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## GRADUATE CALENDAR

The Graduate Calendar is a comprehensive guide to all graduate programs and courses available at the University of Windsor. It outlines academic regulations and standards, program degree requirements, and general University policies.

The online calendars are the official calendars. The University of Windsor publishes graduate web calendars on a semester basis(Fall, Winter, and Spring).

*Note:* Students may follow the academic rules and program regulations set out in the calendar of the term in which they were first admitted to the program or any subsequent calendar.

**FEDERATED AND AFFILIATED INSTITUTIONS:**  
Assumption University  
Canterbury College  
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The University of Windsor is a full member of the Association of Universities and Colleges of Canada, and the International Association of Universities.

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The University offers the following Masters and Doctoral programs.  
*[Programs with a Co-op or Internship option are identified in the list.]*

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**A**  
[Applied Computing \(MAC\) Degree](#)  
[Applied Economics and Policy \(MAEP\)](#)  
[Automotive Engineering \(International Master of Engineering with Politecnico di Torino\)](#) (MAsc in Automotive Engineering/Laurea Magistrale in Automotive Engineering Dual Degree Program))  
[Actuarial Science](#) (M.Act.Sc)  
[Argumentation Studies](#) (PhD)

**B**  
[Biological Sciences](#) (MSc)  
[Biological Sciences](#) (PhD)  
[Business Administration](#) (MBA)  
[Business Administration](#) (MBA) (Co-op)  
[Business Administration](#) (MBA) (Fast-track)  
[Business Administration](#) (MBA for Managers and Professionals)  
[Business Administration/Bachelor of Laws](#) (Integrated MBA/JD)  
*See also Management*

**C**  
[Chemistry and Biochemistry](#) (MSc)  
[Chemistry and Biochemistry](#) (PhD)  
[Civil Engineering](#) (MAsc)  
[Civil Engineering](#) (MEng) (Co-op/Internship Option)  
[Civil Engineering](#) (PhD)  
[Communication and Social Justice](#) (MA)  
*See also Sociology and Social Justice*  
[Computer Science](#) (MSc) (With and without Co-op)  
[Computer Science](#) (PhD)  
[Criminology](#) (MA)

**E**  
[Earth Sciences](#) (MSc)  
[Earth Sciences](#) (PhD)  
[Economics](#) (MA)  
[Education](#) (MEd)  
[Education](#) (MEd) - International Cohort  
[Educational Studies](#) (PhD Joint program)  
[Electrical Engineering](#) (MAsc)  
[Electrical Engineering](#) (MEng) (Co-op/Internship Option)  
[Electrical Engineering \(Computer Engineering Field\)](#) (MEng)  
[Electrical Engineering](#) (PhD)  
[Engineering Materials](#) (MAsc)  
[Engineering Materials](#) (MEng)  
[Engineering Materials](#) (PhD)  
[Engineering Management](#) (Master of Engineering Management)  
[English](#) (MA)  
[Environmental Engineering](#) (MAsc)  
[Environmental Engineering](#) (MEng) (Co-op/Internship Option)  
[Environmental Engineering](#) (PhD)  
[Environmental Science](#) (MSc)  
[Environmental Science](#) (PhD)

## **F**

[Film and Media Arts \(MFA\)](#)

## **H**

[History \(MA\)](#)

[Human Kinetics \(MHK\)](#)

## **I**

[Industrial Engineering \(MASc\)](#)

[Industrial Engineering \(MEng\)](#)

[Industrial and Manufacturing Systems Engineering \(PhD\) \(Multi-Disciplinary Program\)](#)

## **J**

## **K**

[Kinesiology \(PhD\)](#)

## **L**

[Law \(LLM\)](#)

## **M**

[Management \(MM\)](#)

[Mathematics and Statistics \(MSc\)](#)

[Mathematics and Statistics \(PhD\)](#)

[Mechanical Engineering \(MASc\)](#)

[Mechanical Engineering \(MEng\) \(Co-op/Internship Option\)](#)

[Mechanical Engineering \(Automotive Option\) \(MEng\) \(Co-op/Internship Option\)](#)

[Mechanical Engineering \(PhD\)](#)

[Medical Biotechnology \(MMB\)](#)

## **N**

[Nursing \(PhD\)](#)

[Nursing \(MScN\)](#)

[Nursing \(MN\) - Advanced Clinical Field, Nursing Leadership Field](#)

[Nursing \(MN\) - Primary Health Care Nurse Practitioner Field](#)

[Nursing - Primary Health Care Nurse Graduate Diploma](#)

[Nursing - Graduate Diploma in Advanced Practice Oncology/Palliative Care](#)

*See also Graduate Diploma programs*

## **P**

[Philosophy \(MA\)](#)

[Physics \(MSc\)](#)

[Physics \(PhD\)](#)

[Political Science \(MA\)](#)

[Political Science \(MPP Articulation\)](#)

[Psychology \(PhD and MA\)](#)

## **S**

[Social Work \(MSW\) \(Internship\)](#)

[Social Work \(Phd\)](#)

[Social Work and Juris Doctor \(Joint Program\) \(MSW/JD\)](#)

[Social Data Analysis \(MA\) \(Note: As of Fall 2014 there are no new admissions to this program.\)](#)

[Sociology \(MA\)](#)

[Sociology with Specialization in Social Justice \(PhD\)](#)

*See also Communication and Social Justice*

## **V**

[Visual Arts \(MFA\)](#)

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[Computer Science](#)  
[Creative Arts](#)
- E**  
[Earth and Environmental Sciences](#)  
[Economics](#)  
[Education](#)  
[Electrical and Computer Engineering](#)  
[English Language, Literature, and Creative Writing](#)  
[Engineering](#)  
[Environmental Science](#)
- H**  
[History](#)  
[Human Kinetics](#)
- I**  
[Inter-Faculty](#)
- K**  
[Kinesiology](#)
- L**  
[Law and Social Work](#)
- M**  
[Mathematics and Statistics](#)  
[Mechanical, Automotive and Materials Engineering](#)
- N**  
[Nursing](#)
- P**  
[Philosophy](#)  
[Physics](#)  
[Political Science](#)  
[Psychology](#)
- S**  
[Social Work](#)  
[Sociology, Anthropology and Criminology](#)

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[Communication, Media and Film](#)  
[English Language, Literature, and Creative Writing](#)  
[History](#)  
[Philosophy](#)  
[Political Science](#)  
[Psychology](#)  
[School of Creative Arts](#)  
[Social Work](#)  
[Sociology, Anthropology and Criminology](#)

**Faculty of Business Administration (Odette School of Business)**

**Faculty of Education**

**Faculty of Engineering**  
[Engineering](#)  
[Civil and Environmental Engineering](#)  
[Electrical and Computer Engineering](#)  
[Mechanical, Automotive and Materials Engineering](#)

**Faculty of Human Kinetics**

**Faculty of Nursing**

**Faculty of Science**  
[Biological Sciences](#)  
[Chemistry and Biochemistry](#)  
[Computer Science](#)  
[Earth and Environmental Sciences](#)  
[Economics](#)  
[Mathematics and Statistics](#)  
[Physics](#)

