Alberta), F.R.C.P.C.; **Musuka, C.**, B.M.B.S. (Zimbabwe), F.R.C.P.; **Naidoo, J.**, M.B., Ch.B. (Natal); **Naidoo, S.**, M.B., Ch.B. (Natal); **Penner, C.**, B.A., D.D.S. (Missouri); **Phillips, S.**, B.Sc. (Guelph), M.D. (Manitoba), F.R.C.P.C.; **Qing, G.**, M.D., M.Sc. (West China), M.Sc. (Manitoba); **Qiu, H.**, B.M. (Hefei), M.Sc., Ph.D. (Wuhan); **Rivera, R.**, B.Sc., M.D. (Manitoba); **Rossouw, J.**, M.B., Ch.B. (Pretoria), M.Med. (Free State); **Santos, C.**, B.Sc., M.D. (Philippines); **Von Kuster, K.**, B.M.Sc., M.D. (Alberta); **Wang, H.**, M.D. (Harbin), M.Sc., Ph.D. (Manitoba); **Wightman, R.**, B.Sc., M.D. (Manitoba); **Younes, J.**, B.Sc.(Hons.) (Queen's), M.D. (Manitoba); **Zhang, M.**, M.D., M.Sc. (Norman Bethune).

Lecturer

Fuczek, L., Dip.M.R.T. (Red River).

Program Information

The Department of Pathology offers two programs leading to a M.Sc. degree. Honours Science graduates with a strong background in biology can carry out course work plus either a) a research based program and thesis, or b) a practicum leading to a paramedical qualification as a Pathologist's assistant.

Fields of Research

Primary research interests of the faculty include pulmonary pathology, neuropathology, immunobiology, breast cancer, cancer metastasis and neuroimmunology.

Research Facilities

Facilities available in the Department and affiliated teaching hospitals include laboratories for molecular biology, biochemistry, cell culture, and immunocytochemistry.

M.Sc. in Pathology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Department deadlines for Regular Session (September Start Date) are April 1 to the practicum program and June 15 for the research based program.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies as found in the Graduate Studies Regulations Section of this Calendar. Second language reading requirement: none

Ph.D.

The Department of Pathology does not offer a Ph.D. Program. Students interested in further research may continue in the same laboratory but register in the Ph.D. program of another department, or in the interdisciplinary Ph.D. program.

Course Descriptions

PATH 7000 Pathologist Assistant Field Practicum Cr.Hrs.20 The Field Practicum is extensive hands-on training in Anatomic Pathology as it relates to the methods and theory of surgical and Autopsy Pathology. Emphasis is on examination, specimen preparation, dissection techniques and tissue selection as it relates to accurate diagnosis, prognosis, and patient management. The Field Practicum extends over three terms in year one and two terms in year two with an equivalent of four credit hours per term.

PATH 7010 Investigative Pathology Cr.Hrs.6 The student will complete a supervised project in the field of anatomic and/or clinical pathology, the results to be submitted in an acceptable report. The student will be examined on his/her knowledge in the field relating to his project. *Prerequisite:* PATH 7020 or departmental consent.

PATH 7020 Introduction to Pathology Cr.Hrs.6 The course introduces the student to the basic principles of disease processes, using case models to illustrate mechanisms. Assigned reading or seminar presentation will form part of the course.

PATH 7030 Pathologist Assistant Field Practicum Cr.Hrs.20 The Field Practicum is extensive hands-on training in Anatomic Pathology as it relates to the methods and theory of Surgical and Autopsy Pathology. Emphasis is on examination, specimen preparation, dissection techniques and tissue selection as it relates to accurate diagnosis, prognosis, and patient management. The Field Practicum extends over three terms in Year 1 and two terms in Year 2 with an equivalent of 4 credit hours per term.

Section 60: Peace and Conflict Studies

Head: Sean Byrne

General Office: 252 St. Paul's College

Telephone: (204) 474-7979

Fax: (204) 474-8828

E-mail: Sean_Byrne@umanitoba.ca

Website: umanitoba.ca/mauro_centre

Academic Staff

Professors

Byrne, S., B.A. (Limerick), M.S.Sc. (Belfast), M.A., Ph.D. (Syracuse); **Bracken, D.**, B.A. (Holy Cross), M.A. (Toronto), Ph.D. (London); **Brownridge, D.A.**, B.A. (Brandon), M.A., Ph.D. (Manitoba); **Durrant, J.E.**, B.A., M.A., Ph.D. (Windsor); **Fergusson, J.**, B.A., M.A. (Manitoba), Ph.D. (British Columbia); **Fuchs, D.M.**, B.A. (Regina), M.S.W. (Calgary), Ph.D. (Toronto); **Greenhill, P.**, B.A. (Trent), M.A. (Memorial), Ph.D. (Texas); **Haque, E.C.**, B.A. (Hons.), M.A. (Jahangirnagar), M.A., Ph.D. (Manitoba); **Huebner, H.**,

B.A., M.A. (Manitoba), Ph.D. (St. Michael's College); **Kanu, Y.**, B.A., M.Ed. (Sierra Leone), B.Litt. (Birmingham), Ph.D. (Alberta); **Kulchyski, P.**, B.A. (Winnipeg), M.A., Ph.D. (York); **MacLean, G.**, B.A. (Dalhousie), M.A. (McMaster), Ph.D. (Queen's); **Mullaly, R.P.**, B.A. (New Brunswick), M.S.W. (Dalhousie), Ph.D. (Toronto); **Peachey, D.**, B.A. (Virginia), M.A., Ph.D. (Waterloo); **Schwimmer, B.E.**, B.A. (St. John's, MD), M.A. (SUNY Binghamton), Ph.D. (Stanford); **Secter, H.L.**, B.Comm., (Manitoba), LL.M. (Harvard), LL.D. (Hon., Winnipeg); **Steinstra, D.**, B.A. (Alberta), M.A., Ph.D. (York); **Stapleton, J.J.**, B.A. (New Rochelle), M.A. (Washington), Ph.D. (Toronto); **Wiens, J. R.**, B.A., B.Ed., M.Ed. (Manitoba), Ph.D. (Simon Fraser); **Young, J.C.**, B.A., M.A. (Durham), M.Ed. (Kingston), Ph.D. (OISE/ Toronto).

Associate Professors

Buddle-Crowe, K.A., B.A. (Concordia), M.A. (Western Ontario), Ph.D. (McMaster); **Creamer, D.G.**, B.Sc., B.Ed. (St. Mary's), M.Div. (Regis), M.Ed., Ed.D. (OISE/ Toronto); **Davidson, H.S.**, B.A. (Berkeley), M.A., Ed.D. (Toronto); **Gallant, M.M.**, B.A. (Prince Edward Island), LL.B. (New Brunswick), LL.M. (British Columbia), Ph.D. (London); **Kamp, M.**, B.A. (Dartmouth), Ph.D. (Chicago); **McLachlan, S.M.**, B.Sc. (Hons.) (McMaster), M.Sc. (Guelph), Ph.D. (York); **Muller, A.**, B.A. (Calgary), M.A. (Alberta), Ph.D. (McGill); **Piotrowski, C.C.**, B.A., M.A. (Waterloo), M.P.H. (San Diego State), Ph.D. (Pennsylvania State); **Redekop, P.I.**, B.A. (Winnipeg), M.A. (Carleton), Ph.D. (York); **Snyder, A.**, B.A. (Manchester), M.A. (Notre Dame), Ph.D. (Syracuse); **Stewart, J.**, B.A., M.A., Ph.D. (Manitoba); **Turnbull, L.A.**, B.A. (Geneva), B.A. (Kingston), LL.B. (Ottawa), M.A., Ph.D. (Columbia); **Tuso, H.**, (Avondale College, Australia), M.A. (Michigan), Ph.D. (Michigan); **Woolford, A. J.** B.A. (Victoria), M.A. (Western), Ph.D. (British Columbia).

Assistant Professors

B., O., B.S.W. (Senegal), M.S.W., Ph.D. (Laval); **Blum, E.R.**, B.A. (McGill), M.S.W. (Toronto); **Crowe, R.**, B.A. (Hons.) (Alberta), M.Ed., Ed.D. (Toronto); **Edmund, L.**, B.Sc. (Detroit), M.A., Ph.D. (Rosemead); **Fitznor, L.**, B.A., M.A. (Manitoba), Ed.D. (Toronto); **Funk-Unrau, N.**, B.A. (Manitoba), M.A. (Indiana), Ph.D. (Syracuse); **Hansen, N.**, B.A., M.B. (Carleton), Ph.D. (Glasgow); **Jaeger, S.**, Staatsexamen (Bielefeld), Dr. Phil. (Bielefeld); **Muvingi, I.**, B.L., LL.B. (Zimbabwe), M.A. (Notre Dame), Ph.D. (George Mason); **Perry, J.**, B.A. (Guelph), M.Div., M.Th. (St. Mary's), Th.D. (Toronto); **Rice, B.**, B.A., M.A. (Concordia), Ph.D. (San Francisco); **Sawatsky, J.**, B.A. (Winnipeg), M.A. (Virginia), Ph.D. (Hull); **Schulz, J.L.**, B.A. (Gold Medal) and LL.B. (Manitoba), M. Phil. (Cambridge), S.J.D. (Toronto) 2005; **Senehi, J.**, B.A. (Colgate), M.S. (Syracuse), Ph.D. (Syracuse); **Speers, K.M.**, B.A. (Hons.) (Waterloo), M.A. (Queen's), M.P.A. (Carleton), Ph.D. (Alberta); **Starzyk, K. B.**, B.A. (Alberta), M.A., Ph.D. (Queen's); **Thompson, S.**, B.Sc. (Hons.) (Waterloo), M.C.E., B.Ed. Ph.D. (Toronto).

Adjunct Faculty Member

Hewlett, A. K., B.Ed. (Winnipeg/Manitoba), M.Ed., Ph.D. (Manitoba); **Morris, C.**, B.A., LL.B. (Alberta), LL.M. (British Columbia); **Tchantouridze, L.**, B.A. (Hons.)(Tbilisi), M.A., Ph.D. (Queen's).

Instructor

Neal, A., B.A. (Union), M.A. (Indiana), Ph.D. (Manitoba).

Program Information

The Ph.D. Program in Peace and Conflict Studies provides an interdisciplinary approach to analyze and resolve social conflicts through innovative peace research that examines the structural roots of social conflicts, divisions, and inequalities, and strategies for building community and promoting social justice. The focus of the program allows students to examine theory building, skills, and techniques of nonviolent practice and conflict resolution.

The objective of the Ph.D. Program is to prepare educators, researchers, professionals, and public intellectuals to face some of the most challenging problems and tasks of our time by analyzing and resolving the complex issues facing the global milieu of peace and conflict using a variety of tools, processes, and methods common to conflict analysis and resolution, social justice and peace studies. World societies are increasingly aware that they must work together to face shared problems relating to, for example, economic development, environmental issues, health issues, and catastrophes such as famine. Graduates will have demonstrated the ability to analyze conflict, work collaboratively to resolve conflicts, and forge pathways to peace. These analytic and practical skills are important in numerous professional contexts and are increasingly in demand as international governmental and nongovernmental organizations play an increasing role in world affairs.

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar. Graduates of master's degree in Peace and Conflict Studies (or equivalent from other recognized universities) with a minimum Grade Point Average (GPA) of 3.0 in the last 60 credit hours are eligible for direct admission to a course of study leading to the doctoral degree. Graduates of master's degree in diverse disciplines at the University of Manitoba (or equivalent from other recognized universities) are also eligible for direct admission to the program pending successful completion of prerequisite courses to ground them in the field. Applicants will have a thesis-based master's degree, either earned in peace and conflict studies or a related discipline such as social work, education, or sociology, among others. In the event a master's degree is not thesis-based, research capability may be demonstrated by a major research paper from a recognized institution, or an independently completed research article published in a refereed journal. Applicants will also have a proficiency in the English language at levels required by the Faculty of Graduate Studies.

Admission Deadline

The deadline for receipt of the program application form and supporting documents for a September admission is **December 15** for all students. Students who wish to apply for University of Manitoba Graduate Fellowships need to have their applications in before **December 15** (for a September admission).

Program Requirements

Minimum requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. The Ph.D. Degree in Peace and Conflict Studies requirements are 24 credit hours; twelve credits of required course work at the 700 level; six credit hours in a cognate area and 6 credits in research methodology, plus a candidacy examination, a thesis proposal, and a thesis. The six credit hours of cognate and methodology courses can be taken from a list of approved courses at the 500 or 700 level.

Students whose master's degree is not in Peace and Conflict Studies will normally be required to take some prerequisite courses in the field as occasional students in order to be admitted to the Program.

The Peace and Conflict Studies Graduate Program Committee must approve all academic programs. This is normally done on the recommendation of the student's Advisor and/or Advisory Committee following consultation with the student.

Course Descriptions

PEAC 7010 Interpersonal Communication, Problem-Solving, and Trust-building Cr.Hrs.3 Examines the role of language and communication in conflict and conflict resolution. These theoretical and practice perspectives are fundamental to the field of conflict analysis and resolution/peace studies. The role of power, gender, and culture in communication and conflict are reviewed. Theories and practical skills for successful communication, collaborative problem-solving, and trust-building are explored. This class is relevant for addressing conflicts within diverse settings.

PEAC 7020 Theories of Conflict and Conflict Resolution Cr.Hrs.3 Provides an overview of the theoretical foundations of the interdisciplinary field of conflict analysis and resolution, examining macro and micro theories regarding the causes of conflicts and approaches to their resolution. Conflicts are complex and take shape on multiple, interlocking planes. The course focuses on theory and the implications of these theories for practice.

PEAC 7030 International Conflict Resolution and Peace-building Cr.Hrs.3 Examines international conflict resolution and post-accord peace-building. Theories regarding the causes of international conflict are reviewed. Approaches for just and enduring resolution to international conflicts, building peace, and the promotion of a global civil society are explored.

PEAC 7040 Violence Intervention and Prevention Cr.Hrs.3 Examines different definitions and types of violence from the interpersonal to the global levels (e.g., family violence, youth and gang violence, violence in the workplace, hate crimes, and war). Theories of human aggression and causes of violence, as well as approaches for violence intervention and prevention are reviewed. Theories of nonviolence are explored.

PEAC 7050 Intercultural Conflict Resolution and Peace-Building Cr.Hrs.3 Examines the role of socially constructed identities and meaning in intergroup conflicts in a variety of contexts. Culture is broadly conceived to encompass a variety of identities, including differences along racial, ethnic, religious, gender, and class lines. Various models for resolution are reviewed. The nature of, and ethics of intervention in cultures other than one's own are explored.

PEAC 7060 Special Topics in Peace and Conflict Studies 1 Cr.Hrs.3 The topics addressed in this course will vary depending on faculty expertise and student need. Top-

ics could include but will not be restricted to: "Gender and Conflict;" "Storytelling: Identity, Power and Transformation;" "Ethnic Conflict Analysis and Resolution;" "Children and War;" "Peace Education;" "Transformational Conflict Resolution;" "Role of Religion in Conflict and Peace."

PEAC 7070 Special Topics in Peace and Conflict Studies 2 Cr.Hrs.3 The topics ad-

ressed in this course will vary depending on faculty expertise and student need. Topics could include but will not be restricted to: "Gender and Conflict;" "Storytelling: Identity, Power and Transformation;" "Ethnic Conflict Analysis and Resolution;" "Children and War;" "Peace Education;" "Transformational Conflict Resolution;" "Role of Religion in Conflict and Peace."

Section 61: Pharmacology and Therapeutics

General Office: A203 Chown Building, 753 McDermot Avenue,
Winnipeg, MB, R3E 0T6

Telephone: (204) 789 3553

Fax: (204) 789 3932

E-mail: pharmacology@umanitoba.ca

Website: umanitoba.ca/medicine/units/pharmacology

Acting Head: Fiona Parkinson

Graduate Chair: Paul Fernyhough

Graduate Program Assistant: Angie Ekosky

E-mail: angie_ekosky@umanitoba.ca

Academic Staff

Professor Emeritus

Sitar, D.S., Ph.D. (Manitoba).

Senior Scholar

Weisman, H., Ph.D. (Manitoba).

Professors

Aoki, F., M.D. (Manitoba), F.R.C.P.C.; **Bose, R.,** Ph.D. (Manitoba); **Burczynski, F.,** B.Sc., (Pharm.), Ph.D. (Manitoba); **Fernyhough, P.,** Ph.D. (Sheffield, UK); **Glavin, G.,** Ph.D. (Manitoba); **Hatch, G.,** Ph.D. (Manitoba); **Kirshenbaum, L.A.,** Ph.D. (Manitoba); **LaBella, F.,** Ph.D. (Emory); **Lautt, W.,** Ph.D. (Manitoba); **McNicol, A.,** Ph.D. (Glasgow); **Mink, S.N.,** M.D. (Temple, Pennsylvania) F.R.C.P.C.; **Minuk, G.,** M.D. (Manitoba), F.R.C.P.C.; **Parkinson, F.,** Ph.D. (Alberta); **Peeling, J.,** Ph.D. (Manitoba); **Penner, S.,** M.D. (Manitoba), F.R.C.P.C.; **Smyth, D.D.,** Ph.D. (Manitoba); **Tenenbein, M.,** M.D. (Manitoba), F.R.C.P.C.

Associate Professors

Albensi, B., Ph.D. (Utah); **Ariano, R.,** B.Sc. Pharm. (Manitoba), Pharm. D. (Minnesota); **Glazner, G.,** Ph.D. (Colorado State); **Kumar, A.,** M.D. (Ontario); **Miller, D.W.,** Ph.D. (Kansas).

Assistant Professors

Albensi, B., Ph.D. (Utah); **Anderson, C.,** Ph.D. (Manitoba); **Anderson, H.I.,** Ph.D. (Manitoba); **Bras, A.,** Ph.D. (Manitoba); **Martin, M.,** Ph.D. (Yale).

Program Information

Pharmacology is a key medical discipline dealing with the mode of action of therapeutic and recreational drugs and how the body metabolizes these drugs. The department offers both M.Sc. and Ph.D. degrees. A joint M.D.-Ph.D. program is available to students in Medicine.

Fields of Research

Research and facilities are provided in several overlapping areas in which the department specializes. Current research interests include cardiovascular pharmacology, clinical pharmacology, hepatic pharmacology, neuropharmacology and renal pharmacology. The department is among very few pharmacology departments in North America that provide expertise and training in whole animal pharmacology.

Research Facilities

The main research laboratories are located at two sites: the Bannatyne Campus (2nd, 3rd and 4th floors of the Chown Building) and the St. Boniface Research Centre (4th floor). These locations are modern, well equipped facilities with equipment for experimentation in areas ranging from whole animal to molecular biology.

M.Sc. in Pharmacology and Therapeutics

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Qualified students holding B.Sc., M.Sc., B.Pharm., D.V.M. or M.D. degrees may apply

for entry into Graduate Programs. Ancillary work in Pharmacology may be arranged for students pursuing their major studies in related departments.

Application Deadlines

The Department of Pharmacology and Therapeutics allows students to begin their program on either 1 September or 1 January. For consideration of admission for each of these start dates, Canadian students should send in their applications with complete supporting documentation to the Faculty of Graduate Studies no later than four (4) months before the intended start date. Non-Canadian students should send in their applications with complete supporting documentation to the Faculty of Graduate Studies to arrive no later than seven (7) months before the intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Normally, a student will have a prospective advisor identified as a requirement for admission. Unique to our department, some students may enter into the research rotation program of the department in which the student spends two terms of three months in separate laboratories in order to gain experience in multiple techniques/areas. An advisor would be identified following these rotations. Course requirements will depend on prior degree held and research experience. Year 1 courses may include Drugs and human disease (PHAC 4030/4040 (6 credit hours), Cell Biology IMED 7090 (6 credit hours), Physiology PHGY 7240 (6 credit hours) and Fundamentals of Neuroscience IMED 7100 (6 credit hours). Year 2 courses include Pharmacology PHAC 7130 (6 credit hours). Normally, one Statistics Course (3 credit hours) and at least one Seminar Course 1 (3 credit hours) are required. These may be taken at anytime in the program. In each year of the program students are expected to attend weekly seminars and present an oral research presentation on their work. At the end of each year, for the first two years, students take an oral exam which encompasses the year's course activities. Seminar courses include Cardiovascular Regulation and Drug Action PHAC 7040, Drug Distribution, Metabolism and Excretion PHAC 7060, Neuropharmacology PHAC 7160, Recent Advances in Pharmacology PHAC 7180, Pharmacokinetics of Drug Disposition PHAC 7190, Liver Pharmacology PHAC 7200, Clinical Trial Design PHAC 7210 and Molecular Pharmacology PHAC 7220.

Second language reading requirement: none

Expected time to graduate: 2 – 3 years

Ph.D. in Pharmacology and Therapeutics

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. A joint M.D.-Ph.D. program is available for students enrolled in Medicine.

Application Deadlines

The Department of Pharmacology and Therapeutics allows students to begin their program on either 1 September or 1 January. For admission for each of these start dates, Canadian students should send in their applications with complete supporting documentation to the Department of Pharmacology and Therapeutics no later than four (4) months before the intended start date. Non-Canadian students should send in their applications with complete supporting documentation to the Department of Pharmacology and Therapeutics to arrive no later than seven (7) months before the intended start date.

Program Requirements

Program requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Course requirements will depend on prior degree held and research experience. Entry with a B.Sc. (Hon) degree (or 4 year equivalent) may require a course schedule similar to that described for the M.Sc. degree above. Normally at least 3 seminar courses are required. Students entering with a graduate de-

gree (M.Sc.) will have a course schedule which is dependent on previous course work.

Second language requirement: none

Expected time to graduation: 3 – 5 years

Course Descriptions

PHAC 7040 Cardiovascular Regulation and Drug Action Cr.Hrs.3 (Formerly 089.704) The normal homeostatic regulation of the cardiovascular system, its modification by drugs, and the sites and characteristics of drug actions affecting the cardiovascular system.

PHAC 7060 Drug, Distribution, Metabolism, and Excretion Cr.Hrs.3 (Formerly 089.706) The mechanisms by which the body handles foreign chemicals and their effects on the characteristics of drug action.

PHAC 7110 Topics in Pharmacology Cr.Hrs.6 (Formerly 089.711) Short research projects on various properties and effects of newer drugs. Presentation of oral and written reports by graduate students on research conducted. Open only to graduate students in Pharmacology.

PHAC 7130 Pharmacology Cr.Hrs.6 (Formerly 089.713) Three hours a week both terms. Pharmacodynamics of the more important groups of drugs, the factors which control and modify their effects, and the basis for rational selection and administration of drugs in the treatment of disease. *Prerequisite:* permission of the department.

PHAC 7160 Neuropharmacology Cr.Hrs.3 (Formerly 089.716) Seminars, tutorials and selected readings on topics concerning the mechanisms whereby drugs alter central and peripheral nervous activity. These will include drug modification of cellular excitability, neurotransmission and brain function.

PHAC 7180 Recent Advances in Pharmacology Cr.Hrs.3 (Formerly 089.718) Lectures given by staff, followed by group discussions on current research, new developments in drugs and re-evaluation of currently employed drugs, their mechanism of action, etc. Three hours per week both terms. Open only to graduate students in Pharmacology.

PHAC 7190 Pharmacokinetics of Drug Disposition Cr.Hrs.3 (Formerly 089.719) Lectures and problem-solving sessions directed at appropriate modelling of the disposition of drugs in the body.

PHAC 7200 Pharmacology of the Liver Cr.Hrs.3 (Formerly 089.720) Seminars, tutorials and selected readings on topics related to hepatic functions emphasizing the integrative role of the liver in homeostasis including vascular, autonomic and metabolic functions, toxicology and therapeutic aspects.

PHAC 7210 Clinical Trial Design Cr.Hrs.3 (Formerly 089.721) Course designed to evaluate the essential elements of clinical trials as the basis for determining the potential value of interventions advocated for the treatment of diseases in humans. The format will include assigned readings, lectures, discussion and assignment preparation. *Prerequisite:* Undergraduate degree in the health sciences - previous related experience or relevant course credits will be considered as surrogate qualification to an undergraduate health sciences degree.

PHAC 7220 Molecular Pharmacology Cr.Hrs.3 (Formerly 089.722) Lectures, seminars and selected readings on the mechanism of action of therapeutic and recreational drugs. Topics will include several categories of drug receptors and associated signal transducers in the context of drug action.

PHAC 2100 Pharmacology Cr. Hrs. 6 (Formerly 089.210) A broad overview of drug mechanisms, metabolism, and pharmacodynamics, including a survey of the more important drug classes in terms of physiology and pathology.

RESP 1290 Cardiopulmonary Pharmacology, Cr. Hrs. 2 (Formerly 169.129) Pharmacology principles, phases of drug events, factors modifying drug effect, individual pharmacological agents, including ANS drugs, CNS drugs, cardiac medications, respiratory medications, antibiotics. 36 hours

PHAC 4030 Drugs in Human Disease I, Cr. Hrs. 3 Foundation physiological principles underlying human disease integrated with drug disposition and effects of important drug groups on disorders of the autonomic and central nervous systems, and the cardiovascular system.

PHAC 4040 Drugs in Human Disease II, Cr. Hrs. 3 Foundation physiological principles underlying human disease integrated with effects of important drug groups on endocrine and organ system disorders, allergy and inflammation, infection, and cancer. The course also offers an introduction to basic clinical pharmacology as well as several current specialized topics in pharmacology.

Section 62: Pharmacy

Dean: David M. Collins

Associate Dean (Research): Yuewen Gong

Graduate Chair: Hope Anderson

Faculty Administrator: Cheryl Lee

Telephone: (204) 474-9306

Fax: (204) 474-7617

E-mail: pharmacy@umanitoba.ca

Website: umanitoba.ca/pharmacy/programs

Academic Staff

Dean Emeritus

Steele, J.W., B.Sc. (Pharm.), A.R.S.C., Ph.D., (Glasgow).

Professors Emeriti

Briggs, C.J., B.Pharm., Ph.D. (London), F.R.Pharm.S.; **Templeton, J.F.,** B.Sc.(Hons.), MSc. (Memorial), D.I.C. (Imperial College), Ph.D., D.Sc., (London), F.R.S.C.C.Chem., (UK).

Senior Scholar

Metge, C., B.Sc. (Pharm.) (Alberta), Ph.D. (Maryland).

Professors

Biscontri, R., Ph.D. MM-ITM, B.Com, CGA, CPA (Aust.), FCPA (Aust.); **Burczynski, F.J.,** B.Sc. (Pharm.), M.Sc., Ph.D. (Manitoba); **Collins, D.M.,** Dipl. Pharm. (New Zealand), M.Sc., Ph.D. (Minnesota); **Gong, Y.,** B.M. (Beijing), M.Sc., (China), Ph.D., (Manitoba); **Grymonpre, R.,** B.Sc. (Pharm.) (Manitoba), Pharm.D., (Minnesota); **Hasinoff, B.,** B.Sc.(Hons.), Ph.D. (Alberta); **Leslie, W.,** B.Sc. (Hons.), M.Sc., M.D. (Manitoba); **Moghadasian, M.,** D.V.M. (Iran), M.Sc., Ph.D. (British Columbia); **Pierce, G.,** B.P.H.E. (Lakehead), M.Sc., (Dalhousie), Ph.D., (Manitoba); **Simons, K.J.,** B.Sc. (Pharm.), M.Sc. (Manitoba), Ph.D. (Washington); **Sitar, D.,** B.Sc.(Pharm.), M.Sc., Ph.D., (Manitoba); **Vercaigne, L.,** B.Sc. (Pharm.), (Manitoba), Pharm.D. (Toronto); **Zelenitsky, S.,** B.Sc. (Pharm.) (Manitoba), Pharm.D. (SUNY Buffalo).

Associate Professors

Ariano, R., B.Sc.(Pharm.), (Manitoba), Pharm.D., (Minnesota); **Chee, L.,** B.Sc. (Hons), Ph.D. (Manitoba); **Gu, X.,** B.Sc. (Pharm.), M.Sc., Ph.D., (Nan-

jing); **McIntosh, A.R.,** B.Sc. (Hons.) (Calgary), Ph.D. (Queen's); **Namaka, M.,** B.Sc., (Pharm.), M.Sc., Ph.D., (Manitoba).

Assistant Professors

Alessi-Severini, S., B.Sc. (Pharm.) B.Sc. (Pharm. Chem. and Tech.) (Parma), Ph.D., (Alberta); **Anderson, H.,** B.Sc., Ph.D., (Manitoba); **Bras, A.,** B.Sc. (Chem.), Ph.D., (Manitoba); **Bugden, S.,** B.Sc. (Pharm.), M.Sc., (Manitoba); **Coulter, A.,** B.Sc. (Pharm.) (Manitoba.), Pharm.D. (British Columbia); **Davis, C.,** B.Sc. (Pharm.) (Manitoba), Pharm.D. (British Columbia); **Falk, J.,** B.Sc. (Pharm.) (Manitoba), Pharm.D. (British Columbia); **Friesen, A.,** B.Sc., M.Sc., Ph.D. (Manitoba); **Friesen, M.,** B.Sc. (Pharm.), M.Sc. (Manitoba), Pharm.D. (Toronto); **Fusee, R.,** B.Sc. (Pharm.) (Manitoba); **Gin, A.,** B.Sc. (Pharm.) (Manitoba), Pharm. D. (SUNY Buffalo); **Guilbert, K.** B.Sc. (Pharm.), M.Sc. (Manitoba); **Honcharik, N.,** B.Sc. (Pharm.), Pharm.D. (SUNY Buffalo); **Honcharik, P.,** B.Sc. (Pharm.) (Manitoba), Pharm.D. (SUNY Buffalo); **MacNair, K.,** B.Sc. (Pharm.) (Manitoba); **Mang'era, K.,** B.Sc. (Pharm.) (Kenya), M.Sc., Ph.D. (Belgium); **Rabnett, M.,** B.A. (Hons.) (Toronto), MLS (Toronto); **Raymond, C.,** B.Sc. (Pharm.) (Alberta), Pharm.D. (British Columbia); **Sood, A.,** B.Sc. (Pharm) (Toronto), Pharm.D. (Toronto); **Thomson, P.,** B.Sc. (Pharm.) (British Columbia), Pharm.D. (Wayne State); **Thurmeier, R.,** B.Sc., (Pharm.) (Manitoba); **Treacy, S.,** B.Sc., M.Sc. (Saskatchewan); **Trozzo, P.,** B.Sc.(Pharm.), (Manitoba); **Watral, W.,** B.Sc. (Pharm) (Manitoba), PharmD, (Minnesota); **Wazny, L,** B.Sc. (Pharm.) (Manitoba), PharmD. (Minnesota); **Woloschuk, D.,** B.Sc.(Pharm.) (Saskatchewan), Pharm.D., (Cincinnati).

Adjunct Professors

Van Domselaar, G., B.Sc.(Chem), Ph.D. (Pharmacy/Pharmaceutical Sciences) (Alberta).

Program Information

Programs are offered leading to the degrees of Master of Science and Doctor of Philosophy. Thesis based research projects may be undertaken in the following fields of pharmaceutical sciences: pharmaceutics, biopharmaceutics, pharmacokinetics, pharmaceutical and medicinal chemistry, pharmaceutical microbiology, toxicology, pharmacognosy and in the clinically related areas of pharmacoconomics, pharmacoepidemiology, and pharmaceutical policy.

Fields of Research

There are three established research groups: drug discovery and development, drug policy, and antibiotic resistance. Expertise in these areas include dosage form development, geriatrics, medicinal chemistry, natural health products, toxicology, photochemistry, pharmacokinetics and pharmacodynamics, antibiotics, nephrology, pharmacoconomics, epidemiology, health policy, and clinical pharmacy practice. Two teaching hospitals, the Health Sciences Centre and St. Boniface General Hospital, are involved with pharmacy research in the faculty.

Collaborative research programs are conducted among other university departments including Anatomy, Community Health Sciences, Pharmacology, Physiology, Medical Microbiology, Pediatrics and Child Health, Internal Medicine, Cell Biology, and Canadian Centre for Agri-Food Research in Health and Medicine (CCARM). Funding sources include the Canadian Institute of Health Research, health related research grants, and pharmaceutical industry.

Research Facilities

State-of-the-art equipment and apparatus are available, including a wide range of biological, biochemical, chemical and microbiological instrumentation and computerization. Relevant pharmaceutical, chemical and medical publications are available in The Neal John Maclean Health Sciences and the Sciences and Technology Libraries; online search facilities are available through the University e-Library system.

M.Sc. in Pharmacy

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Students who do not possess the requirements for entry directly into the graduate program must take a pre Master's program of courses which will be individually prescribed. Please contact the Faculty for further information.

To enter the Master's program directly a student must have a B.Sc. degree in Pharmacy from the University of Manitoba or equivalent. Students from another faculty with an honours degree in a subject relevant to their research area will also be considered for graduate research.

APPLICANTS MUST CONTACT THE FACULTY OF PHARMACY (IDENTIFY A PROFESSOR AND AREA OF RESEARCH INTEREST) PRIOR TO SUBMITTING A FORMAL APPLICATION TO THE FACULTY OF GRADUATE STUDIES.

Application Deadlines

Start Date	Canadian/U.S.	International
Regular (September)	June 1	March 1
Winter (January)	October 1	July 1
Spring (May)	February 1	November 1
Summer (July)	April 1	January 1

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. All programs are established on an individual basis; the following general principles apply:

- Course work and original thesis are required.
- All students are required to complete the Pharmacy Seminar 1 and 2 courses (PHRM 7160 is a prerequisite for PHRM 7170).
- Seminar courses by graduate students, post-doctoral fellows, research associates, staff or invited lecturers are considered part of the program and must be attended by all graduate students.
- Students are expected to enroll on a 12-month basis and conduct research during the summer months.

- The minimum period of time necessary for the completion of the program is one year.

Second language reading requirement: none

Expected time to graduate: two years

Ph.D. in Pharmacy

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. The normal procedure for a candidate is to complete a M.Sc. degree first. However, after one year of study towards the M.Sc. degree, if satisfactory performance is evident, a student may transfer to the doctoral program.

APPLICANTS MUST CONTACT THE FACULTY OF PHARMACY (IDENTIFY A PROFESSOR AND AREA OF RESEARCH INTEREST) PRIOR TO SUBMITTING A FORMAL APPLICATION TO THE FACULTY OF GRADUATE STUDIES.

Application Deadlines – as per the M.Sc. program in Pharmacy.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. A minimum of three years is required for the Ph.D. degree. However, the actual time spent is usually somewhat longer. The minimum number of courses required for the Ph.D. is 24 credit hours (18 at the 700/7000 level) beyond the B.Sc. (Hons.) or 12 credit hours at the 700/7000 level beyond the M.Sc. All Ph.D. students are required to present a research seminar annually.

Second language requirement: none

Expected time to graduation: 4 - 5 years

Course Descriptions

PHRM 7080 Biopharmaceutics and Relevant Pharmacokinetics Cr.Hrs.3 Lecture course on biopharmaceutics with particular emphasis on the application of pharmacokinetic principles in the design of conventional and sustained-release drug dosage forms, assessment of drug bioavailability, and selection of dosage regimens.

PHRM 7100 Analytical Forensic Toxicology Cr.Hrs.3 A study of the analytical and chemical procedures for the detection of chemicals and medications in body fluids and the identification of drugs of abuse. Some techniques will be emphasized through a practical project.

PHRM 7120 Medical and Scientific Writing Cr.Hrs.3 Lectures and exercises on the preparation of medical and scientific manuscripts, including papers for publication or oral presentation, progress reports, reviews, short papers, grant applications and similar projects.

PHRM 7130 Novel Drug Delivery Systems Cr.Hrs.3 Advanced course dealing with the role of drugs and drug products in the treatment of disease with emphasis on pharmaceutics and physical pharmacy. Current and future status of drug delivery systems, their design and evaluation will also be examined.

PHRM 7140 Pharmaceutical Implications of Free Radical Medicinal Chemistry Cr.Hrs.3 Persistent and stable organic free radicals found in medicinal compounds, unstable and reactive free radicals found in vivo, natural defence mechanisms designed to remove free radicals in vivo, antioxidants as medicinal compounds, important applications of electron paramagnetic spectroscopy of free radicals, spin-trapping of very reactive free radicals, spin label oximetry

PHRM 7160 Pharmacy Seminar 1 Cr.Hrs.3 Seminars and lectures on selected topics in pharmacy. Students are required to present both oral and written reports on research topics.

PHRM 7170 Pharmacy Seminar 2 Cr.Hrs.3 Lectures and group discussions on recent developments in pharmaceutical fields. Students are required to give an oral presentation. (Prerequisite: PHRM 7160)

PHRM 7180 Pharmaceutical Implications of Biotechnology Cr.Hrs.3 Introduction to biotechnology in pharmaceutical sciences and pharmacy. Students will be introduced to concepts from molecular biology, immunology, biotechnology and pharmacogenomics. Implications of biotechnology in pharmaceutical biopharmaceutical research.

Section 63: Philosophy

General Office: 453 University College

Telephone: (204)474 6878

Fax: (204)474 7586

E-mail: philgrad@cc.umanitoba.ca

Website: umanitoba.ca/arts/departments/philosophy

Head: Carl Matheson

Graduate Chair: Rhonda Martens

Administrative Assistant: Laurie Morris

Graduate Secretary: Rosa Di Noto

Academic Staff

Professors

McCarthy, D.J., B.A. (St.Paul's, Washington, D.C.), M.A., Ph.D. (Toronto), L.M.S. (Medieval Institute); **Matheson**, C.A., B.Sc.(Hons.), M.A. (Dalhousie), Ph.D. (Syracuse); **Schafer**, A.M., B.A.(Hons.) (Manitoba), B.Litt. (Oxford); **Shaver**, R.W., B.A. (Toronto), Ph.D. (Pittsburgh).

Associate Professors

Bailey, J.A., B.A. (Gettysburg), M.A., Ph.D. (Pittsburgh); **Jenkins**, J.L., B.A. (Hampshire), M.A., Ph.D. (Pittsburgh); **Martens**, R.M., B.A. Distinction (Manitoba), M.A. (Dalhousie), Ph.D.(Western Ontario); **Stack**, M.F., B.A., M.A. (Saskatchewan), Ph.D. (Duke); **Warmbrod**, W.K., A.B.(Hons.), Ph.D. (North Carolina).

Assistant Professors

Dentsoras, D., B.A. (Middlebury College), Ph.D. (Princeton); **McArthur**, N. M.A. (UWO), Ph.D. (Southern California); **Tillman**, C., B.A.(Hons.) (UMC), M.A., Ph.D. (Rochester); **Diaz-Leon**, E., Ph.D. (Sheffield), M.A., B.A. (Murcia).

Program Information

At the present time, the University of Manitoba offers only the M.A. degree in philosophy. Graduates of this program have been successful in gaining entry to some of the leading doctoral programs in philosophy in Canada, the USA and other continents. Approximately 40 Manitoba graduates are now in tenure-track faculty positions in philosophy in universities across North America. Other graduates have pursued careers in law, management and other fields.

Fields of Research

The Department of Philosophy offers courses in all the major areas of philosophy: the history of philosophy (including twentieth-century European philosophy), logic, epistemology, metaphysics, ethics, philosophy of religion, philosophy of law, philosophy of science, philosophy of language, social philosophy, political philosophy, aesthetics, and the philosophy of mind. The dominant orientation of the Department is analytic. Areas of greatest strength are: metaphysics, history and philosophy of science, history of philosophy, ethics, epistemology, social and political philosophy.

Course Descriptions

PHIL 7040 Topics in Value Theory Cr.Hrs.6 (Formerly 015.704) As the course content will vary from year to year, students may take this course more than once for credit. Not currently offered.

PHIL 7070 Topics in Social and Political Philosophy Cr.Hrs.6 (Formerly 015.707) As the course content will vary from year to year, students may take this course more than once for credit. Not currently offered.

PHIL 7080 Topics in the History of Philosophy Cr.Hrs.6 (Formerly 015.708) A detailed treatment of important figures and movements in the history of philosophy, ancient, modern, and contemporary. As the course content will vary from year to year, students may take this course more than once for credit.

PHIL 7110 Graduate Seminar Cr.Hrs.6 (Formerly 015.711) Not currently offered.

PHIL 7120 Graduate Reading 1 Cr.Hrs.3 (Formerly 015.712) A reading course for graduate students in philosophy. Subject matter may be arranged to suit the special needs and interests of students; the course might, for example, be devoted to modal logic, or the free will problem, the ontological argument, phenomenology, the philosophy of W.V. Quine, etc. As the course content will vary from year to year, students may take this course more than once for credit.

PHIL 7130 Graduate Reading 2 Cr.Hrs.3 (Formerly 015.713) A reading course for graduate students in philosophy, similar to PHIL 7120 (or 015.712). As the course content will vary from year to year, students may take this course more than once for credit.

PHIL 7140 Epistemology 1 Cr.Hrs.3 (Formerly 015.714) A study of selected topics in epistemology.

PHIL 7150 Epistemology 2 Cr.Hrs.3 (Formerly 015.715) A study of selected problems in epistemology.

PHIL 7160 Metaphysics 1 Cr.Hrs.3 (Formerly 015.716) A study of selected topics in metaphysics.

PHIL 7170 Metaphysics 2 Cr.Hrs.3 (Formerly 015.717) A study of selected problems in metaphysics.

M.A. in Philosophy

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Contact the Department of Philosophy for further information.

Application Deadlines

The Department of Philosophy allows students entering the M.A. program to commence their studies on either 1 September or 1 January. Students entering the Pre-Master's program will usually find it necessary to commence their studies on 1 September. Canadian/U.S. students should send applications for admission, with complete supporting documentation, to the Faculty of Graduate Studies, not later than four (4) months prior to the intended start date of their program of study. International students should send applications, with complete supporting documentation, to the Faculty of Graduate Studies, not later than nine (9) months prior to their intended start date.

Those applying for major financial awards offered to entering students should apply directly to the Department of Philosophy, using the application form for the University of Manitoba Graduate Fellowship and including a sample of their recent philosophical writing, not later than January 15 for programs of study commencing in September.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students have three options available to them:

- 15 credit hours in Philosophy, and a major thesis; or
- 18 credit hours in Philosophy, and two research papers; or
- 24 credit hours in Philosophy.