**Faculty of Law**

**Inter-Faculty Programs**

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[Biological Sciences](#) (55-xxx)  
[Business Administration](#) (70-xxx, 71-xxx, 72-xxx, 73-xxx, 74-xxx, 75-xxx, 76-xxx, 77-xxx, 78-xxx)  
[Communication, Media, and Film](#) (40-xxx)  
[Chemistry and Biochemistry](#) (59-xxx)  
[Computer Science](#) (60-xxx)  
[Earth and Environmental Sciences](#) (61-xxx)  
[Economics](#) (41-xxx)  
[Education](#) (80-xxx)  
[Engineering](#) (85-xxx)  
[Engineering - Civil and Environmental Engineering](#) (87-xxx, 93-xxx)  
[Engineering - Electrical and Computer Engineering](#) (88-xxx)  
[Engineering - Mechanical, Automotive, and Materials Engineering](#) (89-xxx, 91-xxx, 92-xxx)  
[English Language, Literature, and Creative Writing](#) (26-xxx)  
[Environmental Science](#) (68-xxx)  
[General, Graduate Studies](#) (09-xxx)  
[History](#) (43-xxx)  
[Inter-Faculty](#) (14-79-xxx)  
[Kinesiology](#) (95-xxx)  
[Law and Social Work \(Joint Program\)](#)  
[Mathematics and Statistics](#) (62-xxx, 65-xxx, 97-xxx) *(includes Actuarial)*  
[Nursing](#) (63-xxx)  
[Philosophy](#) (34-xxx)  
[Physics](#) (64-xxx)  
[Political Science](#) (45-xxx)  
[Psychology](#) (46-xxx)  
[School of Creative Arts](#) (27-xxx, 28-xxx)  
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## APPLICATION INFORMATION

Application for admission may be made online at [www.uwindsor.ca/grad](http://www.uwindsor.ca/grad).

Applicants are advised to check departmental listings for deadlines. If an earlier deadline is not specified, applications, official transcripts, confidential reports, and the application fee should be submitted no later than July 1 for September admission, November 1 for January admission, and March 1 for May admission. However, applicants are advised that offers of admission will be made prior to and following these dates to qualified applicants. All positions may be filled before the deadline dates. Early applications are advised.

International applicants are required to obtain a student visa. This is the sole responsibility of the applicant. Applicants are advised that Canadian government processing of visa applications may take several months. It is recommended that international students apply at least 6-8 months prior to the semester in which they desire admission.

Admission to the Faculty of Graduate Studies is by letter of offer from the Dean of Graduate Studies.

A decision to admit or not to admit is made by the Dean on the basis of a recommendation received from an academic unit, together with the documents required for admission.

A decision may be reconsidered upon the request of either the applicant or the academic unit if further information is offered.

Applicants who have not been admitted to the Faculty of Graduate Studies may upgrade their qualifications and reapply. A subsequent decision would be made on the basis of a further recommendation from the academic unit and the updated file.

## DEFERRED APPLICATIONS

### DOCUMENTATION REQUIRED AND ENGLISH LANGUAGE PROFICIENCY REQUIREMENT Senate Policy on Graduate English Language Proficiency Requirement

**ADMISSION LEVELS** (an applicant may be admitted to a graduate program as a master's student, qualifying master's student, transitional master's student, probationary master's student. or a PhD student)

**POSTGRADUATE AWARDS AND FINANCIAL AID**(Information regarding graduate scholarships, awards and financial aid.)

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## POSTGRADUATE AWARDS AND FINANCIAL AID

### ELIGIBILITY FOR GRADUATE FUNDING

Full-time graduate students in research-based programs may receive funding from three main sources: scholarships (internal and external), Graduate Assistantships (GAs), and Research Assistantships (RAs). This latter category is Department or even supervisor specific. Eligibility for the first two, scholarships and GAs, are subject to constraints dictated by the funding sources and, in the case of GAs, by the Collective Agreement.

One of the constraints upon funding eligibility is temporal and depends upon continuous registration. Support from the University of Windsor at the Master's level can be offered within the first two years from the first term of registration at the Master's level (M2). Support from the University of Windsor at the Doctoral level can be offered within the first four years from the first term of registration at the Doctoral level (D2). While external awards are administered according rules defined by the source agencies, and these can differ slightly from program to program, their rules regarding eligibility are similar to the above listed.

In order to retain support once it is awarded, students must maintain continuous full-time registration; rare exceptions can be made to accommodate a Leave of Absence for medical, maternity or paternity leave. Where leave is granted for other reasons, the term(s) on leave will diminish the number of terms that a student was eligible to receive support.

Failure to register by the posted late registration deadline for each semester will result in forfeiture of support for that semester. Students who are eligible to apply for external awards are obliged to do so, or they may forfeit their funding from the University of Windsor.

For up-to-date detailed information on the funding available to graduate students, please refer to the website of the Faculty of Graduate Studies ([www.uwindsor.ca/grad](http://www.uwindsor.ca/grad)).

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## REGISTRATION

**Registration**  
Students whose applications for admission to graduate study have been approved for full- or part-time study should present themselves to their program advisors prior to registration on the dates recorded in the section "[Academic Dates](#)".

**Categories of Registration** (includes definitions of "full-time graduate student" and "part-time graduate student")

**Graduate Registration Regulations** (includes information on leaves of absence, non-degree registration and auditing courses)

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## AUTHORSHIP AND PLAGIARISM

### Authorship

The Policy Statement on Research Personnel is available by contacting the Office of Research Services.

### Plagiarism

A confirmed incident of plagiarism will result in a sanction ranging from a verbal warning, to a loss of credit in the course, to expulsion.

In case of any doubt, students are strongly urged to consult with the instructor or thesis supervisor. In cases where students feel that their intellectual property or copyrighted material has been plagiarized, complaints should be made in writing to the Dean of Graduate Studies.

Click on the link for the [Graduate Studies Policy on Plagiarism](#).

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## GRADUATION

In order to allow the necessary time for the printing of the diploma and the Convocation program, the candidate's completed work must be approved by the Faculty of Graduate Studies and the major paper, project, thesis or dissertation, if one is presented, must be received by the Office of Graduate Studies at least two weeks before Convocation following requirements prescribed in *Guidelines for Major Papers, Theses, and Dissertations*.

Registration in any program does not constitute an application for a degree or diploma. An "Application to Graduate" must be completed and filed with the [Registrar's Office](#) by the specified date prior to the [Convocation](#) at which the applicant expects to graduate.

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FACULTY OF GRADUATE STUDIES

OFFICERS OF ADMINISTRATION

(Ext. 2107)

Dean

Dr. Patricia L. Weir; B.H.K., M.H.K. (Windsor), Ph.D. (Waterloo)-1991.

Associate Dean

Dr. James W. Gauld; B.Sc. (Queensland), B.Sc.(Hon) (Northern Territory), Ph.D. (Australian National)-2001.  
Dr. Deborah Kane; RN, B.Sc.N. (Windsor), M.Sc.N. (Western Ontario), Ph.D. (Nursing) (Michigan)-1989.

Fluid Dynamics Research Institute

Interim Director: Dr. Gary W. Rankin

Great Lakes Institute for Environmental Research

Director: Dr. Daniel Heath

Humanities Research Group

Director: Dr. Antonio Rossini

Institute for Diagnostic Imaging Research

Director: Dr. Roman Maev

GRADUATE COUNCIL

One graduate faculty representative from each discipline or group of disciplines offering an OCGS approved program.