Second Language Reading Requirement: A reading knowledge of one foreign language will be required if the thesis topic requires it.

Expected Time to Graduate: Students with undergraduate concentration in Philosophy equivalent to approximately nine full courses (54 credit hours) can complete the M.A. degree in one year. Students with a lesser degree of undergraduate concentration will need more than one year to complete the degree.

Ph.D.

The Department of Philosophy does not currently offer a Ph.D. Program.

PHIL 7180 Graduate Reading 3 Cr.Hrs.3 (Formerly 015.718) A reading course for graduate students in philosophy, similar to PHIL 7120 (or 015.712). As the course content will vary from year to year, students may take this course more than once for credit.

PHIL 7190 Graduate Reading 4 Cr.Hrs.3 (Formerly 015.719) A reading course for graduate students in philosophy, similar to PHIL 7120 (or 015.712). As the course content will vary from year to year, students may take this course more than once for credit.

PHIL 7200 Topics in Ethics 1 Cr.Hrs.3 (Formerly 015.720) Basic topics in moral theory. Readings will include contemporary articles and books. As the course content will vary from year to year, students may take this course more than once for credit.

PHIL 7210 Topics in Ethics 2 Cr.Hrs.3 (Formerly 015.721) Basic topics in moral theory. Readings will include contemporary articles and books. As the course content will vary from year to year, students may take this course more than once for credit.

PHIL 7220 Topics in Logic and the Philosophy of Logic 1 Cr.Hrs.3 (Formerly 015.722) Selected topics in mathematical logic, inductive logic, the philosophy of logic, and the methodology of the natural and formal sciences. Students may not hold credit for both PHIL 7220 (or 015.722) and the former 015.705. *Prerequisite:* written consent of department head or M.A. program chair. As the course content will vary from year to year, students may take this course more than once for credit.

PHIL 7230 Topics in Logic and the Philosophy of Logic 2 Cr.Hrs.3 (Formerly 015.723) Selected topics in mathematical logic, inductive logic, the philosophy of logic, and the methodology of the natural and formal sciences. Students may not hold credit for both PHIL 7230 (or 015.723) and the former 015.705. As the course content will vary from year to year, students may take this course more than once for credit.

PHIL 7310 Topics in the Philosophy of Science Cr.Hrs.3 (Formerly 015.731) An historical study of the interaction between science and philosophy since the time of Newton. As the course content will vary from year to year, students may take this course more than once for credit.

Section 64: Physician Assistant Education Program

Director: Sarah Clark

General Office: P121-770 Bannatyne Avenue

Telephone: (204) 272.3094

Fax: (204) 272.3068

E-mail: paep@cc.umanitoba.ca

Website: <http://umanitoba.ca/faculties/medicine/departments/opas/paep/>

Program Information

The PAEP offers coursework leading to the Master of Physician Assistant Studies (MPAS) degree. The Program currently accepts 12 students per year. Graduates are eligible for registration with the College of Physicians and Surgeons of Manitoba as physician assistants. Graduates are also eligible to sit for the Physician Assistant Certification Council national certification exam. Physician assistants currently work in the province of Manitoba as clinical assistants in a variety of medical and surgical specialties. Physician assistants are also employed in the province of Ontario in a number of pilot projects sponsored by HealthForceOntario.

Housed within the Faculties of Medicine and Graduate Studies the PAEP incorporates the concepts of student centred learning, adult learning principles, and professional education with the clinical competencies necessary for effective physician assistant practice.

Fields of Research

As this is a new program, the Program faculty's research focus lies in the area of physician assistant education. Students in the PAEP are required to complete a research project and are encouraged to cultivate research interests in a range of clinical and quality improvement areas.

Research Facilities

The PAEP is housed at the Bannatyne Health Sciences campus. Students have access to the resources of the Neil John MacLean Health Sciences Library.

Master of Physician Assistant Studies

Admission

The PAEP admission requirements are those outlined as the minimum admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar.

This Program is open to graduates of a four year Bachelor's degree, preferably in a health sciences field, from a college or university recognized by the University of Manitoba, with a minimum GPA of 3.0 in the last two full years (60 credit hours) of study. Undergraduate courses in Human Anatomy, Physiology and Biochemistry are required if they were not taken in the Bachelor's degree. Microbiology and Psychology are asset courses.

It is strongly recommended that applicants have 2000 hours (1 year full time) of direct patient contact, i.e. direct involvement in treatment and/or care planning and delivery for patients in hospital, medical office/clinic, nursing home, care home or other care facility.

All students in the PAEP must possess the cognitive, communication, sensory, motor, and social skills necessary to interview, examine, and counsel patients. Students are also expected to competently complete certain technical procedures in a reasonable time while simultaneously ensuring patient safety. Further details are provided in the Essential Skills and Abilities (Technical Standards) for Admission, Promotion and Graduation in the PAEP information sheet. This information is included in the program application package, available at the Office of Physician Assistant Studies.

All applicants are required to submit 3 Application Forms: Faculty of Graduate Studies Application, PAEP Supplementary Application and Adult Criminal Records and Child Abuse Registry Self Declaration Form.

Admission Deadlines

There is only one intake per year, at the beginning of September. Application deadline is the last working day in November each year, for admission the following September. Please visit the PAEP website for exact dates each year at

http://umanitoba.ca/faculties/medicine/departments/opas/paep/pros_students/index.html

Program Requirements

The PAEP is a two year program. The first year consists of 56 credit hours of coursework, delivered as a combination of lecture, clinical skills training, and seminars. The second year includes 33 credit hours (48 weeks) of core clinical rotations. All courses in the PAEP are required major courses, and students must maintain full-time registration throughout the Program.

Second language requirement: none

Expected time to graduation: 26 months

Course Descriptions

PAEP 7000 Physiology and Pathophysiology for Physician Assistants Cr.Hrs.3 This brief introduction is designed to impart an understanding of normal physiological functioning of the human body. This basic science course builds upon the entry knowledge of the Physician Assistant student, by presenting the pathophysiology of disease by organ systems. The emphasis is on the homeostatic mechanisms for all the major organ systems. Evaluation will be by successful completion of exercises, class participation and written examination, demonstrating to faculty proficiency in course principles.

PAEP 7002 Physiology and Pathophysiology for Physician Assistants II Cr.Hrs.3 A continuation of the material presented in Physiology and Pathophysiology for Physician Assistants. A basic science course which builds upon the entry knowledge of the PAEP learner by presenting normal physiology and the pathophysiology for disease by organ systems. Prerequisite: Admission to PAEP Year 1

PAEP 7010 Human Anatomy for Physician Assistants Cr.Hrs.3 This brief comprehensive introduction is designed to impart an understanding of gross functional anatomy of the human body. This basic science course builds upon the entry knowledge of the student by presenting clinical human anatomy, correlated to clinical applications, assessment and pathology of disease. Evaluation will be by successful completion of exercises, class participation and written examination, demonstrating to faculty proficiency in course principles.

PAEP 7030 Professional Studies of Physician Assistants Cr.Hrs.3 This course is designed to provide the student with an understanding of the role the Physician Assistant plays within the structure of the Canadian Health Care System. This introduction is designed to impart an understanding of the interaction between the various stakeholders. Ethical considerations in health care and the legal aspects of the PA role in Canada will be addressed. Evaluation will be by successful completion of a presentation (evaluated by classmates), participation in ethical problem solving exercises and written examination, demonstrating to faculty proficiency in course principles. Students are expected to submit a research paper on an ethics topic of choice and write a short-answer examination at the end of the course.

PAEP 7040 Basic Medical Sciences for Physician Assistants Cr.Hrs.3 This brief introductory course is designed to provide the student with an understanding of medical terminology, biostatistics, epidemiology and public health. Students will acquire knowledge enabling them to become critical consumers of medicine; thus developing their ability to assess, evaluate and improve patient care practices. Evaluation will be by successful completion of problem solving exercises, class participation and written examination, demonstrating to faculty proficiency in course principles. A research methodology exercise, in the form of a research proposal will also be completed with the student under the guidance of a mentor. The student will develop a brief research proposal, utilizing the knowledge gained in the didactic lectures, which will count for 25% of the course grade.

PAEP 7042 Biochemistry for Physician Assistants Cr.Hrs.1 A brief introduction to medical biochemistry.

PAEP 7044 Statistics for Physician Assistants Cr.Hrs.1 A brief introduction to biostatistics, epidemiology, and public health.

PAEP 7046 Genetics for Physician Assistants Cr.Hrs.1 A brief introduction to medical genetics.

PAEP 7048 Pediatrics for Physician Assistants Cr.Hrs.3 A brief, comprehensive didactic introduction to the field of obstetrics and gynecology designed to prepare the physician assistant to diagnose and treat, within his or her scope of practice, common obstetrics and gynecology conditions as would be encountered in a primary care setting. Pre-requisite: Successful completion of MPAS year 1.

PAEP 7050 Obstetrics and Gynecology for Physician Assistants Cr.Hrs.3 A brief, comprehensive didactic introduction to the field of obstetrics and gynecology designed to prepare the physician assistant to diagnose and treat, within his or her scope of practice, common obstetrics and gynecology conditions as would be encountered in a primary care setting. Pre-requisite: Successful completion of MPAS year 1.

PAEP 7052 Patient Assessment for Physician Assistants I Cr.Hrs.2 A comprehensive introduction to the clinical assessment of a patient, delivered as a group of three courses. Part I introduces basic history-taking and physical exam skills. Patient Assessment II and Patient Assessment III extend these skills to other clinical settings.

PAEP 7054 Patient Assessment for Physician Assistants II Cr.Hrs.2 Continues developing the skills in history taking and physical examination introduced in Patient Assessment for Pas I. Learners are introduced to the Standardized Patient Program. Prerequisite: Admissions to PAEP Year 1.

PAEP 7056 Patient Assessment for Physician Assistants III Cr.Hrs.2 A brief, comprehensive introduction to diagnostic imaging techniques and interpretation of diagnostic images designed to enable Physician Assistants, within their scope of practice, to

diagnose and treat medical, surgical, and infectious disease. Prerequisite: Admission to PAEP Year 1.

PAEP 7062 Adult Medicine for Physician Assistants I Cr.Hrs.4 A systems based, comprehensive introduction to medical disease designed to allow the Physician Assistant, within his or her scope of practice, to diagnose and treat medical, surgical, and infectious conditions. Prerequisite: Admission to PAEP Year 1

PAEP 7064 Adult Medicine for Physician Assistants III Cr.Hrs.4 A systems based, comprehensive introduction to medical disease designed to allow the Physician Assistant, within his or her scope of practice, to diagnose and treat medical, surgical and infectious conditions. Prerequisite: Admission to PAEP Year 1

PAEP 7066 Adult Medicine for Physician Assistants III Cr.Hrs.4 A systems based, comprehensive introduction to medical disease designed to allow the Physician Assistant, within his or her scope of practice, to diagnose and treat medical, surgical and infectious conditions. Prerequisite: Admissions to PAEP Year 1

PAEP 7068 Adult Medicine for Physician Assistants I Cr.Hrs.6 A comprehensive, system-based introduction to the clinical disciplines of medicine. Adult Medicine I is the first part of a two-course sequence; content areas include endocrinological, gastrointestinal and neurological, medicine, ophthalmology, and hematology/oncology.

PAEP 7072 Maternal and Child Health for Physician Assistants I Cr.Hrs.2 A brief, comprehensive introduction to obstetrics and pediatrics designed to impart an understanding of normal pregnancy and development and to allow the Physician Assistant, within his or her scope of practice, to diagnose and treat medical, surgical, infectious and developmental conditions within the fields of obstetrics and pediatrics. Prerequisite: Admissions to PAEP Year 1

PAEP 7074 Maternal and Child Health for Physician Assistants II Cr.Hrs.2 A brief, comprehensive introduction to obstetrics and pediatrics designed to impart an understanding of normal pregnancy and development and to allow the Physician Assistant, within his or her scope of practice, to diagnose and treat medical, surgical, infectious, and developmental conditions within the fields of obstetrics and pediatrics. Prerequisite: Admission to PAEP Year 1

PAEP 7076 Maternal and Child Health for Physician Assistants III Cr.Hrs.2 A brief, comprehensive introduction to obstetrics and paediatrics designed to impart an understanding of normal pregnancy and development and to allow the Physician Assistant, within his or her scope of practice, to diagnose and treat medical, surgical, infectious, and developmental conditions within the fields of obstetrics and paediatrics. Prerequisite: Admission to PAEP Year 1

PAEP 7082 Diagnostic Imaging for Physician Assistants Cr.Hrs.1 A brief, comprehensive introduction to diagnostic imaging techniques and interpretation of diagnostic images designed to enable Physician Assistants, within their scope of practice, to diagnose and treat medical, surgical and infectious disease. Prerequisite: Admissions to PAEP Year 1

PAEP 7084 Microbiology for Physician Assistants Cr.Hrs.1 A brief introduction to Medical Microbiology. Prerequisite: Admissions to PAEP Year 1.

PAEP 7090 Principles of Psychiatry for Physician Assistants Cr.Hrs.3 A brief, comprehensive introduction designed to impart an understanding of mental and behavioral health. Based on the special needs of a patient populations, the patient's presentation and unique contributing factors, the PA will be able to evaluate and analyze the patient's needs, providing the required specialty assessment for the psychiatric patient. Evaluation will be by successful completion of a practical and written evaluation, demonstrating the faculty proficiency in the course material.

PAEP 7100 Principles of Surgery for Physician Assistants Cr.Hrs.3 A brief, comprehensive introduction designed to impart an understanding of surgical diseases. Upon completion, the Physical Assistant student, with their scope of practice, will be able to diagnose, refer and treat the medical, surgical and infectious diseases from a surgical perspective. Evaluation will be by successful completion of a practical and written evaluation, demonstrating to faculty proficiency in the principals of surgery and application of surgical skills.

PAEP 7110 Emergency and Critical Care for Physician Assistants Cr.Hrs.3 A brief, systems-based comprehensive introduction designed to impart an understanding of emergency and intensive care medicine. This course will equip the Physician Assistant student with the skills necessary to diagnose, refer and treat medical, surgical and infectious disease emergencies and life threatening conditions. The Advanced Cardiac Life Support (ACLS) course is a mandatory component of the Emergency and Critical Care course. It is organized by the Department of Emergency Medicine and is designed to provide the student with advanced knowledge and experience on how to handle a cardiac arrest. Most Physician Assistant students find the course invaluable regardless of what specialty they enter. Evaluation is based on successful completion of a practical evaluation, problem solving exercises, displaying proficiency in clinical skills and a written examination, demonstrating to faculty proficiency in course principles.

PAEP 7200 Family Medicine for Physician Assistants Cr.Hrs.3 A brief, clinical rotation designed to impart a practical understanding of family medicine. Upon comple-

tion the Physician Assistant student will, within their scope of practice, be able to diagnose, refer and treat the medical, surgical and infectious disease conditions related to the field of family medicine.

PAEP 7210 Clinical Internal Medicine for Physician Assistants Cr.Hrs.3 A brief, clinical rotation designed to impart a practical understanding in the area of internal medicine. There will be an internal medicine speciality focus in this rotation versus the general exposure seen in Family Medicine. Upon completion, the Physician Assistant student will, within their scope of practice, be able to diagnose, refer and treat the medical, surgical and infectious conditions related to the field of internal medicine.

PAEP 7220 Clinical Surgery for Physician Assistants Cr.Hrs.3 A brief, clinical rotation designed to impart a practical understanding of surgical diseases and surgical procedures. Upon completion, the Physician Assistant student will, within their scope of practice, be able to diagnose, refer and treat the medical, surgical and infectious conditions related to the field of clinical surgery.

PAEP 7230 Clinical Orthopedics and Sports Medicine for Physician Assistants Cr.Hrs.3 A brief, clinical rotation designed to impart a practical understanding of orthopedics and sports medicine practiced within this speciality. Upon completion, the Physician Assistant student will, within their scope of practice, be able to diagnose, refer and treat the medical, surgical and infectious conditions related to this field. The Physician Assistant student will become familiar with and perform commonly practiced procedures such as casting and splinting extremities, closed reduction, cast removal, joint injection, joint aspiration and surgical assisting.

PAEP 7240 Clinical Pediatrics for Physician Assistants Cr.Hrs.3 A brief, clinical rotation designed to impart a practical understanding of health and diseases in the field of pediatrics. Upon completion, the Physician Assistant student, within their scope of practice, will be able to diagnose, refer and treat the medical, surgical and infectious conditions related to the field of pediatric medicine.

PAEP 7250 Clinical Psychiatry for Physician Assistants Cr.Hrs.3 A brief, clinical rotation designed to impart a practical understanding of mental health and psychiatric disease to the Physician Assistant. Upon completion, the Physician Assistant student, within their scope of practice, will be able to diagnose, refer and treat the medical, surgical and infectious conditions related to psychiatric medicine.

PAEP 7270 Clinical Emergency Medicine for Physician Assistants Cr.Hrs.3 A brief, clinical rotation designed to impart a practical understanding of emergency medicine and intensive care. Upon completion, the Physician Assistant student, within their scope of practice, will be able to diagnose, refer and treat the medical, surgical and infectious conditions related to emergency medicine and critical intensive care medicine. Students with extensive emergency medical service backgrounds will be allowed to focus on a critical care rotation.

PAEP 7280 Clinical Obstetrics and Gynecology for Physician Assistants Cr.Hrs.3 A brief, clinical rotation in obstetrics and gynecology designed to impart a practical understanding of reproductive health. Upon completion, the Physician Assistant student, within their scope of practice, will be able to diagnose, refer and treat the medical, surgical and infectious conditions related to the field of reproductive, obstetrical and gynecologic health.

PAEP 7290 Clinical Anesthesia for Physician Assistants Cr.Hrs.3 A brief, clinical rotation designed to impart a practical understanding of anesthesia. Upon completion, the Physician Assistant student, within their scope of practice, will be able to undertake airway management, ventilation and understand the principles of regional and general anesthesia. Students with extensive respiratory backgrounds are required to complete this rotation and display understanding and application of the Physician Assistant role in anesthesia.

PAEP 7300 Surgery Specialties for Physician Assistants I and II Cr.Hrs.3 Two brief clinical rotations, designed to impart a practical understanding of surgical diseases and surgical procedures as practised within a surgical speciality. Upon completion, the Physician Assistant student will, within their scope of practice, be able to diagnose, refer and treat the medical, surgical and infectious conditions through surgery. Students will have the opportunity to become familiar with and perform surgeries in the general operating room.

PAEP 7400 National Certification Examination Cr.Hrs. The certification entrance to practice exam is administered independently of any training facility to ensure that the PA meets the standard set out in the Occupational Competency Profile (OCP) for the Physician Assistant profession. The Physician Assistant Certification Council (PACC) is an independent Council of the Canadian Association of Physician Assistants (CA-PA), that administers and maintains the PA certification process. This includes an entry to practice examination written upon the successful completion of a Canadian Medical Association (CMA) accredited PA program. In addition to the National Certification Examination, the Graduate Physician Assistant must complete the Manitoba College of Physician and Surgeons qualification requirements for registration as Certified Clinical Assistants in order to practice. This includes the Objective Structured Clinical Examination or OSCE.

Section 65: Physics and Astronomy

Head: K.S. Sharma

General Office: 301 Allen Building

Telephone: 474 9817

Fax: 474 7622

E-mail: physics@physics.umanitoba.ca

Website: physics.umanitoba.ca/

Academic Staff

Distinguished Professors Emeriti

Morrish, A.H., B.Sc.(Hons.) (Manitoba), M.A. (Toronto), Ph.D. (Chicago), F.R.S.C; **van Oers**, W.T.H., Ph.D. (Amsterdam).

Professors Emeriti

Barber, R.C., B.Sc.(Hons.), Ph.D. (McMaster); **Connor**, R.D., B.Sc., Ph.D. (Edinburgh); **McKee**, J.S.C., B.Sc., Ph.D. (Queen's, Belfast), D.Sc. (Birmingham); **Standing**, K.G., B.Sc.(Hons.) (Manitoba), A.M., Ph.D. (Princeton).

Senior Scholars

Bhakar, B.S., B.Sc. (Agra), M.Sc. (Aligarh), Ph.D. (Delhi); **Bochonko**, R., B.Sc.(Hons.) (Manitoba), M.S., C. Phil., Ph.D. (Michigan); **Falk**, W., B.Sc., M.Sc. (Saskatchewan), Ph.D. (UBC); **Loly**, P.D., B.Sc., Ph.D. (London), D.I.C. (Imperial College); **Svenne**, J.P., B.Sc. (Toronto), Ph.D. (M.I.T.); **Tabisz**, G.C., B.A.Sc., M.A., Ph.D. (Toronto); **Vail**, J.M., B.Sc.(Hons.), M.Sc. (Manitoba), Ph.D. (Brandeis).

Distinguished Professor

Page, J. H., B.Sc. (Hons.) (Dalhousie), D. Phil. (Oxford).

Professors

Birchall, J., B.Sc.(Hons.), Ph.D. (Birmingham); **Blunden**, P.G., B.Math. (Waterloo), Ph.D. (Queen's); **Cadogan**, J.M., B.Sc. (Hons) (Monash), Ph.D. (U.N.S.W.), Canada Research Chair; **Chakraborty**, T, Ph.D. (Dibrugarh, India), Docent (Oulu, Finland), Ph.D. (h.c.) (Oulu, Finland), Canada Research Chair; **Ens**, E.W., B.Sc. (Winnipeg), Ph.D. (Manitoba); **Osborn**, T.A., B.Sc. (Cornell), Ph.D. (Stanford); **Page**, J.H., B.Sc.(Hons.) (Dalhousie), D.Phil. (Oxford); **Page**, S.A., B.Sc.(Hons.), Ph.D. (Queen's); **Pistorius**, S., B.Sc. (Natal), M.Sc., Ph.D. (Stellenbosch); **Roshko**, R.M., B.Sc. (Winnipeg), M.Sc., Ph.D. (Manitoba); **Sharma**, K.S., B.Sc.(Hons.), M.Sc., Ph.D. (Manitoba); **Southern**, B.W., B.Sc. (York), M.Sc., Ph.D. (McMaster); **Whitmore**, M.D., B.Sc. (Hons), M.Sc., Ph.D. (McMaster); **Williams**, G., B.Sc.(Hons.) (Bristol), Ph.D. (London), D.I.C. (Imperial College); **Zetner**, P.W., B.Sc.(Hons.), M.Sc., Ph.D. (Windsor).

Associate Professors

English, J., A.O.C.A. (Ont. Col.Art), B.Sc. (Tor.), Ph.D. (Aust. Nat.U); **Gwiner**, G., Vordiplom, Heidelberg, M.A., Ph.D. (S.U.N.Y); **Hu**, C-M., B.Sc. (Fudan), Ph.D. (W, rzburg); **Safi-Harb**, S., B.Sc. (A.U.B., Lebanon), M.Sc. (Madison, Wisc.), Ph.D. (Madison, Wisc.); **Shamseddine**, K.M., B.Sc. (Hons.)(A.U.B. Lebanon), M.Sc., Ph.D. (Michigan State); **van Lierop**, J., B.Sc. (Hons. Concordia), M.Sc. (Queen's), Ph.D. (McGill).

Assistant Professors

Fiege, J., B.Sc., M.Sc. (Queen's), Ph.D. (McMaster); **Gericke**, M., B.S. (Arkansas, Little Rock), M.S. Ph.D. (Indiana, Bloomington); **Lin**, F., B.S. (Beijing), M.S. (California State), Ph.D. (California, Irvine); **McCurdy**, B.M.C., B.Ed. (Queen's), B.Sc. (Hons.) Waterloo, M.Sc., Ph.D. (Manitoba); **Shalchi**, A. Diploma (Siegen, Germany), Ph.D. (Ruhr Universitat, Bochum).

Adjunct Professors

Berndt, A., B.Sc. (Hons.), M.Sc., Ph.D. (Manitoba); **Bews**, J., B.Sc., M.Sc., Ph.D. (Manitoba); **Bidinosti**, C., B.Sc. (Brandon), M.Sc., Ph.D. (British Columbia); **Carrington**, M.E., A.B. (Bryn Mawr), M.A., Ph.D. (State U. New York Stony Brook); **Elbakri**, I., B.Sc., M.Sc. (Brigham Young); Ph.D. (U. Michigan, Ann Arbor); **Fife**, I., B.Sc. (Hons.), M.Sc., Ph.D. (London); **Foster**, T, B.Sc., M.Sc., Ph.D. (Alberta); **Goertzen**, A., B.Sc. (Hons) (Manitoba), M.Sc., Ph.D. (Univ. California); **Hoult**, D., B.A., M.A., D. Phil. (Oxford); **King**, S., B.Sc., Ph.D. (Manitoba); **Kobes**, R., B.Eng. (Saskatchewan), M.Sc., Ph.D. (Alberta); **Kunstatter**, G., B.A.Sc., M.Sc., Ph.D. (Toronto); **Landecker**, T., B.Sc., M.Eng., Ph.D. (Australia); **Lewis**, J.S., B.Sc. (Chicago), Ph.D. (New Brunswick); **Martin**, J., B.Sc. (Manitoba), Ph.D. (MIT); **Martin**, M., B.Sc. (Hon.) (Manitoba), M.S., M.Phil., Ph.D. (Yale); **Rickey**, D., B.Sc. (Manitoba), M.Sc., Ph.D. (Western); **Ryner**, L., M.Sc. (McGill), Ph.D. (Madison, Wisc.); **Serrai**, H., M.Sc. (France), Ph. D. (France); **Venkataraman**, S., B.Sc. (India), M.Sc., Ph.D. (Bombay, India)

Program Information

The department offers opportunities for graduate study in several experimental and theoretical fields of contemporary interest, leading to the Master of Science and Doctor of Philosophy degrees.

Fields of Research

Astronomy and Astrophysics: The Formation, Evolution, and Structure of Galaxies; The Late Stages of Stellar Evolution (Neutron Stars, Magnetars, Black Holes); Supernova Remnants and our Milky Way Galaxy; Advanced

genetic algorithms for astrophysical data modeling (magnetic fields in molecular clouds; HI galaxy disks; gravitational lens systems).

Atomic, Molecular and Optical Physics: Study of atomic and molecular interactions in dense fluids by laser light scattering and far infrared absorption; atomic collision dynamics studied using electron energy-loss spectroscopy, laser excitation techniques and time-correlated particle detection.

Condensed Matter Physics: Magnetic properties of materials, including their dependence on crystal structure and morphology; surface magnetism of fine particles or thin films; crystalline transformations of amorphous magnetic materials; phase transitions and critical phenomena in ferromagnetics, spin-glasses and site-disordered systems; high T_c superconductors; mesoscopic wave physics of complex materials, including ultrasonic wave transport in strongly scattering media, Anderson localization of ultrasound, phononic crystals, field fluctuation spectroscopy, dynamic imaging in complex media, and ultrasonic characterization of soft food biomaterials; nanomagnetism, biological applications of magnetic nanoparticles, nanoparticle magnetism, magnetism in thin film systems, neutron scattering; theoretical studies of inhomogeneous soft matter; the structure and phase behaviour of block copolymers and polymer brushes; structure, phase behaviour, and order-disorder transitions in lipid bilayers and lipid mixtures.

Mass Spectrometry: Precise atomic mass determinations of stable and unstable nuclides; time-of-flight mass spectrometry of large molecules (particularly biomolecules) and molecular clusters.

Physics of Nanoscale Systems: Electronic and Optical Properties of Low-dimensional Electron Systems and Nanostructures, such as systems exhibiting quantum hall effects, quantum dots and quantum rings; physics of graphene nanostructures and related carbon systems, electronic and magnetic properties of DNA, DNA mispairs, spin dynamics and Rashba effects in quantum dots.

Subatomic Physics: Properties of nuclei far from stability (decay energies, atomic masses, nuclear structure); nucleon-nucleon systems (spin observables, particle production); tests of symmetry principles (charge symmetry, parity); strange quark structure of the proton; Laser and Ion Trapping; measurements of parity-violation in electron scattering and extraction of the weak mixing angle and fundamental physics with cold and ultracold neutrons.

Theoretical Physics: Low temperature excitations in ordered crystalline magnets; investigations of reduced dimensionality on the magnetic and electronic properties of solids; the effects of disorder on the physical properties of solids as studied using renormalization group methods, fractal geometry and random matrix theory; phase transitions and critical phenomena; theory and computer simulation of defect processes in crystalline materials; relativistic dynamics of composite system; Kaluza-Klein theory and string dynamics; evolution problems in quantum, classical and semi-classical mechanics using the rigorous methods of mathematical physics; few-body scattering theory; electromagnetic interactions in both few-body systems and complex nuclei; relativistic approaches to the nuclear many-body problem; Non-Archimedean Analysis (study of field extensions of the real numbers that also contain infinitely small and infinitely large numbers) and applications in physics; black holes and quantum gravity, quantum computation, information theory and non-linear dynamics.

Medical Physics: Research is also carried out at CancerCare Manitoba, the Health Sciences Centre and at the National Research Council Institute for Biodiagnostics. Functional imaging and the development of advanced imaging modalities and reconstruction algorithms, in-vivo portal dosimetry of radiation therapy; the development of low dose breast imaging systems; image guide adaptive radiotherapy and multi-objective optimization techniques; quality control for diagnostic imaging and radiation therapy; high speed dose and image reconstruction and simulation; biomedical Magnetic Resonance Imaging and instrumentation; development of new technologies and methods for positron emission tomography (PET) imaging.

Biophysics: Biophysical and bioengineering approaches for studying immune cell trafficking; development of microfluidic devices for biological and medical applications; the facilities we have include cell culture, imaging, microfabrication for soft – lithography.

Research Facilities

As an integral part of the research programs outlined above, a variety of major research facilities exist within the Department of Physics and Astronomy. These include an HP RX5670 ITANIUM2 quad CPU computer server with 96 Gb RAM, HP Smart Array 5304 controller, 28x146 Gb U320 disk

subsystem, Group members access the server through a high speed, switched network, we also have a HP ZX200 ITANIUM2 development server with a 9Gb RAM, and several PCs for code development and testing. As well, the department has several ultrasonic spectrometers, including a TEMPO laser ultrasound interferometer, a high resolution mass spectrometer, four time-of-flight mass spectrometers for large ions and biomolecules with masses up to approximately 10,000 u, a S.H.E. dilution refrigerator for the production of millikelvin temperatures, a Philips X-ray diffraction, a Quantum Design PPMS 6000 magnetometer/susceptometer and a custom-designed SQUID-based magnetometer, and a local network of computers connected to the university's central computer facilities. A good machine shop and electronics shop are located in the Physics Department. Both liquid nitrogen and helium are available locally for low temperature research.

Research facilities at various national and international laboratories, including Argonne National Laboratory (Chicago), TRIUMF (Vancouver, we are now a full member of the TRIUMF consortium), Los Alamos National Laboratory (Los Alamos, N.M.), the Thomas Jefferson National Accelerator Laboratory (Newport News, VA), and the Max Planck Institute for Nuclear Physics (Heidelberg, Germany) are extensively used by members of the subatomic physics research group.

Research in Astronomy and Astrophysics makes use of data obtained with various telescopes including NASA's Chandra X-ray Observatory and the Hubble Space Telescope, and with the International Galactic Plane Survey.

Students also have access to various pieces of clinical and research related equipment at CancerCare Manitoba, the Health Sciences Centre and at the National Research Council of Canada Institute for Biomedical Research. These include clinical linear accelerators, CT, MRI, Ultrasound, PET, and other imaging systems as well as various sources of radiation and dosimetry equipment. High performance GPU based computer and software for the simulation of radiation transport are also available.

Research in Condensed Matter Physics is undertaken at the nuclear reactors NRU (Chalk River), OPAL (Sydney) and ILL (Grenoble).

The University of Manitoba is a major institution in the Western Canada Research Computing Grid (WestGrid) and is the location of a large high performance computing cluster accessible to all researchers across Canada through Compute/Calcul Canada.

M.Sc. in Physics

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. To enter the Master's program directly, a student must have an Honours B.Sc. degree in Physics and Astronomy, Mathematics and Physics, or Engineering Physics from the University of Manitoba or the equivalent. Students without the degree entrance requirements will have their undergraduate program evaluated and may be required to complete a pre-Master's program of selected University of Manitoba undergraduate courses.

Application Deadlines

The Department of Physics and Astronomy allows students to begin their program on 1 September, 1 January, 1 May, or 1 July. For admission for each of these start dates, Canadian/U.S. students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than three and a half (3.5) months before the intended start date. Non-Canadian students should send their applications with complete supporting documentation to the Faculty of Graduate Studies to arrive no later than six and a half (6.5) months before the intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The Department of Physics and Astronomy has certain supplementary regulations. Information about these regulations as well as a description of research programs in Physics is available at: physics.umanitoba.ca

A Master's degree in physics normally consists of both coursework and a thesis. For students in the Comprehensive Medical Physics M.Sc. program, the course load is increased and the thesis requirement is replaced by research project.

The Master's program with thesis consists of two or three courses from the 700/7000 series offered by the department or from another department offering courses suitable for the candidate's program. In special cases, courses may be drawn from the 400 series as listed. The program of study

extends through a minimum period of twelve months. Frequently two summers of research work plus one winter of research and coursework are required to complete the program. In addition to coursework, these students must submit a thesis and defend it orally.

The Comprehensive M.Sc. program in medical physics is a two-year (18-month, course work, 6-month research project) program which requires 36 credits. A clinical research project in an approved laboratory and the submission of a research report is also required. On completion of the coursework and research project, the student will be required to pass a comprehensive oral examination.

Second language reading requirement: none

Expected time to graduate: 2 years

Ph.D. in Physics

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, the normal procedure to be a candidate for a Ph.D. degree is to complete an M.Sc. degree first. However, students with an honours degree from the University of Manitoba or equivalent may be accepted directly into the PhD program.

Application Deadlines

The Department of Physics and Astronomy allows students to begin their program on either 1 September, 1 January, 1 May, or 1 July. For admission for each of these start dates, Canadian/U.S. students should send their applications with complete supporting documentation to the Faculty of Graduate Studies no less than three and a half (3.5) months before the intended start date. Non-Canadian students should send their applications with complete supporting documentation to the Faculty of Graduate Studies to arrive no later than six and a half (6.5) months before the intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The Department of Physics and Astronomy has certain supplementary regulations. Information about these regulations as well as a description of Research Programs in Physics is available on the web: www.physics.umanitoba.ca

International students entering the Ph.D. program are strongly encouraged to write and obtain minimum grade of 650 on the GRE physics subject examination prior to applying for the Ph.D. program.

The main program of studies is selected from one of the major fields of research listed above in Section 2.2, and is supplemented by an ancillary program which takes into account the student's interests and breadth of experience.

Ancillary subjects must be chosen from a field of physics distinct from the major area of study or from other departments (e.g., Mathematics) offering suitable courses. In consultation with the student, a program of study is decided by a committee with the student's advisor as chair.

Students must pass a candidacy exam and submit a thesis which describes their research work and which will be examined according to the general regulations.

Second language requirement: none

Expected time to graduation: 4 years

Course Descriptions

PHYS 7250 Seminar course in Advanced Physics Cr.Hrs.6 (016.725) Selected topics in advanced physics may be offered from time to time by the faculty or visiting lecturers. Credit for this course will be determined by the head of the department of Physics. *Prerequisite:* consent of instructor.

PHYS 7260 Mass Spectroscopy Cr.Hrs.3 (016.726) Two lectures per week for one term. The course covers the techniques and applications of mass spectroscopy. Special emphasis is given to the general principles of ion optics for use in the design of modern instruments.

PHYS 7360 Medical Radiation Physics Cr.Hrs.3 (016.736) The relevant physics of the production and interaction of radiation beams used in both diagnostic and therapeutic medicine will be covered. Such beams included X- and g-rays, particle beams, visible and I.R. radiation, microwaves, and ultrasound. *Prerequisite:* PHYS 4560 (016.456) (C+) or consent of instructor.

PHYS 7370 Radiotherapy Physics Cr.Hrs.3 (016.737) The calculations and measurements necessary to determine the radiation dose distribution in patients receiving radiotherapy will be presented. Newer treatment modalities, e.g., pion therapy and hyperthermia will be discussed. *Prerequisites:* PHYS 4510 (016.451), PHYS 4560 (016.456) (C+) or consent of instructor.

PHYS 7380 Radiation Biology Cr.Hrs.3 (016.738) The interaction of ionizing and non-ionizing radiations with living systems. The relevance to Radiotherapy. Nuclear medicine and diagnostic radiology. *Prerequisite:* PHYS 1020 (016.102)/016.103 (016.121) or consent of instructor.

PHYS 7390 Radiation Protection Cr.Hrs.3 (016.739) Ionizing radiation including X-ray, g-ray, neutrons, alpha-, beta-, and heavy ion-particle sources, bioeffects, and protection principles are covered. Non-ionizing radiation, including laser light, radio-frequency waves, ultraviolet and infrared light, and ultrasound, sources, bioeffects, and exposure protection guidelines are studied. *Prerequisites:* PHYS 7360 (016.736) and PHYS 7380 (016.738) (C+) or consent of instructor.

PHYS 7400 Medical Imaging Cr.Hrs.3 (016.740) Fundamental principles of image formation, analysis of the characteristics of medical images, parametric description of image quality; application to transmission radiography. *Prerequisite:* consent of instructor.

PHYS 7410 Diagnostic Methods Cr.Hrs.3 (016.741) Medical imaging in terms of signal acquisition, data processing, image reconstruction, special techniques; applications in fluoroscopy, computed tomography, radionuclide imaging, ultrasound, nuclear magnetic resonance imaging. *Prerequisite:* PHYS 7400 (016.740) (C+).

PHYS 7440 Advanced Topics in Physics Cr.Hrs.3 (016.744) Selected topics in advanced physics. This course may be offered from time to time by the faculty or visiting lecturers. *Prerequisites:* consent of instructor.

PHYS 7460 Methods in Medical and Health Physics 1 - (Medical Imaging and Radiation Protection) Cr.Hrs.3 (016.746) This practical course is designed to give students hands-on experience with equipment, clinical techniques and methods of analysis in medical imaging and health physics. Topics such as: dosimetry of unsealed sources, radiation shielding design and surveys, meter calibration, decontamination and plume dispersal, CT, Ultrasound, X-ray and Nuclear Medicine imaging techniques, mammography and quality assurance in medical and health physics will be covered. Students are required to take both PHYS 7460 (016.746) and PHYS 7470 (016.747) which will be offered in consecutive years. Note: only students accepted to the Medical Physics Program will be allowed to register for this course

PHYS 7470 Methods in Medical and Health Physics 2 - (Radiotherapy and Radiation Biology) Cr.Hrs.3 (016.747) This practical course is designed to give students hands-on experience with equipment, clinical techniques and methods of analysis in radiotherapy and radiation biology. Topics such as: error analysis and data reduction, dosimetry of ionizing radiation, radiotherapy treatment planning, calibration, HDR brachytherapy, micro-dosimetry and quality assurance in medical physics, will be covered. Students are required to take both PHYS 7460 (016.746) and PHYS 7470 (016.747) which will be offered in consecutive years. Note: only students accepted to the Medical Physics Program will be allowed to register for this course.

PHYS 7500 Condensed Matter Physics 1 Cr.Hrs.3 (016.750) The principles of electrical and vibrational properties of primarily crystalline structures. Topics include free electron theory, electron-electron interactions, screening, phonons, electron-phonon coupling and transport properties. Not to be held with the former 016.712.

PHYS 7510 Condensed Matter Physics 2 Cr.Hrs.3 (016.751) A comprehensive survey of advanced topics in condensed matter physics. The topics may change from year to year but include collective excitations, defects, localized states, superconductivity, Josephson effect, superfluids, quantum Hall effect. Not to be held with the former 016.712. *Prerequisite:* PHYS 7500 (016.750) (C+) or consent of instructor.

PHYS 7520 Condensed Matter Physics 3 Cr.Hrs.3 (016.752) An advanced treatment of cooperative phenomena which occur in various condensed phases of matter. Topics may change from year to year but include liquids, liquid crystals, incommensurate structures, magnetically ordered systems, amorphous solids, quasicrystals. *Prerequisites:* PHYS 7500 (016.750) and PHYS 7540 (016.754) (C+) or consent of instructor.

PHYS 7530 Physics of Magnetism Cr.Hrs.3 (016.753) A comprehensive survey of magnetism and magnetic materials. Topics include the origins of magnetic interactions, types of magnetic order, domain structures, magnetization processes, dynamics, thin films, applications. Not to be held with the former 016.721. *Prerequisite:* PHYS 7500 (016.750) (C+) or consent of instructor.

PHYS 7540 Statistical Mechanics Cr.Hrs.3 (016.754) The principles of statistical mechanics. Topics include statistical ensembles, entropy, Fermi gas, Bose-Einstein condensation, superfluidity, phase transitions and equilibria, fluctuations, Fluctuation-Dissipation and Wiener-Khinchin theorems, liquids and dense gases. Not to be held with the former 016.719. *Prerequisite:* PHYS 4370 (016.437) (C+) or consent of instructor.

PHYS 7550 Advanced Statistical Mechanics Cr.Hrs.3 (016.755) An advanced treatment of phase transitions and critical phenomena in a variety of systems. Topics include solvable models, mean field theory, Landau theory, scaling laws, series methods, renormalization group methods, linear response theory, generalized rigidity. Not to be held with the former 016.719. *Prerequisite:* PHYS 7540 (016.754) (C+) or consent of instructor.

PHYS 7560 Relativistic Quantum Mechanics Cr.Hrs.3 (016.756) Relativistic single particle equations for bosons and fermions, quantization of fields, interacting fields, elementary quantum electrodynamics, covariant perturbation theory and Feynman diagrams. Not to be held with the former 016.743. *Prerequisite:* PHYS 7420 (016.742) (C+) or consent of instructor.

PHYS 7570 Nuclear Physics Cr.Hrs.3 (016.757) Hadron and lepton scattering, the nucleon-nucleon interaction, nuclear structure, nuclear shell model, nuclear excita-

tions and decay, hadronic interactions and decays, the quark model. Not to be held with the former 016.705. *Prerequisite:* PHYS 4510 (016.451) (C+) or consent of instructor.

PHYS 7580 Advanced Topics in Nuclear Physics Cr.Hrs.3 (016.758) A selection of advanced topics in nuclear and intermediate energy physics. Not to be held with the former 016.706. *Prerequisite:* PHYS 7570 (016.757) (C+) or consent of instructor.

PHYS 7590 Electromagnetic Theory Cr.Hrs.3 (016.759) Maxwell's equations, electromagnetic potentials, gauge conditions, conservation laws, Green function methods, diffraction theory, simple radiating systems, Lagrangian derivation of Maxwell's equations and the covariant structure of electromagnetism. Not to be held with the former 016.715.

PHYS 7600 Applied Electromagnetism Cr.Hrs.3 (016.760) Wave guides and resonant cavities, charged particles collision theory, Bremsstrahlung, radiation of moving charged particles, multipole radiation. Not to be held with the former 016.715. *Prerequisite:* PHYS 7590 (016.759) (C+) or consent of instructor.

PHYS 7610 Experimental Methods in Materials Science Cr.Hrs.3 (016.761) A course covering many of the experimental techniques used in materials science. Topics will change from year to year but will be selected from the following: vacuum techniques, cryogenic techniques, data acquisition, optical and electron microscopy, x-ray diffraction, electrical and optical measurements, superconducting and magnetic properties, ultrasonic measurements.

PHYS 7620 Experimental Methods in Physics Cr.Hrs.3 (016.762) A course covering many of the experimental techniques used in physics. Topics will change from year to year but will be selected from the following: laser, optical and electron spectroscopic techniques (applied to atoms and molecules), mass spectrometry (of large biological molecules and atomic nuclei), general aspects of detector and instrumental designs, cryogenic techniques and targets, basics of particle accelerators, data acquisition.

PHYS 7630 Particle Physics Cr.Hrs.3 (016.763) Basic particles and interactions, symmetries and conservation laws, the quark model, deep inelastic scattering, electroweak theory, introduction to QCD. Not to be held with the former 016.730. *Prerequisite:* PHYS 7420 (016.742) (C+) or consent of instructor.

PHYS 7640 Introduction to Quantum Mechanics for Advanced Students 1 Cr.Hrs.3 (016.764) An introduction to the fundamentals of quantum mechanics for students in engineering and sciences other than physics, in the context of modern materials. Postulates of quantum mechanics, harmonic oscillator, angular momentum, one-electron and many-electron systems. *Prerequisites:* PHYS 1050 (016.105 or 016.118), PHYS 1070 (016.107 or 016.106), MATH 1300 (136.130), MATH 1500 (136.150), MATH 1700 (136.170) (or both MATH 1510 (136.151) and MATH 1710 (136.171) or MATH 1690 (136.169)(C+), or equivalents.

PHYS 7650 Introduction to Quantum Mechanics for Advanced Students 2 Cr.Hrs.3 (016.765) A continuation of PHYS 7640. Electron spin, approximation methods for stationary states, time-dependent perturbation theory, term project. *Prerequisite:* PHYS 7640 (016.764) (C+).

PHYS 7660 Astronomy 1: The Phenomenology of Galaxies Cr.Hrs.3 (016.766) Describes astronomical standards such as intensity magnitudes, colour and metallicity; the properties of stars and the interstellar medium; galactic structure, kinematics, and the evolution of galactic components.

PHYS 7670 Astronomy 2: Galactic Dynamics Cr.Hrs.3 (016.767) A continuation of PHYS 7660, this course provides mathematical descriptions of potential theory, disk dynamics and spiral structure, collisions between galaxies, and dark matter. Additional topics are galaxy evolution, large-scale structure of the universe and cosmology. *Prerequisite:* PHYS 7660 (016.766) (C+).

PHYS 7680 Astrophysics 1: Stars Cr.Hrs.3 (016.768) Covers the basic physical concepts required to extract qualitative estimates of astrophysical parameters, describes several aspects of observational astronomy, and it emphasizes in a more mathematical way the astrophysics of stellar structure and evolution.

PHYS 7690 Astrophysics 2: Interstellar Matter and Galaxies Cr.Hrs.3 (016.769) Emphasizes the physics of interstellar matter and dust grains, gaseous nebulae, basic hydrodynamics, shock waves, and supernova remnants. *Prerequisite:* PHYS 7680 (016.768) (C+).

PHYS 7700 Research Project in Medical Health Physics Cr.Hrs.0 (016.770) Students undertake a relevant research project in an approved laboratory. At least six months of full-time research is expected. The research project report shall be submitted in a style and length as specified by the department. A comprehensive oral examination will follow the submission of the project report.

PHYS 7710 Quantum Optics Cr.Hrs.6 (016.771) Matter-radiation interaction, spectral line broadening, quantization of the radiation field, degree of coherence of light; number, coherent, chaotic and squeezed states of light, quantum theory of detection, laser theory, resonance fluorescence, light scattering, non-linear quantum optics. Not to be held with the former 016.708 *Prerequisite:* permission of instructor

PHYS 7720 Quantum Mechanics 1 Cr. Hrs. 3 (016.772) Topics included the concepts and foundations of quantum mechanics, continuous and discrete symmetries, time dependent perturbation theory including interaction with electromagnetic fields and scattering theory. *Prerequisite:* PHYS 4380 (C+). Not to be held with the former PHYS 7420].

PHYS 7820 Photonics Cr.Hrs.6 (016.782) A survey of photonic devices and their physical principles. Optics, optical fibres, lasers, LEDs, photo-detectors, electro-optic modulators, liquid crystal displays, acousto-optics, photon switching and computing, and fibre-optic communication. *Prerequisite:* PHYS 4520 (016.452), or ECE 3600 (024.360), or consent of instructor.

Section 66: Physiology

Head: Janice Dodd

General Office: 730 William Avenue

Telephone: (204) 789 3694

Fax: (204) 789 3934

E-mail: physiology@umanitoba.ca

Website: umanitoba.ca/medicine/physiology/

Academic Staff

Distinguished Professor

Dhalla, N., B.Sc. (Punjab), M.Sc. (Pennsylvania), Ph.D. (Pittsburgh).

Professors Emeriti

Friesen, H., B.Sc.(Med.), M.D. (Manitoba), F.R.C.P.C., F.R.S.C.

Professors

Cattini, P., B.Sc., Ph.D. (London); **Dixon, I.**, B.Sc.(Hons.), M.Sc., Ph.D. (Manitoba); **Dodd, J.**, B.Sc., M.Sc., Ph.D. (Toronto); **Gardiner, P.**, BPHE, MPE, PhD (Alberta); **Hryshko, L.**, B.Sc., Ph.D. (Manitoba); **Jordan, L.**, B.A., M.A., Ph.D. (Texas); **Kardami, E.**, Ph.D. (London); **Kirshenbaum, L.**, B.Sc., M.Sc., Ph.D. (Manitoba); **Kroeger, E.**, M.Sc., B.Sc. (Wheaton College), Ph.D. (Manitoba); **Mai, S.**, Ph.D. (Germany); **McCrea, D.**, B.Sc., Ph.D. (Manitoba); **Mowat, M.R.A.**, B.Sc. (York), Ph.D. (Alberta); **Myal, Y.**, B.Sc., M.Sc., Ph.D. (Manitoba); **Nagy, J.**, B.Sc., Ph.D. (UBC); **Naimark, A.**, O.C., M.D., B.Sc.(Med.), L.L.D., F.R.C.P.C., F.R.S.C.; **O, K.**, B.S. (Shanghai), M.Sc., Ph.D. (Manitoba); **Pierce, G.**, B.P.H.E. (Lakehead), M.Sc. (Dalhousie), Ph.D. (Manitoba); **Shefchyk, S.**, B.S., M.S., Ph.D. (Manitoba); **Shiu, R.**, B.Sc., M.Sc., Ph.D. (McGill); **Singal, P.**, B.Sc., M.Sc. (India), Ph.D. (Alberta); **Stephens, N.**, B.Sc., M.B., M.D. (Lucknow), F.R.C.P. (London), D.Sc. (Punjab); **Zahradka, P.**, B.Sc.(Hons.), Ph.D. (Western Ontario).

Associate Professors

Czubryt M., B.Sc., Ph.D. (Manitoba); **Duckworth, M.**, B.Sc.(Hons.), M.Sc., Ph.D. (Manitoba); **Fedirchuk, B.**, B.Sc.(Hons), MSc, PhD (Manitoba); **Halayko, A.**, B.Sc., Ph.D. (Manitoba); **Hicks, G.**, B.Sc., M.Sc., Ph.D. (Manitoba); **Mizuno, T.**, B.S., M.S., PhD. (Japan); **O.K.**, MSc, PhD (Manitoba); **Xie, J.**, B.S., Ph.D. (Peking Union Medical College).

Assistant Professors

Karimi, S., BSc. (Iran), MSc. (Iran), PhD (Saskatchewan).

Adjunct Professors

Arora, R. MD (Ontario); **Bshouty, Z.**, MD (Israel), PhD (Manitoba); **Coombs, K.**, B.A. (New York), M.A. (Texas), PhD (Texas); **Dakshinamurti, S.**, B.Sc., M.Sc. (Manitoba), M.D. (Manitoba); **Deslauriers, R.**, M., B.Sc. (Laval), Ph.D. (Ottawa); **Duhamel, T.**, B.Sc., M.Sc., Ph.D. (Waterloo); **Fernyhough, P.**, PhD (Sheffield); **Freed, D.**, MD, PhD (Manitoba); **Gilchrist, J.S.C.** B.Sc., M.Sc., Ph.D. (UBC); **Giles, L.**, M.D. B.N., M.D. (Western Ontario); **Giles, L.**, R.N., M.D. (Western Ontario); **Jassal, D.**, B.Sc. (Manitoba), M.D. (Manitoba); **Kreillaars, D.**, B., Ph.D. (Manitoba), M.Sc. (Dalhousie), Ph.D. (Manitoba); **Maliszka, K.**, B.Sc., Ph.D. (McMaster); **McGavock, J.**, MA (McGill), PhD (Alberta); **McGavock, J.**, M.A. (McGill), Ph.D. (Alberta); **Mesaelli, N.**, B.Sc. (Kuwait), M.Sc. (Kuwait) Ph.D. (Manitoba); **Netticadan, T.J.**, B.Sc., M.Sc., Ph.D. (Bombay); **Nyomba, G.**, M.D. (National University of Zaire), Ph.D. (Leuven); **Porter, M.M.**, B.P.H.E. (Laurentian), M.Sc. (Toronto), Ph.D. (Western Ontario); **Schmidt, B.**, B.Sc.(Med.), M.D. (Manitoba); **Shen, X.**, M.Sc. (Shanghai), M.D./Ph.D. (Shanghai); **Siow, C.**, B.Sc.(Hons), Ph.D. (Manitoba); **Tian, G.**, M.D., M.Sc. (China), Ph.D. (Ottawa).

Program Information

Programs of study leading to the Master of Science and Doctor of Philosophy degrees are offered in several major areas of physiology. A combined M.D./Ph.D. program is available for students who have been admitted to the Faculty of Medicine.

The programs are designed to provide qualified graduates in science and medicine with the background of experience suitable for a career in physiology teaching and research or a research career in clinical medicine.

Fields of Research

The Department of Physiology offers specialized programs of study and research in cardiovascular sciences, molecular endocrinology, gene technology, respiratory and smooth muscle physiology, the cell and molecular biology of cancer, and neurosciences. Updated information on research and training programs are available on the Internet.

Research Facilities

The research laboratories of physiology department members are found in multiple locations. The core laboratories of the department are situated in the Basic Medical Sciences Building of the University of Manitoba Bannatyne Campus (Medical School). Other locations include the Institute of Cell Biology, the National Research Council Institute of Biodiagnostics and the St. Boniface General Hospital Research Centre.

M.Sc. in Physiology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

A minimum of fifteen (15) credit hours in 700/7000 level courses in Physiology. In most cases, students will be required to complete PHGY 7240 Medical Physiology (6 cr. Hrs.)

Second language reading requirement: none

Expected time to graduate: 2 - 5 years

Ph.D. in Physiology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Department at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Department at least 7 months prior to their intended start date.

Program Requirements

Nine (9) credit hours beyond the requirements for the M.Sc. degree. Additional courses as deemed appropriate by the Student's Advisory Committee, with the approval of the Physiology Graduate program Committee. Advanced Topics in Physiology (PHGY 7180) (3) is a required course for Ph.D. students.

Second language requirement: none

Expected time to graduation: 3 - 7 years

Course Descriptions

PHGY 7010 Readings in Physiology Cr.Hrs.6 (Formerly 090.701) Tutorial course covering recent contributions in an area of physiology related to a student's research interests.

PHGY 7030 Special Physiology Cr.Hrs.6 (Formerly 090.703) Seminar and reading course on physiology of particular systems.

PHGY 7150 Cardiac Physiology Cr.Hrs.3 (Formerly 090.715) Tutorial and reading course on cardiac physiology; emphasis on the energetics of cardiac contraction and its relationship to ultrastructural and biochemical properties of the heart.

PHGY 7160 Vascular Physiology Cr.Hrs.3 (Formerly 090.716) Lectures and seminars on physiology of blood vessels including hemodynamics, rheology of blood, and the function and structure of smooth muscle.

PHGY 7170 Endocrine and Metabolic Physiology Cr.Hrs.3 (Formerly 090.717) Special topics in endocrine and metabolic physiology emphasizing current concepts.

PHGY 7180 Advanced Topics in Physiology Cr.Hrs.3 (Formerly 090.718) Advances in selected areas of physiology, research proposals related to the students's area of interest, procedures for grant writing and refereeing grant proposals, evaluation of citations and impact factors.

PHGY 7190 Research Topics in Physiology Cr.Hrs.3 (Formerly 090.719) Seminars on research presentations by staff and senior students in physiology.

PHGY 7230 Molecular and Cellular Aspects of Organ Physiology Cr.Hrs.3 (Formerly 090.723) Tutorial course: Function of various organs in the light of current concepts regarding structure and function at the molecular and cellular level.

PHGY 7240 Medical Physiology Cr.Hrs.6 (Formerly 090.724) Lecture, seminar, tutorial, and demonstration course dealing with fundamental biophysical processes, function of major organ systems, and physiological control mechanisms. Pathophysiological functions and their relation to disease will be discussed where appropriate.

PHGY 7260 Advanced Neurological Sciences Cr.Hrs.3 (Formerly 090.726) Seminar, readings and lecture course covering original research papers leading to the most significant advances in the neurological sciences. Emphasis is placed on student comprehension of major research directions in the broad field of neurological sciences. *Prerequisite:* PHGY 7280 (or 090.728) or equivalent and consent of instructor.

PHGY 7270 Physiology of Striated Muscle Cr.Hrs.3 (Formerly 090.727) A lecture and seminar course dealing with the physiology and biophysics of skeletal and cardiac muscle.

PHGY 7290 Physiology of the Airways Cr.Hrs.3 (Formerly 090.729) A lecture and seminar course dealing with the physiology of the airways in the intact animal and with the role of smooth muscle in controlling airway function. The fundamental properties of airway smooth muscle in controlling airway function will be emphasized. *Prerequisite:* PHGY 7240 (or 090.724) or equivalent and consent of instructor.

PHGY 7300 Molecular Endocrinology Cr.Hrs.3 (Formerly 090.730) A lecture and seminar course on advances in molecular and cellular aspects of endocrinology and other systems. The course is taught by members of the Gene Technology Group and topics will reflect current research interests. These include the roles of hormones/growth factors in cancer, growth and development, and reproduction, and the regulation of hormone gene families. This course is designed for individuals with knowledge in the areas of molecular and/or cell biology. *Prerequisite:* consent of instructor.

PHGY 7310 Principles of Electronics for Life Sciences Cr.Hrs.3 (Formerly 090.731) Lectures on basic principles of electricity and electronics of particular application to electrophysiology.

PHGY 7320 Instrumentation for Electrophysiology Cr.Hrs.3 (Formerly 090.732) Lectures on the application of principles of electricity and electronics to electrophysiology. *Prerequisite:* PHGY 7310 (or 090.731).

PHGY 7330 Physiology of Smooth Muscle Cr.Hrs.3 (Formerly 090.733) A lecture and seminar course dealing with the biophysics, electrophysiology, pharmacology and biochemistry of the smooth muscle in the major organ systems.

PHGY 7340 Cardiovascular Electrophysiology Cr.Hrs.3 (Formerly 090.734) A comprehensive lecture and seminar course on the electrical activity of the cardiovascular

system. The fundamental electrical properties of cardiac and vascular muscle cell membranes, currents and channels as studied by intracellular microelectrodes, voltage clamp and patch clamp techniques will be stressed.

PHGY 7350 Cardiovascular Pathophysiology Cr.Hrs.3 (Formerly 090.735) A comprehensive lecture course on disease in the cardiovascular system. Topics to be covered include methods of analysis of cardiac viability, heart failure, arrhythmias, heart diseases (congenital, valvular, pericardial, cardiomyopathy), hypertension, stroke, atherosclerosis and myocardial infarction. *Prerequisite:* PHGY 7240 (or 090.724).

PHGY 7360 Trends in Cardiovascular Sciences Cr.Hrs.3 (Formerly 090.736) A comprehensive seminar-based course dealing with recent advances in cardiovascular research given by local fellows and prominent scientists. Students will be expected to participate in the series and present their own research data seminar. *Prerequisite:* PHGY 7240 (or 090.724).

PHGY 7370 Cardiovascular Molecular Biology Cr.Hrs.3 (Formerly 090.737) A lecture course dealing with the structure and regulation of genes responsible for normal cardiac muscle and vascular system fluctuations as well as a survey of the genetic contribution to cardio-vascular disease (atherosclerosis, hypertension, heart failure). *Prerequisite:* PHGY 7240 (or 090.724).

PHGY 7380 Cardiovascular Cell Biology Cr.Hrs.3 (Formerly 090.738) A comprehensive lecture course on morphology, biochemical composition and function of the cardiac and smooth muscle cell, with particular emphasis on developmental and injury-related issues. Topics include the description of various cardiac cells and their immediate extracellular environment, intercellular communication, cardiac development, control of cell cycle, hyperplasia and hypertrophy, cardiac growth factors, mechanism of injury and cell death, regeneration, heat shock proteins and cardioprotection.

PHGY 7390 Gene Therapy Cr.Hrs.3 (Formerly 090.739) Advanced course detailing new frontiers in the application of gene therapy and technological protocols currently utilized in treating cardiovascular diseases such as cardiomyopathy, hypertension, congenital birth defects and restenosis. *Prerequisites:* PHGY 7370 (or 090.737), PHGY 7380 (or 090.738) or 082.724 or permission of the course coordinator.

PHGY 7400 Cellular and Molecular Biology of the Vascular System Cr.Hrs.3 (Formerly 090.740) This course provides current concepts in vascular biology at the molecular level as well as the pathogenesis and treatment of vascular diseases for the purpose of graduate studies. Students may also learn up-to-date techniques in research of vascular cell biology and the diagnosis of vascular diseases through laboratory demonstrations.

Section 67: Plant Science

General Office: 222 Agriculture Building

Telephone: (204) 474 8221

Fax: (204) 474 7528

E-mail: plantscience_gradstudies@umanitoba.ca

Website: umanitoba.ca/afs/plant_science

Head: Peter McVetty

Graduate Chair: Fouad Daayf

Academic Advisor: Martha Bloum

Academic Staff

Professors Emeriti

Evans, L.E., B.S.A. (Saskatchewan), M.Sc., Ph.D. (Manitoba); **Larter, E.N.,** B.Sc., M.Sc. (Alberta), Ph.D. (Washington).

Professors

Ballance, G.M., B.Sc.(Hons.), M.Sc. (Manitoba), Ph.D. (Heriot-Watt); **Br^olè-Babel, A.L.,** B.S.A., Ph.D. (Saskatchewan); **Entz, M.H.,** B.S.A., M.Sc. (Manitoba), Ph.D. (Saskatchewan); **Fernando, W.G.D.,** B.Sc. (Peradeniya), M.Sc. (Kelaniya), Ph.D. (Oregon State); **Hill, R.D.,** B.Sc., M.Sc., Ph.D. (Manitoba); **McVetty, P.B.E.,** B.Sc., M.Sc. (Queen's), Ph.D. (Manitoba); **Pritchard, M.K.,** B.S.A., M.Sc. (Manitoba), Ph.D. (Purdue); **Scarth, R.,** B.A., M.Phil., Ph.D. (Cambridge).

Associate Professors

Daayf, F., B.Sc. (Marrakech), M.Sc., Ph.D. (Montpellier), D.útat (Marrakech); **Fristensky, B.W.,** B.A. (Cornell), Ph.D. (Washington State); **Li, G.,** B.S., M.S. (Henan), Ph.D. (Huazhong); **Stasolla, C.,** B.Sc.(Hons.), Ph.D. (Calgary).

Assistant Professors

Ayele, B.T., B.Sc. (Mekelle), M.Sc. (Wageningen), Ph.D. (Alberta); **Gulden, R.H.,** B.S.A., M.Sc. (Manitoba), Ph.D. (Saskatchewan); **Tahir, M.,** B.Sc.(Hons) (Peshawar), M.Sc.(Hons) Faisalabad, Ph.D. (Washington State).

Adjunct Professors

Cloutier, S., B.Sc. (Laval), M.Sc. (Guelph), Ph.D. (Montreal); **Djordjevic, J.,** B.S. (Belgrade), M.S., Ph.D. (Novi Sad); **Fox, S.L.,** B.Sc. (AGR) (Guelph), M.Sc., Ph.D. (Manitoba); **Humphreys, D.G.,** B.Sc. (Queen's), M.Sc. (Guelph), Ph.D. (McGill); **Rashid, K.Y.,** B.Sc. A., Agr. Eng., (American University of Beirut), Ph.D. (Manitoba); **Somers, D.J.,** B.Sc., M.Sc., Ph.D. (Toronto); **Tamburic-Illincic, L.,** B.Sc. (Sarajevo), M.Sc. (Belgrade), Ph.D. (Guelph); **Van Acker, R.C.,** B.Sc., M.Sc. (Guelph), Ph.D. (Reading).

Program Information

The Department of Plant Science is one of seven departments in the Faculty of Agricultural and Food Sciences and draws together expertise in both the applied and basic sciences. Since its origin in 1937, the Department has maintained a leading role in agricultural research in Canada. Its achievements in rapeseed and canola breeding and in cereal breeding and cytogenetics are known world-wide. Faculty members have major research programs in agronomy and plant protection, plant breeding and genetics, and plant physiology-biochemistry (elaborated below). The graduate program of coursework offers considerable choice to the student and is based mainly on the student's primary interests and previous scholarly training. In general, a series of graduate courses in the student's chosen field offered by the Department of Plant Science is required for the major credit. A wide range of courses in ancillary fields (e.g., biological sciences, chemistry, statistics, soils, etc.) may be chosen to complete the graduate coursework.

Fields of Research

Programs of study and research are offered in the following areas, leading to the M.Sc. and Ph.D. degrees.

Agronomy and Plant Protection: Cropping systems research; annual and perennial crop agronomy including rotational benefits of traditional and novel legumes; self-regenerating cover crops; long term organic vs conventional crop production systems; pasture water use efficiency. Weed biology, ecology and eco-physiology; integrated weed management; the impact of management techniques on weed community assembly; crop/weed competition. Canola and wheat pathology; breeding for disease resistance;

applied and molecular approaches to understanding the epidemiology of plant pathogens; biological control and mode of action by antagonists on plant pathogens; isolation, identification and characterization of microbial genes involved in pest control; proteomics in host-pathogen resistance; IPM in sustainable agricultural systems. Biochemical and molecular mechanisms of plant-microbe interactions, with an emphasis on plant defense reactions and the mechanisms of their suppression by pathogens; mechanisms of biological control of plant diseases; role of secondary metabolites (i.e., phenolics, terpenes) in defense and defense signalling and role of inducers and suppressors in induced resistance.

Plant Breeding and Genetics: Wheat breeding and genetics; modelling crop development and yield; genetics of resistance to leaf spotting diseases; development and evaluation of breeding methodologies; genetics of herbicide resistance; development of Fusarium Head Blight resistant germplasm; development of wheat for fuel and feed. Open pollinated population and hybrid canola/rapeseed breeding; open pollinated population and hybrid herbicide tolerant canola/rapeseed breeding; agronomy and genetic studies in canola/rapeseed; bio-products and bio-fuels research and development. Plant genomics and molecular biology; genetic and transcriptome mapping, gene profiling and cloning; construction of high density SRAP maps and molecular marker development; cloning of genes involved in the pathways of glucosinolates and fatty acids, and for disease resistance, seed coat colour, and male sterility in Brassica crops. Improvement of oil content and oil quality in canola rapeseed through traditional and molecular breeding with special emphasis on development of Brassicas suitable as feed stock for biodiesel; plant genomics to isolate, clone and study the expression of economically important genes for use in breeding programs. Gene expression in plants during resistant or susceptible interactions with fungal or bacterial pathogens; genetic engineering of disease resistance; bioinformatics.

Plant Physiology-Biochemistry: Biochemical and molecular analyses of host-fungal pathogen interactions in wheat with emphasis on tan spot disease; fungal toxin structure and toxin mode of action. Biochemistry and physiology of anaerobic stress in cereals; biochemistry and molecular biology of abscisic acid metabolism in cereals; cereal germination physiology and biochemistry. Physiology and molecular biology of embryo development *in-vivo* and *in-vitro*; improvement of embryo quality and plant regeneration of both angiosperm and gymnosperm species through tissue culture techniques. Physiology and molecular biology of biofuel crops with the aim of understanding and manipulating the major plant physiological processes including starch biosynthesis, sucrose metabolism and transport; study on plant hormones with emphasis on gibberellin metabolism (biosynthesis and inactivation), its role in regulating crop development and mediating crop-environment interaction.

There is a wide range of employment opportunities for M.Sc. and Ph.D. graduates from the Department of Plant Science, including research and teaching positions at universities throughout the world, research and extension positions with the federal and provincial governments and positions in private industry.

Research Facilities

The Department of Plant Science has excellent research facilities including well-equipped laboratories, ample greenhouse space and controlled-environment chambers, and a horticultural-research storage building. A 60 hectare field research station is situated on campus within walking distance of the Plant Science Building. As well the Department has a 165 hectare field-research station located at Carman, Manitoba on prime agricultural soil.

M.Sc. in Plant Science

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this *Calendar*.

Admission Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 4 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Research and thesis

A minimum of 15 credit hours of coursework (including PLNT 7250 Plant Science Seminar) of which at least 6 credit hours will be courses at the 700/

7000 level. The 6 credit hours at the 700/7000 level cannot include PLNT 7250 Plant Science Seminar or ANSC 7500 Methodology in Agricultural and Food Sciences.

Second language reading requirement: none

Expected time to graduation: two years

Ph.D. in Plant Science

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this *Calendar*.

Admission Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 4 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this *Calendar*. In addition, students must take PLNT 7420 Advanced Plant Science Seminar for which they must register each year of their Ph.D. program. The 12 credit hours at the 700/7000 level cannot include ANSC 7500 Methodology in Agricultural and Food Sciences.

Second language reading requirement: none

Expected time to graduation: three years

Course Listing

PLNT 7120 Special Problems in Plant Science Cr.Hrs.3 Reading or assignment or research on specific aspects of crop development, crop production, weed science, plant pathology, plant biochemistry or plant physiology. *Prerequisite:* written consent of department head.

PLNT 7130 Topics in Plant Breeding and Genetics Cr.Hrs.3 An in-depth study of selected topics of current interest in the fields of plant breeding and genetics. *Prerequisite:* written consent of department head.

PLNT 7160 Advanced Genetics Cr.Hrs.3 Procedures and designs in genetic experimentation, the fundamentals of gene action, mutation and mutagens, linkage and recombination, extranuclear inheritance. *Prerequisite:* PLNT 4330 or consent of instructor.

PLNT 7162 Plant Genomics Cr.Hrs.3 Detailed analysis of advanced genomic techniques, experimental approaches, and progress in current plant genomic projects.

PLNT 7170 Advanced Plant Breeding Cr.Hrs.3 Advanced training in modern methods of plant breeding. *Prerequisite:* PLNT 3520 or consent of instructor.

PLNT 7250 Plant Science Seminar Cr.Hrs.3 Principles of oral and poster presentations, visual aid design and organization are discussed and then applied by students in presentations of their current research, and agricultural issues. Course evaluated on a pass/fail basis.

PLNT 7340 Advanced Weed Science Cr.Hrs.3 Weed biology and ecology in the context of weed management, covering theory, current information, investigative approaches and experimental techniques. Topics explored include: weed population biology, modelling, weed community ecology, herbicide efficacy and herbicide resistant weeds. *Prerequisite:* PLNT 3540 or equivalent or consent of instructor.

PLNT 7420 Advanced Plant Science Seminar Cr.Hrs.3 The development of a research proposal, instruction and practice in scientific writing and presentation of a seminar. For Ph.D. students only. Course evaluated on a pass/fail basis.

PLNT 7480 Epidemiology of Plant Disease Cr.Hrs.3 Lectures, seminars and discussions relating epidemiological principles to plant disease development and control. The course examines in-depth the interrelationships of host, pathogen and environment. Measurement of epidemiological parameters is stressed in relation to disease assessment, disease forecasting and disease management.

PLNT 7490 Storage of Horticultural Crops Cr.Hrs.3 Types of storage available for fruits, vegetables and ornamentals will be discussed in relation to their effects on post-harvest physiology and stored crop quality.

PLNT 7610 Topics in Crop Physiology Cr.Hrs.3 An in-depth study of selected topics of current interest in the field of Crop Physiology. *Prerequisite:* written consent of department head.

PLNT 7612 Advanced Plant Physiology Cr.Hrs.3 Examination of current concepts of regulation and limitations of photosynthesis, nitrogen metabolism, and assimilate partitioning in field and horticultural crops. Content will include the mode of action of plant growth regulators and herbicides in these processes. Not to be held with the former 039.764. *Prerequisites:* PLANT 3500 and PLANT 4590 or the former 039.452 or consent of instructor.

PLNT 7620 Topics in Agronomy Cr.Hrs.3 An in-depth study of selected topics of current interest in the field of Agronomy. *Prerequisite:* written consent of department

head.

PLNT 7630 Topics in Plant Pathology Cr.Hrs.3 An in-depth study of selected topics of current interest in the field of Plant Pathology. *Prerequisite:* written consent of department head.

PLNT 7650 Specialized Plant Pathology Cr.Hrs.3 A laboratory course permitting the student to work directly under one of the plant pathology specialists of the Agriculture and Agri-Food Canada Research Centre. It includes the study of assigned literature and preparation of seminars in specialized fields. *Prerequisite:* written consent of department head.

PLNT 7660 Advanced Crop Production Cr.Hrs.3 A lecture-seminar course to investigate environmental, crop management and genetic limitations to growth, yield formation, yield, water use efficiency and quality of field, forage and horticultural crops. Interactions will be stressed and emphasis will be placed on sustainable crop production systems. Simple and complex relationships will be demonstrated using models. *Prerequisite:* consent of instructor.

PLNT 7670 Quantitative Genetics and Plant Breeding Cr.Hrs.3 The theoretical basis of quantitative genetic variation. The genetic structure of plant breeding populations. Estimation, interpretation and use of genetic parameters in cross-pollinated and self-

pollinated plant species. Variance components, genotype x environment interaction, inbreeding, heterosis, selection, heritability and combining ability. *Prerequisites:* PLNT 3520 and PLNT 4330 or consent of instructor.

PLNT 7680 Plant Molecular Genetics Cr.Hrs.3 A synthesis of the knowledge gained from the application of molecular and classical genetics to the study of plant biology, and its impact on biotechnology. Areas of emphasis include transgenic plants, molecular markers, development and physiology, and molecular plant pathology. *Prerequisite:* PLNT 2530 or the former 039.450 or PLNT 3140 or PLNT 4330 or equivalent or consent of instructor.

PLNT 7690 Bioinformatics Cr.Hrs.3 An introduction to the theory, strategies, and practice of data management, analysis and utilization in molecular biology. Topics include DNA and protein sequence analysis, biological databases, genomic mapping and analysis of gene expression data. The course will include problem-solving exercises using Unix server-based software. Not to be held with PLNT 4610. *Prerequisite:* PLNT 2530 (or 039.253) or the former 039.450 or PLNT 3140 (or 039.314) or PLNT 4310 or the former PLNT 4540 (or 039.454) or MBI0 3410 (or 060.341) or consent of instructor.

Section 68: Political Studies

Head: George MacLean

General Office: 532 Fletcher Argue

Telephone: (204) 474 9733

Fax: (204) 474 7585

E-mail: Political_Studies@UManitoba.CA

Website: umanitoba.ca/arts/political_studies

Academic Staff

Duff Roblin Professorship of Government

Thomas, P.G., B.A.(Hons.), M.A. (Manitoba), Ph.D. (Toronto).

Senior Scholars

Daycock, D.W., B.A.(Hons.), M.A. (Manitoba), Ph.D. (London); **Knysh, G. D.,** B.A.(L.P.H.), M.A. (Manitoba), Ph.D. (London); **Lambert, G.,** B.A.(Hons.) (Manchester), M.A., Ph.D. (Minnesota); **Neville, W.F.W.,** B.A.(Hons.) (Manitoba), M.A. (Oxford); **Peterson, T.E.,** B.A., M.A. (Manitoba); **St. John, O.P.,** B.A.(Hons.) (UBC), M.Sc., Ph.D. (London).

Professors

Debicki, M., LL.M. (Warsaw), Ph.D. (Carleton); **Desai, R.,** B.A.(Hons.) (Maharaja Sayajirao U Barodas), M.A., Ph.D. (Queen's); **Fergusson, J.G.,** B.A.(Hons), M.A. (Manitoba), Ph.D. (UBC); **MacLean, G.A.,** B.A.(Hons.) (Dalhousie), M.A. (McMaster), Ph.D. (Queen's); **Sigurdson, R.F.,** B.A., M.A. (Manitoba), Ph.D. (Toronto); **Thomas, P.G.,** B.A.(Hons.), M.A. (Manitoba), Ph.D. (Toronto).

Associate Professors

Jacoby, T.A., B.A.(Hons.) (Manitoba), M.A. (Hebrew), Ph.D. (York); **Ladner, K.,** B.A. (Calgary), M.A. (Saskatchewan), M.A., Ph.D. (Carleton), Canada Research Chair; **Ogrodnick, M.,** B.A., M.A. (Alberta), Ph.D. (York).

Assistant Professors

Lecce, S.A., B.A. (Toronto), M.A., Ph.D. (Western); **MacDonald, F.,** B.A. (Brandon), B.S.W. (Calgary), M.A. (Simon Fraser), Ph.D. (UBC); **Wesley, J.J.,** B.A.(Hons)(Alberta), M.A. (Manitoba), Ph.D. (Calgary).

Program Information

The Department of Political Studies offers students a Pre-Master's year, a Master of Arts degree program, as well as a Masters in Public Administration program jointly offered with the University of Winnipeg (see Section 69 in this calendar). The program provides a solid basis for those wishing to go to doctoral studies, or for those interested in careers in law, government, the private and voluntary sectors and international organizations.

With fourteen full-time faculty members and approximately forty graduate students per year, the low student to faculty ratio provides an excellent opportunity for students to work closely with faculty in the department and for flexibility in the design of programs of study. A further attraction lies in the department's links with the Centre for Defence and Security Studies, a research institute focused on the area of security, strategic and defence studies. Since 1985, graduate students in the department have organized the annual Political Studies Students' Conference in association with the Centre for Defence and Security Studies with invited speakers including distinguished academics and specialists from across Canada and from abroad. The Duff Roblin Professor of Government and the Duff Roblin Po-

litical Studies Fellowship (established in 1998) advance the study of Canadian politics within the department and amongst its students.

Fields of Research

The department offers courses at the pre-Master's and Master's levels in five areas of concentration: Canadian politics, international relations, public administration, political theory and comparative politics.

Canadian Politics, including government institutions, public policy, the Charter of Rights and Freedoms and anti-discrimination legislation, indigenous politics & governance; and political parties;

International Relations including defence and security studies, foreign and defence policy; international political economy; globalization and international organizations and policy, and colonization and decolonization;

Comparative Politics including parties and politics, political economy, women in politics, middle east politics, politics in India, politics in Britain and politics of development, indigenous politics & indigenist theory;

Public Administration including comparative public administration, human resources development, provincial and local administration, government reform, accountability, and performance measurement;

Political Theory including contemporary and early modern political thought, feminist political thought, autobiography and the political philosophy of Jean-Jacques Rousseau and Simone de Beauvoir.

Research Facilities

As a provincial capital, Winnipeg offers important advantages for undertaking research in politics. Key research libraries are housed at the University of Manitoba and the Manitoba Legislative Library, both official repositories for Canadian publications. The University of Manitoba Archives and Special Collections, and Provincial Archives provide a wealth of material on Manitoba, Prairie and Canadian politics. Additionally, the university's data library and the Inter-University Consortium for Political and Social Research provide access to electronic data sources, including Statistics Canada and census data, as well as public opinion and election surveys. The University of Manitoba is also a member of the Shastri Indo-Canadian Institute which enhances the Library collection on India and supports graduate research. Finally, the Centre for Defence and Security Studies supports an extensive library of journals, periodicals, and texts in the fields of international relations, security studies, and foreign policy.

M.A. in Political Studies

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, admission to the Master's program in Political Studies is through successful completion of the pre-M.A. year, as outlined below, or by completion of a B.A.(Honours) program in Political Studies. Applicants possessing a B.A.(Honours) are expected to have maintained a grade point average of 3.5 (B+) in their last 36 credit hours in Political Studies courses, to have completed a course in Political Theory, and to have maintained a cumulative grade point average of 3.0 (B). Students who have a B.A.(Adv.) with a course selection pattern and performance comparable in quality to that of

a B.A.(Hons.) student will also be considered. Applicants possessing a B.A. (Honours) in another discipline with a cumulative grade point average of 3.5 (B+) will be considered for direct entry into the program, primarily on the basis of their completion of Political Studies or directly related courses.

The pre-Master's year is designed for students who do not meet the requirements for admission to the Master's program. To be eligible for pre-Master's study, applicants will normally possess a general Bachelor's degree with a major in Political Studies (30 credit hours including one course in Political Theory), with a minimum cumulative grade point average of 3.0 (B). Applicants possessing a general B.A. in another discipline with a cumulative grade point average of 3.5 (B+) will also be considered for direct entry into the pre-Master's program, primarily on the basis of their completion of Political Studies or directly related courses.

Admission to the pre-Master's year does not guarantee future admission to a MA program in Political Studies; students in the pre-Master's program are required to follow the normal application procedures for entry into the Master's program.

Application Deadline

Department deadline for applications for Regular Session (September) for International students is January 15 and for Canadian/U.S. students June 1.

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, students in the Master's program must complete either: 12 credit hours of 7000-level courses in Political Studies and a thesis requiring some original research in primary sources; or 24 credit hours of 7000-level courses, a research paper demonstrating familiarity with secondary sources, two written comprehensive exams, and an oral examination. All students must maintain an overall average of "B+" with no grade below a "B" in their coursework to remain in the program.

A student in the pre-Master's year will normally be required to successfully complete 24 credit hours at the 4000 level in Political Studies. Under special circumstances, the substitution of 6 credit hours at the 4000 level in an ancillary subject or at the 3000 level in Political Studies may be allowed. Decisions regarding the substitution of courses for the fulfilment of the program requirements rest with the Department's Graduate Committee and must be obtained in writing.

Students in the pre-Master's year must achieve a cumulative grade point average of 3.5 (B+) with no grade lower than a B (3.0 grade points) in course work to be eligible for admission into the Master's program.

More information may be found in the Supplementary Regulations pertaining to the Master of Arts and pre-Master's Programs in Political Studies.

Second Language Reading Requirement: No

Expected Time to Graduate: Two years

Ph.D.

The Department of Political Studies does not offer a Ph.D. Program.

Course Descriptions

POLS 6010 The Manitoba Legislative Internship Seminar Cr.Hrs.6 (Formerly 019.601) This credit is granted to six individuals who annually complete the assignment as Legislative Interns within the Manitoba Legislative Assembly.

POLS 6500 Co-operative Education Work 1 Cr.Hrs.3 (Formerly 019.650) This credit is granted to full time registered students in the Master of Public Administration who have registered in the co-op option of the program. Eligible candidates must have attended two mandatory workshops and completed a minimum 24 credit hours of course work prior to the first work term placement. Work terms are paid positions by employers primarily in the public sector. Work terms are a minimum of 13 weeks.

POLS 6510 Co-operative Education Work 2 Cr.Hrs.3 (Formerly 019.651) This credit is granted to full time registered students in the Master of Public Administration who have registered in the co-op option of the program. Eligible candidates must maintain full time status and have attended two mandatory workshops, completed a minimum 24 to a maximum of 48 credit hours of course work, and successfully completed a first work term prior to the second work term placement. Work terms are paid positions by employers primarily in the public sector. Work terms are a minimum of 13 weeks.

POLS 7280 Directed Readings in Politics Cr.Hrs.3 (Formerly 019.728) An independent reading and/or research course on a selected topic in political studies, undertaken and arranged in consultation with the prospective instructor, upon the approval of the Graduate Committee. As the course content will vary from year to year, students may take this course more than once for credit.

POLS 7290 Directed Readings in Politics 2 Cr.Hrs.6 (Formerly 019.729) An independent reading and/or research course on a selected topic undertaken and arranged in consultation with the prospective instructor, upon approval of the Graduate Committee. As the course content will vary from year to year, students may take this course more than once for credit.

POLS 7300 Directed Readings in Public Administration Cr.Hrs.3 (Formerly 019.730) An independent reading and/or research course on a selected topic undertaken and arranged in consultation with the prospective instructor, upon approval of the Graduate Committee. As the course content will vary from year to year, students may take this course more than once for credit.

POLS 7340 Canadian Government Cr.Hrs.3 (Formerly 019.734) Examines the core institutions of Canadian Government and politics including parliamentary government, federalism, the Constitution and the Charter of Rights and Freedoms. Students may not hold credit for both POLS 7340 (or 019.734) and the former 019.776.

POLS 7350 Canadian Democracy Cr.Hrs.3 (Formerly 019.735) Examines the core institutions and processes of Canadian democracy including political parties, elections, voting, social movements, interest groups and public opinion. Students may not hold credit for both POLS 7350 (or 019.735) and the former 019.776.