Ex-officio Members (with vote): Dean of Graduate Studies; Associate Dean, Graduate Studies; Vice-President, Research; President of the Graduate Student Society; University Librarian;  
Four (4) decanal representatives, elected by the Faculty Deans;  
Other members, to a maximum of two invited from the academic and/or administrative support services (non-voting);  
Nine additional student representatives from the Graduate Student Society

COMMITTEES

- Academic Standing Committee
- Admissions Committee
- Awards Committee
- Executive Committee
- Graduate Support Committee
- New Programs Committee
- Nominating Committee

Membership elected annually from Graduate Council and graduate faculty.

For more on the Faculty of Graduate Studies, visit its website at [www.uwindsor.ca/grad](http://www.uwindsor.ca/grad)

FACULTY OF GRADUATE STUDIES: GENERAL COURSES



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## COURSE NUMBERING SYSTEM AND FACULTY AND PROGRAM CODES

Each course is identified by a three-part number. The first part refers to the Faculty, the second part to the subject area, the third to the level of the course. Thus, the course 02-46-501 would be a course in the Faculty of Arts and Social Sciences (02-), in the subject area of Psychology (46-) and would be at the graduate level. 100, 200, 300, and 400 numbers indicate undergraduate courses, while 500, 600 and 700 numbered courses are graduate level courses.

Note: some courses have stated prerequisites which are prior requirements for entry to a course. Students who do not satisfy the prerequisite for a course, or who in the opinion of the instructor do not possess an equivalent background to that of the stated prerequisite, may not register for the course, and may be removed if they register inappropriately.

Faculty of Arts and Social Sciences	01- (Arts)/02- (Social Sciences)
Faculty of Science	03-
Faculty of Business Administration	04-
Faculty of Education	05-
Faculty of Engineering	06-
Faculty of Human Kinetics	07-
Faculty of Law	08-
Faculty of Nursing	11-
Inter-Faculty Programs	14-

### Program/Course Codes

*Note:* The Program/Course codes are preceded by the relevant Faculty code.

Arts and Science, 14-56-  
Additional Qualification Courses, 05-79-  
Biology, 03-55-  
Business Administration:  
Accounting, 04-70-  
Business Strategy and Entrepreneurship, 04-75-  
Finance, 04-72-  
Management and Labour Studies, 04-71-  
Management Science, 04-73-  
Marketing, 04-74-

Chemistry and Biochemistry, 03-59-  
Civil and Environmental Engineering:  
Civil, 06-87-  
Environmental, 06-93-

Languages, Literatures and Cultures:  
Aboriginal Studies, 01-06-  
Intercultural Studies, 01-07-  
Multicultural Studies, 01-08-  
Asian Studies, 01-10-  
Classical Studies, 01-11-  
Greek & Roman History, 01-12  
Greek Languages & Literature, 01-13-  
Latin Languages & Literature, 01-14-  
German, 01-15-  
Italian, 01-21-  
Spanish, 01-23-

Communication Studies: 02-40-  
Computer Science, 03-60-  
Dramatic Art: 01-24-  
Earth Sciences:  
Geology, 03-61-  
Environmental Science, 03-66-  
Geography, 03-67-

Economics, 03-41-  
Education, 05-80-  
Electrical and Computer Engineering, 06-88-  
English, 01-26-

Environmental Studies, 14-58-  
Forensics, 14-57-  
French Studies, 01-29-  
General Engineering, 06-85-  
Geography: 02-42-  
Great Lakes Institute for Environmental Research - Environmental Science, 03-68-  
History, 02-43-  
Industrial and Manufacturing Systems Engineering, 06-91-  
Kinesiology, 07-95-  
Labour Studies: 02-54-  
Law service courses, 08-99-  
Law courses, 08-98-  
Mathematics and Statistics:

Mathematics, 03-62-  
Statistics, 03-65-

Mechanical, Automotive, and Materials Engineering:

Mechanical, 06-92-  
Automotive, 06-94-  
Materials, 06-89-

Music:

Music Academic Studies, 01-32-  
Music Performance Studies, 01-33-

Nursing, 11-63-  
Philosophy: 01-34-  
Physics, 03-64-  
Political Science: 02-45-  
Psychology: 02-46-  
Social Justice: 02-38-  
Social Work: 02-47-  
Sociology and Anthropology:

Sociology, Criminology, 02-48-  
Anthropology, 02-49-  
Planning, 02-50

Visual Arts:

Visual Arts, 01-27-  
Art History, 01-28-

Women's Studies, 02-53-

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## RESEARCH INSTITUTES

### THE GREAT LAKES INSTITUTE FOR ENVIRONMENTAL RESEARCH (GLIER)

The Great Lakes Institute for Environmental Research (GLIER) is a world-class combination of researchers, graduate programs, facilities and location - on the Canada-US border at the heart of the world's most economically significant freshwater system.

GLIER research is currently focussed on two interrelated themes that assess the impact of multiple stressors on large lakes and their watersheds. The stressors include metal and organic chemical contamination, species invasions, climate change, harvesting of populations, nutrient enrichment, and habitat destruction. The themes are environmental chemistry and toxicology, and conservation and resource management. GLIER's 5200 m2, tri-level, dedicated facility on the Detroit River is without parallel in Canada. It includes over 25 extensively equipped laboratories, offices for researchers and post-doctoral and graduate students, and conference and meeting rooms. GLIER maintains a private boat launch on the Detroit River and has dedicated boats.

GLIER has the distinction of housing the only university-based environmental analytical laboratory in Canada accredited by the Canadian Association of Environmental Analytical Laboratories (CAEAL) to international standards of performance.

Further details of activities and facilities appear on GLIER's website at [www.uwindsor.ca/glier](http://www.uwindsor.ca/glier).

The Environmental Science graduate programs are offered through GLIER. See [Environmental Science](#).

### FLUID DYNAMICS RESEARCH INSTITUTE

The Fluid Dynamics Research Institute was founded to foster interdepartmental and inter-Faculty research and postgraduate teaching related to the dynamics of fluids. Members conduct basic and applied research, and are committed to providing a broad training for graduate students in all aspects of fluid mechanics and heat transfer. Members are drawn from Mechanical Engineering, Civil and Environmental Engineering, and Applied Mathematics. Research ranges from theoretical studies on stability and exact solutions to enhancement of flow measurement techniques to implementation of commercial computer codes and development of new codes for industrial problems. Application areas include civil engineering, environmental engineering, the automotive, defence and petroleum industries, biomechanics and aeronautics. Graduate students affiliated with Institute members in their research projects will register in the member's department and complete the degree requirements of that department.

Further details are available from <http://venus.uwindsor.ca/research/fdri/index.htm>.

### INSTITUTE FOR DIAGNOSTIC IMAGING RESEARCH

The University of Windsor Institute for Diagnostic Imaging Research (the "Institute") is a multi-disciplinary collaborative research and innovation consortium dedicated to the development of innovative diagnostic imaging technologies and products using advanced and diverse imaging techniques. The Institute will develop intellectual property that will strengthen the University's ability to directly help diversify the region's economic sectors and increase the general competitiveness of the local region.