POLS 7370 Seminar in the Theory and Practice of Public Administration Cr.Hrs.6 (Formerly 019.737) The intent of this course is to provide insight into the exigencies of actual public administration. The course will be conducted on a topical basis within the framework of certain trends facing Canadian governments today. (The course will attempt to utilize, to the fullest extent possible, the particular expertise of students in the program, faculty members, and of both elected and appointed public officials.) Students may not hold credit for both POLS 7370 (or 019.737) and the former 019.731.

POLS 7410 Selected Topics in Political Behaviour 1 Cr.Hrs.3 (Formerly 019.741) A systematic examination of empirical research in the area of political socialization and political culture. Students may not hold credit for both POLS 7410 (or 019.741) and the former 019.725.

POLS 7470 Strategic Human Resource Management in Government Cr.Hrs.3 A study of the human resource management functions, including planning, staffing, training, performance management, compensation and labour relations, in ways that optimize organizational performance. This course will also address contemporary challenges including recruitment and retention, managing change, demographic shifts, and information technology.

POLS 7520 The Political Classics Cr.Hrs.3 (Formerly 019.752) A thorough study of selected works with special attention to methodology, historical content, theoretical position and universal significance. Students may not hold credit for both POLS 7520 (or 019.752) and the former 019.771.

POLS 7530 International Political Economy Cr.Hrs.3 (Formerly 019.753) An examination of the systematic study of international political economy. Particular attention is paid to the foreign economic policies of advanced industrialized states and the various issues surrounding the redistribution of wealth and influence in the contemporary international system.

POLS 7550 Contemporary Issues in Canadian Politics Cr.Hrs.3 (Formerly 019.755) A seminar series examining a contemporary debate in Canadian politics and government. The specific topic will vary from year to year depending on faculty interest and specialization.

POLS 7610 Political Theory and Contemporary Issues Cr.Hrs.3 (Formerly 019.761) An examination of recent theoretical perspectives on contemporary political institutions, problems and values. Students may not hold credit for both POLS 7610 (or 019.761) and the former 019.771.

POLS 7710 Liberalism and Its Critics Cr.Hrs.3 An advanced study of liberalism and various theoretical challenges to its ethical and political claims.

POLS 7720 Comparative Government Cr.Hrs.6 (Formerly 019.772) Three hours a week, both terms. The primary focus of this course will be on the major Western "democracies" (e.g., United Kingdom, United States, and Western Europe). Phenomena to be examined include political participation and the problems of social change in industrial societies.

POLS 7770 Seminar in Public Administration Cr.Hrs.6 (Formerly 019.777) An inquiry into the relationship between politics and administration, including regulatory public administration, the process of bureaucratization, and the interplay of administrative authority, responsibility, and accountability.

POLS 7790 International Relations Theory Cr.Hrs.3 (Formerly 019.779) A critical assessment of basic theories and models used in International Relations, emphasizing theoretical approaches and research. Students may not hold credit for both POLS 7790 (or 019.779) and the former 019.773.

POLS 7850 Contemporary Strategic and Security Studies Cr.Hrs.6 (Formerly 019.785) An advanced course in strategic studies. The evolution of strategic thought in the modern period will be examined, and particular emphasis will be placed on the role of armed force in relation to the problem of international security. Students may not hold credit for both POLS 7850 (or 019.785) and the former 019.783. Normally students will be expected to have taken POLS 4730 (or 019.473) or its equivalent as *prerequisite*.

POLS 7910 Multivariate Research Methods Cr.Hrs.3 (Formerly 019.791) Introduction to the theory and application of multivariate regression models in political analysis. Students may not hold credit for POLS 7910 (or 019.791) and either the former 019.732 or 019.788.

POLS 9010 41.4301 U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9020 41/4400 U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9030 41.4415.U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9090 41.7331 U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9120 41.4220 U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9230 41.4410 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9240 41.4505 U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9340 41.7300 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9350 41.7305 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9370 41.7320 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9380 41.7325 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9390 41.4200 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9460 41.7505 U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9470 41.7335 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9490 41.4600 U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9500 41.4605 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9540 41.4515 U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9570 41.4100 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9580 41.4120 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9590 41.4440 U.WPG. Cr.Hrs.6 Course may be taken as part of a Master of Public Administration program offered jointly with the University of Winnipeg.

POLS 9602 U.WPG 41.7380 Cr.Hrs.6 University of Winnipeg Course: Special Topics Seminar in Public Administration.

POLS 9604 POL.4385 U.WPG. Cr.Hrs.3 University of Winnipeg Course: Special Topics in Public Administration.

Section 69: Preventive Dental Science

For information about graduate programs in the following units: Dental Diagnostic and Surgical Sciences, or Oral Biology please refer to the table of contents for page numbers.

Orthodontics

Head and Graduate Chair: W.A. Wiltshire

General Office: D341-780 Bannatyne Avenue

Telephone: (204) 789 3628

Fax: (204) 977-5699

E-mail: grad_orthodontic@umanitoba.ca

Website: umanitoba.ca/dentistry

Academic Staff

Senior Scholars

Odlum, O., B.D.S. (London), B.D.S.(Hons.), M.S.C. (Manitoba).

Professors

Hechter, F.J., D.M.D., M.Sc., M.Ed., Ph.D. (Manitoba); **Lekic, C.,** D.D.M., M.Sc., Ph.D. (Belgrade), F.R.C.D.(C); **Wiltshire, W.,** B.Ch.D., B.Ch.D. (Honors); M.Dent., M.Ch.D. (Ortho), D.Sc. (Odont.) (Pretoria), F.R.C.D.(C).

Associate Professors

Brothwell, D., B.Ed., D.M.D. (Saskatchewan), M.Sc., D.D.Ph. (Toronto); **Pesun, I.J.** D.M.D. (Manitoba), M.Sc. (Georgia), F.A.C.P., Diplomat, Am. Bd. of Perio.

Assistant Professors

Akyalcin, S., D.D.S., M.S., Ph.D. (Ege); **Dumore, T.,** D.M.D. (Manitoba), M.Sc. Ortho (San Francisco); **Gamboia, K.,** D.D.S., Cert. Pedo (Mexico); **Lee, H.,** D.M.D., M.S. Ortho. (Washington); **McFadden, L.,** D.D.S. (Alberta), M.Sc. (Dalhousie), **Ramirez-Yanez, G.,** D.D.S. (Colombia), Cert. Pedo (Mexico), M.Dent, Ph.D. (Queensland); **Rody, W.,** D.D.S., Cert. Ortho (Brazil), M.S. (Washington); **Solomon, G.,** D.D.S., Dip Ortho (Toronto).

Instructors

Bales, J., D.D.S. (Western), M.Sc. Ortho (Manitoba); **Cantin, R.,** D.M.D. (Manitoba), Cert. Pedo (Connecticut), **Cohn, C.,** D.M.D. (Manitoba) Diamond, R., D.M.D., Cert Paed (Manitoba), Cert Paed (Connecticut); **Dobbs, T.,** B.S., D.D.S. (Tennessee), Cert. Pedo. (Manitoba); **Gill, Nar,** D.M.D. (Manitoba); **Gill, Novjot,** D.M.D. (Manitoba), **Kass, F.,** D.M.D. (Manitoba), M.S. (Minnesota); **Kmet, P.,** B.Sc., D.M.D. (Manitoba); **Lekic, M.,** D.M.D., M.Sc.Ortho (Manitoba); **Levine, G.,** D.M.D., M.Sc.Ortho (Manitoba); **Maniate, J.,** D.M.D. (Manitoba) Cert. Pedo (Connecticut); **Patel, S.,** D.M.D. (Manitoba), **Pesun, R.,** D.M.D. (Manitoba), **Row, K.,** D.D.S. (Toronto), M.Sc. Ortho (Manitoba); **Schau, J.,** D.M.D. (Manitoba); **Tsang, S.,** D.M.D., M.Sc. Ortho (Manitoba).

Program Information

The department offers a 3-year (minimum 36 months) Master's program in orthodontics, fully accredited by the Commission on Dental Accreditation

of Canada. This program provides eligibility to sit the examination of the Royal College of Dentists of Canada (RCDC) and the American Board Exams in Orthodontics (ABO). The program is intended to provide a background in the basic sciences underlying orthodontic treatment and develop a critical, independent, problem-solving approach toward clinical practice.

Graduate orthodontic students have the opportunity to treat approximately 65 new patient starts and a similar number of transfer and retention patients using a wide variety of orthodontic techniques. The strength of the clinical program is a wide range of diversity in instructor philosophies of treatment and the opportunity to learn several techniques such as full fixed modified edgewise type mechanics, sectional arch mechanics, early treatment philosophies and functional orthopaedics. In addition, a variety of surgical and cleft palate combination orthodontic surgical cases.

Graduate students also are expected to do some limited teaching in the undergraduate orthodontic clinic, present their research at an international congress, submit an article for peer-reviewed publication based on their research and orally defend their research project.

Graduates of the program over the past years have gone on to establish successful practices world-wide in such countries as Canada, U.S.A., Australia, Ireland, Columbia, Taiwan, Finland and the United Arab Emirates, amongst others.

Fields of Research

The current foci of research are in orthodontic biomaterials, adhesivity, anticariogenicity, allergenicity, fluoride release, epidemiology of malocclusion, public health orthodontics, preventive and interceptive orthodontics, clinical research in temporomandibular joint dysfunction, and the biology of tooth movement.

Research Facilities

The graduate orthodontic program offers a state-of-the-art 14 chair clinic with modern computerized diagnostic equipment and an on-site dedicated orthodontic technician. The latest addition to the research facilities is a state-of-the-art Zwick materials testing machine, in addition to the general research laboratories of the Faculty of Dentistry.

M.Sc. in Orthodontics Speciality

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application deadline

All application materials should be submitted to the Faculty of Graduate Studies by September 1.

Program Requirements

Minimum Program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this calendar. Stu-

dents must successfully complete all courses offered by the department as well as ANAT 7060, CHSC 7470, RSTD 7150, DDSS 7230. A thesis based on original research and acceptable to the Faculty of Graduate Studies and successful oral defence is also required, as well as submission of a peer-reviewed paper suitable for publication to the satisfaction of the program director.

Clinical Requirements

Students are required to treat approximately 65 new cases, a number of active transfer cases, plus approximately 80 retention cases including cleft palate and combined orthodontic-surgical patients to the satisfaction of the clinical faculty and an external examiner. The minimum full-time requirement to complete the total program is 35 months.

Second Language Reading Requirement: None
Expected Time to Graduate: minimum 36 months

Ph.D.

There is no Ph.D. Program offered in the Department of Preventive Dentistry.

Course Descriptions

PDS 7000 Neural Basis of Oropharyngeal Function Cr.Hrs.3 (Formerly 101.700) A program of problem-oriented seminars on the sensory and reflex mechanisms affecting the respiratory and alimentary functions of the mouth and pharynx, mandibular posture and movement and respective application to oropharyngeal dysfunction

Section 70: Psychology

Head: T. A. Mondor

Graduate Office: P514 Duff Roblin

Telephone: (204) 474 6377

Fax: (204) 474 7917

E-mail: psych_grad_office@umanitoba.ca

Website: umanitoba.ca/psychology

Academic Staff

Professor Emeritus

Adair, J.G., B.Sc., M.Sc. (Trinity,Texas), Ph.D. (Iowa); **Martin, G.L.**, B.A. (Colorado), M.A., Ph.D. (Arizona).

Senior Scholars

Altemeyer, R., B.S. (Yale), M.S., Ph.D., (Carnegie Mellon); **Forest, J.J.**, B.A. (Hons.) (Alberta), M.Sc. (Washington), Ph.D. (Alberta); **Kaye, S.M.**, B.Sc. (McGill), M.A., Ph.D. (Dalhousie); **Whiteley, J.H.**, B.A.(Hons.) (Toronto), M.A. (Western Ontario), Ph.D. (Iowa State).

Professors

Arnett, J.L., B.A. (Hons.) (Rhode Island), M.A. (Mount Pleasant), Ph.D. (Manitoba); **Chipperfield, J.**, B.A.(Hons.), M.A., Ph.D. (Manitoba); **Cox, B.**, B.A.(Hons.) (Winnipeg), M.A., Ph.D. (York); **DeLuca, R.**, B.A.(Hons.) (Winnipeg), M.A., Ph.D. (Manitoba); **Eaton, W.O.**, B.A. (Stanford), M.A., Ph.D. (Illinois); **Jakobson, L.**, B.A.(Hons.) (Manitoba), M.A., Ph.D. (Western Ontario); **Keselman, H.J.**, B.A. (Farleigh Dickinson), M.Sc., Ph.D. (Oklahoma); **Keselman, J.C.**, B.A., M.A., Ph.D. (Manitoba); **LeBow, M.D.**, B.A.(UCLA), M.A., Ph.D. (Utah); **Leventhal, L.Y.**, B.A. (UCLA), M.A., Ph.D. (Southern Illinois); **Martin, D.G.**, B.A. (Albion), M.A., Ph.D.(Chicago); **Mondor, T.A.**, B.A.(Hons.) (Winnipeg), M.A., Ph.D. (Waterloo); **Pear, J.J.**, B.S. (Maryland), M.A., Ph.D. (Ohio); **Perry, R.P.**, B.A. (UBC), M.Sc., Ph.D.(Calgary); **Singer, M.**, B.Sc. (McGill), M.S., Ph.D. (Carnegie Mellon); **Voraueer, J.**, B.A. (UBC), M.A., Ph.D. (Waterloo); **Wilson, L.M.**, A.B. (Mt. Holyoke College), M.A., Ph.D. (Kent State).

Associate Professors

Bailis, D., B.A. (UCLA), M.A., Ph.D. (Princeton); **Cameron, J.J.**, B.A. (Hons.) (Manitoba), Ph.D. (Waterloo); **Holborn, S.W.**, B.A. (Victoria), M.A., Ph.D. (Iowa); **Huynh, C-L.**, M.P.A. (Brigham Young), M.A. (Simon Fraser), M.A., M.S., Ph.D. (Iowa); **Ivanco, T.L.**, B.A.Sc. (Lethbridge), Ph.D. (McMaster); **Johnson, E.**, B.A.(Hons.) (Queen's), Ph.D. (Waterloo.); **Leboe, J.**, B.A.(Hons.), M.A. (Simon Fraser), Ph.D. (McMaster); **Mallin, B.**, B.A. (Hons.), M.A., Ph.D. (Manitoba); **Marotta, J.J.**, B.Sc. (Queen's), M.Sc., Ph.D. (Western Ontario); **Medved, M.**, B.Sc. (Hons.), M.A., Ph.D. (Toronto); **Morry, M.**, B.A.(Hons.) (Alberta), M.A., Ph.D. (Iowa); **Sande, G.N.**,

and orthodontic therapy. One seminar per week for one term.

PDS 7020 The Mechanics of Orthodontic Therapy Cr.Hrs.6 (Formerly 101.702) The mathematics of three dimensional space, force and moment systems are given as the basis for considering the mechanics of orthodontic treatment. The mechanical properties of some orthodontic materials are studied as a background for appliance design. The quantitative aspects of tooth movement are discussed in terms of patient treatment planning. Seminar and laboratory sessions.

PDS 7030 Biological Basis of Craniofacial Growth and Development Cr.Hrs.3 (Formerly 101.703) A program of student-based seminars on the biophysical, biochemical and histological basis of growth and development of craniofacial structures.

PDS 7040 Clinical Craniofacial Growth and Development Cr.Hrs.3 (Formerly 101.704) A program of student-based seminars on the morphogenesis of craniofacial structures and their significance to clinical problems.

PDS 7060 Cephalometric Analysis Cr.Hrs.3 (Formerly 101.706) A seminar program on the application of cephalometric radiography to craniofacial morphological research, orthodontic diagnosis and case analysis.

PDS 7100 Biology of Orthodontics and Facial Orthopedics Cr.Hrs.3 (Formerly 101.707) A program of student-based seminars and lectures on the biological basis of orthodontic and facial orthopedic diagnosis and therapeutic technique.

RSTD 7100 Dental Materials Cr.Hrs.6 (Formerly 102.710) This course consists of lecture, seminar and laboratory periods. The student will examine the current literature relevant to the program and will gain experience in the testing procedures used to evaluate dental materials. A project involving the evaluation of a dental material will be required of each student.

RSTD 7150 Orthodontic Materials Cr.Hrs.3 (Formerly 102.715) Students will examine in depth through lectures, seminars and research of the current literature, those materials used by orthodontists in their clinical practice. The relationship between materials properties and clinical performance will be emphasized.

B.A.(Hons.) (Victoria), M.A., Ph.D. (Waterloo); **Shapiro, L. J.**, B.A. (Colgate), M.A., Ph.D. (Texas Christian); **Tefft, B. M.**, B.A. (Cornell), Ph.D. (Roch.); **Wilson, J.R.**, B.A. (Northern Illinois), M.S. (Kansas State), Ph.D. (Kent State); **Yu, C.T.**, B.A., M.A., Ph.D. (Manitoba).

Assistant Professors

Ellery, M., B.A. (Hons.), Ph.D. (Dalhousie); **Glenwright, M.**, B.A. (Hons.) (Winnipeg), M.Sc., Ph.D. (Calgary); **Jamieson, R.K.**, B.A. (Hons.) (York), M.A. (Queen's), Ph.D. (Queen's); **Kruk, R.**, B.Sc. (Hons.), M.A., Ph.D. (Toronto); **Leboe, L.**, B.A. (Simon Fraser), M.A., Ph.D. (Manitoba); **Mackenzie, C.S.**, B.A. (Hons.) (Alberta), M.A., Ph.D. (Queen's); **Montgomery, J.M.**, B.Ed., Ph.D. (Saskatchewan); **Soderstrom, M.**, B.S. (Massachusetts Institute of Technology), M.A., Ph.D. (John Hopkins); **Starzyk, K.**, B.A. (Hons.) (Alberta), M.A., Ph.D. (Queen's).

Instructors

Hladkyj, S., B.A., M.A., Ph.D. (Manitoba).

Adjunct Professors

Anderson, J., B.Sc. (British Columbia), B.Sc. (Med) (Manitoba), Ph.D. (Manitoba); **Clancy, C.**, B.A., M.A., Ph.D.; **DeWiele, L.**, B.A. (Hons.), M.A., Ph.D. (Manitoba); **Durup, J.**, B.Sc. (Hons.), M.Sc. (Acadia), Ph.D. (Dalhousie); **Enns, M.W.**, MD; **Fehr, B.**, B.A. (Hons.) (Winnipeg), M.A., Ph.D. (UBC); **Feldgaier, S.**, B.A. (McGill), M.A. (Iowa State), Ph.D. (Ohio State); **Fergusson, P.**, B.A. (Hons.) (Winnipeg), Ph.D. (Waterloo); **Freeman, W.S.**, B.A. (Regina), M.A., Ph.D. (British Columbia); **Larson, S.**, B.A. (Hons.) (Manitoba), Ph.D. (McMaster); **Leslie-Toogood, S. A.**, B.A., M.A., Ph.D. (Manitoba); **Malisza, K.**, B.A. (Hons.), M.A., Ph.D.; **Nickels, J.B.**, B.A. (Occidental College), M.A., Ph.D. (Missouri); **Pallotta-Cornick, A.**, B.A. (Brazil), M.A., Ph.D. (Manitoba); **Pearson, P.**, B.A. (Hons.), M.A., Ph.D. (Western Ontario); **Renaud, R.D.**, B.A. (Hons.), M.A., Ph.D. (Western Ontario); **Sareen, B.S.** (Winnipeg), B.S. (Med) (Manitoba), MD. (Manitoba); **Schonwetter, D.**, B.A. (Hons.), M.A., Ph.D. (Manitoba); **Smith, D.**, B.A. (Lethbridge), M.A., Ph.D. (Waterloo); **Tait, R.W.**, B.A., M.A. (Queen's), Ph.D. (Iowa); **Thomas, M.**, B.A. (Texas), M.A., Ph.D. (Tennessee); **Vincent, N.**, B.Sc., B.A., M.A., Ph.D. (Manitoba); **Walker, J.**, B.A.(Hons.), M.A., Ph.D. (Manitoba).

Program Information

Graduate study in the Department of Psychology is offered at both the M.A. and the Ph.D. levels. The primary purpose of the program is to provide training in several specialized areas of psychology for individuals desiring to advance their level of knowledge, their research skills, and their applied capabilities. The M.A. program is designed to provide a broad foundation in the scientific approach to psychology, as well as specialized skills. The

Ph.D. program provides a higher degree of specialization coupled with more intensive training in research and application. With their advanced training graduates make careers in a variety of work settings such as self-employment, universities and colleges, government, private for-profit companies, schools, and private not-for-profit organizations.

An on-line brochure entitled Graduate Study in Psychology, which details staff interests, the areas in which students may study, and the offerings and requirements in each area, is available at: umanitoba.ca/psychology

Fields of Research

Research areas include: Applied Behaviour Analysis, Brain and Cognitive Sciences, Clinical, Developmental, Methodology, School, Social and Personality.

Research Facilities

The department has a variety of research facilities in virtually all areas of psychology. These facilities are housed in over 100 different research rooms that include: A microcomputer laboratory and local area network; a biofeedback laboratory; operating and histological rooms and equipment; animal laboratories for research with ducks, rats, pigeons, fish, rabbits, mice, and parakeets; one way vision rooms for small group research; closed circuit television systems; a laboratory for studying college teaching; vision laboratories; the Avian Behaviour Laboratory, a field station/laboratory complex to study the behaviour of mallard ducks and Canada geese; the Psychological Services Centre, a training clinic for clinical psychology graduate students, social work students, and psychiatric residents; specialized electronics shop.

Psychology

M.A. in Psychology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Additional requirements are detailed in the brochure entitled Graduate Study in Psychology, which is available on-line at umanitoba.ca/psychology

Application Deadline

All applicants should send their applications with complete supporting documentation to the Faculty of Graduate Studies, no later than January 15.

The normal requirement for admission is an Honours B.A. or B.Sc. in Psychology or its equivalent. Students seeking admission with other degrees will usually be required to complete a pre-Master's year to the satisfaction of the department.

Program Requirements

The basic requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Additional requirements are detailed in the brochure entitled Graduate Study in Psychology, which is available on-line at umanitoba.ca/psychology

Second Language Reading Requirement: Not required

Expected Time to Graduate: Two years

Ph.D. in Psychology

Admission

Students may be admitted to the doctoral program if they have the equivalent of an M.A. degree in Psychology from the University of Manitoba. Additional requirements are detailed in the brochure entitled Graduate Study in Psychology, which is available on-line at umanitoba.ca/arts/psychology

Application Deadline

All applicants should send their application with complete supporting documentation to the Faculty of Graduate Studies no later than January 15.

Program Requirements

The basic requirements are those of the Faculty of Graduate Studies. Additional requirements are detailed in the brochure entitled Graduate Study in Psychology. Students in the clinical training program have a more extensive program of study, including clinical practice at the Psychological Service Centre, and must complete an internship year at an accredited training site. A formal candidacy exam is set by the advisory committee. Following

successful completion of the candidacy examinations, the student completes a Ph.D. thesis.

Second language requirement: Not required

Expected time to graduation: Non-Clinical Programs, three years; Clinical Program, four years.

School Psychology

M.A. in School Psychology

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Additional requirements are detailed in the brochure entitled Graduate Study in Psychology, which is available on-line at umanitoba.ca/psychology

Application Deadline

All applicants should send their applications with complete supporting documentation to the Faculty of Graduate Studies no later than January 15.

The normal requirement for admission is an Honours B.A. or B.Sc. in Psychology or its equivalent. Students seeking admission with other degrees will usually be required to complete a pre-Master's year to the satisfaction of the department.

Program Requirements

The basic requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Additional requirements are detailed in the brochure entitled Graduate Study in Psychology, which is available on-line at umanitoba.ca/psychology

Second Language Reading Requirement: Not required

Expected Time to Graduate: Two years

Course Descriptions

PSYC 7010 Ethics, History and Profession of School Psychology Cr.Hrs.6 (Formerly 017.701) An overview of the fundamental concepts and issues of professional School Psychology. Ethical, professional, regulatory and legal issues pertaining to the practice of school psychology are examined. Also examined are the history of school psychology and the organization of educational systems. *Prerequisite:* permission of instructor.

PSYC 7020 Psycho-educational Assessment and Measurement Cr.Hrs.6 (Formerly 017.702) Designed to provide students with competencies in the basic principles of psychological assessment and related measurement concepts, highlighting the process of data-based decision making. Emphasis will be placed on how information from a variety of psycho-educational sources is used to identify profiles for planning intervention programs. *Prerequisite:* permission of instructor.

PSYC 7030 Learning and Cognitive Impairment Cr.Hrs.3 (Formerly 017.703) An examination of cognitive and medical disorders that have a direct impact on learning, including disabilities, reading failure, mental retardation, Attention Deficit Hyperactivity Disorder, pervasive development disorders (e.g. autism), fetal alcohol syndrome, and co-occurring conditions. Effective compensatory interventions and social, behavioural and affective consequences will be emphasized.

PSYC 7040 Teaching Strategies, Learning Styles, and Academic Remediation Cr.Hrs.3 (Formerly 017.704) Provides an overview of basic theories of learning as applied to effective classroom instruction. Knowledge of individual differences in learning and principles of best practices in classroom instruction will be applied to the development of effective and curriculum adaptations for students with specific academic problems.

PSYC 7050 Junior Practicum in School Psychology Cr.Hrs.3 (Formerly 017.705) Supervised practice with school children in a field setting. Emphasis on development of skills in assessing intelligence, academic skills and social-emotional difficulties, and on communication of findings to parents, teachers, and school administrators through written and verbal reports. Pass/Fail course. *Prerequisite:* permission of instructor.

PSYC 7060 Senior Practicum in School Psychology Cr.Hrs.6 (Formerly 017.706) Supervised practice in a school setting. The focus is on development of skills relevant to case conceptualization, intervention, and supervision of junior practicum students. Pass/Fail course. *Prerequisites:* PSYC 7050 (or 017.705), permission of instructor.

PSYC 7070 Social, Emotional, and Personality Assessment of Children/Youth Cr.Hrs.3 (Formerly 017.707) An overview of theory, research, and the educational implications of social, emotional, and personality assessment of children and adolescents. A variety of methods are examined with an emphasis on empirically-supported practices in the assessment of psychopathology and socio-emotional functions. *Prerequisite:* permission of instructor.

PSYC 7080 Child/Youth Psychopathology Cr.Hrs.3 (Formerly 017.708) Examines mental health conditions, covering a range of internalizing and externalizing disorders in children and youth. Biopsychosocial and ecological models, risk and resiliency, and developmental and cultural issues are examined. Structured and semi-

structured diagnostic interviews are reviewed.

PSYC 7090 Behavioural Assessment and Intervention in School Settings Cr.Hrs.3 (Formerly 017.709) Behavioural management strategies and techniques for children and adolescents who present with serious disruptive and/or emotional and behavioural disorders in schools. A wide range of techniques and strategies are considered. *Prerequisite:* permission of instructor.

PSYC 7100 Intervention in the Early/Middle Years Cr.Hrs.3 (Formerly 017.710) Examines interventions directed at individuals, groups, and families, as well as classroom- and school-based intervention and prevention programs to promote a range of adaptive outcomes and intervene in a range of maladaptive pathways. *Prerequisite:* PSYC 7080 (or 017.708), permission of instructor.

PSYC 7110 Intervention in Adolescence Cr.Hrs.3 (Formerly 017.711) Examines interventions directed at individuals, groups, and families, as well as classroom- and school-based intervention and prevention programs to promote a range of adaptive outcomes and intervene in a range of maladaptive pathways. *Prerequisite:* PSYC 7080 (or 017.708), permission of instructor.

PSYC 7120 Consultation and Supervision Cr.Hrs.3 (Formerly 017.712) An examination of theories and models of school-based consultation and collaboration. Practice with techniques and procedures associated with effective consultation with teachers, school administrators, and parents. *Prerequisite:* permission of instructor.

PSYC 7130 School Psychology Research Design and Program Evaluation Cr.Hrs.3 (Formerly 017.713) Provides students with knowledge and skills needed to understand, design, and conduct evaluations of intervention programs for individuals experiencing academic or behaviour difficulties in school. Addresses the aims, theories and methods of program evaluation, including relevant research design and statistical methods. *Prerequisite:* permission of instructor.

PSYC 7140 Clinical Research Design Cr.Hrs.3 This course addresses issues of research design relevant to clinical research. Topics include reliability and validity of measurement, correlational, quasi-experimental, and experimental designs, clinical significance, and power analysis. Students complete a research proposal relevant to their thesis interests.

PSYC 7150 Readings in Autism Spectrum Disorders Cr.Hrs.3 Students will read recent research in Autism Spectrum Disorders, acquire skills to critically evaluate empirical evidence, and examine implications for practice. Among the topics covered will be assessment, diagnosis, epidemiology, and applied behaviour analysis early intervention. *Prerequisite:* permission of instructor.

PSYC 7160 Cross-Cultural Social Psychology Cr.Hrs.3 Cross-cultural psychology is the critical and comparative study of the linkages between cultural norms and thoughts, feeling and behaviour. This course focuses on Cross-cultural Social Psychology. Therefore, the assigned readings deal with topics that Social Psychology in general examines.

PSYC 7170 Theories of Close Relationships Cr.Hrs.3 Students will be exposed to the theories that apply to the initiation, development, maintenance, and dissolution of relationships. The primary focus will be on evolutionary theory, attachment styles, communal and exchange relationships, equity theory, interdependence theory and the investment model, attributional theories, and theories of love.

PSYC 7180 Self-Regulation and Health Cr.Hrs.3 This course examines how self-regulatory processes such as goal-setting and self-awareness can affect behaviours that promote or undermine human health. A wide range of health-related behaviours is considered such as smoking, exercise, safe-sex practices, and eating.

PSYC 7190 Social Psychology and Health Cr.Hrs.3 This course considers health from a social psychological perspective. Weekly readings and discussion will focus on social cognitive processes and social influence processes that may mediate between stress and illness or may direct people's judgments of their health and choices of health-related behaviours.

PSYC 7200 Quantitative Methods in Psychology 1 Cr.Hrs.3 An introduction to descriptive and inferential statistics as it relates to the analysis of psychological data. Topics such as shapes of distributions, measures of central tendency and variability, hypothesis testing, and interval estimation, single and multifactor analyses, classical and robust methods of analysis will be discussed.

PSYC 7210 Quantitative Methods in Psychology 2 Cr.Hrs.3 Applied statistics for psychologists, with a focus on regression analysis, linear models, and generalized linear models. Emphasis will be placed on the application of statistical methods and computer software in psychological research. Not to be held with the former PSYC 8420 (017.842). *Prerequisite:* PSYC 7200 or permission of instructor.

PSYC 7220 Autism Practicum 1 Cr.Hrs.3 Graduate students will be taught to provide applied behavior analysis training for children with autism. Students will be taught many of the skills expected of tutors and senior tutors in the St. Amant Applied Behavior Analysis Program for Children with Autism. *Prerequisite:* permission of instructor.

PSYC 7230 Autism Practicum 2 Cr.Hrs.3 Graduate students will learn to supervise tutors and parents providing applied behavior analysis training for children with autism. Students will be taught many of the skills expected of a clinical consultant in the St. Amant Applied Behavior Analysis Program for Children with Autism. *Prerequisite:* PSYC 7220 and permission of instructor.

PSYC 7240 Developmental Disabilities Practicum 1 Cr.Hrs.3 Students will work closely with behavior analysts in the Psychology Department at St. Amant to assess problems, design and execute appropriate interventions, and conduct follow-ups for persons with developmental disabilities. *Prerequisite:* permission of instructor.

PSYC 7250 Developmental Disabilities Practicum 2 Cr.Hrs.3 Graduate students will work closely with behavior analysts in the Psychology Department at St. Amant in the provision of applied behavior analysis consultation services for front line staff caring for persons with developmental disabilities. *Prerequisite:* PSYC 7240 and permission

of instructor.

PSYC 7260 Case Conceptualization and Communication 1 Cr.Hrs. In this course students will be exposed to the theory and practice of case conceptualization and communication. Students are required to be present for presentations of clinical cases and participate in discussions of them. Grading is Pass/Fail. *Prerequisite:* permission of instructor.

PSYC 7270 Case Conceptualization and Communication 2 Cr.Hrs. In this course students will be exposed to the theory and practice of case conceptualization and communication. Students are required to be present for presentations of clinical cases and participate in discussions of them. Grading is Pass/Fail. *Prerequisite:* permission of instructor.

PSYC 7280 History and Systems of Psychology Cr.Hrs.3 A survey of the major contemporary systems of psychology and their history.

PSYC 7290 Psychopathology and Diagnosis Cr.Hrs.3 Advanced study of abnormal behaviour, diagnostic approaches, and related research. Not to be held with the former PSYC 7870 (017.787). *Prerequisite:* permission of instructor.

PSYC 7310 Current Topics 1 Cr.Hrs.3 (Formerly 017.731) An intensive study of the contemporary research and theory in a selected field of psychology. As the course content will vary from year to year, students may take this course more than once for credit.

PSYC 7320 Foundations of Evidence-Based Treatment Cr.Hrs.3 This course is designed to provide students with both a knowledge/evidence base for the foundations of psychotherapy and practical skills that will prepare them for more advanced learning via supervised work with clients. Not to be held with the former PSYC 8410 (017.841). *Prerequisite:* permission of instructor.

PSYC 7330 Cognitive Development Cr.Hrs.3 You will gain an advanced understanding of core theories and fundamental issues in cognitive development research. You will also gain an in-depth understanding of a particular cognitive developmental research issue of your choice. *Prerequisite:* consent of instructor.

PSYC 7340 Sensory Processes 1 Cr.Hrs.3 (Formerly 017.734) An intensive review of current research and theories in visual processes. Both behavioural and physiological aspects of vision will be considered.

PSYC 7350 Sensory Processes 2 Cr.Hrs.3 (Formerly 017.735) An intensive review of current theories and research in audition, smell, taste, and the cutaneous senses.

PSYC 7360 Perception Cr.Hrs.3 (Formerly 017.736) A survey of theories of perception.

PSYC 7370 Cognitive Processes Cr.Hrs.3 (Formerly 017.737) A study of thinking and related areas.

PSYC 7380 Advanced Research Design Cr.Hrs.3 (Formerly 017.738) The use of randomized subjects, block, factorial, latin square, and repeated measures designs in psychological research is discussed. Ancillary topics considered are unbalanced designs, multiple linear regression, magnitude estimation and simultaneous inference. Students will also use statistical packages to analyze data from psychological experiments. *Prerequisite:* PSYC 8420 (or 017.842) or permission of instructor.

PSYC 7390 Scaling Cr.Hrs.3 (Formerly 017.739) Methods and theory of scaling. Scaling models and issues in current psychophysical research. *Prerequisite:* PSYC 8420 (or 017.842) or permission of instructor.

PSYC 7400 Measurement and Scaling Theory Cr.Hrs.3 (Formerly 017.740) Discussion of measurement theory, data theory, and scaling models. *Prerequisite:* PSYC 7390 (017.739) or permission of instructor.

PSYC 7410 Advanced Psychometric Theory Cr.Hrs.3 (Formerly 017.741) Current theory and research in psychometrics. *Prerequisite:* PSYC 7400 (017.740) or permission of instructor.

PSYC 7420 Multivariate Methods in Psychology Cr.Hrs.3 (Formerly 017.742) Designing and analyzing behavioural science experiments containing multiple dependent (criterion) and independent (predictor) variables is discussed. The use of statistical packages is illustrated. *Prerequisite:* PSYC 8420 (or 017.842) or permission of instructor.

PSYC 7430 Advanced Physiological Psychology Cr.Hrs.3 (Formerly 017.743) The physiological correlates of sensation, perception, learning, motivation, and complex behaviour.

PSYC 7450 Psychology of Group Behaviour Cr.Hrs.3 (Formerly 017.745) An examination of the methodology, results, and interpretations of studies of the structural properties of groups, group formation, leadership, communication, problem-solving, and other group processes.

PSYC 7460 Attitude Development and Change Cr.Hrs.3 (Formerly 017.746) A critical review of research involving attitude measurement, with emphasis on the experimental analysis of variables influencing the formation and modification of attitudes.

PSYC 7470 Advanced Developmental Psychology Cr.Hrs.3 (Formerly 017.747) Theory and research in contemporary developmental psychology.

PSYC 7480 Advanced Learning Cr.Hrs.3 (Formerly 017.748) Current research and literature in selected areas of learning.

PSYC 7500 Bases of Behaviour 1 Cr.Hrs.3 This course will provide students with broad and general knowledge of theory and research in social/multicultural bases of behaviour, lifespan development, and individual differences (including personality and diversity). Preference will be given to clinical students. If space permits, non-clinical psychology students may enroll. *Prerequisite:* permission of instructor.

PSYC 7510 Bases of Behaviour 2 Cr.Hrs.3 This course will provide students with broad and general knowledge of theory and research in biological, and cognitive/affective bases of behaviour, as well as the history and systems of psychology. Preference will be given to clinical students. If space permits, non-clinical psychology students may enroll. *Prerequisite:* permission of instructor.

PSYC 7520 Ethics and Professional Issues in Clinical Psychology Cr.Hrs.3 Study of professional issues in clinical psychology. Historical development and present status of clinical psychology; what defines a profession; ethics codes, standards of practice, and legal requirements; training, internships, and accreditation; professional organizations, registration, and advocacy; employment in public and private sectors. Grading is Pass/Fail. Not to be held with the former PSYC 8070 (017.807). *Prerequisite:* permission of instructor.

PSYC 7530 Research in Psychopathology Cr.Hrs.3 (Formerly 017.753) A survey of the literature and a critical examination of methodological problems arising from studies of psychiatric milieu, psychotherapy, and the epidemiology of mental illness.

PSYC 7540 Theories in Psychotherapy Cr.Hrs.3 (Formerly 017.754) An introduction to current approaches to psychotherapy and their underlying theories.

PSYC 7580 Advanced Motivation Cr.Hrs.3 (Formerly 017.758) Theory and methodology in contemporary studies of motivation.

PSYC 7590 Instrumentation in Psychology Cr.Hrs.3 (Formerly 017.759) Construction and use of psychological laboratory equipment.

PSYC 7610 Psychopharmacology Cr.Hrs.3 (Formerly 017.761) The concepts of neuropharmacology as they explicate drug effects on behaviour. Sedatives, stimulants, tranquilizers, anti-depressants, autonomic drugs will be considered. *Prerequisite:* one course in neuro-anatomy, physiology, or zoology. Some organic chemistry knowledge preferred.

PSYC 7630 Seminar in Social Psychology Cr.Hrs.3 (Formerly 017.763) An examination of current methods, research, and theory in selected topics in the area of experimental social psychology.

PSYC 7640 Seminar in Social Psychology Cr.Hrs.3 (Formerly 017.764) An examination of current methods, research, and theory in selected topics in the area of experimental social psychology.

PSYC 7650 Theory and Research in Personality Cr.Hrs.3 (Formerly 017.765) A lecture and reading course designed to familiarize the student with the concepts and operations associated with various approaches to the study of individual differences and patterns of difference in behaviour; emphasis is placed on research and that function of theory which generates research.

PSYC 7670 Seminar in Personality 1 Cr.Hrs.3 (Formerly 017.767) An intensive examination of the current methods and research arising from the classical theories of personality.

PSYC 7680 Seminar in Personality 2 Cr.Hrs.3 (Formerly 017.768) An examination of individual difference variables suggested by the various personality theories. Particular emphasis will be given to current research and theory.

PSYC 7690 Seminar in Physiological Psychology Cr.Hrs.3 (Formerly 017.769) An examination of significant physiological processes underlying human and animal behaviour. The more recent experimental work on such areas as human brain function and central and autonomic nervous system activity will be considered in their theoretical contexts.

PSYC 7700 Problems in Psychological Research Cr.Hrs.3 (Formerly 017.770) No description available for this course.

PSYC 7710 Problems in Psychological Research Cr.Hrs.3 (Formerly 017.771) No description available for this course.

PSYC 7720 Problems in Psychological Research Cr.Hrs.3 (Formerly 017.772) No description available for this course.

PSYC 7730 Problems in Psychological Research Cr.Hrs.3 (Formerly 017.773) No description available for this course.

PSYC 7740 Problems in Psychological Research Cr.Hrs.3 (Formerly 017.774) No description available for this course.

PSYC 7750 Problems in Psychological Research Cr.Hrs.3 (Formerly 017.775) No description available for this course.

PSYC 7760 Problems in Psychological Research Cr.Hrs.3 (Formerly 017.776) No description available for this course.

PSYC 7770 Problems in Psychological Research Cr.Hrs.3 (Formerly 017.777) No description available for this course.

PSYC 7780 M.A. Thesis Proposal Development Cr.Hrs. Students registering for this course will work under the supervision of their advisor to prepare a complete draft of the M.A. Thesis Research Proposal. Students enrolled in a thesis-based M.A. program in Psychology must register for this course in one of their first four (4) terms of full-time study. The course must culminate in submission of a complete draft of the M.A. Thesis Research Proposal to all members of the thesis advisory committee. This course will be graded on a pass/fail basis as determined by majority opinion of the thesis advisory committee.

PSYC 7790 Ph.D. Dissertation Proposal Development Cr.Hrs. Students registering for this course will work under the supervision of their advisor to prepare a complete draft of the Ph.D. Dissertation Research Proposal. Ph.D. students must register for this course in one of their first eight (8) terms of full-time study. The course must culminate in submission of a complete draft of the Ph.D. Dissertation Research Proposal to all members of the thesis advisory committee. This course will be graded on a pass/fail basis as determined by majority opinion of the thesis advisory committee.

PSYC 7800 Seminar in Quantitative Methods in Psychology 1 Cr.Hrs.3 (Formerly 017.780) Special topics and recent advances in the design and analysis of behavioural science data will be discussed. *Prerequisite:* PSYC 7760 (or 017.776) or permission of instructor.

PSYC 7810 Seminar in Quantitative Methods in Psychology 2 Cr.Hrs.3 (Formerly 017.781) An extension of the material covered in PSYC 7800 (or 017.780) with particular emphasis on quantitative techniques typically employed in such areas as discrimination learning, personality, etc. *Prerequisite:* PSYC 7760 (or 017.776) or

permission of instructor.