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## STATEMENT OF RESPONSIBILITY OF THE UNIVERSITY

1. The content of this Calendar is provided for the general guidance of the student and is not intended to make any contractual commitments therefor. The Calendar is accurate at the time of publication, but programs, courses, staffing, etc. are subject to change from time to time as deemed appropriate by the University of Windsor in order to fulfill its role and mission, or to accommodate circumstances beyond its control. Any such changes may be implemented without prior notice and, unless specified otherwise, are effective when made. The official University of Windsor academic calendars are: the Undergraduate Web Calendar, the Graduate Web Calendar, and the Faculty of Law Calendar.
2. This Calendar represents the University of Windsor's best judgment and projection of the course of conduct of the University of Windsor during the periods addressed herein. It is subject to change due to forces beyond the University of Windsor's control or as deemed necessary by the University of Windsor in order to fulfill its educational objectives.
3. Advisors are provided to assist students in planning their academic programs. Advisors are not authorized to change established policy of the University of Windsor. Students are solely responsible for assuring that their academic programs comply with the policies of the University of Windsor. Any advice which is at variance with established policy must be confirmed by the appropriate Dean's Office.
4. Any tuition fees and/or other charges described herein are good faith projections for the academic year. They are, however, subject to change from one academic term to the next as deemed necessary by the University of Windsor in order to meet its financial commitments and to fulfill its role and mission.
5. There are other fees and charges which are attendant upon a student's matriculation at the University of Windsor. These fees or charges may be determined by contacting the University offices which administer the programs or activities in which the student intends to enroll or engage.
6. The University of Windsor reserves the right to terminate or modify program requirements, content, and the sequence of program offerings from term to term for educational reasons which it deems sufficient to warrant such actions.  
  
Further, the University of Windsor reserves the right to terminate programs from term to term for financial or other reasons which it determines warrant such action. The content, schedule, requirements and means of presentation of courses may be changed at any time by the University of Windsor for educational reasons which it determines are sufficient to warrant such action. Programs, services, or other activities of the University of Windsor may be terminated at any time due to reasons beyond the control of the University of Windsor.
7. The course descriptions herein are based upon reasonable projections of faculty and faculty availability and appropriate curriculum considerations. The matters described are subject to change based upon changes in circumstances upon which these projections were based and as deemed necessary by the University of Windsor to fulfill its role and mission.

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## 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 enrollment 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, enrollment information, previous education, and labour force activity.

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 identification and contact 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. Coats Building, Tunney's Pasture, Ottawa, K1A 0T6.

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## COMPUTER SCIENCE

### THE MASTER OF APPLIED COMPUTING (MAC) DEGREE

The Master of Applied Computing is a professional program that will provide students with a solid foundation and knowledge of industry-oriented practical aspects of Computer Science, which will enable them to take up positions in the growing software industry in Canada and around the world.

#### Admission Requirements

In order to be admitted to the program, a student must hold a 4-year bachelor degree in Computer Science or related discipline with a minimum major average of 70% or an average of 77% or better in the last 2 years of study. Applicants are required to include a 'statement of interest' (maximum 2 pages) with their application that includes a description of a major technology project they have undertaken in the past 3 years.

Students with a 4-year bachelor degree in other non-Computer Science disciplines will be eligible for admission if they are accepted into and complete the University of Windsor's one-year Bachelor of Computer Science for University Graduates program with a 70% average or better.

Applicants are strongly encouraged to have a demonstrated background in computer science and mathematical foundations, advanced programming, hardware architecture and systems concepts. Admission is highly competitive and preference will be given to applicants who exceed the minimum requirements and who have demonstrated work experience in the field. Candidates who lack the recommended background may be considered for admission on a case by case basis.

Candidates must demonstrate English proficiency by meeting or exceeding an IELTS score of 6.5 (or equivalent). If an applicant receives an IELTS English language proficiency score of less than 6.5 (or equivalent) they may be offered a conditional letter of acceptance pending successful completion of an approved English Language Training program, such as the University of Windsor's Centre for English Language Development's English Language Improvement Program (ELIP).

Applicants must pass a successful interview with a representative or agent acting on behalf of the University of Windsor and submit two letters of reference.

#### Program Requirements (Major Requirements)

**Total courses:** 30 credit hours (8 courses – 3 credit hours each; plus 60-699 (Project/Internship), which is worth 6 credit hours)

- Major requirements:**
- 60-611. Advanced Software Engineering Topics
  - 60-615. Advanced Database Topics
  - 60-634. Internet Applications and Distributed Systems
  - 60-654. Advanced Computing Concepts
  - 60-656. Advanced Systems Programming
  - 60-667. Networking and Data Security
  - 60-699. Project/Internship (worth 6 credit hours)

**NOTE:** The above courses, except 60-699, may be offered in an accelerated 4 or 6 week format.

- Other requirements:**
- Two of the following:
- 78-612. Finance in a Global Perspective
  - 78-614. Marketing
  - 78-613. Managing Employees

#### Suggested Program Sequencing

- Term 1: Fall Semester (September - December)**
- 60-615. Advanced Software Engineering Topics
  - 60-654. Advanced Computing Concepts

One of the following three: 78-613: Managing Employees, 78-614: Marketing, 78-612 Finance in a Global Perspective.

- Term 2: Winter Semester (January - April)**
- 60-615. Advanced Database Topics
  - 60-656. Advanced Systems Programming

One of the following three: 78-613: Managing employees, 78-614: Marketing, 78-612 Finance in a Global Perspective.

- Term 3: Summer Semester (May - July)**
- 60-634. Internet Application and Distributed Systems

60-667. Networking and Data Security  
60-699. Project/Internship (2 terms)

**Term 4: Fall Semester (September - December)**  
60-699. Project/Internship (2 terms)

NOTE: Course sequencing may change (except 60-699), particularly for Term 2 and Term 3.

**Project/Internship Requirements**

Students will be required to complete an approved software development project, with an industry partner or a faculty supervisor, as part of the 60-699 course. Students working with an industry partner may be required to work off-campus for their internship. Students will receive credit for the course 60-699 (worth 6 credit hours) upon successful completion of a two semester internship.

**Standing Required for Continuation in the Program**

Students must maintain an average of 70%. Students may be permitted to have at most two course grades between 60-69%, on a case by case basis, based on recommendation from the MAC program committee.

**Standing Required for Graduation**

In order to graduate, students must have an average of 70%. Students may be permitted to have at most two course grades between 60-69%, on a case by case basis, based on recommendation from the MAC program committee.

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## Master of Applied Economics and Policy (MAEP)

### Admission Requirements

In order to be admitted to the program, a student must hold a 4-year bachelor degree with a minimum major average of B- (70%) or an average of B+ (77%) or better in the last 2 years of study. Applicants must have at least one undergraduate course in statistics, and introductory-level courses in microeconomics and macroeconomics. In exceptional cases, students not meeting these requirements can be admitted at the discretion of the Program Coordinator after consultation with the Advisory Board. In addition, two semesters of calculus, and a semester of intermediate microeconomics and macroeconomics are highly recommended, but not required.

Applicants are strongly encouraged to have a demonstrated background in economics and mathematical and statistical foundations. Admission is highly competitive and preference will be given to applicants who exceed the minimum requirements and who have demonstrated work experience in the field. Candidates who lack the recommended background may be considered for admission on a case by case basis.

Candidates must demonstrate English proficiency by meeting or exceeding an IELTS score of 6.5 (or equivalent). If an applicant receives an English language proficiency score of less than 6.5 (or equivalent) they may be offered a conditional letter of acceptance pending successful completion of an approved English Language Training program, such as the University of Windsor's Centre for English Language Development's English Language Improvement Program (ELIP), or submitting a successful English language test score.

Applicants must pass a successful interview with representative or agent acting on behalf of the University of Windsor.

### Program Requirements

**Total Courses: 39 credit hours (13 courses - 3 credit hours each)**

#### Major Requirements:

- 41-601: Applied Microeconomics
- 41-602: Applied Macroeconomics
- 41-603: Mathematics for Applied Economics
- 41-604: Applied Econometrics 1
- 41-605: Applied Econometrics 2
- 41-606: Business Communication
- 41-607: Research Project in Economic Policy and Seminar

#### Other Requirements:

- Two of the following:
- 41-373: International Economics: Trade
  - 41-374: International Economics: Finance
  - 41-416: Urban and Regional Economics
  - 41-420: Industrial Organization Theory
  - 41-430: Economics Analysis of Law
  - 41-460: Cost-Benefit Analysis
  - 41-486: Public Sector Economics: Finance

- Two of the following:
- 41-510: International Economics
  - 41-550: Monetary Theory and Policy
  - 41-580: Models of Strategic Behavior
  - 41-594 Special Studies in Economics

- Two of the following (offered by the Masters of Management program):
- 78-611: Accounting Concepts and Techniques
  - 78-612: Finance in a Global Perspective
  - 78-631: International Business
  - 78-636: International Financial Reporting
  - 78-637. International Financial Management
  - 78-655: Domestic Transportation and International Shipping

#### Note the following:

To improve communication skills, students will be required to complete a course in Business Communication (offered by CEPE) with short modules spread throughout the program.

These modules are:

- Term 1: Learning strategies in North American universities
- Term 2: Norms of class participation, giving and receiving criticism graciously and productively
- Term 3: Working in a team, including dealing with personality differences
- Term 4: Training in using Linked-In



Students will be required to complete a policy project to fulfill the requirements of Research Project in Economic Policy. Topics would normally be of applied nature. Students would work on group projects involving statistical analysis and make group presentations.

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**International Masters in Automotive Engineering - consisting of:**  
**International MASC in Automotive Engineering/Laurea Magistrale in Automotive Engineering (Dual Degree Program)**

**ADMISSION REQUIREMENTS**  
Admission will be granted, within the limits of program availability (initially 5 students/year) to University of Windsor students possessing a Bachelor of Applied Science degree in Mechanical Engineering (or equivalent engineering degree) from an accredited Canadian university. Standard admission requirements for entry in the Mechanical Engineering MASC program will be met. Applications will be reviewed by the coordinator for the International Master of Applied Science in Automotive Engineering program. Student application files will be forwarded to the Faculty of Graduate Studies, with a request for formal admission of those students approved by the program coordinator. Accepted students will be enrolled at the University of Windsor with M2 status (Master candidate) in the International Masters in Automotive Engineering.

For Politecnico di Torino students, admission will be granted, within the limits of program availability (initially 5 students/year) to Torino students possessing a Laurea [*Bachelor's degree*] in Automotive Engineering or Mechanical Engineering (or equivalent engineering degree) from an accredited European university. Student files will be reviewed by the program coordinator similar to the University of Windsor process. Accepted students will begin the first year in the Laurea Magistrale in Automotive Engineering at Politecnico di Torino.

**Total courses:** Three (3) Windsor courses and 60 ECTS credits at Torino (which equates to 3 courses at the Politecnico di Torino for the Torino students, and 30 ECTS of courses plus a 30-ECTS thesis for the Windsor students). The suggested course choices at each school will be streamed into four key areas: Manufacturing Management, Automotive Vehicle Design and Engineering, Automotive Powertrain and Virtual Engineering for Product Development.

Each student will be required to take at least one course in each of the above four areas plus two others of their choosing. In this way, all of the graduates of the proposed program will receive a well-rounded education in Automotive Engineering and an opportunity to build a significant level of specialized expertise in an area which is of particular interest to them.

**Major requirements:** Three (3) Windsor graduate courses and an equivalent number of ECTS credits in courses in Italy. The total course requirements will be equivalent to the weight of study done to complete a Windsor Masters' degree in Engineering with a thesis (thus making the students eligible to continue their studies at the doctoral level).

The Torino students will complete 60 ECTS course credits and 3 Windsor graduate courses which makes them eligible for doctoral work in Europe when completed in conjunction with their major thesis project.

**Other requirements: Thesis Project**

Each student will complete a thesis project in conjunction with the two industry companies. Thesis co-supervision will be by both Windsor and a Torino faculty member. For the purposes of the University of Windsor degree, the thesis committee will consist of the co-supervisors, an internal program reader, and an external program reader. Additional Committee members may be added to meet the requirements of the Torino program. The thesis project will be a substantial piece of work representing an advance on the state of the art of a character of that expected for a Masters degree in Engineering. The Windsor students will carry out much of their work in Fiat while they are in Italy and the Torino students will work on a project with Chrysler while they are in Canada. Each student in the program will complete a Masters of Applied Science thesis as is customary in the University of Windsor MASC program.

NOTE: The Italian (Torino) MASC students will not be eligible for GA support while they are present in Windsor.

The Windsor students will each complete either one or two 4-6 month internships under the Industrial Research and Development Internship (IRDI) program internship at the ARDC facility during the spring of their first year. Following that they will travel to Italy where they will do their thesis research at the facilities of Fiat Centro Research in Torino. The Italian students will perform their thesis research at the facilities of Chrysler Canada and potentially at Chrysler Corp. in the US for certain projects.

The program layouts are shown schematically below:

University of Windsor students	Year 1(University of Windsor)			Year 2 (Politecnico di Torino)		Comments
	Term 1	Term 2	Term 3	Sem. 1	Sem. 2	
	1-2 courses	1-2 courses	1-2 courses	30 ECTS courses30 ECTS thesis		Total courses/credits = 3 courses in Windsor + 30 ECTS of courses and 30 ECTS for Thesis in Torino
	3 Courses + Planning of Thesis			Industry-Academic		Thesis

			Research Thesis			
Total:	60 ECTS		60 ECTS			Total 120 ECTS
Politecnico di Torino  students	Year 1 (Politecnico di Torino)		Year 2 (University of Windsor)			Comments
	Sem. 1	Sem. 2	Term 1	Term 2	Term 3	
	60 ECTS courses		1-2 courses	1-2 courses	Project	Total courses/credits = 60 ECTS of courses in Torino + 3 courses in Windsor
	Planning of Major Industry-Academic Project (equivalent to Thesis)		3 courses + Major Industry-Academic Project Report (equivalent to Thesis)			Major Industry-Academic Project Report (equivalent to Thesis) )
	Total:		60 ECTS			Total 120 ECTS

**NOTE:** The term “ECTS Course” refers to the *European Credit Transfer and Accumulation System*. It is an EU designation for a number of credit-hours that will be equivalent to a comparable number of University of Windsor graduate course credits (please see the note below on the ECTS). The total number of ECTS and Windsor credits undertaken by each student will be *at least* equal to that required to earn a traditional University of Windsor Masters of Applied Science degree.