PSYC 7880 Seminar in Clinical Problems Cr.Hrs.3 (Formerly 017.788) Discussion and consideration of current problems associated with clinical service, teaching, research, and administration. *Prerequisite:* PSYC 7540 (or 017.754).

PSYC 7890 Seminar in Clinical Problems Cr.Hrs.3 (Formerly 017.789) Discussion and consideration of current problems associated with clinical service, teaching, research, and administration. *Prerequisite:* PSYC 7540 (or 017.754).

PSYC 7900 Foundations of Health Psychology Cr.Hrs.3 For advanced students in psychology seeking specialized expertise in health, this course will review major topics such as the human body, the mind/brain connection, research methods, psychology and health care, terminal illness, pain and chronic disease, stress/coping, and health-related behaviours.

PSYC 7910 Clerkship-Practicum in Clinical Psychology Cr.Hrs.0 (Formerly 017.791) Supervised practice in a clinical service facility operated by the university. Testing, case observation, and role-playing at early levels of training and direct responsibility for working with assigned cases at later levels. *Prerequisite:* consent of instructor.

PSYC 7920 Clerkship-Practicum in Clinical Psychology Cr.Hrs.0 (Formerly 017.792) Supervised practice in a clinical service facility operated by the university. Testing, case observation, and role-playing at early levels of training and direct responsibility for working with assigned cases at later levels. *Prerequisite:* consent of instructor.

PSYC 7930 Clerkship-Practicum in Clinical Psychology Cr.Hrs.0 (Formerly 017.793) Supervised practice in a clinical service facility operated by the university. Testing, case observation, and role-playing at early levels of training and direct responsibility for working with assigned cases at later levels. *Prerequisite:* consent of instructor.

PSYC 7940 Clerkship-Practicum in Clinical Psychology Cr.Hrs.0 (Formerly 017.794) Supervised practice in a clinical service facility operated by the university. Testing, case observation, and role-playing at early levels of training and direct responsibility for working with assigned cases at later levels. *Prerequisite:* consent of instructor.

PSYC 7950 Clerkship-Practicum in Clinical Psychology Cr.Hrs.0 (Formerly 017.795) Supervised practice in a clinical service facility operated by the university. Testing, case observation, and role-playing at early levels of training and direct responsibility for working with assigned cases at later levels. *Prerequisite:* consent of instructor.

PSYC 7970 Internship in Clinical Psychology Cr.Hrs.0 (Formerly 017.797) Supervised practice in a clinical setting outside the university involving more responsible, more autonomous, and more professional work than is present in either clerkship or practicum. *Prerequisite:* four terms of PSYC 7910 (or 017.791) - PSYC 7950 (or 017.795).

PSYC 7980 Internship in Clinical Psychology Cr.Hrs.0 (Formerly 017.798) Supervised practice in a clinical setting outside the university involving more responsible, more autonomous, and more professional work than is present in either clerkship or practicum. *Prerequisite:* four terms of PSYC 7910 (or 017.791) - PSYC 7950 (or 017.795).

PSYC 7990 The Psychology of Language Cr.Hrs.3 (Formerly 017.799) Examination of recent advances in the study of human language use. Topics such as memory for meaning, language development and language comprehension will emphasize the interactions between modern cognitive psychology and linguistics.

PSYC 8010 Intergroup Behaviour Cr.Hrs.3 (Formerly 017.801) An investigation of intergroup processes, with particular emphasis on intergroup conflicts and the role of leadership in affecting these processes. Large social movements will receive particular attention.

PSYC 8020 Theory and Methods in Social Psychology Cr.Hrs.3 (Formerly 017.802) The presentation of a number of broad theoretical overviews in social psychology and an introduction on the graduate level to the particular methodological problems encountered in social psychological research.

PSYC 8030 Organizational Psychology Cr.Hrs.3 (Formerly 017.803) Group and individual factors as related to understanding complex organizations.

PSYC 8040 Psychology of Aging Cr.Hrs.3 (Formerly 017.804) An intensive review of current research and theory. Biological, psychological, and social aspects of aging are related to each other.

PSYC 8050 Human Brain Functions Cr.Hrs.3 (Formerly 017.805) The physiological basis of human cognitive processes is discussed from various perspectives. Different theories and different research strategies are discussed critically.

PSYC 8060 Advanced Adolescent Development Cr.Hrs.3 (Formerly 017.806) A critical evaluation of current theory and research in adolescent development. Topics covered include cognitive social development, self-concepts, sex roles, family relationships, etc.

PSYC 8080 Case Conceptualization and Communication 3 Cr.Hrs.3 In this course students will learn the theory and practice of case conceptualization and communication. Students will prepare and present clinical cases using well-defined models of treatment and case formulation strategies. *Prerequisite:* permission of instructor.

PSYC 8090 Clinical Supervision in Psychology Cr.Hrs.3 This course will review the major models, ethical issues, and recommended strategies and practices of clinical supervision. Learning modalities will include discussion of readings, role-playing, and supervised supervision of student clinicians. Pass/Fail course. *Prerequisite:* permission of instructor.

PSYC 8100 Social and Community Intervention Cr.Hrs.3 A general introduction to community psychology and community mental health. Historical, conceptual, and

philosophical underpinnings of community psychology and community mental health; community assessment and intervention; alternative approaches to contemporary social problems; understanding social policy and the role of the public sector; community research methods. Not to be held with the former PSYC 8170 (017.817). *Prerequisite:* permission of instructor.

PSYC 8110 Program Evaluation and Consultation Cr.Hrs.3 An overview of program evaluation and consultation as major areas of applied psychological practice; analysis of contemporary social and health problems; development, implementation, and evaluation of human service programs; understanding human service organizations; the role of consultant and common types of consultation; ethical issues in program evaluation and consultation. Not to be held with the former PSYC 8180 (017.818). *Prerequisite:* permission of instructor.

PSYC 8120 Current Topics 2 Cr.Hrs.3 (Formerly 017.812) An intensive survey of the contemporary research and theory in a selected field of psychology. As the course content will vary from year to year, students may take this course more than once for credit.

PSYC 8130 Principles of Ethology Cr.Hrs.3 (Formerly 017.813) A critical examination of the principles and the current research in ethology. The methods used by ethologists to study organisms will be reviewed. Discussion of the behaviour of organisms in zoological parks. An ethogram on an animal of the student's choice located at Assiniboine Park Zoo will be required.

PSYC 8140 Seminar in Ethology Cr.Hrs.3 (Formerly 017.814) An intensive examination of the research relating to various topics of ethology. Articles relating to the schools of thought, conflicting viewpoints, synthesis of thought, and present orientation of these topics will be discussed.

PSYC 8150 Personality and Intellectual Assessment 1 Cr.Hrs.3 (Formerly 017.815) Introduction to the theory and practice of psychological evaluation with emphasis on administration and interpretation of individual intelligence tests and some objective personality tests. Preference given to clinical students. If space permits, non-clinical psychology students may enroll. *Prerequisite:* consent of instructor.

PSYC 8160 Personality and Intellectual Assessment 2 Cr.Hrs.3 (Formerly 017.816) Examination of projective and other personality tests and their use for investigating diagnostic problems in adults and children, and an evaluation of theory, research, and practice in this area. Preference given to clinical students. If space permits, non-clinical psychology students may enroll. *Prerequisite:* PSYC 8150 (or 017.815) and/or consent of instructor.

PSYC 8200 Development and Its Deviations 1 Cr.Hrs.3 (Formerly 017.820) Developmental deviations will be related to such factors as genetic influences, physiological development, early experiences, language, intellectual and mental abilities, social and ethnic influences, parent-child interactions, and peer group interactions. Methods of special treatment will be considered.

PSYC 8210 Development and Its Deviations 2 Cr.Hrs.3 (Formerly 017.821) A continuation of PSYC 8200 (or 017.820). It will focus on developmental processes during later childhood and adolescence emphasizing concurrently the range and significance of deviations from normal behaviour and conditions contributing to these problems. Methods of special treatment will also be considered. *Prerequisite:* PSYC 8200 (or 017.820).

PSYC 8220 Topics in Abnormal Psychology Cr.Hrs.3 (Formerly 017.822) An in-depth study of various areas in the field of psychopathology.

PSYC 8230 Clinical Neuropsychology Cr.Hrs.3 (Formerly 017.823) The understanding and evaluation of cognitive, sensory, and motor functions as they relate to cerebral dysfunction.

PSYC 8240 Seminar in Behaviour Modification Cr.Hrs.3 (Formerly 017.824) This seminar deals with a variety of specific topics in behaviour modification.

PSYC 8250 Practical Applications of Behaviour Modification Cr.Hrs.3 (Formerly 017.825) This course deals with the design, implementation, and evaluation of program packages, based on behaviour modification, to different population and problem areas.

PSYC 8260 Individual Organism Research Methodology Cr.Hrs.3 (Formerly 017.826) An extensive coverage of the methods by which behaviour can be studied in individual organisms, including the rationale for the use of such methods as opposed to methods involving the averaging of group data.

PSYC 8270 Seminar in Basic Operant Research Cr.Hrs.3 (Formerly 017.827) This seminar deals with selected topics in basic operant research.

PSYC 8280 Supervised Field Study in Behaviour Modification 1 Cr.Hrs.3 (Formerly 017.828) Supervised training will take place in a service facility typically located off the University campus. Students will work closely with a supervisor in assessing a problem, designing and executing an intervention program and conducting a follow-up. *Prerequisite:* permission of the instructor.

PSYC 8290 Supervised Field Study in Behaviour Modification 2 Cr.Hrs.3 (Formerly 017.829) Supervised training will take place in a service facility typically located off the University campus. Students will work closely with a supervisor in assessing a problem, designing and executing an appropriate intervention program and conducting a follow up. *Prerequisite:* permission of the instructor.

PSYC 8300 Behavioural Assessment Cr.Hrs.3 (Formerly 017.830) This course teaches students how to conduct behavioural assessment as a necessary feature of the three interrelated processes of problem identification, program design and outcome evaluation in the application of behaviour modification techniques. *Prerequisite:* permission of the instructor.

PSYC 8330 Family Therapy Seminar Cr.Hrs.3 (Formerly 017.833) This course deals with both family theory and practice by reviewing the current literature on family systems and providing case discussions, peer supervision and small group simulated tasks. Corequisite: current enrolment in PSYC 7910 (or 017.791) - PSYC 7950 (or 017.795) or GRAD 7030 (or 069.703) or permission of the instructor.

PSYC 8340 Cognitive Behaviour Modification Cr.Hrs.3 (Formerly 017.834) An overview of the empirical and theoretical status of cognitive events and their role in behaviour change will be undertaken. The techniques of cognitive behaviour modification as applied to various problem behaviours will be surveyed and evaluated. *Prerequisite:* written consent of the instructor.

PSYC 8350 Developmental Psychobiology Cr.Hrs.3 (Formerly 017.835) An examination of environmental and biological influences on development. Models and studies of animal and human behaviour are considered. Topics may include, for example, biological constraints on development, early experience effects, the ontogeny of learning and memory, and physiological substrates of ontogenetic changes.

PSYC 8360 Research Methods in Developmental Psychology Cr.Hrs.3 (Formerly 017.836) A survey of concepts, strategies, and methods in the study of behavioural development, with emphasis on the problems encountered in the measurement of age-related change in humans.

PSYC 8370 Logic of Research Design Cr.Hrs.3 (Formerly 017.837) A survey of non-statistical issues in research design, focusing on precise formulation of research questions and implication for research design. Design problems from various psychological areas are solved by students in the laboratory the purpose being to strengthen critical ability and to identify commonalities across areas in methodological approach. Broader philosophical issues relevant to research design, such as the meaning of causality, are also addressed. *Prerequisite:* PSYC 8420 (or 017.842) or permission of instructor.

PSYC 8380 History and Theory in Developmental Psychology Cr.Hrs.3 (Formerly 017.838) A history of fundamental concepts in developmental psychology with consideration of important philosophical, theoretical, and empirical influences on the contemporary field.

PSYC 8400 Behaviour Therapy Cr.Hrs.3 (Formerly 017.840) The theory and practice of utilizing learning principles in behaviour change will be explained and exemplified. Goals of the class are for students to recognize that behaviour therapy is dynamic and to learn the mechanics of including behaviour therapy in work with patients. Students may not hold credit for PSYC 8400 (or 017.840) and the former 017.782, 017.783 and 017.784.

Section 71: Public Administration

Head: George MacLean

General Office: 532 Fletcher Argue

Telephone: (204) 474 9733

Fax: (204) 474 7585

E-mail: Political_Studies@UManitoba.CA

Website: umanitoba.ca/faculties/arts/political_studies

Program Chair: Marek Debicki

Department of Political Studies

Telephone: (204) 474-8196

Fax: (204) 474-7585

Email: mdebick@cc.umanitoba.ca

Academic Staff

Duff Roblin Professorship of Government

Thomas, P.G., B.A. (Hons.), M.A. (Manitoba), Ph.D. (Toronto).

Senior Scholars

Lambert, G., B.A. (Hons.) (Manchester), M.A., Ph.D. (Minnesota); Neville, W.F.W., B.A. (Hons.) (Manitoba), M.A. (Oxford); Peterson, T.E., B.A., M.A. (Manitoba).

Professors

Debicki, M., LL.M. (Warsaw), Ph.D. (Carleton); Leo, C., B.A. (Wartburg), M.A., Ph.D. (Toronto); Silver, J.B., B. Comm. (Manitoba), B.A. (Hons.) (Winnipeg), M.A. (Carleton), D.Phil. (Sussex); Thomas, P.G., B.A. (Hons.), M.A. (Manitoba), Ph.D. (Toronto).

Associate Professors

Gibbons, K., A.B. (Marshall), M.A. (Western Ontario), Ph.D. (Carleton); Grace, J., B.A. (Hons.), (Victoria), M.P.A. (Manitoba/Winnipeg), Ph.D. (McMaster); Ladner, K., B.A. (Calgary), M.A. (Saskatchewan), M.A., Ph.D. (Carleton), Canada Research Chair; Ogrodnick, M., B.A. (Alberta), M.A. (Alberta), Ph.D. (York).

Assistant Professors

DeRiviere, L., B.A., M.A., Ph.D.(Manitoba); **Lecce, S.A.** B.A.(Toronto), M.A., Ph.D.(Western); **MacDonald, F.**, B.A.(Brandon), B.S.W.(Calgary), M.A.(Simon Fraser), Ph.D.(UBC); **Sampert, S.**, B.A., (Edmonton), M.A. (Calgary), Ph.D. (Edmonton); **Wesley, J.J.**, B.A.(Hons)(Alberta), M.A. (Manitoba), Ph.D.(Calgary).

Program Information

This master's program is offered jointly by the Department of Politics at the University of Winnipeg and the Department of Political Studies of the University of Manitoba. Unless otherwise specified by particular agreements attached to its own creation, it is governed by the general procedures and regulations devised by the two universities for joint master's programs.

The objective of the program is to provide students, both full and part-time, with a sound knowledge of public administration. The approach is interdisciplinary; although courses in Politics/Political Studies are emphasized. The core exposes all students to a common set of courses designed to encourage both innovative and integrative perspectives. The public administration emphasis allows those interested students to obtain knowledge of both the theory and the practice of government organizations, including knowledge of the political, economic, social and other contexts in which they operate.

Master of Public Administration

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, applicants for admission to the program must be one of the following:

Persons holding a recognized three- or four-year General or Advanced Bachelors degree (B.A., B.Sc., B.E.S., etc.)

or

Persons holding a recognized four-year honours Bachelor's degree (or equivalent)

or

Persons who do not hold an undergraduate degree, but have attained positions of marked responsibility in either public or private sector management, and who have a demonstrated record of outstanding performance in their career. Admissions in this category will normally be restricted to one or two students per academic year.

It is preferred, but not required, that applicants have some formal course background in public administration, political science or economics. Students from other disciplines are also encouraged to apply.

Application Deadline

Department deadline for applications for Regular Session is January 15

Contact the department for additional application procedures.

Program Requirements

Two-Year MPA Program

Students who are admitted as graduates of a general bachelor's degree program or who are admitted as exceptional candidates not holding an undergraduate degree are required to satisfactorily complete an academic program consisting of a minimum of 48 credit hours. Within the 48 credit hours, 27 hours of credit must be taken from among the Core Courses and a further 21 hours of credit from among the approved options. All students must complete up to 18 hours of credit at the 700/7000 level, including the 700/7000 level core courses. A student may elect, with permission, to write a Master's thesis in lieu of 12 credit hours of 700/7000 level option coursework.

One-Year MPA Program

Students who are admitted as graduates of an Honours bachelor's degree (or equivalent) are required to satisfactorily complete an academic program consisting of a minimum of 24 credit hours. Students who, prior to admission, have not completed 24 credit hours in courses equivalent to those designated as 400/4000 level Core Courses, or have not completed appropriate option course equivalents, will normally be required to complete the appropriate course(s) in addition to the 24 credit hour program minimum. All students must complete up to 18 hours of credit at the 700/7000 level, including the 700/7000 level core courses. A student may elect, with permission, to write a Master's thesis in lieu of 12 credit hours of 700/7000 level option course work.

Co-op Education Option in Public Administration

The Co-operative Education Option in the Master of Public Administration program combines full-time academic study with the benefits of practical work experience, largely in the public sector. A full-time student who has completed one academic year in good academic standing will be eligible to engage in full-time employment. The program requires the successful completion of two work-terms of 13 weeks each. The work terms provide students with practical experience, enriched knowledge in an area of policy specialization, industry-standard remuneration, and guidance in career choices.

Students engaged in full-time study in the M.P.A. program are eligible to apply for the full-time co-operative education option on satisfactory completion of their first year of full-time M.P.A. studies (24 credit hours). The co-op option consists of two 13-week work terms which can be taken consecutively or separately. Each work term carries three hours of course credit and each must be satisfactorily completed as part of the co-op option. Co-op credits do not replace academic credits, thus students in the two-year M.P.A. program with a co-op option must therefore complete a minimum of 54 credit hours as part of their degree requirements. Students in the one-year M.P.A. program with a co-op option must complete a minimum of 30 credit hours as part of their degree requirements. Students intending to apply for the M.P.A. co-op option should read the detailed option description below.

Application and Eligibility

Application for the Co-operative Education Option in the Master of Public Administration (M.P.A.) program is part of the normal application process for the M.P.A. program as a whole. The Co-operative Education Option is restricted to those who apply for full-time study in the M.P.A. Students who are accepted into the M.P.A. with a co-operative option must, in their first academic year, successfully complete required non-credit courses in addition to their full-time academic course load.

Work Terms and Continuance

On entry to the M.P.A. program, applicants accepted for the co-op option must arrange their program with the director of co-operative education in the MPA program and take part in a competitive job-matching process conducted in an Employers' Forum. Students who are eligible for co-op, but who are not matched with a co-op work term, will be able to continue in the regular M.P.A. program. Co-op students who have successfully completed one full academic year of coursework, and the required non-credit courses, and who have satisfied the M.P.A. requirements for continuation in the program, will be eligible to engage in their first work term placement. They must also complete relevant workshops, etc. to maintain co-op eligibility.

Each work term is 13 weeks duration and each work term carries three hours of course credit for which registration is required. Co-op students are considered to have full-time student status while engaged in a work term placement. Co-op students must successfully complete two work terms in addition to their academic program. Work terms are evaluated in terms of job performance and assigned written work (project or practicum). The final grade for each work term will employ the GPA scale which is used by the M.P.A. program. The course and grade requirements (B average overall and no course less than C+) for the co-operative education option are those which govern the M.P.A. program as a whole. If a co-op student fails to maintain these requirements, s/he will be permitted one make-up work term attempt. If a student fails to meet the requirements on the make-up attempt, s/he will be required to withdraw from the M.P.A. program.

Co-op Education Work Term Courses

Students in the co-operative education option must complete six credit hours:

POLS 6500 Co-operative Education Work 1 Cr.Hrs.3 (Formerly 019.650) This credit is granted to full time registered students in the Master of Public Administration who have registered in the co-op option of the program. Eligible candidates must have attended two mandatory workshops and completed a minimum 24 credit hours of course work prior to the first work term placement. Work terms are paid positions by employers primarily in the public sector. Work terms are a minimum of 13 weeks.

POLS 6510 Co-operative Education Work 2 Cr.Hrs.3 (Formerly 019.651) This credit is granted to full time registered students in the Master of Public Administration who have registered in the co-op option of the program. Eligible candidates must maintain full time status and have attended two mandatory workshops, completed a minimum 24 to a maximum of 48 credit hours of course work, and successfully completed a first work term prior to the second work term placement. Work terms are paid positions by employers primarily in the public sector. Work terms are a minimum of 13 weeks.

POLS 6520 Co-operative Education Work 3 Cr.Hrs.3

Course Descriptions

Core Courses (27 credit hours)

Students must take:

POLS 3950 Research Methods in the Study of Politics Cr.Hrs.3 (Formerly 019.395) An introduction to the major quantitative and qualitative research strategies employed in the study of politics. The topics addressed include interviewing, content analysis, comparative studies, survey design, sampling, research ethics and basic statistical analysis. Students may not hold credit for both POLS 3950 (or 019.395) and the former 019.390. *Prerequisite:* a grade of "C" or better in six credit hours of Political Studies at the 2000 level or written consent of instructor or department head.

POLS 9010 / 41.4301 Administrative Theory Cr.Hrs.6 (Formerly 019.901) See University of Winnipeg Calendar for description.

In addition, students must take six credit hours from:

POLS 9150 / 14.3303 Economics of Public Expenditures Cr.Hrs.3 (Formerly 018.915) See University of Winnipeg Calendar for description.

POLS 9160 / 14.3304 Economic Taxation Cr.Hrs.3 (Formerly 018.916) See University of Winnipeg Calendar for description.

ECON 3370 Public Finance Cr.Hrs.6 (Formerly 018.337) The economic theory of public expenditure, taxation, intergovernmental fiscal relations, and allocative and redistributive effects of government policies. *Prerequisite:* a grade of "C" or better in one of: ECON 2450 (or 018.245), ECON 2451 (or 018.245) or ECON 2700 (or 018.270).

POLS 4660 The State in the Economy Cr.Hrs.6 (Formerly 019.466) Drawing from literature in Canadian political economy, this course will examine historical and contemporary patterns and forms of Canadian state involvement in the economy. Both federal and provincial contexts will be studied and selected areas of current interest, such as the role of crown corporations and industrial policy, will be emphasized. *Prerequisite:* written consent of instructor or department head.

POLS 9030 / 41.4415 The State and the Economy Cr.Hrs.6 (Formerly 019.903) See University of Winnipeg Calendar for description.

Plus six credit hours from:

POLS 4860 The Canadian Policy Process Cr.Hrs.6 (Formerly 019.486) This course will examine a number of conceptual frameworks for the analysis of the policy process, will analyze the role of different institutions and actors in the policy process, and will appraise current government responses to problems within Canadian society. *Prerequisite:* written consent of instructor or department head.

POLS 9370 / 41.7320 Seminar in the Public Policy Process Cr.Hrs.3 (Formerly 019.937) See University of Winnipeg Calendar for description.

POLS 9380 / 41.7325 Seminar in Public Policy Issues Cr.Hrs.3 (Formerly 019.938) See University of Winnipeg Calendar for description.

and six credit hours from:

POLS 7370 Seminar in the Theory and Practice of Public Administration Cr.Hrs.6 (Formerly 019.737) The intent of this course is to provide insight into the exigencies of actual public administration. The course will be conducted on a topical basis within the framework of certain trends facing Canadian governments today. (The course will attempt to utilize, to the fullest extent possible, the particular expertise of students in the program, faculty members, and of both elected and appointed public officials.) Students may not hold credit for both POLS 7370 (or 019.737) and the former 019.731.

POLS 7770 Seminar in Public Administration Cr.Hrs.6 (Formerly 019.777) An inquiry into the relationship between politics and administration, including regulatory public administration, the process of bureaucratization, and the interplay of administrative authority, responsibility, and accountability.

POLS 9340 / 41.7300 Seminar in Theory and Practice of Public Administration 1 Cr.Hrs.3 (Formerly 019.934) See University of Winnipeg Calendar for description.

POLS 9350 / 41.7305 Seminar in Theory and Practice of Public Administration 2 Cr.Hrs.3 (Formerly 019.935) See University of Winnipeg Calendar for description.

Further Optional Coursework

With the approval of the chair of the JDC, and other approval as may be required, courses may be chosen from the following list or from, for example, designated offerings in Economics, Geography, Management, Psychology, Sociology, etc.

POLS 4150 Indigenous Governance Cr. Hrs.3 An examination of Indigenous governance before and since the "European invasion" which introduces key themes, debates and controversies pertaining to Indigenous governance and its study. Students may not hold credit for both POLS 4150 and POLS 4160 (019.416) when offered with the topic "Indigenous Governance." *Prerequisite:* written consent of instructor or department head.

POLS 4180 Provincial Politics in Canada Cr.Hrs.3 (Formerly 019.418) The course focuses on politics at the provincial level in Canada and on the politics of the regions: Atlantic, Quebec, Ontario, the West and BC. Emphasis is on a comparison of political cultures, governments, budgets, parties, elections, and political change across the regions. *Prerequisite:* written consent of instructor or department head.

POLS 4190 Manitoba Politics and Government Cr.Hrs.3 (Formerly 019.419) An examination of politics and government in modern Manitoba. Topics addressed include

federal-provincial relations, parties and elections, political culture, the legislative process and public policy. Students may not hold credit for both POLS 4190 (or 019.419) and the former 019.476. *Prerequisite:* written consent of instructor or department head.

POLS 4370 Comparative Public Administration Cr. Hrs.3 A study of the systems, processes, and values of public administration in an international comparative context. Topics include public sector organization and reform, international standards of policy and practice, and the role of international institutions in promoting public sector modernization. The course covers countries from several geographic zones and places domestic issues in the larger, global political economy. *Prerequisite:* written consent of instructor or department head.

POLS 4470 Managing Modern Government Cr. Hrs.3 A study of the skills required to effectively manage in the public sector. Topics covered include: managerial effectiveness, written and interpersonal communication, gaining power and influence, working with political staff and politicians, conflict management, risk management, performance management, creating and working through teams, decision-making, motivation, and empowerment. Student may not hold credit for both POLS 4470 and the former POLS 4570 (019.457). *Prerequisite:* written consent of instructor or department head.

POLS 6010 The Manitoba Legislative Internship Seminar Cr.Hrs.6 (Formerly 019.601) This credit is granted to six individuals who annually complete the assignment as Legislative Interns within the Manitoba Legislative Assembly.

POLS 7290 Directed Readings in Politics 2 Cr.Hrs.6 (Formerly 019.729) An independent reading and/or research course on a selected topic undertaken and arranged in consultation with the prospective instructor, upon approval of the Graduate Committee.

POLS 7300 Directed Readings in Public Administration Cr.Hrs.3 (Formerly 019.730) An independent reading and/or research course on a selected topic undertaken and arranged in consultation with the prospective instructor, upon approval of the Graduate Committee.

POLS 7340 Canadian Government Cr.Hrs.3 (Formerly 019.734) Examines the core institutions of Canadian Government and politics including parliamentary government, federalism, the Constitution and the Charter of Rights and Freedoms. Students may not hold credit for both POLS 7340 (or 019.734) and the former 019.776.

POLS 7350 Canadian Democracy Cr.Hrs.3 (Formerly 019.735) Examines the core institutions and processes of Canadian democracy including political parties, elections, voting, social movements, interest groups and public opinion. Students may not hold credit for both POLS 7350 (or 019.735) and the former 019.776.

POLS 7470 Strategic Human Resource Management in Government Cr. Hrs 3 A study of the human resource management functions, including planning, staffing, training, performance management, compensation and labour relations, in ways that optimize organizational performance. The course will also address contemporary challenges including recruitment and retention, managing change, demographic shifts, and information technology.

POLS 7550 Contemporary Issues in Canadian Politics Cr.Hrs.3 (Formerly 019.755) A seminar series examining a contemporary debate in Canadian politics and government. The specific topic will vary from year to year depending on faculty interest and specialization.

POLS 7610 Political Theory and Contemporary Issues Cr.Hrs.3 (Formerly 019.761) An examination of recent theoretical perspectives on contemporary political institutions, problems and values. Students may not hold credit for both POLS 7610 (or 019.761) and the former 019.771.

POLS 7720 Comparative Government Cr.Hrs.6 (Formerly 019.772) Three hours a week, both terms. The primary focus of this course will be on the major Western "democracies" (e.g., United Kingdom, United States, and Western Europe). Phenomena to be examined include political participation and the problems of social change in industrial societies.

POLS 7910 Multivariate Research Methods Cr.Hrs.3 (Formerly 019.791) Introduction to the theory and application of multivariate regression models in political analysis. Students may not hold credit for POLS 7910 (or 019.791) and either the former 019.732 or 019.788.

POLS 9270 / 41.4305 Administrative Law Cr.Hrs.3 (Formerly 019.927) See University of Winnipeg Calendar for description.

POLS 9600 / 41.4310 Equity in Human Resources Cr.Hrs.6 (Formerly 019.960) See University of Winnipeg Calendar for description.

POLS 9020 / 41.4400 Seminar in Canadian Politics Cr.Hrs.6 (Formerly 019.902) See University of Winnipeg Calendar for description.

POLS 9240 / 41.4405 Seminar in Manitoba Politics Cr.Hrs.6 (Formerly 019.924) See University of Winnipeg Calendar for description.

POLS 9230 / 41.4410 Seminar in Women in Politics Cr.Hrs.3 (Formerly 019.923) See University of Winnipeg Calendar for description.

POLS 9020 / 41.4440 Seminar in Aboriginal Politics Cr.Hrs.6 (Formerly 019.902) See University of Winnipeg Calendar for description.

POLS 9090 / 41.7331 Directed Readings in Public Administration Cr.Hrs.6 (Formerly 019.909) See University of Winnipeg Calendar for description.

POLS 9470 / 41.7335 Directed Readings in Public Administration Cr.Hrs.3 (Formerly 019.947) See University of Winnipeg Calendar for description.

POLS 9200 / 41.7310 Special Topics Seminar in Public Administration Cr.Hrs.6 (Formerly 019.920) See University of Winnipeg Calendar for description.

POLS 9510 / 41.7315 Special Topics Seminar in Public Administration Cr.Hrs.3 (Formerly 019.951) See University of Winnipeg Calendar for description.

*a student may elect, with permission to write a Master's thesis in lieu of 12 credit hours of 700/7000 level coursework.

Ph.D.

Public Administration does not offer a Ph.D. Program

Section 72: Religion

Acting Head: Ian Whicher
General Office: 328 Fletcher Argue
Telephone: (204) 474 9516
Fax: (204) 474 7601
E-Mail: Rose_Fiorillo@umanitoba.ca
Website: umanitoba.ca/arts/religion/
Graduate Program Assistant: Rose Fiorillo

Academic Staff

Distinguished Professor Emeritus

Klostermaier, K.K., Dr. Phil. (Gregorian, Rome), Ph.D. (Bombay).

Distinguished Professor

McCance, D., B.Sc., M.A., Ph.D. (Manitoba).

Senior Scholar

Grislis, E., B.A.(Gettysburg), B.D. (Lutheran Theological Seminary, Gettysburg), Ph.D. (Yale), Dr.(h.c.) (Latvia), D.D. (h.c.) (St. John's College).

Associate Professors

Whicher, I., B.A. (Queen's), M.A. (Concordia), Ph.D. (Cambridge); **MacKendrick, K.**, B.A. (Hons.) (Windsor), M.A., Ph.D.(Toronto).

Assistant Professors

Alexandrin, E., B.A. (Boston), M.A.(Toronto), Ph.D.(McGill); **Drewes, D.**, B.A.(Lawrence), M.A., Ph.D.(Virginia), **Lewis J. J.**, B.A., M.A., Ph.D. (Toronto), **Marx-Wolf, H.**, B.A. (Calgary), Ph.D. (Pennsylvania), Ph.D. (California at Santa Barbara).

Instructor

Cantelo, B., B.A., M.A., Ph.D. (Manitoba)

Program Information

Introduction

The Department of Religion offers both an M.A. and a Ph.D. The M.A. is offered as a Joint Program in co-operation with the Department of Religious Studies at the University of Winnipeg. The Ph.D. is offered solely by the Department of Religion, University of Manitoba.

These highly successful programs have graduated students in Biblical studies, history of Christianity, world religions, Asian religions, Islam, women and religion, hermeneutics, critical theory and other religion and culture fields.

Fields of Research

Research interests of the department include: world religions; Bible, Christian Origins, Judaism; Islam; Buddhism; Hinduism; religions and cultures of Western antiquity; medieval; Christianity and culture; ethics; methodology; body history; hermeneutics; critical theory.

Research Facilities

Department programs are supported by substantial library holdings. Required research languages are offered either through the Department or through affiliated units. Research space and computer resources are available on a limited basis.

M.A. in Religion

Admission

The Department of Religion at the University of Manitoba and the Department of Religious Studies at the University of Winnipeg offer a joint Master of Arts program. Eligible for admission are graduates of the University of Manitoba holding a B. A. (Honours) degree in Religion; graduates of the University of Winnipeg holding a B.A. (four-year) in Religious Studies; students who hold degrees equivalent to the B.A. (Honours) in Religion from other recognized universities or colleges; students who have completed a recognized pre-Master's program in Religion. Students who have courses with equivalent content or cognate courses in recognized departments or

faculties other than Religion or Religious Studies may be given credit for up to 12 credit hours towards admission. To be eligible for admission, applicants must have achieved a cumulative grade point average of at least 3.0 (on a 4.0 point scale) in their last 60 credit hours of study and they must have completed a total of 60 credit hours in Religion. Breadth in preparation is expected as indicated by the description of the B.A. (Honours) in Religion in the University of Manitoba Undergraduate Calendar, or the four-year B.A. in Religious Studies in the University of Winnipeg Calendar. Applications will be considered from B.A. (Honours) graduates in other disciplines with a strong background in Religion. Such students may be admitted at the pre-Master's level and required to complete a program of study as specified by the department. Applicants are also to submit a representative sample of written academic work, and two letters of references. Contact the Department of Religion for further information.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students completing the Joint M.A. Program in Religion may elect to receive their degrees from either of the participating universities. Two types of program are available:

Thesis Option: minimum of 12 credit hours of coursework including:

- Major courses: a minimum of six credit hours at the 7000 level;
- Ancillary courses: a minimum of six credit hours at the 7000, 4000(UM)/5000(UW), or in special cases, at the 3000(UM)/ 3000(UW) level.

Course and Comprehensive Option: a minimum of 24 credit hours beyond the level required for admission to the M.A., with at least 6 credit hours to be ordinarily taken from each of the two departments involved in the JMP in Religion, at least 18 credit hours to be taken at the 7000 level, and at least 18 credit hours to be in Religion. Students may take 6 credit hours at the 4000(UM)/5000(UW) level or in exceptional circumstances at the 3000 level, and this is usually chosen from an extra-departmental field or ancillary. Students can, however, elect to take all 24 credit hours from within the two departments of the JMP in Religion. Students must demonstrate competence in Western religions, world religions and religion and culture, with one of these areas to be designated the major area from which graduate courses amounting to 12 credit hours are normally chosen. The other two are designated as minor areas, and usually a student will take graduate courses amounting to 6 credit hours in each of these areas. An Ancillary may be substituted for one of the minor areas of study.

Students must have 6 credit hours in Methodology from a recognized university or college. A student who does not have this training in methodology will be required to take either RLG 4770 Method and Theory in the Study and Interpretation of Religion UM, or 47.5000-1 Method and Theory in the Study of Religion UW or RLG 4510 and RLG 4520 Hermeneutics Western Traditions and Hermeneutics Eastern Traditions UM, in addition to normal credit hours required for their program.

Second Language Reading Requirement: Yes

Expected Time to Graduate: two years

Ph.D. in Religion

The Department of Religion of the University of Manitoba offers a Ph.D. program in the following areas: world religions; Bible, Christian Origins, Judaism; Islam; Buddhism; Hinduism; religions and cultures of Western antiquity; medieval; Christianity and culture; ethics; methodology; body history; hermeneutics; critical theory.

Admission

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Normally a thesis based M.A. in Religion (with a minimum cumulative GPA of 3.5) or its equivalent will be required for entry into the Ph.D. program. Applicants must have previously obtained at least 6 credit hours of training in methodology (3 credit hours in methodology for the study of Eastern Religions and 3 credit hours in methodology for the study of Western Religions). Applications should include a statement of intent, a representative sample of written academic work, and two letters of references. Contact the Department of Religion for further information.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the department at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the department at least 7 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students accepted into the program will be required to complete a minimum of 18 credit hours of coursework at the 7000 level. Students must be able to demonstrate not only proficiency in written and spoken English but also a reading knowledge of two other research languages, determined by the advisory committee according to the program of studies.

Before submitting their thesis proposal students will be required to demonstrate competence in the primary research language(s) specified by their thesis advisor.

Second language requirement: yes

Expected time to graduation: approximately 4 years

Course Descriptions

RLGN 7130 Seminar in Hinduism Cr.Hrs.3 An advanced study of select aspects of the Hindu tradition.

RLGN 7140 Seminar in Buddhism Cr.Hrs.3 An advanced study of select aspects of the Buddhist tradition.

RLGN 7150 Seminar in Islam Cr.Hrs.3 An advanced seminar in the study of Islam.

RLGN 7160 Seminar in Judaism Cr.Hrs.3 An advanced seminar in the study of Judaism.

RLGN 7170 Seminar in Formative Christianity Cr.Hrs.3 Advanced studies in selected aspects of formative Christianity.

RLGN 7180 Seminar in Early Modern, Modern and Contemporary Christianity Cr.Hrs.3 Advanced studies in developments of Western Christianity since 1500.

RLGN 7190 Seminar in Religion and Philosophy Cr.Hrs.3 Examination of the relation between religion and philosophy through selected figures and themes.

RLGN 7200 Seminar in Religion and Psychology Cr.Hrs.3 Examination of selected developments in psychology and religion and/or in psychoanalysis and the study of religion.

RLGN 7210 Studies in Religious Concepts and Practices Cr.Hrs.3 Advanced study of selected religious concepts and practices topics.

RLGN 7220 Seminar in Religions and Historiography Cr.Hrs.3 Advanced studies in the interactions among specific religious traditions, ideologies and historiography.

RLGN 7230 Thesis Seminar Cr.Hrs.3 Exploration of a range of academic writing techniques and of their theoretical aspects.

RLGN 7240 Textual Studies in Original Languages Cr.Hrs.3 Close study of primary texts in their original languages.

RLGN 7250 Research Seminar Cr.Hrs.3 Study of selected theoretical and methodological issues in the study of religion.

RLGN 7270 Seminar in Christianity Cr.Hrs.3 Critical study or selected historical and/or theoretical issues in selected periods of Christianity.

RLGN 7300 Seminar in Religion and Culture Cr.Hrs.3 Study of selected religion-and-culture figures, issues, or themes.

RLGN 8260 Seminar in Hinduism Cr.Hrs.3 Critical study of selected aspects of the Hindu tradition.

RLGN 8280 Seminar in Islam Cr.Hrs.3 Selected issues in the study of Islam.

RLGN 8290 Seminar in Buddhism Cr.Hrs.3 Study of selected issues, traditions, and texts in the development of Buddhism.

RLGN 8310 Seminar in Judaism Cr.Hrs.3 Selected issues in the study of Judaism.

RLGN 9150 47.7901 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Religion program offered jointly with the University of Winnipeg.

RLGN 9160 47.7902 U.WPG. Cr.Hrs.3 Course may be taken as part of a Master of Religion program offered jointly with the University of Winnipeg.

RLGN 9290 REL-3030-001 W.WPG Cr.Hrs.6 Course may be taken as part of a Master of Religion program offered jointly with the University of Winnipeg.

Section 73: Social Work

Dean: Harvy Frankel

Associate Dean: Lawrence Deane

Graduate Program Coordinator: Brenda Bacon

General Office: 521 Tier Building

Enquiries: (204) 474 7050

Fax: (204) 474 7594

E-mail: socialwork@ms.umanitoba.ca

Web: umanitoba.ca/social_work

Academic Staff

Professor Emeritus

Jehu, D., B.A. (Reading), Dip.Soc.Sc., Dip.App.Soc.Studies (Liverpool), F.B.Ps.S. (London); **Trute, B.**, B.A. (Saskatchewan), M.S.W. (McGill), Ph.D. (Berkeley).

Senior Scholars

Grosser, S.J., B.A., M.S.W. (Manitoba); **Hudson, P.**, B.A. (London), M.S.W. (Toronto); **Kaminski, L.E.**, B.A., M.S.W. (Manitoba); **Mullaly, R.P.**, B.A. (New Brunswick), M.S.W. (Dalhousie), Ph.D. (Toronto); **Penner, A.G.**, B.A., B.S.W. (Manitoba); **Reid, J.G.W.**, B.A. (Regina), M.S.W. (Toronto), Ph.D. (Manitoba); **Ryant, J.C.**, B.Comm., M.A., M.S.W., Ph.D. (McGill); **Spearman, L.B.**, B.A., M.S.W. (Nebraska), D.S.W. (Washington).

Professors

Frankel, H., B.S.W. (Manitoba), M.S.W. (McGill), Ph.D. (Berkeley); **Fuchs, D.M.**, B.A. (Regina), M.S.W. (Calgary), Ph.D. (Toronto); **Heinonen, T.**, B.A. (Alberta), B.S.W. (Calgary), M.S.W. (McGill), D.Phil. (Sussex); **McKenzie, B.**, B.A. (Saskatchewan), M.S.W. (Manitoba), Ph.D. (Arizona State); **Roy, R.**, F.R.S.C., B.A. (Delhi), A.A.P.S.W. (London), Adv. Dip. S.W. (Toronto).