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## MATHEMATICS AND STATISTICS

### THE MASTER OF ACTUARIAL SCIENCE (M.Act.Sc)

**Admission Requirements**  
Bachelor degree in a calculus-based quantitative discipline (e.g. Engineering, physics, chemistry, business) with at least a 70% average (or equivalent) overall, and good mathematics grades. Knowledge of calculus and matrix algebra is essential. Admission is limited and competitive. Up to two courses may be accepted for credit based on previous background (although the total fee remains the same.) Students from programs with a three year university degree would be admitted if their university course background in mathematics is strong.

**Program Requirements**

Total Courses: 12

**Year 1 Term 1:**  
97-501 Probability for Risk and Actuarial Science  
97-502 Financial Mathematics, Theory of Interest  
76-503 Introduction to Financial Management\*

**Year 1 Term 2:**  
97-503 Derivatives Markets I  
76-512 Financial Management  
97-505 Life Contingencies I

**Year 1 Term 3:**  
97-504 Derivatives markets II  
97-520 Regression and Time Series  
97-510 Microeconomics

**Year 2 Term 4**  
97-506 Life Contingencies II  
97-507 Special Topics in Actuarial Science  
97-511 Macroeconomics

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## PhD in Argumentation Studies

The program provides expertise in the history, methods, and applications of argumentation scholarship as this interdisciplinary field has developed in the last six decades. Argumentation is defined as collaborative or competitive reasoning through verbal or visual means by which people strive to persuade others on any topic where information, knowledge, or claims conflict or are inconsistent. Different ways for analyzing and evaluating people's arguments address the methods and principles that may be involved, and provide the core subject matter for Argumentation Studies. This will include some attention to policy agendas, interpersonal reasoning, and individual cognition.

### Admission Requirements

Students identified for the program will specify which research cluster they wish to work with, or detail a project that can be assigned to one of the clusters. This interest should be communicated in a personal statement provided by each student. The members of that cluster will give advice to the program's steering committee of the student's suitability with respect to their background and their intended research. This decision will be based on the statement, their CV and letters of reference. Given the interdisciplinary nature of the program, we would not expect a common background, so decisions will be made on the basis of past performance and letters of reference. Students will also be expected to have achieved a Master's degree (or equivalent professional experience) with an 80% or higher standing. Appropriate Master's programs for admission would include English or Communication Studies (with an emphasis on rhetoric), Rhetoric (with an emphasis on rhetorical theory or debate), Psychology (with an emphasis on reasoning, or bias), Computer Science (with an emphasis on modelling artificial intelligence), Law (with an interest in dimensions of evidence), Political Science (with an emphasis on conflict resolution or political reasoning), Philosophy (with an emphasis on informal logic), Linguistics (with an emphasis on discourse analysis), or Women's Studies (with an emphasis on gender bias and reasoning).

Equivalent professional experience will be assessed in terms of its relevance to Argumentation Studies and presence of background knowledge required for success on the planned project.. But all admitted students will have to have shown evidence in their application that they have the requisite requirements for success in the program in terms of both their past education and having experience in a profession (such as law or policy analysis) that uses principles and methods characteristic of our program. The student's Advisory Committee will be drawn from the Research Cluster with which he or she is associated with on admission. The supervisory committee will determine the number of qualifying graduate courses (if any, to a maximum of three) and students will be informed of these requirements as part of their offer of admission.

### Program of Study

Within the first term of the student's registration, his/her Advisory Committee will be formed except for the external examiner, who will be appointed during the final year of a student's study and research (unless the student's Advisory Committee wishes to bring the external in at the proposal stage) . The Advisory Committee will be chosen in the manner detailed in Section "[PhD Program Requirements](#)" of the University of Windsor's Graduate Calendar and consist of the following members as a minimum: an independent examiner external to the university (chosen at the time of the proposal or prior to the final defence), one member from the university faculty but outside of the Argumentation Studies Graduate Program, and three Argumentation Studies Graduate Program members, drawn from the appropriate Research Cluster. The external examiner must be a Full or Associate Professor with expertise in the area being examined and a proven research record. He/she must be impartial to both the student's supervisor and the student. The Dean of the Faculty of Graduate Studies will choose the external examiner on the recommendation of the Argumentation Studies Graduate Program Steering Committee. The external examiner will normally attend the defence and submit a written report on the dissertation to the Dean of Graduate Studies. The final oral defence will be chaired by a designate of the Dean of Graduate Studies.

In order to complete the program:

### Degree Requirements

14-79-500 History and Theories of Argumentation  
14-79-501. Advanced Studies in Argumentation  
14-79-798. Dissertation (*To be developed*)

Students must successfully complete History of Theories of Argumentation and Advanced Studies in Argumentation. However, in order to progress from fall to winter students must have a 77% average. The courses will be led by the Directors of the program with full faculty involvement on a rotating basis. The courses will be graded in accordance with university standards. All Ph.D. students who have successfully completed the course with a minimum grade of 77% will be expected to attend the courses as auditors in a subsequent year of their program.

Requirements to complete the degree are the two multi-disciplinary graduate seminar courses; preparation and defence of a Research Proposal; preparation and defence of an original dissertation.

### Oral Qualifying Exam

Students will successfully complete during the first two years of enrolment in the program, an oral qualifying exam, administered by the student's Advisory Committee. Students will be required to possess comprehensive knowledge of their field of study as well as any ancillary fields relevant to the dissertation topic (as determined in advance by the Advisory Committee). It is in terms of ensuring success in this requirement that some students may be directed to take supplementary courses. Students will be evaluated on a satisfactory, unsatisfactory basis. Should a student be unsuccessful in the first attempt at the oral qualifying exam, they will be provided a detailed assessment by their committee and have the opportunity to take a second exam within six months. Students must be judged satisfactory on this background exam before completing their research proposal.

### **Dissertation**

Students must successfully complete and defend a Research Proposal. The dissertation proposal is submitted to and evaluated by the student's Advisory Committee, including the faculty member from another program. Students are evaluated on a pass, fail basis. They will be required to submit a Research Progress Report to the Advisory Committee annually and meet with the committee every six months to discuss progress and research plans.

Following this, students must complete an original research project reported in a dissertation. They must then defend the dissertation in a public lecture before the Advisory Committee, including external members.