Associate Professors

Bacon, B.L., B.S.W. (Regina), M.S.W. (Toronto), Ph.D. (Texas); **Bonnycastle, C.R.**, Dip. Ren Res. (Saskatchewan), B.H.J., M.S.W. (Regina); **Bracken, D.C.**, B.A. (Holy Cross College), M.A. (Toronto), Ph.D. (London); **Cheung, M.**, B.Soc.Sc., M.Soc.Sc. (Hong Kong), Ph.D. (Wilfrid Laurier); **Clare, K.A.**, B.S.W. (Manitoba), M.S.W. (Carleton); **Deane, L.J.**, B.S.W., M.S.W., Ph.D. (Manitoba); **Ferguson, E.B.**, B.A., M.S.W. (Manitoba), Ph.D. (Toronto); **Frankel, S.I.**, B.S.W., M.S.W. (Manitoba), Ph.D. (Berkeley); **Hiebert-Murphy, D.**, B.S.W., M.A., Ph.D. (Manitoba); **Milliken, E.J.**, B.S.W. (Manitoba), M.S.W. (Calgary), Ph.D. (Memorial); **Pompana, Y.**, B.A. Adv., M.S.W. (Manitoba); Ph.D. (Trent); **Taylor, L.**, B.A. (McMaster), M.S.W. (Wilfrid Laurier), Ph.D. (Toronto); **Taylor-Henley, S.**, B.A. (St. Thomas), M.S.W. (Dalhousie), Ph.D. (Minnesota); **Wright, A.** B.A. (College Universitaire de St. Boniface), B.S.W., M.S.W. (Manitoba), Ph.D. (Glasgow).

Assistant Professors

Baffoe, M., B.A. (Ghana), B.S.W. (McGill), M.S.W. (McGill); **Hart, M.**, B.S.W., M.S.W. (Manitoba), Ph.D. (Manitoba); **Hughes, J.**, B.S.W. (St. Thomas), M.S.W., Ph. D. (Toronto); **Levine, K.**, B.S.W. (Manitoba), M.S.W. (Carleton), Ph.D. (Manitoba); **Nixon, K.**, B.A. (Western Ontario), B.S.W. (King's College), M.S.W., Ph.D. (Calgary); **Straka, S.**, B.A. (Concordia), B.S.W., M.S.W., Ph.D. (McGill).

Adjunct Professors

Bennett, M., B.A., M.A. (Manitoba); **Blum, E.R.**, B.A. (McGill), M.S.W. (Toronto); **Curtis, A.** B.A., M.S.W. (Manitoba); **Edwards, J.**, B.M.R. (O.T.) (Manitoba), M.Sc. (O.T.) (Minnesota); **Gosek, G.**, B.A., B.S.W., M.S.W. (Manitoba); **Halonon, D.**, B.A., B.S.W., M.S.W. (Lakehead); **Jensen, K.**, B.S.W., M.S.W. (Manitoba); **Lesperance, D.**, B.S.W., M.S.W. (Manitoba); **Lowe, K.**, B.A. (Saskatchewan), M.Sc. (London), Ph.D. (Cambridge); **Newman, P.R.**, B.A., M.S.W. (Manitoba); **Redekop, P.**, B.A. (Winnipeg), M.A. (Carlton), Ph.D. (York); **Richert, M.**, B.S.W., M.S.W. (Manitoba); **Rodgers,**

J., B.S.W., M.S.W. (Manitoba); **Scott, K.A.**, B.S.W., M.S.W. (Manitoba); **Shangreux, C.**, B.Sc. Northwest Indian Bible College, B.Ed. (Eastern Montana College), M.Ed. (Montana); **Stevens, H.** M.A. (Toronto); **Strang, M.**, B.A., B.S.W. (Manitoba); **Strega, S.**, B.S.W., M.S.W. (Manitoba), Ph.D. (Southampton).

Master of Social Work

Program Information

The Faculty has operated since 1943 and there are two different concentrations available through which students may receive M.S.W. degrees. They are addressed to the differing interests that are common within advanced social work practice and are identified in this curriculum as Social Services Administration and Social Clinical. The M.S.W. degree is fully accredited and recognized internationally as both a professional and academic qualification.

Social Services Administration Stream

The stream's aim is to educate progressive social work managers, program evaluators, and policy analysts within the public, voluntary, and private sectors. A critical approach is used for examination of power, oppression, and resistance. Organizational theories, strategies, analyses of social service administration practice are examined. Students acquire strong analytical and practice skills in policy analysis and social service administration. Through critical review of theories, techniques, and case study applications, students learn to develop and apply different models of social service administration, planning, implementation, and the evaluation of social policies and programs.

Social Clinical Stream

This stream is based on an eco-systemic perspective, while also incorporating anti-oppressive and anti-colonial perspectives. This view provides a broad context for social work practice by emphasizing the interrelatedness of individuals, families, groups, and communities and their relationships with social institutions and cultural forces. The family unit, broadly defined, is given particular focus.

Program Description

Graduates of this program currently occupy a wide range of positions within the human services in Canada and throughout the world. While the majority of graduates work within the social service sector others have become active as politicians, scholars, senior civil servants, private consultants and are also active in a wide range of fields such as international development work and the creation of information systems.

While the program covers the core material which is essential to social work practice there has been particular attention given to issues relevant to women and the Aboriginal communities. Many graduates are Aboriginal persons and are actively involved in the creation and operation of the Aboriginal human services organizations.

Considerable attention is given to issues of educational equity. In addition to treating these matters as course content, every effort is made to ensure that people from disadvantaged groups have access to the M.S.W. program. The purpose of this initiative is to achieve equality in professional education so that no person shall be denied educational opportunities or benefits for reasons unrelated to ability. In the fulfillment of this goal the aim is to correct the conditions of disadvantage in professional education experienced by Aboriginal peoples, persons with disabilities, immigrants and refugees to Canada, Gender and Sexual Minorities' group members and persons who are members of a visible minority in Canada. Educational equity means more than treating persons in the same way, it also requires special measures and the accommodation of difference.

Fields of Research

The faculty are involved with research in virtually all areas of the human services covering clinical, administrative and planning issues. A partial list of current research includes questions regarding gender, international social development, ethnicity, the justice system, services for Aboriginal people, rural and northern development, family violence, day care, issues concerning disabled persons, the immigrant experience, the development of clinical services, the political economy of the welfare state, the nature and treatment of pain, and services in child welfare.

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, the

deadline for submission of applications to the program is January 15th for Canadian citizens and permanent residents and December 1st for International applicants.

M.S.W. Admissions Criteria

- Possession of a B.S.W. degree (by June 30th of the application year) from an accredited university which is recognized by the University of Manitoba.

- A Minimum Grade Point average of 3.0 (B) is required in the last 60 credit hours of university study.

- If courses have been taken subsequent to the degree as a Special Student and/or Occasional Student and/or in a subsequent degree or a Pre-Master program, they will be calculated into the Grade Point Average as part of the last 60 credit hours.

- Applicants who self-identify as members of one or more of the Educational Equity priority groups and who possess a Grade Point Average between 2.5 and 2.99 will be reviewed for special consideration. Applicants with Adjusted Grade Point Averages below 2.5 will not be considered.

Pre-M.S.W. Admissions Criteria

- Possession of, or eligible for the granting of, a 4 year degree other than Social Work at point of application from an accredited university which is recognized by the University of Manitoba. Persons who plan to graduate in May of the year of application are not eligible for admission.

- One year (1680 hours) of relevant social work experience, paid or volunteer (see application package for details).

- A minimum Grade Point Average of 3.0 (B) is required in the last 60 credit hours of the university study.

- If courses have been taken subsequent to the degree as a Special Student and/or Occasional Student and/or in a subsequent degree or a Pre-Master program, they will be calculated into the Grade Point Average as part of the last 60 credit hours.

- Applicants who self-identify as members of one or more of the Educational Equity priority groups and who possess a Grade Point Average between 2.5 and 2.99 will be reviewed for special consideration. Applicants with adjusted grade point averages below 2.5 will not be considered.

Occasional Students

An Occasional Student in Social Work is one who wishes to take graduate courses with no intention of proceeding to the Pre-M.S.W. program or the Master degree in social work at the present time. Pre-M.S.W. program courses available to Occasional Students holding a previous 4 year degree in a discipline other than social work (e.g., B.A., B.Ed.):

SWRK 3100	Systematic Inquiry in Social Work	3
SWRK 6030	Canadian Social Welfare Policy	6
SWRK 6040	Anti-Oppressive Social Work Practice	3
SWRK 6060	Social Work and Aboriginal People	3

The maximum number of credit hours permitted is six credit hours, plus SWRK 3100 (3 credit hours).

M.S.W. program courses available to Occasional Students holding a previous degree in social work and non-social work students currently registered in another graduate program:

SWRK 6010	Data Analysis for Social Work Research or	3
SWRK 6070	Qualitative Research in Social Work	3
SWRK 7290	Family-Focused Social Work Practice	6
SWRK 7300	Clinical Evaluation of Social Work Interventions	3
SWRK 7310	Social Service Administration Practice	6
SWRK 7400	Theoretical Foundations of Social Service Administration	3
SWRK 7420	Theoretical Foundations of Social Policy Analysis, Planning and Evaluation	3
SWRK 7230	Problem Seminar (Several topics are offered each year. Consult timetable for current titles being offered)	3
SWRK 7390	Advanced Social Work Practice Seminar	3
SWRK 7430*	Evaluation Research in Social Work Practice	3
SWRK 7440	Policy Analysis in Social Work Practice	3

The maximum number of credit hours permitted is 6 credit hours plus SWRK 6010 (3 credit hours) or SWRK 6070 (3 credit hours).

All Occasional and non-social work students are required to abide by the same pre/co-requisite policy that applies to Social Work students.

*Pre/co-requisite SWRK 6010 or SWRK 6070

Educational Equity Initiative

For the purpose of identification the definitions for the Educational Equity priority groups are:

Aboriginal Peoples: All indigenous peoples of Canada including: First Nations, Metis, Denè and Inuit.

Visible Minorities: Persons other than Aboriginal peoples who, because of their colour, are a visible minority in Canada.

Immigrants: Immigrants are those who do not record Canadian citizenship by birth, and whose native tongue is NOT English.

Refugees: A Refugee is an individual who has left his/her country of residence because of persecution for belonging to a particular social, cultural, religious and/or national group, and/or for holding political beliefs and has been accepted for residence in Canada.

Persons with Disabilities: Persons with disabilities are those who would consider themselves disadvantaged by reason of any physical, intellectual, mental, sensory or learning impairment.

Gender and Sexual Minorities' group members: Persons who identify as Gay, Lesbian, Bi-Sexual, Trans-Gendered, Two-Spirited, Queer, Questioning, and /or Intersex.

These definitions are subject to change.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar.

Students may take the Pre-M.S.W. program on a part-time basis and the M.S.W. program on a full-time or part-time basis. There is a three year time limit to complete the Pre-M.S.W. program and a six year time limit to complete the M.S.W. program. There is no second language requirement.

The Pre-M.S.W. Program

The Pre-M.S.W. program is designed to prepare students who do not have a B.S.W. degree from an accredited university, or its equivalent, for entry to the M.S.W. program. It is intended to build on the existing background and experience of students by providing them with an opportunity for focused study on Canadian social welfare policy, generalist social work practice, the philosophy and values of the profession of social work, including content on diversity and anti-oppression, and supervised practice in the field of social work.

Program Requirements

SWRK 3100	Systematic Inquiry in Social Work	3
SWRK 4200	Field/Focus	6
SWRK 6020	Social Work Practice Seminar	6
SWRK 6030	Canadian Social Welfare Policy Analysis	6
SWRK 6040	Anti-Oppressive Social Work Practice	3
SWRK 6050	Field Practice	6
SWRK 6060	Social Work and Aboriginal People	3
	Maximum credit hours load	33

Program Requirements

The M.S.W. Program

The Social-Clinical Intervention Stream

Students must complete 24 or 27 credit hours of seminar and tutorial work (Students opting for the "Course-Based Specialization Option" must complete 27 credit hours during their M.S.W. Program. All other students require 24 credit hours). The program requires at least 12-18 months of full-time study. Students may elect to take the program on a part-time basis.

The program includes 15 credit hours of core material (which must be completed within 24 months from date of admission) and 9 credit hours of electives. In addition to the course work, students are required to complete a thesis, practicum or the course-based specialization option. Students admitted prior to 2004 may complete Option 1 (thesis); Option 2 (practicum)

or Option 3 (course-based specialization). Those students admitted in 2004 or later may complete Option 1 (thesis) or Option 3 (course-based specialization).

In addition to the one Advanced Social Work Practice Seminar required, students take nine hours of electives (up to six hours may be taken outside of the Social Work faculty).

Course SWRK 7290 is pre- or co-requisite to final approval of the proposal of the thesis, practicum or specialization course-based option.

Social-Clinical Intervention Stream

Core Courses and Electives

SWRK 6010	Data Analysis for Social Work Research	3
	or	
SWRK 6070	Qualitative Research in Social Work	3
SWRK 7290	Family-Focused Social Work Practice	6
SWRK 7300	Clinical Evaluation	3
SWRK 7390	Advanced Social Work Practice Seminar	3
	(Required elective-choose one from three offered)	
	Electives*	9
	AND	
Option 1		
GRAD 7000	Thesis	0
Option 2		
GRAD 7030	Practicum**	0
Option 3		
	Course-Based Specialization Option	
SWRK 7180	Advanced Field Practice	0
SWRK 7190	Integrating Theory and Research in Advanced Field Practice	3

NOTE:

* Electives may be chosen from SWRK 7390 Advanced Social Work Practice Seminars, and/or SWRK 7230 Problem Seminars (which include a number of seminars on different areas of clinical practice), and/or SWRK 7220 Selected Topics in Social Work, and/ or SWRK 7280 Readings in Social Work and Social Welfare Research.

**Available only to students admitted prior to 2004.

The Social Services Administration Stream

Students must complete 24 or 27 credit hours of seminar and tutorial work (Students opting for the "Course-Based Specialization Option" must complete 27 credit hours during their M.S.W. Program. All other students require 24 credit hours). The program requires at least 12-18 months of full-time study. Students may elect to take the program on a part-time basis.

The program includes 21 credit hours of required courses which must be completed within 24 months from date of admission. Students electing to study full-time may complete all 24 credit hours in one academic year. In addition to the course work, students are required to complete a thesis, practicum or the course-based specialization option. Students admitted prior to 2004 may complete Option 1 (thesis), Option 2 (practicum), or Option 3 (course-based specialization). Those students admitted in 2004 or later may complete Option 1 (thesis) or Option 3 (course-based specialization).

Social Services Administration Stream

Core Courses and Electives

SWRK 6010	Data Analysis for Social Work Research	3
	or	
SWRK 6070	Qualitative Research in Social Work	3
SWRK 7310	Social Service Administration Practice	6
SWRK 7400	Theoretical Foundations for Social Service Administration	3
SWRK 7420	Theoretical Foundations of Social Policy Analysis, Planning and Evaluation	3
SWRK 7430	Evaluation Research in Social Work Practice	3
SWRK 7440	Policy Analysis in Social Work Practice	3
	Electives*	3
	AND	
Option 1		
GRAD 7000	Thesis	0
Option 2		
GRAD 7030	Practicum**	0
Option 3		
	Course-Based Specialization Option	

SWRK 7180	Advanced Field Practice	0
SWRK 7190	Integrating Theory and Research in Advanced Field Practice	3

NOTE:

* Students should take their elective course in Social Work or another department. Part-time students should take SWRK 7310 and SWRK 7400 together and SWRK 7420/ SWRK 7430/ SWRK 7440 in the same academic year.

** Available only to students admitted prior to 2004.

Ph.D. in Social Work

Admission

In addition to the admission requirements of the Faculty of Graduate Studies, admission requirements to the doctoral program in Social Work include:

Master of Social Work degree, or equivalent, from an accredited degree-granting university, with a minimum 3.0 grade point average (as defined by the University of Manitoba). Equivalency to a M.S.W. degree from the University of Manitoba is defined as: possession of a M.S.W. degree from an accredited program at another accredited university OR possession of a Master's level degree other than a M.S.W. delivered by an academic unit with the mandate of preparing social workers for professional practice, accredited by the relevant social work education authority, and which would render its holders eligible for registration with the Manitoba Institute of Registered Social Workers.

Applicants who possess a B.S.W. degree and a non-social work Master's degree may be admitted to a qualifying year during which the student may be required to complete all or selected core courses of the M.S.W. stream consistent with the applicant's Ph.D. focus of study. Equivalency standing of prior courses will be assessed by a committee that includes representatives from the Ph.D. Admissions Committee and the M.S.W. stream consistent with the applicant's Ph.D. focus of study. Applicants holding a B.S.W. degree and a non-social work Master's degree are encouraged to apply at least one year prior to when they intend to enter the Ph.D. program.

Minimum research competency in qualitative or quantitative methods equivalent to the level required for the Master of Social Work degree from the University of Manitoba, with a minimum grade of 3.0 (B). Although the minimum requirement is for one course, applicants will be expected to have basic competency in both qualitative and quantitative methods.

Evidence of scholarly ability, through publications in refereed journals, other scholarly work of equivalent standard, or courses taught in accredited university programs must be provided.

A minimum of two years of professional practice experience in social work.

Admission is subject to the availability of an advisor with demonstrated scholarship in the applicant's proposed area of research.

Advising

Each student is assigned an advisor on admission. An advisory committee that includes the advisor, one additional member from Social Work and one from another faculty will be appointed to assist the student in developing a study plan and to supervise the student's research. All members of the advisory committee must be members of the Faculty of Graduate Studies.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. A minimum of TWO YEARS of study (the fall and winter terms of the first and second year following admission) is required.

The program consists of: (a) 27 credit hours of coursework, (b) a candidacy examination, and (c) a Ph.D. thesis.

Course Requirements

Students must complete 27 credit hours of approved course work beyond the M.S.W. degree and will include:

Social Work core courses (6 credit hours): ● SWRK 8010 - Perspectives on Knowledge for Social Work (3 credit hours) ● SWRK 8020 - Development of the Social Work Profession (3 credit hours)

Research Courses (12 credit hours): ● SWRK 8030 - Advanced Qualitative Research in Social Work (6 credit hours) ● SWRK 8040 - Advanced Quantitative Research in Social Work (6 credit hours)

Teaching Requirement (3 credit hours): ● Seminar in Post-Secondary Instruction (EDUA 7450) (3 credit hours) OR ● an alternative requirement that addresses teaching (3 credit hours)

Electives (6 credit hours): ● One elective in the student's area of specialization (3 credit hours) ● One additional elective (3 credit hours)

Candidacy

A candidacy examination committee will also be appointed when the student begins to prepare for the candidacy examination. This three-person committee, which includes the advisor, is responsible for administering the candidacy examination. The candidacy examination will normally be taken after completing all course work but in no case later than one year prior to expected graduation. The candidacy examination consists of a major paper on a topic within the student's general area of study and an oral examination of the topic covered in the paper.

Dissertation Research

The student's Ph.D. advisory committee, chaired by a thesis advisor, provides advice and guidance in the development of the proposal for the dissertation, and during the ongoing research phase. Normally, advisory committee members become members of the examining committee for the dissertation during the final examination for the Ph.D. degree.

Second language requirement: none

Maximum time to graduation: seven years

Course Descriptions

SWRK 6010 Data Analysis for Social Work Research Cr.Hrs.3 An intermediate course in the analysis of social work data. Course will emphasize application and interpretation of analytical techniques useful in the practice of social work. A course in elementary statistics such as STAT 2200 is strongly recommended prior to taking this course. *Prerequisite:* SWRK 3100 (or 047.310) or equivalent. May not hold with 047.411.

SWRK 6020 Social Work Practice Seminar Cr.Hrs.6 Introduces students to ecological and other generalist practice models in the provision of social services. Attention is given to key contextual aspects of social work practice such as gender, poverty, and culture in the study of professional roles and ethics. Intervention modalities considered range from direct practice with individuals to strategies of community change.

SWRK 6030 Canadian Social Welfare Policy Cr.Hrs.6 An examination of the elements of ideology, and the application of competing ideological systems in the study of social welfare policy. This course also examines the history of Canadian social welfare from European contact to contemporary developments.

SWRK 6040 Anti-Oppressive Social Work Practice Cr.Hrs.3 An overview of anti-oppressive social work practice. Focuses on application of this approach to a wide variety of service participants and the connections between policy and practice. Implications for the profession are explored.

SWRK 6050 Field Practice Cr.Hrs.6 An educationally focused practice experience where the student carries a sustained professional role as a beginning practitioner. Requires 450 hours of time including an orientation program, engagement in practicum activities under supervision, educational contact time with the field instructor and evaluation of performance. For Pre-MSW students only. Subject to satisfactory completion and reports, students will be graded on a pass/fail basis. *Pre /Co requisite* SWRK 6020 (or 47.602) *Co-requisite* SWRK 4200

SWRK 6060 Social Work and Aboriginal People Cr.Hrs.3 Focuses on the analysis of social welfare policy and social work practice from an Aboriginal perspective. The influence of colonization as an attribute of oppression is examined along with an exploration of developments oriented to the goal of decolonization and empowerment.

SWRK 6070 Qualitative Research in Social Work Cr.Hrs.3 An intermediate course in qualitative approaches for research on social work practice and social welfare issues. It will include some of the main approaches to the design and analysis of qualitative social work research.

SWRK 7180 Advanced Field Practice Cr.Hrs.0 A student directed specialized practice experience where the focus is on the integration of theory, research and practice. Requires 450 hours of supervised, advanced practice following approval of a proposal developed by the student. Students will be graded on a pass/fail basis. *Pre/Co requisite* SWRK 7190 (or 047.719)

SWRK 7190 Integrating Theory and Research in Advanced Field Practice Cr.Hrs.3 Requires application of theory and research to analysis of selected activities undertaken in Advanced Field Practice (SWRK 7180) *Pre/Co requisite* SWRK 7180 (or 047.718)

SWRK 7220 Selected Topics in Social Work Cr.Hrs.3 A tutorial approach which permits the graduate student to develop an area of concentration independently but with assistance and mutual work with a faculty member. *Prerequisite:* written permission of instructor.

SWRK 7230 Problem Seminar Cr.Hrs.3 Students focus on the theory, social policy and social work practice implications of a given social problem area.

SWRK 7280 Readings in Social Work and Social Welfare Research Cr.Hrs.3 A tutorial in specialized research methodology to be offered only to students who have highly specialized research interests which are not commonly offered in other courses. *Prerequisite:* an introductory research course and consent of the instructor.

SWRK 7290 Family-Focused Social Work Practice Cr.Hrs.6 Perspectives such as ecological, systemic, post-modern, anti-colonial, structural and anti-oppressive practice are examined as they relate to family-focused social work. Practice methods are studied with special attention given to research and social contextual factors.

SWRK 7300 Clinical Evaluation of Social Work Interventions Cr.Hrs.3 Methods of evaluating clinical social work intervention with individuals, couples, families, and other small groups. *Prerequisite:* SWRK 3100 (or 047.310) or 047.411, or their equivalents.

SWRK 7310 Social Service Administration Practice Cr.Hrs.6 This course will focus on the development of skills in the analysis and implementation of organizational models for social service delivery, and administration methods for the effective delivery of social services. Students may not hold credit for SWRK 7310 (or 047.731) and the former 047.735 or 047.736.

SWRK 7390 Advanced Social Work Practice Seminars Cr.Hrs.3 Study of social work practice organized by size of client system. Students must select one seminar from several which are offered. Remaining seminars may fulfill elective requirements. For clinical students only *Pre/Co prerequisite:* SWRK 7290 (or 047.729).

SWRK 7400 Theoretical Foundations of Social Service Administration Cr.Hrs.3 An examination of organizational theories and strategies and evaluation of their relevance for the administration of social services agencies.

SWRK 7420 Theoretical Foundations of Social Policy Analysis, Planning and Evaluation Cr.Hrs.3 An advanced course in the welfare state in Canada - the relationship between ideology, economics and the existing structure of the welfare state in Canada, with a focus on the attempts to roll it back and the consequent tasks of social work in the preservation and advancement of social security. Students may not hold credit for 047.737 and SWRK 7420 (or 047.742).

SWRK 7430 Evaluation Research in Social Work Practice Cr.Hrs.3 Presentation of the knowledge and skills necessary in the application of models and methods of planning and evaluating social policy and social programs. Analytical and practice skills are developed through a critical review of a variety of theories and techniques and case study applications. *Pre/Co prerequisite:* SWRK 6010 (or 047.601) or SWRK 6070. Applicable to students admitted subsequent to 1997-1998. May not hold with the former 047.741.

SWRK 7440 Policy Analysis in Social Work Practice Cr.Hrs.3 Presentation of the knowledge and skills necessary in the application of models and methods of planning social policy and social programs. Analytical and practice skills are developed through a critical review of a variety of theories and techniques and case study appli-

cations. Applicable to students admitted subsequent to 1997-1998. May not hold with SWRK 7410 (or 047.741).

SWRK 7450 Advanced Research Methods 1 Cr.Hrs.3 An overview of design and methodology options in quantitative and qualitative social work research, with special emphasis on practice in community settings.

SWRK 7460 Advanced Research Methods 2 Cr.Hrs.3 Advanced quantitative analysis of social work policy and practice, with emphasis on multivariate analysis techniques.

SWRK 7470 Advanced Research Methods 3 Cr.Hrs.3 Advanced qualitative analysis of social work policy and practice, with emphasis on analyzing appropriate case studies, and interview and documentary information.

SWRK 7480 Advanced Family-Focused Practice Cr.Hrs.3 Study of the family as a client system, using theoretical approaches within an ecological paradigm.

SWRK 7490 Advanced Family-Focused Practice with Special Populations Cr.Hrs.3 Special issues in family-focused practice, including supervision of practice.

SWRK 7520 Dissertation Seminar Cr.Hrs.0 A required non-credit course on special issues to support students in preparing their formal dissertation proposals. Topics include scholarly findings, research methodology, and data analysis. Graded as P/F.

SWRK 7530 Critical Issues in Social Work Cr.Hrs.3 An opportunity for students to engage in the study of a specific field or topic in social work. Taken as a course, tutorial or offered as a special Ph.D. seminar when numbers permit.

SWRK 8010 Perspectives on Knowledge for Social Work Cr.Hrs.3 A seminar focusing on the definition, development, legitimization, and transmission of knowledge for social work practice. A range of approaches will be discussed including scientific approaches (logical positivism), post-modern approaches, indigenous and culturally based approaches, and critical approaches.

SWRK 8020 Development of the Social Work Profession Cr.Hrs.3 A seminar focusing on the development of social work from mainstream and marginalized people's perspectives (including Aboriginal people and women), and its relationship to current professional issues. Historical, ideological, economic, theoretical, and political factors will be considered in examining selected fields of practice.

SWRK 8030 Advanced Qualitative Research in Social Work Cr.Hrs.6 A seminar and laboratory course in the understanding and use of a wide range of epistemological and methodological approaches to research related to social work. This will include a focus on the views and practices of Aboriginal peoples, women, and other marginalized persons. *Pre-requisite:* A grade of "B" or better in a Master's level qualitative research course taken within five years or instructor approval.

SWRK 8040 Advanced Quantitative Research in Social Work Cr.Hrs.6 A seminar and laboratory course in the use of multivariate statistics in analyzing experimental, quasi-experimental, survey and administrative data related to social policy, social services, and social work practice. *Pre-requisite:* A grade of "B" or better in a Master's level quantitative research course taken within five years or instructor approval.

Section 74: Sociology

Head: Elizabeth Comack

General Office: 320 Isbister Building

Telephone: (204) 474 9260

Fax: (204) 261 1216

E-mail: sociology@umanitoba.ca

Website: umanitoba.ca/arts/sociology

Academic Staff

Dean Emeritus

Currie, R.F., M.A., Ph.D. (Fordham).

Professor Emeritus

Driedger, L., A.B. (Kansas), B.D. (Bethany Biblical Seminary), M.A. (Chicago), Ph.D. (Michigan State); Kwong, J., B.A. (Hong Kong), M.Ed. (Alberta), Ph.D. (Toronto); Ramu, G.N., B.A., M.A. (Mysore), M.A., Ph.D. (Illinois); Segall, A., B.A., M.A. (Manitoba), Ph.D. (Toronto).

Senior Scholars

Boldt, E.D., B.Sc., B.A.(Calgary), M.A., Ph.D.(Alberta.); Goldstein, J.E., B.A. (San Francisco), M.A., Ph.D. (Washington State); Rennie, D. L., B.Sc., B.A. (Sir George Williams), M.A. (McGill), Ph.D.(Yale).

Professors

Albas, D.C., B.A. (Alberta), Ph.D. (Colorado); Comack, A.E., B.A. (Winnipeg), M.A. (Queen's), Ph.D. (Alberta); Linden, E.W., B.A., M.A. (Alberta), Ph.D. (Washington); Olsen, G. M., B.A. (Windsor), M.A., Ph.D. (Toronto); Prentice, S.L., B.A. (Toronto), M.E.S., Ph.D. (York); Roberts, L., B.A., M.A., Ph.D. (Alberta); Smandych, R.C., B.A. (Saskatchewan), M.A. (Simon Fraser), Ph.D. (Toronto); Ursel, E.J., B.A., M.A. (Manitoba), Ph.D. (McMaster).

Associate Professors

Axelrod, C.D., B.A.(Sir George Williams), M.A., Ph.D.(York); Grant, K.R., B.A., M.A. (Manitoba), Ph.D. (Boston); Kueneman, R., B.A. (Waterloo), M.A., Ph.D. (Ohio State); Payne, B.J., B.A. (York), M.Sc., Ph.D. (Toronto); Taylor, K.W., B.A., M.A. (Saskatchewan), Ph.D. (Southern Illinois); Wilkinson, L., B.A., M.A. (Saskatchewan), Ph.D. (Alberta); Woolford, A., B.A., (Victoria), M.A. (Western Ontario), Ph.D., (British Columbia).

Assistant Professors

Bookman, S., B.A., (Winnipeg), M.A.(Econ), Ph.D. (Manchester); Fries, C. B.A., (Regina), M.A. (Guelph) Ph.D. (Calgary); Hudson, M., B.A. (Manitoba), M.E.S. (York); Ph.D. (Oregon); Peter, T., B.A., (Winnipeg), M.A. (Queen's), Ph.D. (Manitoba); Powell, C., B.A., M.A., (Toronto), Ph.D. (Carleton).

Adjunct Professors

Strain, L.A., B.A. (Brandon), M.N.R.M. (Manitoba), Ph.D. (Toronto)

Program Information

The Department of Sociology offers programs at the Master and Ph.D. levels. Both programs provide training in the core areas of the discipline (theory and research methods) as well as in the department's major areas of specialization: criminology; gender, sexuality and family/intimate relations; health and aging; and inequality. The relatively low graduate student/faculty ratio creates an informal learning environment in which students receive considerable individual attention. Faculty members are actively involved in research, including some projects that readily lend themselves to the production of student theses/dissertations. Many students who have completed their Sociology degrees at the University of Manitoba have gone on to successful careers in the academic community, in the private sector, and in government service.

Fields of Research

The major areas of research of the Sociology faculty include criminology and criminal justice, health care, gender studies, inter-group (race/ethnic) relations, power and inequality, social change and development, and social psychology. Several department members have affiliations with research centres and institutes at the University of Manitoba, including the Centre on Aging, and RESOLVE (a centre for research and education for solutions to violence and abuse).

M.A. in Sociology

Admission

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students who have completed a University of Manitoba Honours B.A. (or equivalent) in Sociology may enter directly into the Master of Arts program. Students with other degrees or backgrounds may be eligible for admission to a pre-Master's program to the satisfaction of the department. Contact the Sociology Department for further information.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The Master of Arts program in Sociology requires 12 credit hours of coursework (700/7000 level) beyond the pre-Master's requirements. Students must also complete and successfully defend a thesis.

Second Language Reading Requirement: None

Expected Time to Graduate: Two years

Ph.D. in Sociology

Admission

Admission requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students who wish to enter the Doctor of Philosophy program must have completed the equivalent of a University of Manitoba Master of Arts in Sociology.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Department at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Department at least 7 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students must complete:

- A minimum of 18 credit hours of coursework (including 3 credit hours in Theory and 6 credit hours in Research Methods);
- A passing grade in two comprehensive examinations in two different subject areas, chosen from the following: Classical Theory; Criminology; Gender, Sexuality and Family/Intimate Relations; Inequality and Social Transition; Research Methods; Social Psychology; Health.
- Successful defense of a dissertation proposal; and
- Successful defense of the completed dissertation.

Second language requirement: no

Expected time to graduate: four years

Course Descriptions

SOC 7110 Seminar in Sociology of Religion Cr.Hrs.3 (Formerly 077.711) A comparative and analytical study of religion with particular reference to such areas as integration, change, ideology, value orientation, normative structures, social class, intergroup relations, personality systems.

SOC 7120 Seminar in Sociology of Education Cr.Hrs.3 (Formerly 077.712) An analytical treatment of the influence of education, as a basic social institution, on society its functions in socialization, change, control, social mobility, social progress, etc. and the influence of society on the organization, content, and goals of education.

SOC 7130 Seminar in Sociology of Developing Countries Cr.Hrs.3 (Formerly 077.713) An intensive study of developing countries vis-à-vis their formulation and implementation of policies of guided societal transformations and international implications of modernization of traditional societies.

SOC 7160 Selected Topics Cr.Hrs.3 (Formerly 077.716) An intensive study of the contemporary research and theory in a selected field of sociology. As the course content will vary from year to year, students may take this course more than once for credit.

SOC 7190 Seminar in Selected Topics in Sociological Theory Cr.Hrs.3 (Formerly 077.719) The content of this course may vary from year to year, depending on interest and need. As the course content will vary from year to year, students may take this course more than once for credit.

SOC 7240 Seminar in Selected Topics in Research and Methods Cr.Hrs.3 (Formerly 077.724) The content of this course may vary from year to year, depending on interest and need. As the course content will vary from year to year, students may take this course more than once for credit.

SOC 7250 Advanced Seminar Cr.Hrs.3 (Formerly 077.725) Seminar with reference to one or more selected problems in sociology. As the course content will vary from year to year, students may take this course more than once for credit.

SOC 7260 Seminar in Selected Problems in Social Psychology Cr.Hrs.3 (Formerly 077.726) Examination of the major concepts, assumptions, findings, and implications of one or more substantive areas within social psychology.

SOC 7280 Seminar in Theories of Criminal Behaviour Cr.Hrs.3 (Formerly 077.728) An advanced course dealing with theory and research in the field of criminology with emphasis placed on an evaluation of existing theories of crime and criminal behaviour.

SOC 7300 Seminar in the Sociology of Law and Social Control Cr.Hrs.3 (Formerly 077.730) A critical examination of classical and contemporary sociological theories of law and social control and their import for understanding substantive issues relating to the law-society relationship.

SOC 7310 Seminar in Intergroup Relations Cr.Hrs.3 (Formerly 077.731) This seminar will provide an opportunity for detailed study of intergroup (religious, racial, and ethnic) relations in contemporary Canadian society. As the course content will vary from year to year, students may take this course more than once for credit.

SOC 7320 Seminar in Political Sociology Cr.Hrs.3 (Formerly 077.732) A critical examination of classical and contemporary sociological theories and current empirical research concerned with the relationship between politics and society. Particular emphasis is placed upon the origin, development, nature and future of the welfare state from a comparative perspective.

SOC 7340 Seminar in the Sociology of the Family Cr.Hrs.3 (Formerly 077.734) This seminar investigates various conceptual frameworks which are developing in the study of the family today, including research problems and procedures unique to such study. Various approaches will be examined.

SOC 7350 Advanced Reading and Research 1 Cr.Hrs.3 (Formerly 077.735) Directed study of a selected area within the general field of sociology.

SOC 7360 Advanced Reading and Research 2 Cr.Hrs.3 (Formerly 077.736) Directed study of a selected area within the general field of sociology.

SOC 7370 Issues in Health Care Seminar Cr.Hrs.3 (Formerly 077.737) An advanced seminar designed to examine current issues in health care. The content of this course may vary from year to year depending on interest and need. *Prerequisite:* a grade of "C+" or better in SOC 4540 (or 077.454) or written consent of the department head.

SOC 7380 Issues in Aging Cr.Hrs.3 (Formerly 077.738) An advanced seminar designed to examine current issues in aging. The content of this course may vary from year to year depending on interest and need. *Prerequisite:* a grade of "C+" or better in SOC 4550 (or 077.455) or written consent of the department head.

SOC 7390 Survey Research Methods Cr.Hrs.3 (Formerly 077.739) Through the use of secondary electronic data sources, students learn all aspects of survey research. Topics covered include: sampling, question and questionnaire construction, index construction and scaling methods, techniques of establishing validity and reliability, order effects, conducting interviews, coding, data analysis, and budgeting. Previous experience with multivariate data analysis at the undergraduate level is strongly encouraged.

SOC 7400 Advanced Quantitative Research Methods Cr.Hrs.3 (Formerly 077.740) This course emphasizes the understanding and application of advanced quantitative data analysis techniques to sociological research problems. Issues in regression decomposition, path analysis, log-linear analysis, discriminant function analysis, principal components and factor analysis, as well as non-parametric statistical tests are covered as they relate to sociological research concerns. Statistical packages are used to illustrate sociological examples. *Prerequisite:* SOC 4480 (or 077.448) or written consent of the department head.

SOC 7410 Selected Topics in Quantitative Research Methods Cr.Hrs.3 (Formerly 077.741) This course emphasizes the understanding and application of selected quantitative data analysis procedures as they apply to sociological research concerns. Statistical packages are used to illustrate sociological applications. Topics covered will vary but may include logistic regression, multiple classification analysis, multivariate analysis of variance and covariance, canonical correlation, recursive and non-recursive models, and LISREL. The course emphasizes issues related to the sociological use of these techniques. *Prerequisite:* SOC 4480 (or 077.448) or written consent of the department head. As the course content will vary from year to year, students

may take this course more than once for credit.

SOC 7420 Qualitative Research Methods Cr.Hrs.3 (Formerly 077.742) This course provides an overview of the methods of qualitative research. Discussion focuses on the philosophical foundations of qualitative methods, the variety of techniques available within interpretive and conflict paradigms, issues of sampling, analysis, validity, and report writing.

SOC 7430 Seminar in Classical Sociological Theory Cr.Hrs.3 (Formerly 077.743) A critical examination of certain central aspects of the sociological tradition. The content of this course may vary from year to year depending on interest and need.

SOC 7440 Seminar in Contemporary Sociological Theory Cr.Hrs.3 (Formerly 077.744) An examination of current trends in sociological theory. The content of this course may vary from year to year depending on interest and need.

SOC 7450 Selected Topics in Criminology Cr.Hrs.3 (Formerly 077.745) An advanced seminar in a selected area of criminology. As the course content will vary from year to year, students may take this course more than once for credit.

SOC 7460 The Sociology of Comparative Industrial Relations Cr.Hrs.3 (Formerly 077.746) An advanced course in industrial relations in Europe and North America

from a macro-sociological approach which will introduce the student to theoretical and empirical work on the nature of power and conflict in capitalist society.

SOC 7470 Evaluating Social Programs Cr.Hrs.3 (Formerly 077.747) Designed as a course in applied sociology, students will review the models and methodologies used for evaluating social programs. The course will introduce the necessary conceptual and analytic tools to design and carry out program evaluations. Students may not hold credit for both SOC 7470 (or 077.747) and the former 077.733.

SOC 7480 Social Inequality Cr.Hrs.3 (Formerly 077.748) A critical examination of classical and contemporary theories and current empirical research concerned with various dimensions of social inequality (such as class, gender and race) and social stratification from a comparative perspective.

SOC 7490 Globalization Cr.Hrs.3 (Formerly 077.749) A sociological examination of the globalization of trade, production and finance, including the creation of multilateral trading blocs (e.g., APEC, EU, NAFTA) and international organizations (e.g., WTO, IMF, the World Bank) and their impact upon social inequality, the welfare state and the environment in developed and developing nations.

Section 75: Soil Science

Head: Brian Amiro

General Office: 362 Ellis Building

Telephone: (204) 474 8153

Fax: (204) 474 7642

E-mail: soilscience@umanitoba.ca

Website: umanitoba.ca/afs/soil_science

Graduate Assistant: Lynda Closson

Academic Staff

Professor Emeritus

Racz, G.J., B.S.A., M.Sc. (Saskatchewan), Ph.D. (Manitoba); **Soper, R.J.,** B.A., B.S.A., M.Sc. (Saskatchewan), Ph.D. (McGill), F.A.I.C.

Senior Scholars

Shaykewich, C.F., B.S.A., M.Sc. (Manitoba), Ph.D. (McGill).

Professors

Akinremi, O.O., B.Agr. (Nigeria), M.Sc., Ph.D. (Manitoba); **Amiro, B.D.,** B.Sc.(Hons.), M.Sc., (Laurentian), Ph.D. (Guelph); **Farenhorst, A.,** B.Sc., M.Sc. (Amsterdam), Ph.D. (Toronto); **Flaten, D.N.,** B.S.A. (Saskatchewan), Ph.D. (Manitoba); **Goh, T.B.,** B.AgSc. (Hons.) (Malaya), M.Sc. (Ghent), Ph.D. (Saskatchewan); **Lobb, D.A.,** B.Sc. (Toronto), M.Sc., Ph.D. (Guelph).

Associate Professors

Bullock, P.R., B.Sc., M.Sc. (Saskatchewan), Ph.D. (Australia); **Tenuta, M.,** B.Sc. (Toronto), M.Sc. (Guelph), Ph.D. (Western Ontario).

Assistant Professor

Zvomuya, F., B.Sc. (Zimbabwe), M.Sc. (Reading), Ph.D. (Minnesota).

Adjunct Professors

Barthet, V., B.S. (Paul Sabatier), M.S. (Nancy), Ph.D. (McGill); **Burton, D.L.,** B.Sc. (Hons.) (Dalhousie), M.Sc. (Guelph), Ph.D. (Alberta); **Buckley, K.,** B.Sc. (Alberta), M.Sc. (Manitoba), Ph.D. (British Columbia); **Eilers, R.G.,** B.S.A., M.Sc. (Manitoba); **Elliott, J.A.,** B.Sc. (Aberdeen), M.Sc., Ph.D. (Saskatchewan); **Grant, C.A.,** B.S.A., M.Sc., Ph.D. (Manitoba); **Hao, X.,** B.Sc. (Beijing, China), M.Sc. (Saskatchewan), Ph.D. (Manitoba); **McGonigle, T.,** B.Sc. (Hons.) (Sussex, England), Ph.D. (York, England); **Murray, B.,** B.Sc.Ag., M.Sc., Ph.D. (Manitoba); **Pennock, D.J.,** B.Sc., M.Sc. (Calgary), Ph.D. (Queen's); **Raddatz, R.L.,** B.Sc. (Saskatchewan), B.Ed. (Regina), M.Sc. (Alberta); **Sheedy, C.,** B.Sc. (Laval), M.Sc. Ph.D. (Guelph); **Waite, D.T.,** B.Sc. (Sir George Williams), M.Sc. (Saskatchewan), Ph.D. (Waterloo).

Program Information

The Department of Soil Science offers graduate instruction leading to M.Sc. and Ph.D. degrees. Students will select one of the following four programs:

- Environmental Science
- Fundamental Soil Science
- Agricultural Science

• Agrometeorology

Studies related to these four programs include fundamental and applied studies on the management of soil resources for crop and animal production, soil fertility and nutrient management, pest control management, chemical use in agriculture and food quality, effects of weather and climate on agricultural production, soil erosion, tillage practices, precision agriculture, pesticide fate in the environment, environmental monitoring, manure and waste management, remediation of contaminated or degraded soils, land use suitability assessment, soil genesis and classification, soil mineralogy, soil microbiology and biochemistry, soil and pesticide chemistry, soil physics and agrometeorology.

Graduate students are required to obtain a comprehensive knowledge of soil science, but the department permits considerable variation in the selection of courses depending on the background of the student and the particular area of specialization. Graduates with knowledge or a major in soil science have had excellent career opportunities with agribusiness, environmental land use agencies or firms, and regulatory agencies. M.Sc. and Ph.D. graduates are employed in land inventory activities, research in the various areas of fundamental and applied soil science, environmental consulting and extension.

Fields of Research

Research interests of academic staff in the Department of Soil Science includes transport and transformation of organic and inorganic chemicals in soil, agrometeorological modelling of crop and agricultural processes, impacts of climate change, soil ecology and biochemistry, agricultural pesticides and sustainable agriculture, soil fertility, soil chemistry and mineralogy, landscape ecology and land resource management, land remediation, manure management, greenhouse gas dynamics, forest fires, nutrient dynamics and chemistry of soil fertility.

Research Facilities

The Department of Soil Science and its research facilities are located in the Ellis Building. Facilities within the department include excellent instrumentation to measure soil physical, chemical and biological characteristics, and to quantify soil nutrient and pesticide residue levels in soil extracts and water samples. The department conducts field-based research at a number of locations, both in the province and beyond, in collaboration with scientists from other universities and federal and provincial organizations. Within the department, full-time technicians add quality assurance and quality control to the research programs, and provide a positive effect on the training of students. In addition, the department has the opportunity to share research facilities with other departments within the university and at several locations throughout the province.

M.Sc. in Soil Science

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Start Date	Canadian/U.S.	Non-Canadian/U.S.
September	June 1	March 1
January	October 1	July 1
May	February 1	November 1
July	April 1	January 1

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this calendar, a "B" is the minimum passing grade in the major subject area.

Second language reading requirement: none

Expected time to graduation: two years

Ph.D. in Soil Science

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar.

Application Deadlines

Start Date	Canadian/U.S.	Non-Canadian/U.S.
September	June 1	March 1
January	October 1	July 1
May	February 1	November 1
July	April 1	January 1

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar, a "B" is the minimum passing grade in the major subject area.

Second language reading requirement: none

Expected time to graduation: three years

Course Descriptions

SOIL 7100 Soil Physical Chemistry Cr.Hrs.3 Topics of discussion: ionic equilibria, ion exchange and ionic transport including soil-plant relationships.

SOIL 7110 Soil Physics I - General Cr.Hrs.3 First and second laws of thermodynamics, Darcy's law, saturated and unsaturated flow, simulation modeling of moisture movement, soil aeration, water availability to seeds, strength properties of unsaturated soils.

SOIL 7120 Soil Physics II Special Problems Cr.Hrs.3 Each student will be required to prepare a comprehensive review of literature on an assigned topic and present a seminar. In addition, each student will conduct a minor research project and submit a written report on the project.

SOIL 7130 Soil Chemistry Cr.Hrs.3 Chemical equilibria and soil solution chemistry; surface chemistry and solid-solution reactions; mineral structure, colloid chemistry and analytical techniques; fate of nutrients and pollutants; reactions of fertilizers.

SOIL 7140 Soil Nitrogen Cr.Hrs.3 Discussion of organic and inorganic nitrogen in soils, nitrogen fixation, mineralization, nitrification, denitrification, and plant availability of soil nitrogen. Students will be required to review literature on assigned topics.

SOIL 7170 Agricultural Micrometeorology Cr.Hrs.3 Discussion of mass and energy transport in the boundary layer, evaporation and transpiration of water, light absorption and transmission of carbon dioxide in plant canopies and climate change impacts on micrometeorological processes. *Prerequisite:* SOIL 3060 or consent of instructor.

SOIL 7180 Environmental Chemistry of Pesticides and Related Compounds Cr.Hrs.3 Pesticide chemodynamics, biological and non-biological transformations of pesticides in water, soil and biota, bioaccumulation and food chain distribution of pesticides and related xenobiotics and environmental fate models will be discussed.

SOIL 7210 Topics in Soil Fertility Cr.Hrs.3 Advanced study of behaviour and crop requirements for selected nutrients (except for nitrogen, as covered in SOIL 7140). Students will be required to review literature and prepare seminars on assigned topics. *Prerequisites:* SOIL 4520 or consent of instructor.

SOIL 7220 Principles of Scientific Research and Communication Cr.Hrs.3 Principles of scientific research; management skills; writing skills; oral and poster presentation; preparation of research proposal and thesis. These topics will focus on aspects of soil science and will give students experience in writing and presenting scientific material to increase their professionalism as soil scientists.

SOIL 7230 Topics in Landscape Processes I Cr.Hrs.3 An examination of methods of landscape characterization and of landscape processes, their impacts, interactions and modelling. *Prerequisite:* Consent of instructor.

SOIL 7240 Topics in Landscape Processes II Cr.Hrs.3 A continuation of SOIL 7230. *Prerequisite:* Consent of instructor.

SOIL 7250 Topics in Soil Science Cr.Hrs.3 Several courses in soil science are sectioned into modules. Modules of one credit hour on special topics are also available. Students may select three modules from the various courses or from special topics for SOIL 7250.

SOIL 7260 Pesticide Residues in Food, Water and Soil Cr.Hrs.3 Discussion and application of research protocols for examining pesticide fate in the environment and for quantifying pesticide residues in food, water and soil. *Prerequisite:* consent of instructor.

SOIL 7270 Advanced Soil Ecology Cr.Hrs.3 Examine the role of soil organisms and their communities in decomposition, elemental cycling, and pathogen/pest suppression in managed and natural soil systems. Understand methods of studying biochemical activity and communities in soil. Take a specific research topic of choice and develop an understanding of the organisms and communities, environmental controls of key biological processes involved and apply your knowledge to resolving a specific research issue.

Section 76: Statistics

Head: Dr. John Brewster

General Office: 338 Machray Hall

Telephone: 204-474 9826

Fax: 204-474 7621

E-mail: statsgd@cc.umanitoba.ca

Website: umanitoba.ca/statistics

Graduate Program Assistant: Margaret Smith

Academic Staff

Professors

Brewster, J.F., B.Sc.(Hons.) (UBC), M.Sc. (Toronto), Ph.D. (UBC); **Cheng, S.W.**, B.Sc. (Taiwan), M.A., Ph.D. (Western); **Thavaneswaran, A.**, B.Sc.(Hons.) (Sri Lanka), M.Math, Ph.D. (Waterloo); **Wang, X.**, B.Sc. (Central China Normal), M.Sc., Ph.D. (Saskatchewan); **Wang, L.**, B.Sc. (Northern Jiaotong), M.Sc. (Beijing), Ph.D. (Austria).

Associate Professors

Mandal, S., B.Sc. (Hons.), M.Sc. (India), Ph.D. (UK);

Assistant Professors

Davies, K., B.Sc., M.Sc. (McMaster), Ph.D. (Western); **Jafari Jozani, M.**, (Allameh Tabatabaie University), M.Sc., Ph.D. (Shahid Beheshti University); **Johnson, B.**, B.Sc., M.Sc. (Manitoba), M.Sc., Ph.D. (Purdue); **Leblanc, A.**, B.Sc., M.Sc., Ph.D., (Montreal); **Martsynuk, Y.**, B.Sc., M.Sc. (Taras Shevchenko University of Kiev), Ph.D. (Carleton).

Program Information

The University of Manitoba offers graduate programs in statistics leading to the M.Sc. and Ph.D. degrees as well as a B.Sc. in Statistics degree. Applications are encouraged from students with strong interest in statistics, mathematics or related fields.

Fields of Research

Areas of research interest in the department include: Bayesian statistics; biostatistics; clinical trials; computational statistics; decision theory; distribution theory of runs and patterns; econometrics; environmental statistics; errors-in-variables models; experimental design; image processing; non-parametric statistics; order statistics; probability; quality control; reliability theory; statistical inference; stochastic processes; survival analysis; and time series.

Research Facilities

In addition to the vast network of computing facilities maintained by Computer Services at the University of Manitoba, the Department of Statistics maintains two smaller networks for use by their students. The graduate computing laboratory consists of iMac computers which are capable of running both OS X and Windows, and one IBM Intellistation running Ubuntu Linux. All of the computers in both the undergraduate and graduate labs are also available as a clustered computing resource with an aggregate 180 GHz processing speed and over 150 Gb of RAM.

M.Sc. in Statistics

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. An honours/major degree in Statistics, is normally required for entry into the Master's program.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Faculty of Graduate Studies at least 7 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. The Master's degree may be earned in one of three ways:

- Submission of a thesis, nine credit hours of approved work at the 700/7000 level in statistics which must include STAT 7080 and STAT 7220, and six credit hours of approved coursework at the 400/4000 or 700/7000 level in Statistics.
- Submission of a practicum, nine credit hours of coursework at the 700/7000 level, which must include STAT 7080, STAT 7220 and STAT 7290, and six credit hours of approved work at the 400/4000 or 700/7000 level in Statistics.
- Eighteen credit hours of course work at the 700/7000 level, which must include STAT 7080 and STAT 7220, and six credit hours of approved coursework at the 400/4000 or 700/7000 level in Statistics, and passing a set of comprehensive examinations.

Students are also expected to take part in laboratory instruction.

Second language reading requirement: none

Expected time to graduate: one to two years depending on the option selected

Ph.D. in Statistics

Admission

Admission requirements are those of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this Calendar. Completion of a Master's degree in Statistics is usually required for admission to the Ph.D. program.

Application Deadlines

Canadian/U.S. students should submit their application and supporting documentation to the Department at least 3 months prior to their intended start date. International students should submit their application and supporting documentation to the Department at least 7 months prior to their intended start date.

Program Requirements

Minimum program requirements of the Faculty of Graduate Studies are found in the Graduate Studies Regulations Section of this Calendar. Students are required to satisfy the following requirements:

- Candidates are required to attempt and successfully complete twelve credit hours at the 700/7000 level. These courses will normally be taken

from the Department of Statistics. Courses will normally be recommended by the candidate's supervisor.

- Candidates are required to pass the Ph.D. qualifying examination within 12 months of first registration.
- Candidates are required to pass a candidacy examination which will normally be administered twelve months prior to the completion of all degree requirements. The candidacy examination will be set and administered by the candidate's Ph.D. advisory committee. The format may vary.

Second language requirement: none

Thesis: required

Expected time to graduation: five years

Course Descriptions

STAT 7060 Advanced Theory of Probability Cr.Hrs.3 (Formerly 005.706) Probability as measure, convolutions, limit laws, conditional probability and expectation, law of large numbers and other selected topics. *Prerequisite:* consent of instructor.

STAT 7080 Advanced Statistical Inference Cr.Hrs.3 (Formerly 005.708) Selected topics from recent developments in parametric and/or non-parametric statistical inference. *Prerequisite:* consent of instructor.

STAT 7090 Advanced Statistical Analysis Cr.Hrs.3 (Formerly 005.709) Construction of regression models, response surfaces, nonlinear model ANOVA as regression model, variance components, and selected topics. *Prerequisite:* consent of instructor.

STAT 7100 Analysis of Discrete Data Cr.Hrs.3 (Formerly 005.710) Inference concerning discrete distributions, analysis of categorical data, and other selected topics. *Prerequisite:* consent of instructor.

STAT 7120 Nonparametric Inference Cr.Hrs.3 (Formerly 005.712) Order statistics, Kolmogorov-Smirnov tests, Wilcoxon-Mann-Whitney tests, and other selected topics. *Prerequisite:* consent of instructor.

STAT 7140 Linear Models Cr.Hrs.3 (Formerly 005.714) Theory of linear models, regression analysis, and analysis of variance. *Prerequisite:* consent of instructor.

STAT 7180 Selected Topics in Advanced Sampling Theory Cr.Hrs.3 (Formerly 005.718) Selected topics from recent and current literature. *Prerequisite:* consent of instructor.

STAT 7200 Multivariate Analysis 1 Cr.Hrs.3 (Formerly 005.720) Multivariate normal distribution, Hotelling's T^2 , Classification methods, principal components and canonical correlations. *Prerequisite:* consent of instructor.

STAT 7210 Multivariate Analysis 2 Cr.Hrs.3 (Formerly 005.721) Advanced topics in multivariate analysis. *Prerequisite:* STAT 7200 (or 005.720) or consent of instructor.

STAT 7220 Seminar in Statistics 1 Cr.Hrs.3 (Formerly 005.722) A seminar course on new developments in statistics.

STAT 7230 Seminar in Statistics 2 Cr.Hrs.3 (Formerly 005.723) A seminar course on current research topics in statistics.

STAT 7240 Advanced Topics in Statistics 1 Cr.Hrs.3 (Formerly 005.724) Special advanced research topics in statistics.

STAT 7250 Advanced Topics in Statistics 2 Cr.Hrs.3 (Formerly 005.725) Special advanced research topics in statistics.

STAT 7260 Time Series Cr.Hrs.3 (Formerly 005.726) The auto-correlation function and spectrum, various processes, model identification, estimation and forecasting. *Prerequisite:* consent of instructor.

STAT 7270 Bayesian Inference Cr.Hrs.3 (Formerly 005.727) Bayesian decision problems, priors, Jeffrey's Rule, robustness of posteriors, Bayesian justification of ANOVA. *Prerequisite:* consent of instructor.

STAT 7280 Reliability Analysis and Risk Assessment Cr.Hrs.3 (Formerly 005.728) Fault tree, event tree, common-mode failure analyses, cut set, path set, estimation of system reliability, quantitative evaluation of the consequences of disastrous accidents, risk-benefit analysis. *Prerequisite:* consent of instructor.

STAT 7290 Statistical Consulting Cr.Hrs.3 (Formerly 005.729) The role of a statistics consultant. Practical consulting experience. *Prerequisite:* consent of department.

Section 77: Surgery

Head: Dr Richard Nason

General Office: GH604 - General Centre, HSC, 820 Sherbrook Street

Telephone: 204 787 7581

Fax: 204 787 4837

E-mail: surgpostgrad@hsc.mb.ca

Website: under construction

Research Director: Dr Helmut Unruh

Administrator: Mary Brychka

Academic Staff

Professors Emeriti

Barwinsky, J., M.D. (Manitoba), F.R.C.S.C., F.A.C.S., F.A.C.C.P., D.A.B.S., D.A.B.T.S., F.A.C.C., F.R.S.M.; **Blanchard, R., M.D.** (Manitoba), B.Sc.(Med.), M.Sc.(Surg.) (Minnesota), F.R.C.S.C., F.A.C.S.; **Downs, A., M.D.**, (Manitoba), F.R.C.S.C., F.A.C.S.; **Riese, K., M.D.** (Manitoba), F.R.C.S.C., F.A.C.S.; **Stranc, M., M.D.** (Dublin), F.R.C.S., F.R.C.P.I., F.A.C.S., F.R.C.S.C.

Professors

Black, G., B.Sc., M.D. (Dalhousie), F.R.C.S.C.; **Cristante, L.**, M.D., Ph.D. (Giessen); **Danzinger, R.**, B.Sc., M.D. (Manitoba), F.R.C.S.C., F.A.C.S.; **Hosking, D.**, M.D., M.B., Ch.B. (Capetown), F.R.C.S., F.R.C.S.C., F.A.C.S.; **Kirkpatrick, J.**, M.B., Ch.B., (Edinburgh), F.R.C.S., F.R.C.S.C., F.A.C.S.; **MacDonald, P.**, B.Sc.(Med.), M.D. (Manitoba), F.R.C.S.C.; **Menkis, A.**, D.D.S. (Toronto), M.D. (McMaster), F.A.C.S., F.R.C.S.C.; **Nason, R.**, B.Sc. (Acadia), M.D. (Dalhousie), M.Sc. (Alberta), F.R.C.S.C.; **Oppenheimer, L.**, M.D., Ph.D. (Barcelona), F.R.C.S.C.; **Postuma, R.**, B.Sc.(Med.), M.D. (Manitoba), F.R.C.S.C., F.A.C.S.; **Rennie, W.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Saadia, R.**, M.D. (Grenoble), F.R.C.S.; **Unruh, H.**, M.D. (Manitoba), F.R.C.S.C.; **West, M.**, B.Sc.(Med.), M.D., Ph.D. (Manitoba), F.R.C.S.C.

Associate Professors

Abdoh, A., M.B., Ch.B. (Cairo), Ph.D. (New Orleans); **Boyd A.**, Ph.D., M.D. (Toronto), F.R.C.S.C.; **Buchel, E.**, B.Sc., B.Sc.(Med.), M.D. (Manitoba), A.B.S., A.B.P.S.; **Dolynchuk, K.**, B.Sc., M.D., Ph.D. (Manitoba), F.R.C.S.C., F.A.C.S.; **Duerksen, F.**, M.D. (Argentina), F.R.C.S.C.; **Fewer, H.**, B.Sc. (Loyola), M.D., C.M. (McGill), F.R.C.S.C.; **Gray, P.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Guzman, R.**, M.D. (Manitoba), F.R.C.S.C., F.A.C.S.; **Hancock, B.**, B.Sc., M.D., M.Sc. (Manitoba), F.R.C.S.C., F.A.C.S.; **Kassum, D.**, B.A., M.B., Ch.B., M.A. (Cambridge), F.R.C.S.C., F.R.C.S.; **Kaufmann, A.**, B.Sc.(Med.), M.D., M.Sc. (Manitoba), F.R.C.S.C.; **Khan, T.**, M.B., B.S. M.Sc. (East Pakistan), F.R.C.S., F.R.C.S.C., F.A.C.S.; **Latosinsky, S.**, B.E.Sc. (Western Ontario), M.D. (Toronto), F.R.C.S.C.; **Lipschitz, J.**, M.B., Ch.B. (Witwatersand.), R.C.S., F.C.S., F.R.C.P.C.; **Logsetty, S.**, B.Sc.(Med.); M.D. (Alberta), F.R.C.S.C.; F.A.C.S.; **MacMahon, R.**, M.B., Ch.B., B.A.O. (Ireland), F.R.C.S., F.R.C.S.C.; **Monson, R.**, M.D. (Manitoba), F.R.C.S.C.; **Murray, K.**, B.A., M.D. (Dalhousie), F.R.C.S.C.; **Pascoe, E.**, M.D. (Manitoba), F.R.C.S.C.; **Pathak, A.**, M.S.(Surg); Dip.Nat.Bd., F.R.C.S. (Glasgow), F.R.C.S. (Edinburgh), M.N.A.M.S.; **Sigurdson, L.**, M.D. (Queen's), M.Sc. (Dalhousie), MBA. (St. Mary's), F.R.C.S.C.; **Tan, L.**, B.Sc. (Dalhousie), M.D., C.M. (McGill), F.R.C.S.C.; **Thorlakson, T.**, M.D. (Manitoba), F.R.C.S., F.R.C.S.C., F.A.C.S.; **Torchia, M.**, M.Sc., Ph.D. (Manitoba), M.C.I.C., M.A.C.S.; **Vajcner, A.**, M.D. (Manitoba), F.R.C.S.C., F.A.C.S.; **Warrian, K.**, B.Sc.(Med.), M.D. (Manitoba), F.R.C.S.C.; **Wirtzfeld, D.**, M.D. (Alberta), F.R.C.S.C., F.A.C.S.; **Wiseman, N.**, B.Sc.(Med.), M.D. (Manitoba), F.R.C.S.C., F.A.C.S.; **Yaffe, C.**, M.D. (Manitoba), F.R.C.S.C.

Assistant Professors

Andrew, C., B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Arora, R.**, B.A. (Western Ontario), M.D. (Toronto), Ph.D. (Dalhousie), F.R.C.S.C.; **Assuras, G.**, M.D. (Toronto), F.R.C.S.C.; **Bard, R.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Barron, L.**, M.D. (Saskatchewan), F.R.C.S.C.; **Bartlett, L.**, M.D. (Western Ontario), F.R.C.S.C.; **Berrington, N.**, M.B., Ch.B. (South Africa), M.Med., F.R.C.S., F.C.S.; **Bohm, E.**, B.M.E., M.D. (McMaster), F.R.C.S.C.; **Bracken, J.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Burnell, C.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Cross, H.**, D.M.D., M.Sc. (Manitoba) C.P.D. (Connecticut); **Curran, J.**, B.D.S., F.F.D. (Ireland); **Dascal, M.**, M.D. (Buenos Aires); **Dharamsi, N.**, B.Ed., B.Sc., M.Sc., M.D. (Calgary), F.R.C.S.C.; **Drachenberg, D.**, B.Sc., M.D. (British Columbia), F.R.C.S.C.; **Dubberley, J.**, B.Sc. (Acadia), M.D. (Manitoba), F.R.C.S.C.; **Fraser, V.**, M.D. (Manitoba), F.R.C.S.C., F.A.C.S.; **Freed, D.**, M.D. (Alberta); Ph.D. (Manitoba), F.R.C.S.C.; **Goytan, M.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Graham, C.**, B.Sc., D.C., M.D. (Saskatchewan), F.R.C.S.C.; **Harding, G.**, B.Sc.(Med.), M.D. (Manitoba), F.R.C.S.C.; **Hayakawa, T.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Hedden, D.**, B.Sc., M.D. (Cape Town), F.R.C.S.C.; **Hochman, D.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Huebert, D.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Islur, A.**, B.Sc. (Western Ontario), M.D. (Toronto); **Jellicoe, P.**, B.Sc. (St. Andrews), MBChB. (Manchester), FRCS, LLM (Med Law); **Johnson, M.**, B.A., B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Koulack, J.**, M.D. (Manitoba), M.Sc. (Dalhousie), F.R.C.S.C.; **Krcek, J.**, B.A., M.Sc. (Western Ontario), Ph.D., M.D. (Calgary), F.R.C.S.C.; **Lee, J.**, M.D. (Toronto), M.Sc. (Western Ontario), F.R.C.S.C.; **Lekic, C.**, D.D.S., M.Sc.(Copenhagen), Ph.D. (Belgrade), F.R.C.D.C.; **Lum Min, S.**, M.D. (Calgary), F.R.C.S.C.; **Lysack, A.**, B.A., B.Sc., M.D. (Manitoba), F.R.C.S.C.; **MacIntosh, E.**, B.Sc., M.D., M.Sc. (Manitoba), F.R.C.S.C.; **Manji, R.**, M.D. (Alberta), Ph.D., F.R.C.S.C.; **McCarthy, B.**, B.Sc. (Manitoba), M.D.; **McDonald, P.**, M.D.(Hons.) (Toronto), F.R.C.S.C.; **McKay, A.**, B.Sc.(Med.); M.D., M.Sc. (Manitoba), F.R.C.S.C.; **McPherson, J.**, M.D. (Manitoba), F.R.C.S.C.; **Olivier, S.**, M.D. (Sherbrooke), F.R.C.S.C.; **Pilkey, B.**, B.Sc., M.D. (Saskatchewan), F.R.C.S.C.; **Moon, M.**, B.Sc.(Med.); B.Sc.(Gen.), M.D., (Manitoba); F.R.C.S.C.; **Psooy, K.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Raabe, M.**, B.Sc., M.D., M.Sc. (Manitoba), F.R.C.S.C.; **Ross, J.**, M.D. (Manitoba), F.R.C.S.C., F.A.C.S.; **Ross, L.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Saettler, E.**, M.D. (Western Ontario), F.R.C.S.C.; **Saranchuk, J.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.; **Sil-**

vaggio, J., B.Sc. (Queen's), M.D. (Toronto), F.R.C.S.C.; **Silverman, R.**, M.D. (Manitoba), F.R.C.S.C.; **Singal, R.**, B.Sc. (Winnipeg), B.Sc. (Med.), (Manitoba), M.D., M.Sc. (Surgery), FRCSC.; **Singh, G.**, M.B., B.S. (India), F.R.C.S.C., F.A.C.S.; **Srinathan, S.**, B.Sc.(Hons.), M.D. (McMaster), F.R.C.S.C., F.R.C.S.C.(C-Th); **Stimpson, R.**, M.D. (Manitoba), F.R.C.S.C.; **Stoykewych, A.**, B.Sc., D.M.D., N.D.E.B. (Manitoba); **Tanner, J.**, B.A., B.Sc.(Med.), M.D. (Manitoba), F.R.C.S.C.; **Taylor, H.**, M.D.(Manitoba), F.R.C.S.C.; **Thompson, S.**, B.Sc. (Manitoba), M.D. (McGill), F.R.C.S.C.; **Tufescu, T.**, B.Sc.(Hons.), (Toronto); M.D. (Queen's), F.R.C.S.C.; **Turgeon, T.**, B.Sc., M.D. (Western Ontario), F.R.C.S.C.; **Violago, F.**, M.D. (Manila), D.A.B.S., F.R.C.S.C., F.A.C.S.; **Williams, O.**, B.Sc., M.D. (Calgary), F.R.C.S.C.; **Yip, B.**, M.S. (Manitoba), M.D. (Western Ontario), Human Kinetics, (Windsor), F.R.C.S.C.

Lecturers

Anderson, B., B.A., B.Sc., M.D. (Manitoba), F.R.C.S.C.; **DeMuelenaere, P.**, M.B., Ch.B. (Pretoria), F.C.S. (South Africa); **Hussain, M.**, M.D. (Bangalori), F.A.C.S.C., F.A.C.S.; **Inglis, D.M.D.** (Manitoba); **Klippenstein, N.**, M.D. (Manitoba); F.R.C.S.C., F.A.C.S.; **Milner, J.**, B.Sc., M.D., M.Sc. (Alberta), F.R.C.S.C., F.A.C.S.; **Myers, W.**, M.D. (Manitoba), F.R.C.S.C.; **Reimer, D.**, B.Sc., M.D. (Manitoba), F.R.C.S.C.

Adjunct Professor

Tian, G., M.Sc., M.D. (China), Ph.D. (Ottawa).

Program Information

The program is designed to grant surgical residents a year free of clinical duties to work on a research project of their own design under the mentorship of a senior investigator. The purpose of the program is to encourage the development of surgical clinician scientists, who will become the academic leaders of surgery in the future. Many recent MSc (Surgery) recipients have gone on to careers in academic surgery or are still undertaking fellowship training with plans to assume an academic career in surgery.

Fields of Research

The research interests of the department reflect the diversity of the clinical specialties contained therein. These specialties comprise the following: general surgery; cardiac surgery; thoracic surgery; neurosurgery; orthopedics; urology; plastic surgery; vascular surgery.

Research Facilities

Research occurs within facilities provided by the advisor. Such individuals are University of Manitoba faculty, and generally have research facilities located at the Health Sciences Centre / University of Manitoba Bannatyne Campus or the St. Boniface Hospital Research Centre.

M.Sc. in Surgery

Admission

In addition to the admission requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this *Calendar*, this program is open to holders of an M.D. degree who are currently enrolled in a postgraduate residency program in the Faculty of Medicine at the University of Manitoba or holders of a D.M.D degree who are currently enrolled in the Faculty of Dentistry at the University of Manitoba. Candidates incorporate this program as part of their residency training, qualifying for both.

Program Requirements

In addition to the minimum course requirements of the Faculty of Graduate Studies found in the Graduate Studies Regulations Section of this *Calendar*, students must complete:

Twelve months' work of research, under the supervision of the director of research, Department of Surgery;

Submission of a major thesis on the research project;

Demonstration of an examining committee of satisfactory theses and an adequate knowledge of the subject involved.

Two fields of study must be chosen for the M.Sc. degree: one as a major and the other as an ancillary study. Major studies must be taken in any surgical problem, while the ancillary study should be selected from some related field (e.g., pathology, physiology, biochemistry).

Second language reading requirement: none

Expected time to graduate: one year

Ph.D.

Surgery does not offer a Ph.D. program

Course Descriptions

SURG 7010 Surgery: Major course in Surgical Problems Cr.Hrs.6 (Formerly 094.701) Description not available for this course.

SURG 7020 Surgery Cr.Hrs.6 (Formerly 094.702) Description not available for this

Section 78: Textile Sciences

Acting Head: Tammi S. Feltham

General Office: 205 Human Ecology Building

Telephone: (204) 474 8137

Fax: (204) 474 7592

E-mail: mail to: textile_sciences@umanitoba.ca

Website: umanitoba.ca/faculties/human_ecology/textiles/

Academic Staff

Associate Professors

Feltham, T., B.Sc., M.B.A. (Montana), Ph.D. (Queen's); **Horne, L.**, B.Sc.(H.Ec.), M.Sc. (Alberta), Ph.D. (Iowa State).

Assistant Professors

Zhong, W., B.Sc., Ph.D. (China Textile University); **Liu, S.**, B.Sc., M.Sc. (China Textile University), Ph.D. (UC Davis); **Rahman, M.**, B.Sc.(Dhaka), B.Ed. (Winnipeg), Ph.D. (Leeds).

Adjunct Professor

King, M.W., B.Sc. (Manchester), Ph.D. (Compigne)

Program Information

The Textile Sciences graduate program offers opportunities for in-depth study and technical and social dimensions of textile product development. The technical dimension includes research in the physical and chemical properties of textiles, and polymer science. The social dimension includes research in consumer behaviour toward textiles or textile products and marketing of textiles or textile products. The program comprises course work and a thesis.

Graduates from the program have found challenging careers in diverse fields. These include: technical product developer for medical/healthcare, industrial, and exercise and sports end uses, textile testing in industry or government research laboratories, post-secondary education, quality assurance, or a stepping stone to a Ph.D. degree.

Fields of Research

Faculty members are currently involved in research projects in many areas of the field. Research interests of faculty include: attitudes, values and interests of selected groups toward clothing, organizational and consumer decision-making for textile products, application of theories in consumer behaviour, marketing and economics to clothing-related phenomena, clothing for older adults, communication of apparel information to older consumers, textile product development, bio-protective textiles, sensory, physical, and chemical attributes related to the selection and performance of textile products, and skin/fabric interactions and their impact on clothing comfort and skin lesions.

Research Facilities

The department has well equipped laboratories for the study of textiles and textile products. Space and equipment are available for chemical, physical, microscopic and sensory investigations of textiles, for polymer synthesis and textile surface modification, for textile product development research, and for the study of consumer behaviour toward textile products. Special equipment includes an Instron tensile tester, an Atlas Fade-Ometer, a Nicolet iS10 FTIR spectroscopy, a Hunterlab colorimeter, a KES-SE Frictional Analyzer, a Porosimeter, a Tensiometer, a Electrospinner and a range of flammability, thermal comfort testers. A computer-aided design laboratory houses computers equipped with an industry-standard software system for textile product development. Campus facilities contribute to a quality environment for research. Students in the department have access to the special facilities and equipment of both the Departments of Family Social Sciences and Human Nutritional Sciences. The University of Mani-

course.

SURG 7030 Advanced Surgery Cr.Hrs.3 (Formerly 094.703) Description not available for this course.

SURG 7040 Surgical Epidemiology and Biostatistics Cr.Hrs.3 (Formerly 094.704) Prepare students to design studies suitable for a wide variety of research questions including diagnostic, etiologic and prognostic, and treatment outcomes, with focus on surgical issues. It should also provide the students with the essential biostatistical and epidemiologic tools to critique medical literature. The evaluation will be based on submission of a complete proposal to answer a research question of each student's choice.

toba libraries system holds major volumes of English-language periodicals in textile sciences and ancillary areas. Internet access is available throughout the Human Ecology Building. The University has numerous research institutes of potential relevance to the textile sciences graduate students. The Department of Textile Sciences maintains close relationships with the textile and related industries in Manitoba. Faculty are members of national or international organizations such as the Institute of Textile Science, the American Association of Textile Chemists and Colorists, the American Society for Testing and Materials, the American Chemical Society, the Administrative Sciences Association of Canada, The Academy of Marketing Science and The Association for Consumer Research.

M.Sc. in Textile Sciences

Admission

A baccalaureate degree with high standing is required. Applicants with a 4-year degree in Textile Sciences or its equivalent may be admitted to the Master's program. Those without a Textile Sciences major or its equivalent will normally be admitted to the Pre-Master's program. The Pre-Master's program involves a period of study, typically one year, to bring the standing of the student to the level of graduates with the B.Sc. degree at the University of Manitoba. Six credit hours of Statistics (or equivalent) are required by all applicants regardless of the type of baccalaureate degree. Undergraduate statistics courses taken by students from other universities will be evaluated by the Faculty of Graduate Studies for equivalency with STAT 1000 or STAT 2000 during the admission process. If those courses are not deemed as equivalents, students will be required to take these two courses in their program even though the credits cannot be included in their program. In addition to submitting the application form and academic transcripts, please submit a one to two page description of your research goals, career goals, and reasons for seeking admission into the Master's Program. The application must be accompanied by two letters of reference. Applicants whose first language is not English, or whose previous education has been conducted in a language other than English, must attain a TOEFL iBT 80 or an IELTS 6.5, or equivalent. Test scores that are two years or older are not acceptable.

Application Deadlines

Canadian/U.S. students and international students must submit their application and supporting documentation to the Faculty of Graduate Studies by December 1.

Program Requirements

Students will select a program appropriate to their educational career goals and the research activities of the faculty. The Master's program comprises a minimum of 18 credit hours of courses and a thesis. The coursework requirement is as follows: TXSC 7042 Preparation for Research in Textile Sciences, TXSC 7070 Seminar in Textile Sciences, TXSC ancillary at the 3000, 4000 or 7000 level* (maximum 9 credit hours), Ancillary: 3000 level or higher* (maximum 9 credit hours)* One of the ancillary courses must be at the 7000 level.

Second language reading requirement: none.

Expected time to graduate: two years.

Ph.D.

The Department of Textile Sciences does not offer a Ph.D. program.

Course Descriptions

TXSC 7042 Preparations for Research in Textile Sciences Cr.Hrs.6 The course helps students develop the essential skill set to complete an academic research proposal. By

integrating literature review and research methods, students will know how to seek, retrieve, critically assess and use information to develop a research topic, to formulate questions, and to make defensible methodological and data analysis decisions.

TXSC 7120 Topics in Textile and Apparel Marketing Cr.Hrs.3 (Formerly 064.712) A critical examination of practices in the production, distribution, and consumption of textiles and apparel.

TXSC 7162 Topics in Textile Sciences - Physical Properties Cr.Hrs.3 An in-depth study of the properties of fibres, yarns, fabrics, finishes and fabric assemblies using quantitative physical and sensory laboratory techniques.

TXSC 7164 Topics in Textile Sciences - Chemical Properties Cr.Hrs.3 An in-depth

study of the properties of textiles of modern and historic origin using qualitative and quantitative chemical and microscopic laboratory techniques.

TXSC 7166 Seminar in Textile Sciences Cr.Hrs.3 Critical study of development in selective areas of textiles and/or clothing with emphasis on recent research findings.

TXSC 7168 Problems in Textile Sciences Cr.Hrs.3 this course covers advanced problems in one or more of the following areas: chemical, physical, or biological properties and/or structure of textile materials; physiological aspects of textiles; consumer behaviour or marketing.

Important Sources of Information for All Students

Aurora student	aurora.umanitoba.ca
Student Bus Passes	Answers Information Booth, 1st Floor, University Centre
Computer Accounts	umanitoba.ca/claimid
Graduation and Convocation	umanitoba.ca/registrar
Fee Assessment	Aurora Student; go to Enrolment and Academic Records
Financial Aid and Awards	umanitoba.ca/student/fin_awards
Medical Insurance	UMSU Health and Dental Office, 110 University Centre (International Students: Registrar's Office, 400 University Centre)
Payment of Fees	umanitoba.ca/feepayment
Personal Counselling	Student Counselling and Career Centre, 474 University Centre Chaplains' Association, 102Y University Centre
Registration	umanitoba.ca/registrar (for information) Aurora Student (to activate registration)
Student I.D. Cards	umanitoba.ca/registrar
T2202A Education Tax Forms	Aurora Student; go to Enrolment and Academic Records and then Canadian Tax Forms
Transcripts	umanitoba.ca/registrar

Registration Information

IMPORTANT NOTE REGARDING GRADUATE FEES:

Registration is not complete until fee payment or fee payment arrangements are made with the Financial Services Office in writing. Do not wait for a fee statement to be mailed to you. Students are urged to check the section: "Fees, Payments and Refunds" found in this *Guide* and/or the graduate fee information which can be accessed at the following website: umanitoba.ca/student/records/fees

Registration Reminders

Have you:

- Submitted your Progress Report form?
- Met with your advisor or department for program approvals?
- Accessed Aurora Student to check for any timetable updates?
- Accessed Aurora Student to register for your courses?
- Accessed Aurora Student for a fee assessment?
- Paid your fees?

SECTION 1: Information for All Graduate Students

Welcome to the Faculty of Graduate Studies

Whether you are a new or returning graduate student, we hope you will familiarize yourself, not only with the information contained in this publication. Remember you are registering in a professional program leading to or supporting your career choice. Registering for courses that meet your department or your advisor's approval is your responsibility. However, your department office will be able to help you if you encounter difficulties in selecting or registering for courses.

Re-Registration Deadline

- All returning graduate students who intend to continue in their programs **must re-register and pay fees before September 8.**
- Any student whose program of study extends over more than one year **must re-register for September and January of each succeeding year of their program until a degree is obtained.**

Students who do not re-register in time will be subject to being "Discontinued" from their graduate programs. Students who have registered but have not paid in time will be subject to late fee payment or cancellation and discontinuation after this date.

Returning Students Progress Report

The Progress Report for graduate students in thesis/practicum project programs **must** be submitted to the Faculty of Graduate Studies at least prior to registration. Failure to submit this report will result in registration access being denied.

Initial Access Times

Access to registration times can be found in your Aurora Student account. Simply log in to Aurora Student, select Enrolment & Academic Records, select Registration, and then Registration Time and Status in order to view your access times for a given term.

1.1 Admission and Registration

Admission and registration in the Faculty of Graduate Studies is by recommendation from a unit/department offering graduate programs. Students are admitted and register in the following categories: Occasional, pre-Master's, Diploma, Master's or Ph.D. and normally may commence study in September, January or Summer Session.

Students are responsible for meeting the requirements of the program and ensuring they have the prerequisites for the individual courses for which

they register. Reference should be made to the current *Graduate Calendar* for detailed regulations and procedures of the Faculty.

Students whose program of study extends over more than one year must re-register each year until the degree is awarded. Students who fail to re-register do not retain the status of graduate student and must apply for re-admission. See above for re-registration deadline.

Undergraduate students are not allowed to register in graduate courses; that is, admission to the Faculty of Graduate Studies is a condition for registration in courses at the 6000 level and above.

Students wishing to register for courses that are offered by a department/unit outside their major department/unit must get the approval of the offering department.

1.2 Student Status

A student is considered to be full-time if the student is planning to carry the normal academic load of the department during the registration period. Graduate students who do not meet the criteria specified for full-time students should complete the form "Request for Part Time Status."

This form must be approved by the department head and advisor and submitted to the Faculty of Graduate Studies prior to registration.

1.3 Course Numbers for Graduate Studies

Registration for Thesis/Practicum or Comprehensive Examinations: Students who intend to graduate in the coming year (February, May or October) must register for their thesis, practicum or comprehensive examination requirement. Therefore, you *may* need to register for one of the following:

GRAD 6000 Summer Research

Only for those students commencing their programs in May or July when courses may not be available.

GRAD 6100 Visiting Canadian Student Research Course

To formalize the status of visiting Canadian Graduate Student Researchers. Students must meet the terms of the Canadian Graduate Student Research Mobility Agreement (CGSRMA), and submit the Visiting Graduate Student Research Authorization form to be eligible to register.

GRAD 7000 Master's Thesis

- fall term
(graduation in February or working on thesis during fall term only)
- fall & winter terms
(graduation in May or working on thesis during fall & winter terms)
- winter term
(graduation in May or working on of thesis during winter term only)

GRAD 7010 Master's Comprehensive Examination

- fall term (graduation in February or preparing for comprehensive exam during fall term only)
- fall & winter terms (graduation in May or preparing for comprehensive exam during fall & winter terms)
- winter term (graduation in May or preparing for comprehensive exam in winter term only)

GRAD 7020 Master's Re-registration**

GRAD 7022 Master's Re-registration

MBA and MPA students who are not registering for any courses in Fall and/or Winter terms must register in this course to retain status.

GRAD 7030 Master's Practicum

- fall term
(graduation in February or working on practicum during fall term only)
- fall & winter terms
(graduation in May or working on practicum during fall & winter terms)
- winter term (graduation in May or working on practicum during winter term only)

GRAD 7040 M.Eng. Project and Report (3)

GRAD 7050 M.Eng. Project and Report (6)

GRAD 7060 Diploma Re-registration**

GRAD 7090 Design Thesis

- fall term

(graduation in February or working on thesis during fall term only)

- fall & winter terms

(graduation in May or working on thesis during fall & winter terms)

- winter term

(graduation in May or working on of thesis during winter term only)

GRAD 7200 MFA Thesis/Studio Exhibition

GRAD 8000 Ph.D. Thesis

- fall term

(graduation in February or working on thesis during fall term only)

- fall & winter terms

(graduation in May or working on thesis during fall & winter terms)

- winter term

(graduation in May or working on of thesis during winter term only)

GRAD 8010 Ph.D. Candidacy Examination

GRAD 8020 Ph.D. Re-registration **

NOTE:

** The most efficient way to ensure that you are registered in order to retain status is to register for the "Re-Registration" course. Re-registration numbers are used by those students who are re-registering to retain status only - when not taking any courses or working on thesis/ practicum or comprehensive examination.