### **COURSES: INTER-FACULTY**

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<a href="#">Hot Tips</a>	<b>THE MASTER OF SCIENCE DEGREE</b>
<a href="#">Glossary</a>	<b>Admission Requirements</b>
<a href="#">Search the Graduate Calendar</a>	1) Applicants with an honours degree in Biological Sciences or a related field may be admitted to the Master's Candidacy (M2) program.
<a href="#">Programs</a>	2) Applicants with a general B.Sc. degree in Biological Sciences or a related field may be admitted to the Master's Qualifying (M1) program.
<a href="#">Programs (Listed Alphabetically)</a>	3) For the Neuroscience and Behaviour field, agreement with a research supervisor for supervision will also be required.
<a href="#">Programs (Listed by Department)</a>	<b>Program Requirements</b>
<a href="#">Programs (Listed by Faculty)</a>	Students may pursue one of the following fields within the MSc in Biological Sciences: 1) Molecular/Cellular Biology; 2) Ecology, Evolution, Environment, and Behaviour; and 3) Neuroscience and Behaviour.
<a href="#">Graduate Diploma Programs</a>	1) Students admitted to the Master's Candidacy program will be expected to:
<a href="#">Courses</a>	(a) comply with the general regulations;
<a href="#">Alphabetical by Department</a>	(b) attend all departmental seminars in Biological Sciences (formal presentations of visiting speakers, graduate student seminars, thesis defense presentations and dissertation defense presentations) each year of full-time registration;
<a href="#">Admission Information</a>	(c) present a departmental seminar in each year of enrollment (the thesis defense may count as one of these);
<a href="#">Application Information</a>	(d) successfully complete a minimum of two graduate courses with approval of the Master's Committee, courses may be in a cognate area. Statistics 65-453 (Statistics for Life/Social Sciences) may be allowed for graduate credit;
<a href="#">Awards and Financial Aid</a>	(e) complete an original research project and embody it in a thesis;
<a href="#">Registration</a>	(f) defend the thesis orally at a public lecture or seminar.
<a href="#">Academic Regulations</a>	2) Students admitted to the Master's Qualifying program, besides meeting the minimum requirements of the Master's Candidacy program, are expected in the first year of the two-year program to achieve a level of qualification equivalent to an honours degree through research and a minimum of four courses.
<a href="#">Faculty Regulations</a>	3) <i>Grading</i> : A student must maintain at least a 70% in each Biological Sciences course and at least a 70% average in any non-Biological Sciences courses.
<a href="#">Additional Degrees</a>	4) <i>Master's Committee</i> : Within one term of the student's registration in the program, the research committee will be formed and the names submitted to the Dean of Graduate Studies. The full committee will consist of at least three members - the research supervisor, one other faculty member from within Biological Sciences, and one University faculty member from outside of Biological Sciences.
<a href="#">Exam and Grading Procedures</a>	The student should meet with individual committee members on an informal basis at least twice a year. The committee, in turn, must meet to:
<a href="#">Authorship and Plagiarism</a>	(a) review and approve course work and the research proposal no later than six months into the program;
<a href="#">Graduation</a>	(b) discuss the student's research and thesis at least six months before the anticipated time of the final oral examination;
<a href="#">Faculty of Graduate Studies</a>	(c) participate in the final oral examination.
<a href="#">Graduate Faculty Designation</a>	<i>Research Progress</i> : Each year from the date of initial registration, the student must submit a Research Progress Report to and meet with his or her Master's committee. In addition, the student must review his or her research in a meeting with the Master's committee at least six months before the anticipated date of the final oral examination.
<a href="#">Calendars</a>	<i>Research Thesis</i> : A thesis embodying the results of an original investigation in the student's major field is required of all candidates. The student must defend the thesis orally at a public lecture or seminar, which will be the final oral examination.
<a href="#">Undergraduate Calendar</a>	<b>BIOLOGICAL SCIENCES: COURSES</b>
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## BIOLOGICAL SCIENCES

### THE DOCTOR OF PHILOSOPHY DEGREE

In addition to the general requirements as set out in the [Faculty of Graduate Studies Regulations](#), the following requirements must be met by all students proceeding to the Ph.D. degree.

#### Admission Requirements

Applicants with an honours degree in Biological Sciences or related field and who have been judged to be outstanding students may be admitted directly into the Ph.D. program. Applicants holding an M.Sc. degree or equivalent from the University of Windsor or from another recognized university or college may be admitted to the Ph.D. program with advanced standing in course work as described below.

#### Program Requirements

Students may pursue one of the following fields within the PhD in Biological Sciences: 1) Molecular/Cellular Biology; 2) Ecology, Evolution, Environment, and Behaviour; and 3) Neuroscience and Behaviour.

*Course Work:* Students proceeding toward the Ph.D. degree will follow one of the programs given below:

- 1) Students proceeding directly to the Ph.D. from an Honours B.Sc. degree will be expected to:
- (a) comply with the general regulations;
  - (b) attend all departmental seminars in Biological Sciences (formal presentations of visiting speakers; graduate student seminars, thesis defense presentations and dissertation defense presentations) each year of full-time registration;
  - (c) present a departmental seminar in each year of enrollment (the dissertation defense may count as one of these);
  - (d) successfully complete a minimum of three (3) graduate courses. With the approval of the Doctoral Committee, courses may be in a cognate area. Statistics 65-453 (Statistics for Life/Social Sciences) may be allowed for graduate credit;
  - (e) complete a dissertation embodying the results of an original investigation;
  - (f) defend the dissertation at a public lecture or seminar.

Students recommended and approved for transfer into the Ph.D. program after having completed between 12 and 15 months and one course (1) with at least an A- grade of a M.Sc. degree in Biological Sciences at the University of Windsor will normally receive one credit during the M.Sc. program and require two more credits at the Ph.D. level for a total of three (3) courses.

- 2) Students entering into a Ph.D. program with an M.Sc. degree will be expected to:

- (a) comply with the general requirements;
- (b) attend all departmental seminars in Biological Sciences (formal presentations of visiting speakers, graduate student seminars, thesis defense presentations and dissertation defense presentations) each year of full-time registration;
- (c) present a departmental seminar in each year of enrollment (the dissertation defense may count as one of these);
- (d) successfully complete a minimum of two graduate courses which may be in a cognate area. With the approval of the Doctoral Committee, courses may be in a cognate area. Statistics 65-453 (Statistics for Life/Social Sciences) may be allowed for graduate credit;
- (e) complete a dissertation embodying the results of an original investigation;
- (f) defend the dissertation at a public lecture or seminar.

*Grading:* A student must maintain at least a 70% in each course in Biological Sciences and at least a 70% average in any non-Biological Sciences courses. Any student whose performance is deemed unsatisfactory in course work or research will be asked to withdraw.

*Doctoral Committee:* Within the first term of the student's registration, the doctoral committee will be formed except for the external examiner, who is to be appointed during the student's final year of study/research. The full committee will consist of at least five members; one must be from outside the University, one from the University faculty but outside Biological Sciences, and three must be within Biological Sciences. The research advisor will act as chairperson of this committee. The student should meet with individual committee members on an informal basis at least twice a year.

The doctoral committee must meet for the following:

- (a) to review and approve course work and the research proposal no later than six months into the program;
- (b) to prepare and administer the comprehensive examination within the first two years of the student's registration in the program;
- (c) to discuss the student's progress within two months after the comprehensive examination. (The extramural committee member need not participate.);
- (d) to discuss the student's research and dissertation at least two months before the anticipated time of the final oral examination;
- (e) the final oral examination.



*Research Progress:* Each year from the date of initial registration, the student must submit a Research Progress Report to and meet with his or her doctoral committee. In addition, the student must review his or her research in a meeting with the doctoral committee at least six months before the anticipated date of the final oral examination.