"Master's re-registration"

GRAD 7020 A02 (spanned course – both Fall and Winter term)

or

"Ph.D. re-registration"

GRAD 8020 A02 (spanned course – both Fall and Winter term)

Language Reading Tests

FREN 6000 French

FREN 6010 Spanish

FREN 6030 Italian

LATN 6000

GRMN 6000 German

RUSN 6000 Russian

1.4 Course Classifications

Students are responsible for determining the correct course classifications, sections and slots in consultation with their Department. Courses with the X, A, or O status must be added to a student's registration by the department, i.e., this cannot be achieved through Aurora Student.

- O Occasional Course is not part of the program and not included in the GPA (Additional fees will be assessed)
- X Auxiliary Course is not major requirement of the program but specified as necessary and required by the student's advisor or advisory committee and not included in the GPA.
- A Audit Course is not part of program, credit is not granted and grade will not be assigned. (Additional fees will be assessed)

1.5 Voluntary Withdrawal Dates

Graduate Students are not allowed to withdraw from courses without permission from their department head on recommendation from their advisor/advisory committee giving approval to the program change.

For further information, contact your home Department or the Faculty of Graduate Studies
(204) 474 9377, 500 University Centre.

Website: umanitoba.ca/graduate_studies

E-Mail: graduate_studies@umanitoba.ca

SECTION 2: Departmental Information for Aurora Student

For general information on Aurora Student, refer to the Registration Information section of this Guide. Graduate Students in the **following programs/units** must contact their respective units to register: **Law, I.A. Asper School of Business, Individual Interdisciplinary Programs, St. Boniface College (Education and Canadian Studies), Ph.D. in Foods & Nutritional**

Sciences. (Note: registration forms will not be mailed to students. The form can be accessed at the following Graduate Studies website: umanitoba.ca/graduate_studies/forms/)

2.1 Faculty of Agricultural and Food Sciences

Agribusiness and Agricultural Economics

New and returning students must meet with their program advisor to determine courses prior to registration. Courses must be listed on the departmental approval form available from the Graduate Studies Assistant, 352 Agriculture, and written approval granted from both the advisor and the department head or designate. Students may only register for courses listed and approved at that time. Any course revisions (additions and/or withdrawals) must be approved in the same manner. The signed form must be submitted to Judy Powell, who will then complete the registration process.

Not all courses are offered each year.

Registration and program enquiries:

Judy Powell, 352 Agriculture Building; **Phone** (204) 474-9259;

E-mail: judy_powell@umanitoba.ca

Animal Science

All students in the graduate program must meet with their advisor/advisory committee to determine courses. Courses must be listed on the departmental approval form (available from the Animal Science General Office) and written approval granted from both the advisor and the department head or designate. Registration revisions are to be dealt with and approved in a like manner.

Not all courses are offered each year.

Registration and program enquiries:

Cathy Plouffe, 201 Animal Science Building; phone: (204) 474-6028;

Fax: (204) 474-7628

E-mail: animal_science@umanitoba.ca

Entomology

Prior to registration, students must consult with their advisor and then present a completed registration approval form to the department head. Any changes after the initial registration must also be approved by both advisor and department head.

Registration approvals contact N.J. Holliday, phone (204) 474-6020, email: Neil_Holliday@UManitoba.CA

Registration assistance contact K. Graham, phone (204) 474-8077, email: grahamk@Ms.UManitoba.CA

Food Science

Prior to registration, students must consult with their advisor and then present a completed registration approval form to the department head. Any changes after the initial registration must also be approved by both advisor and department head.

Courses are subject to cancellation if there is insufficient enrolment. Courses with insufficient enrolment will be cancelled the first week of classes.

Registration enquiries: Allison Cranmer, 250 Ellis Building; phone (204) 474-9621

Registration approvals: Dr. Gary Fulcher, phone (204) 474-9065; gary_fulcher@umanitoba.ca

Plant Science

All students in the graduate program must meet with their advisor/advisory committee to determine courses. Courses must be listed on the departmental approval form (available from the Plant Science General Office) and written approval granted from both the advisor and the department head or designate. Registration revisions are to be dealt with and approved in like manner. Not all courses are offered each year.

Registration and program enquiries:

Martha Blouw, 226 Agriculture Building; phone: (204) 474-8223;

Fax: (204) 474-7528

E-mail: plantscience_gradstudies@umanitoba.ca

Soil Science

Registration inquiries: Lynda Closson (Lynda_Closson@umanitoba.ca), phone: (204) 474-8153.

Program information: Dr. David Lobb (lobbda@ms.umanitoba.ca), Chair, Graduate Studies Committee.

2.2 Faculty of Architecture

Continuing Courses (CO'S): Students who are unable to complete a course may receive a mark classification of CO until such time as a final grade can be established. The deadline for completion is normally not later than one-year from the end of the term in which the course was originally registered.

If the course is not completed by the next September and the students intend completing the course(s), they must *re-register* for the course(s).

If you have any questions regarding registration that are NOT answered in the Registration Guide, please contact one of the Graduate Student Advisors as noted below.

Architecture

Please refer to the information communicated to you on course selection and requirements.

<http://umanitoba.ca/faculties/architecture/programs/113.htm>

Graduate Student Advisor: Gloria Baudry (204) 474-9286; fax (204) 474-7532;

baudrygi@cc.umanitoba.ca; 201 Russell Building.

Graduate Student Advisor: Jodena Baertsoen (204) 474-8763; fax (204) 474-7532;

baertsoe@cc.umanitoba.ca; 201 Russell Building.

City Planning

Please refer to the information communicated to you on course selection and requirements. All new students must meet with their faculty advisor within the first month of classes. Students with registration issues should meet with City Planning

Graduate Student advisor during the last two weeks in August or first week in September.

<http://umanitoba.ca/cityplanning>

Graduate Student Advisor: Yvonne Halden (204) 474-8769; fax (204) 474-7532

haldenyl@cc.umanitoba.ca; 201 Russell Building.

Interior Design

Prior to registration, all new students must contact the Graduate Student Advisor, between mid-August and commencement of classes, who will determine whether a meeting with the Department Head is required. Timetable changes may occur throughout the summer. Department course list offerings and elective offerings are posted on the architecture website at <http://umanitoba.ca/interiordesign>

Graduate Student Advisor: Yvonne Halden (204) 474-8769; fax (204) 474-7532

haldenyl@cc.umanitoba.ca; 201 Russell Building.

Landscape Architecture

All new students should meet with the Department Head and must meet with the Graduate Student Advisor before registering. Returning students with registration issues should make an appointment with the Graduate Student Advisor prior to the first week in September. Courses may be cancelled if there is insufficient enrolment. Department course offerings and elective offerings will be mailed out and are also posted on the department website:

<http://umanitoba.ca/landscapearchitecture>

Graduate Student Advisor: Yvonne Halden (204) 474-8769; fax (204) 474-7532

haldenyl@cc.umanitoba.ca; 201 Russell Building

Design and Planning

Graduate Student Advisor: Yvonne Halden (204) 474-8769; fax (204) 474-7532

haldenyl@cc.umanitoba.ca; 201 Russell Building

2.3 Faculty of Arts

Anthropology

All students in the graduate program must meet with their advisor to determine their course load. Courses must be listed on the departmental approval form (available from the Anthropology general office) and written approval granted from both the Advisor and the department head or designate. Registration revisions are to be dealt with and approved in like manner.

Registration and program enquiries:

General Office, 435 Fletcher Argue Building; phone: (204) 474 9361;

Fax: (204) 474 7600

Email: um-anthro@cc.umanitoba.ca

Economics

Prior to registering, all students must meet with a member of the Economics Department Graduate Studies Committee to determine their course load. The course load resulting from this meeting must be listed on the Departmental Course Approval Form (available from, 504 Fletcher Argue), and the form must be signed by a Graduate Studies committee member. The signed form must be submitted to Betty McGregor, 504 Fletcher Argue, who will then complete the registration process.

All course additions and withdrawals (registration revisions) must be approved in the same manner.

Registration and program enquiries:

Betty McGregor, 504 Fletcher Argue Building; **Phone** (204) 474 6240

E-Mail: Betty_McGregor@umanitoba.ca

English

All students (new and returning) must have their courses approved by the graduate chair prior to registering. Any courses added/dropped/changed must be at all times approved by the graduate chair. Only those courses that have been approved will be credited to your program. Courses are subject to cancellation if there is insufficient enrolment.

Students are reminded that they must satisfy the language requirement prior to scheduling their thesis defence.

Registration Enquiries: English Graduate Program Assistant;

623 Fletcher Argue Building; phone (204) 474-7365, 8:30 a.m. to 4:30 p.m.

French, Spanish and Italian

All returning and newly admitted students must consult with the graduate chair or the department head prior to registration. Students must fill out a pre-registration form which must be signed by the graduate chair or department head and submitted to Vonne Bannavong, 430 Fletcher Argue, who will then complete the registration process.

Registration enquiries: Vonne Bannavong, 430 Fletcher Argue;

phone: (204) 474 9313; E-mail: Vonne_Bannavong@umanitoba.ca

German and Slavic Studies

Prior to registration in German or Slavic Studies, students must consult with the graduate chair or the department head. Departmental office: 328 Fletcher Argue; phone: (204) 474-9370; fax: (204) 474-7601.

History

All new and returning students are required to see the chair or department head prior to attempting to register.

Students may only register for courses listed and approved on the Departmental Graduate Student Registration Form, available at the time of your meeting with the graduate chair. Any course registration revisions (addition and/or withdrawals) must be approved in the same manner. Your program, including the registration of the right courses, is your responsibility.

Students are reminded that they must satisfy the language requirement prior to graduation (French for Canadian History students).

Pre-Master's, Joint Master's and Ph.D. students may take 4000- and 7000-level courses offered by the Department of History at the University of Winnipeg. Consult the History Department, University of Manitoba for information on course offerings and registration.

Registration Inquires: Carol Adam, 403 Fletcher Argue Building;
Phone: (204) 474 8401
Email: carol_adam@umanitoba.ca

Icelandic Studies

Prior to registration for graduate courses in Icelandic, students must consult with the department head: Dr. Birna Bjarnad—ttir, 372 University College;
Phone: (204) 474 9551

Linguistics

Students must meet with their program advisor/thesis supervisor to determine course load. These courses must be approved by the department's Graduate Committee. All course additions and withdrawals (registration revisions) must be approved in the same manner.

For registration and program enquiries:
Debbie Spindler, 534 Fletcher Argue Building; **Phone:** (204) 474 9596.
E-mail: spindlr@cc.umanitoba.ca

Native Studies

All students must meet with the Graduate Program Chair to determine their course load. Prior to registering, students must have written approval from the Graduate Program Chair to take selected courses. All course additions and withdrawals (registration revisions) must be approved in the same manner.

For registration and program enquiries: Shirley McFaren, Graduate Program Assistant, 204E Isbister Building, phone (204) 474 9899.
E-mail: mcfaren@cc.umanitoba.ca

Further assistance is available from: Dr. Renate Eigenbrod, Graduate Program Chair, 204D Isbister Building, phone (204) 474 7026
E-mail: eigenbro@ms.umanitoba.ca

Philosophy

All students (new and returning) in the Master's and pre-Master's programs of the Department of Philosophy must have their courses approved by the graduate chair prior to registering. Students may only register for, and will only receive credit for, those courses approved by the graduate chair.

Graduate Chair: Rhonda Martens, 456 University College;
phone: (204) 474 9104; fax: (204) 474 7586.
Email: martensr@cc.umanitoba.ca

Registration Enquiries: Sandi Mazur, 453 University College;
phone (204) 474 6878.

Political Studies/Public Administration (MPA)

All new and returning students are required to have their registration pre-approved by the Chair or designate prior to attempting to register (appointments must be held prior to July 1).

Students may only register for courses listed and approved on the Departmental Graduate Student Registration Form, available at the time of your meeting with the graduate chair. Registration revisions (addition and/or deletion) must be approved in the same manner.

Students may need to register for POLS 6010 Manitoba Legislative Internship.

Registration Inquiries: Erika Ing, 532 Fletcher Argue Building; phone (204) 474 9733; Email: inge@cc.umanitoba.ca

POLS 6010 Manitoba Legislative Internship

Registration Inquiries: Erika Ing, 532 Fletcher Argue Building; phone (204) 474 9733; Email: inge@cc.umanitoba.ca

Psychology

Prior to registration, all students (new and returning) must meet with their advisor to determine their program of study. Courses must be listed on a Departmental Program Registration Form (available on the web at umanitoba.ca/arts/psychology/graduate/forms.html). The form must be signed by

the advisor and the graduate programs coordinator). Clinical Program students must obtain the director of clinical training's signature prior to that of the graduate programs coordinator. Only those courses that have been approved by the graduate office will be credited to a student's program. See the Registration Information section of this Guide for registration procedures.

All course additions and withdrawals (registration revisions) must be approved in the same manner.

Contact registration and program enquiries: e-mail: psych_grad_office@umanitoba.ca

Religion

To obtain written approval for courses before registration, all students in the Religion Joint Master's Program must meet either the chair of the Joint Discipline Committee, Religion, or with the department head or designate. All Ph.D. students must meet first with the head, Department of Religion. Course additions and withdrawals must be approved in the same way.

Sociology

All new and returning Pre-Masters, M.A., and Ph.D. students must meet with the Chair of Graduate Studies in Sociology to discuss their program of study (usually in late August). The Graduate Program Assistant will then register the student. All course additions and withdrawals must be arranged in a similar fashion.

For registration and program inquiries: Margaret Currie, Sociology Graduate Program Assistant, 320B Isbister Building, phone: (204) 474-9260.
Email: Margaret_Currie@umanitoba.ca

2.4 Clayton H. Riddell Faculty of Environment, Earth, and Resources

Environment, Earth, and Resources and Geography

All students must meet with their program advisor/thesis supervisor to determine their course selections. Courses must be listed on the Departmental Registration Approval Form (available from the departmental office) and written approval from the advisor and department head or designate must be obtained. Students are also responsible for obtaining any instructor or special permission which may be required for certain courses.

All course additions and withdrawals (registration revisions) must be approved in the same manner.

Registration and program enquiries: Pat Gutoski
210 Isbister Building; phone (204) 474 7065.
E-mail: gutoski@cc.umanitoba.ca

Geological Sciences

All students must consult with their advisor prior to registration and present a completed Program Form to the administrative assistant. The selection of courses and changes in a student's program must be approved by their advisor in the case of Masters students or their advisory committee in the case of doctoral students.

Students should consult the administrative assistant regarding the schedule of graduate course offerings in the department. Please note that some courses require a field component to be run before lectures begin in the fall. Courses with insufficient enrolment may be cancelled well in advance of the first week of lectures.

Registration inquiries: Brenda Miller
phone (204) 474-677; E-mail: brenda_miller@Umanitoba.ca

Natural Resources Institute

All returning and newly admitted students to the Natural Resources Institute are required to see their faculty advisor to complete their Degree Requirement Form prior to attempting to register. Appointments can be made by calling (204) 474 8373. Only courses that have been approved by the faculty advisor will be credited to a student's program.

Registration Inquiries: Dalia Naguib, 303 Sinnott Building;
phone (204) 474 8373.

2.5 Faculty of Dentistry

Oral Biology

All new or returning graduate students must have identified a faculty member willing to act as thesis supervisor. This must be done through personal interviews prior to registration. All programs of study must be approved by the department head or chair of the Graduate Studies and Research Committee.

Not all departmental graduate level courses are offered each year. Consult with appropriate faculty members.

Consult the department office for a list of courses offered.

Enquiries may be made: Chair, Graduate Studies and Research Committee; phone (204) 789 3705.

Oral and Maxillofacial Surgery

Graduate students in Oral and Maxillofacial Surgery will be registered by the office assistant in Dental Diagnostic and Surgical Sciences. Prior to registration, a personal interview will be held with the head of the program to approve all programs of study.

Consult the department office for a list of courses offered.

Enquiries: phone: (204) 789 3633 or e-mail: Oral_Surgery@umanitoba.ca

Periodontics

Graduate students in Periodontics will be registered by the office assistant in Dental Diagnostic and Surgical Sciences. Prior to registration, a personal interview will be held with the head of the program to approve all programs of study.

Consult the department office for a list of courses offered.

Enquiries: Periodontics, phone: (204) 789 3633 or e-mail: Periodontics@umanitoba.ca

Preventive Dental Sciences (Orthodontics)

All new and returning students are required to have their registration processed by the Program Assistant.

Registration and program enquiries: Cathy Watt, Program Assistant, Orthodontics at (204) 789-3628 or e-mail: Cathy_Watt@umanitoba.ca

2.6 Disability Studies

Students must meet with their program advisor to select and receive approval for courses to be taken, prior to registration. Any course revisions (additions and/or withdrawals) must be approved in the same manner.

Continuing Courses (CO's)

Students who are unable to complete a 7000 level course may receive a mark classification of CO until such time as a final grade can be established. The deadline for completion is normally not later than one year from the end of the term in which the course was originally registered. If the course is not completed by August 31, students must re-register for the course for the next academic session in order to receive a grade.

Enquiries: Disability Studies Office (Room 128 Education Building) phone (204) 474 7017.

2.7 Faculty of Education

It is recommended that students read the registration information relevant to graduate students before attempting to register.

2.7.1 Initial Access Times

Students are referred to the Chapter, Registration Information: Aurora Student.

Students must ensure that courses to be taken have been approved and entered on their program approval form. If not approved, students should meet with their program advisor to select and approve the courses to be taken.

2.7.2 Registration Assistance

Graduate Programs and Research Office
227 Education Building
Office Hours: 8:30 a.m. to 4:30 p.m. Monday to Friday
Telephone: (204) 474 7886 or Toll Free in Manitoba 1 800 432 1960
Fax: (204) 474 7551
E-mail: edgradpr@ms.umanitoba.ca
Website: umanitoba.ca/education

2.7.3 Continuing Courses (CO'S)

Students who are unable to complete a 7000 level course may receive a mark classification of CO until such time as a final grade can be established. The deadline for completion is normally not later than one year from the end of the term in which the course was originally registered. If the course is not completed by August 31, students must re-register for the course(s) for the next academic session in order to receive a grade.

2.7.4 Occasional Students

Prior to registration, students must obtain written permission from the department head for 7000 level Education courses. This permission must be submitted to the Graduate Programs and Research Office prior to attempting to register.

2.7.4 Registration for student initiated courses

Prior to registration for student initiated courses, students must have the Student Initiated Form approved by their instructor and the department head and submitted to the Graduate Programs and Research Office. Upon receipt of the form, a Faculty of Education staff will activate the course and contact the student with further instructions.

2.7.5 Registering for courses offered in other faculties

Education graduate students wanting to register for graduate courses outside the Faculty of Education are encouraged to contact the department concerned for registration procedures. In some cases, written approval may be required from the instructor and department head of the course requested. The written approval must be presented to the Graduate Programs and Research Office prior to attempting to register.

2.7.6 Students Registered in Other Faculties or Schools

Students registered in other faculties or schools see Chapter The Registration System: Aurora Student, for registration access dates to Education courses.

2.7.7 Visiting Students

Students who are working on a graduate program at another institution and wish to register for a graduate course at the University of Manitoba with the express purpose of having credit transferred to their home university must apply for admission to the Faculty of Graduate Studies by the published application deadline dates. Also, a letter of permission from their home university must be submitted to the Graduate Programs and Research Office, Faculty of Education prior to registration. For registration dates see Chapter The Registration System: Aurora Student.

2.8 Faculty of Engineering

Courses are subject to cancellation if there is insufficient enrolment. Courses with insufficient enrolment may be cancelled the first week of classes. Not all courses will be offered each year — contact the department for courses that will not be offered. All returning and newly admitted students must see an academic advisor or the department head prior to attempting to register.

Biosystems Engineering

Registration inquiries: Debby Watson, E2-376 EITC;
phone (204) 474 6033; email: debby_watson@umanitoba.ca

Civil Engineering

Registration Inquiries: Connie Wenzoski, E3-386 EITC;
phone (204) 474 8596; email: wenzoski@ms.umanitoba.ca

Electrical and Computer Engineering

Registration Enquiries: Karin Kroeker; Room E2-390 EITC
phone (204) 474 9603; email: karin_kroeker@umanitoba.ca

Mechanical and Manufacturing Engineering

Registration inquiries: Kusum Vyas, E2-327 EITC;
phone (204) 474 6540; email: vyas@cc.umanitoba.ca

2.9 Faculty of Human Ecology

Textile Sciences

All returning, newly admitted and occasional students must have their course selections and withdrawals approved by their advisor prior to registration.

Registration Inquiries: please see your advisor.

Application Inquiries: Dr. Wen Zhong, H517 Duff Roblin Bldg., phone: (204) 474-9913

Email: zhong@cc.umanitoba.ca

Family Social Science

Prior to registration students must get approval for courses from their advisor.

Readings course: Prior to registering for a Readings course, students must arrange for a faculty member to direct in the course and get approval from the Family Social Sciences department head.

Registration inquiries:

Secretary, Family Social Sciences Department;
phone (204) 474 9225; email: family_social_sciences@umanitoba.ca

Human Nutritional Sciences

All returning or newly admitted graduate and occasional students must see a faculty advisor or the department head, and submit their course plan, prior to registering.

Registration enquiries: Pat Parish, Office Assistant; phone (204) 474 9901.

For program information contact Dr. Rotimi Aluko, Chair, Graduate Studies Committee; phone (204) 474-9555

2.10 Faculty of Kinesiology and Recreation Management

Program Approval Form

All new students must complete a Graduate Program Approval Form, in consultation with their advisor, and submitted to the Graduate Program Chair, prior to registering for courses. Only courses that are included on the Program Approval Form will be credited to the student's program of study. The Advisor and Graduate Program Chair must approve any changes made to the Program of Study.

Directed Study

Students may complete a maximum of two directed study courses as part of their Master's program degree requirements. Students, in conjunction with the advisor for the course, must complete a Directed/Individual Study form. This form must include a description of the course work to be completed and an outline of how the final grade will be determined. This form must be approved by the Graduate Program Chair and filed with the Graduate Program Assistant who will register the student for the course.

Registration and Program Assistance

Janis McGonigle, HLHP Research Institute General Office; phone 474 7493; fax: 261 4802;
e-mail: janis_mcgonigle@umanitoba.ca

2.11 Faculty of Management

For information regarding the Asper MBA program, contact the Asper Graduate Program Office at:

Phone: (204) 474-8448

Email: aspermba@umanitoba.ca

For information regarding the Asper Ph.D. and M.Sc. programs, contact the Asper Graduate Program Office at:

Phone: (204) 474-8448

Email: asper_phd_msc@umanitoba.ca

2.12 Faculty of Medicine

Biochemistry and Medical Genetics

All new and returning graduate students in the department of Biochemistry and Medical Genetics are required to complete a Course Approval Form available on the website:

<http://umanitoba.ca/faculties/medicine/units/biochem/student/2784.htm>

umanitoba.ca/faculties/medicine/biochem/programs/registration_steps.html

or in the general office, in consultation with their supervisor **prior** to registering for courses and making program changes. The Course Approval Form must be signed by the student, supervisor, graduate chair or the department head and submitted to the graduate program coordinator. Only courses that are included on the Course Approval Form will be credited to the student's program. All course additions and withdrawals (registration revision) must be approved in the same manner by completing or filling out the Registration Revision Form available on the website:

http://umanitoba.ca/faculties/graduate_studies/media/registration_revision.pdf

Consult the department office or browse the web for a list of course offerings.

<http://umanitoba.ca/faculties/medicine/units/biochem/student/graduate.html>

umanitoba.ca/faculties/medicine/units/biochem/programs/graduate

It should be noted that not all courses are offered every year and some courses will be held only with a minimum enrolment. Please check the Aurora catalog to find out when a course is offered (https://aurora.umanitoba.ca/banprod/bwckctlg.p_disp_dyn_ctlg)

Registration enquiries: Mrs. Tuntun Sarkar

Email: sarkar@cc.umanitoba.ca

Phone: (204) 789-3399

Community Health Sciences

Prior to registration, all students must have obtained permission from the relevant course instructor and both their academic/thesis advisor and the graduate director (or designate). The program approval form is available from the Graduate Program office and on our website. Only courses that are listed on the Program Approval Form may be credited towards the student's program of study. All course additions and withdrawals are to be handled in like manner.

Not all courses are offered each year. Contact the Graduate office for a list of current course offerings.

Registration enquiries: Theresa Kennedy, S111, Medical Services Building, **Phone:** (204) 789-3655

Human Anatomy and Cell Science

Prior to registration, all new and returning students must meet with their advisor or the Chair, Graduate Studies Committee in the Department to determine their program of study. All course additions and withdrawals (registration revisions) must be approved in the same manner. The Program Approval Form must also be signed by the Chair, Graduate Studies Committee or Department Head.

Consult the department office for a list of courses offered.

Registration and program enquiries: phone (204) 789 3411;
(204) 789 3652 or email: anatomycellsci@umanitoba.ca

Immunology

All new and returning students must meet with their advisor to determine their program of study prior to registration. Once the student has met with their advisor and subsequently receives approval from the Department Head, they must contact the Administrative Assistant, who will register the student in their courses.

All course additions and withdrawals (registration revisions) must be approved in the same manner.

Consult the department office for a list of courses offered in 2006-07.

Registration and program enquiries:

Karen Morrow, Administrative Assistant phone (204) 789 3509;
email: kmorrow@cc.umanitoba.ca

Medical Microbiology

Prior to registration, all new and returning students must meet with their advisor to determine their program of study. Students should register themselves by signing up for the Aurora Student service on the University of Manitoba website. If difficulties are incurred students may contact the Graduate Studies Committee Office Assistant as per the information below.

All course additions and withdrawals (registration revisions) must be approved in the same manner.

Not all courses are offered each year. Contact the department for a list of course offerings.

Registration and program enquiries, phone (204) 789 3444;
email: nelsonak@ms.umanitoba.ca

Medical Rehabilitation

Prior to registration, all new and returning students must meet with their advisor to determine their program of study.

All course additions and withdrawals (registration revisions) must be approved in the same manner.

Not all courses will be offered each year. Please check the Aurora catalog to find out when a course is offered
(https://aurora.umanitoba.ca/banprod/bwckctlg.p_disp_dyn_ctlg).

Registration and program enquiries, phone (204) 789 3259;
email: msc_med_rehab@umanitoba.ca

Occupational Therapy

Master of Occupational Therapy (M.O.T.) students are required to register themselves through Aurora Student. Aurora Student is available 7 days per week, 24 hours per day (subject to minor scheduled and unscheduled outages in off-peak hours), thus providing students with greater access/flexibility regarding the registration process.

To begin registration, go to the University of Manitoba home page (umanitoba.ca) and click on 'Aurora Student' under the Student Links section. Click on 'Enter Secure Area'. Log in using your student number and PIN (Personal Identification Number) from MyUMInfo. If you have forgotten your PIN number, please contact the Registrar's Office at (204) 474-9420 for assistance. If you do not yet have a PIN number, enter your birth date as instructed (YYMMDD). Follow all prompts to set your security access. Before continuing, you will be asked to agree to 'Terms of Use'. Once you agree, you will be taken to the 'Main Menu'. Under the 'Personal Information' tab, you can change your PIN, update your address, etc.

Click on 'Enrolment and Academic Records'. Select 'Registration', then 'Add/Drop Classes'. You will be asked to choose a 'Term'. Register in both the Fall and Winter Terms, i.e. listed as 'Fall 2009' and 'Winter 2010'. Ensure that you have chosen the correct term where the course is being offered; if the incorrect term is entered, the CRN for the course you want to register for will not appear. An e-mail will be sent to advise students when the Aurora Student system is available to accept Summer Session registrations, i.e. listed as 'Summer Session 2010'. Register for the courses that pertain to the respective year that you are entering into (note that you will only be required to enter the course reference number (CRN) that pertains to each of the courses listed in that specific year of the program; each year, new CRNs are assigned to courses). CRNs will be available via the Department. As soon as the CRNs become available, students will have that info e-mailed to them using their address listed in Aurora. Students are required to "Submit Changes" after completing any Add/Drop transactions. If encountering registration errors when trying to register for several courses during one transaction, please register for one course at a time (saving after each entry). In most cases, this will rectify the problem. To log out of the system, it is important that you click on the 'Exit' button.

After you have registered in all of the courses pertaining to the year in which you will be entering, use Aurora Student to obtain a fee assessment. Pay all fees by the fee payment deadlines published.

Registration Exceptions

Students who have a failing grade(s) registered against them and/or have other outstanding academic matters (i.e. deferred or supplemental examinations, modified program, etc.) in regards to the previous academic session will not be allowed to register using Aurora Student until instructed to do so. Students falling into this category should initially contact Donna Collins at (204) 789-3422 or dcollin@cc.umanitoba.ca for further information.

First Year M.O.T. Student Information

Courses in the first year of the program are as follows:

Fall 2009

Dept. Name	Dept. Code	Course No.	Credit Hrs.
Occupational Therapy	OT	6100	6
Occupational Therapy	OT	6110	3
Occupational Therapy	OT	6120	3
Occupational Therapy	OT	6130	3
Occupational Therapy	OT	6140	7
Occupational Therapy	OT	6190	1
Occupational Therapy	OT	6200	4

Winter 2010

Dept. Name	Dept. Code	Course No.	Credit Hrs.
Occupational Therapy	OT	6300	4
Occupational Therapy	OT	6310	4
Occupational Therapy	OT	6320	4
Occupational Therapy	OT	6330	4
Occupational Therapy	OT	6350	4

Summer Session 2010*

Dept. Name	Dept. Code	Course No.	Credit Hrs.
Occupational Therapy	OT	6400	8

* Students will be advised when the Aurora Student system is available to accept Summer Session 2010 registrations.

Total credit hours for First Year: 55

Second Year M.O.T. Student Information

Courses in the second year of the program are as follows:

Fall 2009

Dept. Name	Dept. Code	Course No.	Credit Hrs.
Occupational Therapy	OT	7540	4
Occupational Therapy	OT	7560	6
Occupational Therapy	OT	7570	6
Occupational Therapy	OT	7750	6

Winter 2010

Dept. Name	Dept. Code	Course No.	Credit Hrs.
Occupational Therapy	OT	7600	8
Occupational Therapy	OT	7740	4
Occupational Therapy	OT	7760	6
Occupational Therapy	OT	7770	6

Summer Session 2010*

Dept. Name	Dept. Code	Course No.	Credit Hrs.
Occupational Therapy	OT	7800	6

* Students will be advised when the Aurora Student system is available to accept Summer Session 2010 registrations.

Total credit hours for Second Year: 52

Total program credit hours: 107

Registration Assistance

When registering for courses, if problems are encountered that you cannot resolve on your own, contact Doris Weigel at (204) 789-3248 or dweigel@cc.umanitoba.ca. Your queries will be addressed as soon as possible.

Students on Hold

If your records are on Hold, you are prevented from any registration transaction until you have cleared this status.

Applying to Graduate

The O.T. Department will notify the Department of Graduate Studies about your eligibility to graduate. You will receive a verification letter from the Registrar's Office confirming relevant graduation information such as name, address, degree sought and date of graduation. Amend any errors in the verification and return it to the Registrar's Office immediately to ensure time for correction.

Change of Address

You are responsible for updating your home/permanent addresses using Aurora Student. So as to keep your School of Medical Rehabilitation personnel file up to date, also provide your address changes to the General Office of School of Medical Rehabilitation.

E-mail Accounts

All students are expected to have an e-mail account with the University of Manitoba. As a student in the School of Medical Rehabilitation, you are expected to check your University of Manitoba e-mail regularly.

Pathology

All programs of study must be approved by the Chair of Graduate Studies or by the Department Head.

Not all courses are offered each year. Please consult with the department office or appropriate faculty members.

Enquiries: Dr. Y. Myal, Chair, Graduate Studies, phone (204) 789 3538.

Pharmacology

Prior to registration, all new and returning students must meet with their advisor and Pharmacology Director of Graduate Studies to determine their program of study.

All course additions and withdrawals (registration revisions) must be approved in the same manner. Consult the department office for a list of courses offered.

Registration and program enquiries, phone (204) 789 3553;
email: pharmacology@umanitoba.ca

Physiology

Prior to registration, all new and returning students must meet with their advisor to determine their program of study.

All course additions and withdrawals (registration revisions) must be approved in the same manner.

Not all courses are offered every year and some courses will be held only with a minimum enrolment. Consult the department office for a list of courses offered.

Registration and program enquiries, phone (204) 789 3764;
email: mcindle@ms.umanitoba.ca

Surgery

All new or returning graduate students must contact the Department: phone (204) 787 7277; email: mbrychka@hsc.mb.ca.

2.13 Marcel A. Desautels Faculty of Music

All graduate students must meet with the Faculty's Registrar to obtain and complete a course approval form: this form will list the student's proposed course schedule. Students must receive written approval from both their advisor and the Chair of the Grad Studies program before registering. Registration revisions are to be approved in a like manner.

Not all courses are offered each year: please check with the Faculty's Registrar for current and upcoming offerings.

Registration and program enquiries: Registrar, 206 Music Building; phone: (204) 474-9133; Fax: (204) 474-7546; email: sleeson@cc.umanitoba.ca

New Supplemental Regulations governing the Marcel A. Desautels Faculty of Music graduate programs came into effect July 2008. Supplemental Regulations may be found on the Faculty of Graduate Studies website or at umanitoba.ca/music, Future Music Students, Graduate Studies.

2.14 Peace and Conflict Studies

Prior to registering, all students (new and returning) must meet with their program advisor to select and receive approval for courses to be taken. Any course revisions (additions and/or withdrawals) must be approved in the same manner.

Registration and program enquiries:

Mauro Centre, 252 St. Paul's College

Phone: (204) 474 6052

Fax: (204) 474 8828

Email: mauro_centre@umanitoba.ca

2.15 Faculty of Pharmacy

All students in the graduate program must meet with their advisor/advisory committee to determine courses. Courses must be listed on the Faculty Approval Form (available from the Pharmacy General Office) and written approval granted from both the advisor and the graduate chair. Any registration revisions (withdrawals or additions) are to be dealt with and approved in a like manner. Graduate students who register in any course that is not approved by the advisor will be withdrawn from the course.

Not all courses are offered each year. Registration inquiries: Phone (204)474-6008.

2.16 Faculty of Science

Chemistry

All returning and new graduate students in the Department of Chemistry must complete a Graduate Program Approval form and consult with the Academic Programs Administrator. The selection of courses and changes in a student's program must be initiated by their graduate advisor in the case of Masters students or their advisory committee in the case of doctoral students. Students should consult the Academic Programs Administrator.

Registration assistance: Heather Paterson; phone 474 6243;
e-mail heather_paterson@umanitoba.ca

General inquiries should be directed to the general office, 360 Parker;
phone 474 9321, e-mail chemistry_dept@umanitoba.ca

Computer Science

All students must consult with their advisor prior to registration and hand in a completed registration form for approval to E2-445 EITC. Any changes, after the initial registration, must also be approved by the advisor.

See the sections, Registering for Thesis and Practicum, and Graduate Studies Course Numbers.

A listing of available courses can be picked up at the departmental general office, E2-445 EITC. Courses are subject to cancellation if there is insufficient enrolment.

Registration Enquiries: Lynne Romuld; phone (204) 474 8669 or romuld@cs.umanitoba.ca.

Mathematics

All new and returning students are required to consult with a department advisor (mathematics_dept@Umanitoba.ca) prior to registration. Contact H.D. Aldwyn (mathematics_dept@Umanitoba.ca) at (204) 474 8703.

Mathematical, Statistical and Computational Sciences

All new and returning students in the Master of Mathematical, Statistical and Computational Sciences must consult with the Director prior to registration.

Registration inquiries: iims@umanitoba.ca Phone: (204) 474-6724

Microbiology

All new and returning graduate students in the Department of Microbiology must have their programs approved by their advisor and the department head prior to registration.

For registration inquiries: Sharon Berg; phone (204) 474 9372;
e-mail sberg@ms.umanitoba.ca

Physics and Astronomy

All students must consult with their advisor prior to registration.

Registration Inquiries: Susan Beshta; phone (204) 474 9817.

Statistics

All new and returning graduate students in the Department of Statistics must consult with the grad chair and the administrative assistant prior to attempting to register.

All students must consult with their advisor prior to registration and present a completed registration form to 338 Machray Hall. Any changes, after the initial registration, must also be approved by the advisor.

A listing of available courses can be picked up at the departmental general office, 338 Machray Hall.

Registration inquiries: Liqun Wang; phone 474 6270;

e-mail liqun_wang@Umanitoba.ca.

or the administrative assistant, Margaret Smith, 338 Machray Hall;

phone 474 9801; e-mail Margaret_Smith@Umanitoba.ca

2.17 Faculty of Social Work

Students must meet with their faculty advisor to select and approve the courses before registering.

Registration assistance: (204) 474 8350,

Email: singleto@cc.umanitoba.ca

(204) 474 9152,

Email: nowakaj@ms.umanitoba.ca

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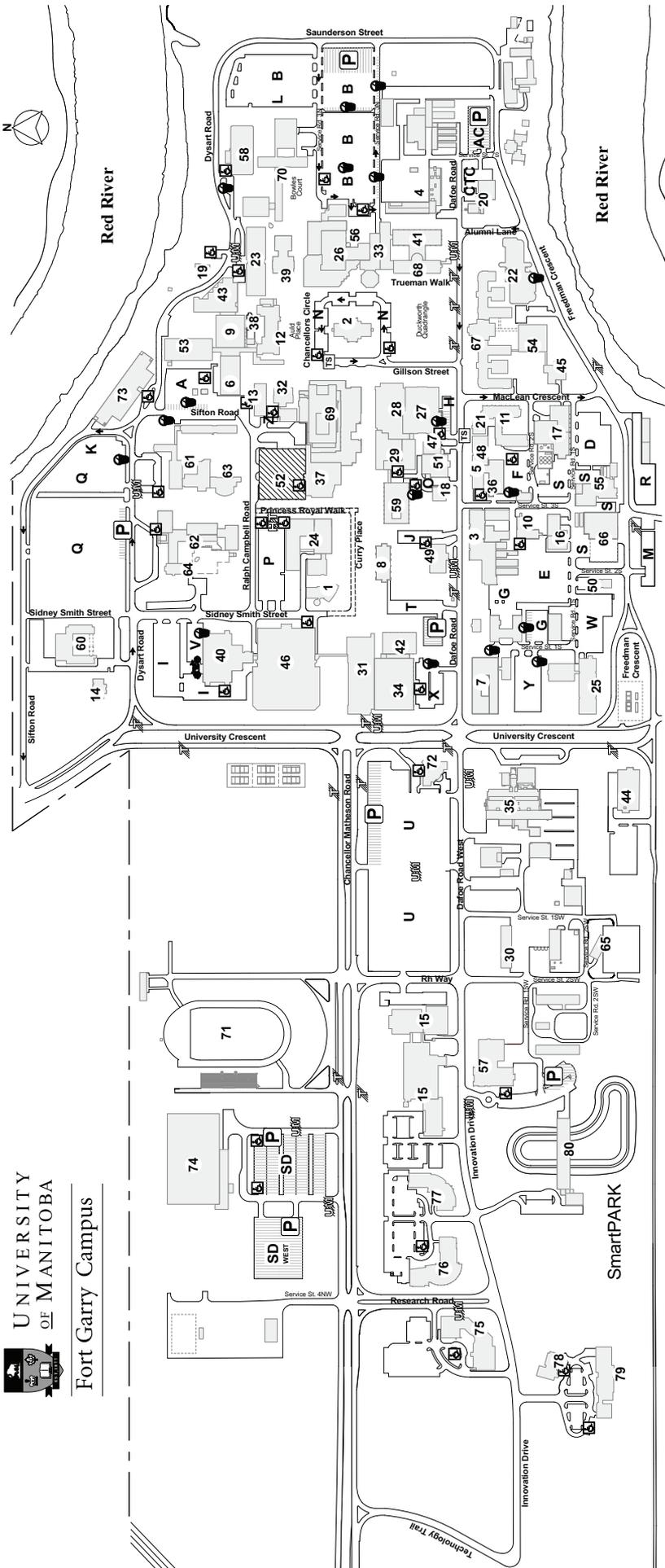
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Fort Garry Campus



LEGEND

- Parkade (Public Parking)
- Meter Parking
- Pay & Display Parking
- Reserved Parking Areas*

- Staff Parking*
- Student Parking*
- Residence Parking (24hr.)

- Accessible Parking*
- Motorcycle Parking (permit required)*
- Taxi Stand
- Handi-Transit Pickup

- University Shuttle Bus (September to April)
- Fort Garry Campus Shuttle
- Transit Bus Stops

*U of M PERMIT REQUIRED FROM 7:30 am to 4:30 pm

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3. Agriculture Building	24. Education Building	36. CWB Grain Storage Research Lab	45. Many Speechly Hall	53. Parker Building	64. Sinnott Bldg / Soccer Complex	74. Winnipeg Indoor Soccer Complex
4. Agriculture Canada	25. Ellis Building	37. Helen Glass Centre	46. Max Bell Centre	54. Pembina Hall	65. Straw Bale Bldg / The Alternative Village	75. One Research Road
5. Agricultural & Civil Engineering	26. Biological Sciences	38. High Performance Computer Facility	47. McMath High Voltage Laboratory	55. Physical Plant	66. Stores Building	76. 135 Innovation Drive
6. Allen Building	27. EITC E1	39. Human Ecology	48. McQuade Structures Laboratory	56. Psychological Services	67. Tache Hall	77. 137 Innovation Drive
7. Animal Science /Entomology	28. EITC E2	40. Investors Group Athletic Centre	49. Marcel A. Desautels Music Building	57. Richardson Centre	68. Tier Building	78. 100-78 Innovation Drive
8. Architecture 2	29. EITC E3	41. Isbister Building	50. Music Annex One	58. Robson Hall	69. University Centre	79. 200-78 Innovation Drive
9. Armes Lecture Building	30. Environmental Safety	42. Joyce Fromson Pool		59. Russell Building	70. University College	80. 150 Innovation Drive
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