*Dissertation:* Six months before the anticipated date of the final oral examination the student must review the research and dissertation in a meeting with the committee.

A dissertation embodying the results of an original investigation in the student's major field is required of all candidates. The dissertation is expected to be of a quality suitable for publication in a refereed biological journal.

*Examinations:*

(a) *Comprehensive Examination:* The primary purpose of the Comprehensive Examination is to ensure that the student demonstrates both a reasonable mastery of the field of specialization, and knowledge of broader areas of Biology; it is designed to test the student's command of knowledge and ability to integrate that knowledge. This examination must be completed within two years of the student's initial registration in the program. Prior to the examination, the student will have provided the doctoral committee with a written proposal outlining the background, approach and general expectations of the intended research project; however the Comprehensive Examination is not intended to be, and should not be limited to, a defense of this proposal. The Comprehensive Examination will normally be an oral examination administered by the doctoral committee, and chaired by the Biological Sciences Graduate Coordinator (or designate). The student's Academic Advisor will communicate the results of the examination and any recommendations to the student, and to the Biology Graduate Committee. Following the Comprehensive Examination the doctoral committee may assign the student appropriate remedial or supplementary course work. Successful completion of the examination and any remedial studies or course work recommended by the doctoral committee is prerequisite to the student's admission to candidacy in the doctoral program.

(b) Finally, the student will be requested to defend the dissertation orally at a public lecture or seminar (final oral examination).

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THE MASTER OF BUSINESS ADMINISTRATION DEGREE (MBA)

*M.B.A. PROGRAM SEQUENCE*

The program will consist of five teaching modules

- Module 1: Business Fundamentals
- 76-501 Interpersonal Dynamics
  - 76-502 Core Concepts of Accounting I
  - 76-503 Introduction to Financial Management
  - 76-505 Marketing Management.
  - 76-511 Research Methodology
- Module 2: New Venture
- 76-510 Core Concepts of Accounting II
  - 76-512 Financial Management.
  - 76-513 Human Resources Management.
  - 75-690 Entrepreneurship: New Venture Formation and Management
- Module 3: Managing Growth
- 76-504 Quantitative Techniques in Management
  - 71-600 Business Ethics and Sustainability
  - 74-631 Consumer Behaviour
  - 75-611 Project Planning I
- Module 4: Managing in a Mature Market
- 71-646 Dynamics of Business Negotiations
  - 75-698 Strategic Management
  - 76-514 Management Information Systems.
  - 75-612 Project Planning II
- Module 5: Specialization
- Three 600-level business courses

**The Major Paper**

Students may choose a major paper option. All students choosing this option must have a detailed major paper proposal approved by at least two faculty members in the Odette School of Business. These two faculty members will have primary responsibility for supervising the student's work. The approved proposal application form must be submitted to the Assistant to the Dean in order to register for the major paper (76-796). An oral defence will be required.

The major paper will be graded, will receive six credits and will substitute for two 600-level course electives.

**The Thesis**

Students may choose a thesis option. All students choosing this option must have a detailed thesis proposal approved by at least two faculty members in the Odette School of Business and by one faculty member external to the School but from within the University. An oral defence will be required.

The thesis will be graded, will receive twelve credits and will substitute for four 600-level course electives.

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ODETTE SCHOOL OF BUSINESS

MASTER OF BUSINESS ADMINISTRATION DEGREE CO-OPERATIVE EDUCATION

*Note: Admissions to the MBA Co-op Program will be suspended as of Fall 2008.*

Course Requirements

The M.B.A Co-op requires eleven 500-level courses in the first year.

The major paper is weighted as two courses; the thesis as four. A student writing a major paper or thesis would require eight or six additional courses respectively. Fast Track students who do not complete a co-op work term will be required to complete a major paper in addition to the ten courses. 75-698 is required of all MBA students.

Students will be allowed to pursue a general M.B.A. or choose one specific area of concentration. Areas of concentration include Business Strategy and Entrepreneurship, Finance, International Business, Marketing, Management and Labour Studies, Management Science and Production/Operations Management. To obtain an area of concentration, courses must be completed as follows:

*BUSINESS STRATEGY AND ENTREPRENEURSHIP*

75-680. Managing the International Enterprise  
75-682. Manufacturing Strategy  
75-690. Entrepreneurship: New Venture Formation and Management

Plus any two of:  
75-692. Topics in Strategic Management  
74-639. Marketing Strategy and Planning  
71-613. Leadership and Organizational Change

*FINANCE*

72-672. Cases in Financial Management  
70-651. Reporting, Analyzing, and Using Accounting Information

Plus any three of:  
72-670. Investment Analysis and Management  
72-671. Portfolio Management  
72-673. Topics in Finance  
72-674. International Financial Management

*INTERNATIONAL BUSINESS*

71-643. International Management  
72-674. International Financial Management  
74-635. International Marketing Strategy  
75-680. Managing the International Enterprise

Plus any one of:  
45-566. International Political Economy  
41-510. Theory of International Trade  
or a Topics course with an international focus offered by any of the Areas

*MARKETING*

74-639. Marketing Strategy and Planning

Plus any three of:  
74-631. Consumer Behaviour  
74-632. Marketing Research  
74-635. International Marketing  
74-638. Special Topics in Marketing

Plus any one of:  
72-672. Cases in Financial Management  
75-680. Managing the International Enterprise  
75-682. Manufacturing Strategy  
or a Topics course being offered by one of the other Areas whose content is relevant to Marketing.

### *MANAGEMENT SCIENCE*

73-603. Management Science Methods  
73-605. Operations Management  
73-606. Strategic Implementation for Technologies Management

Plus any two of:

73-602. Topics in Management Science  
60-537. Database Management Systems  
60-538. Information Retrieval Systems  
60-539. Emerging Non-traditional Database Systems  
91-504. Advanced Operations Research I  
91-505. Advanced Operations Research II  
91-511. Stochastic Processes  
91-502. Manufacturing Systems Simulation  
91-500. Optimization  
91-503. Production and Inventory Control Systems  
91-508. Reliability Engineering

### *MANAGEMENT AND LABOUR STUDIES*

71-613. Leadership and Organizational Change  
71-643. International Management  
71-646. Business Negotiations and Problem Solving  
71-647. Managing Diversity in the Work-place

Plus any one of:

71-648. Topics in Management and Labour Studies  
95-500. Sport Leadership

### *PRODUCTION/OPERATIONS MANAGEMENT*

73-604. Operations Management  
75-682. Manufacturing Strategy

Plus any three of:

73-602. Topics in Management Science  
74-631. Consumer Behaviour  
75-680. Managing the International Enterprise  
41-531. Industrial Organization  
91-509. Computer-Integrated Manufacturing  
91-512. Flexible Manufacturing Systems

### **THE MAJOR PAPER**

Students may choose a major paper option. All students choosing this option must have a detailed major paper proposal approved by at least two faculty members in the Odette School of Business. These two faculty members will have primary responsibility for supervising the student's work. The approved proposal application form must be submitted to the Assistant to the Dean in order to register for the major paper (76-796). An oral defence will be required.

The major paper will be graded, will receive six credits and will substitute for two 600-level course electives.

### **THE THESIS**

Students may choose a thesis option. All students choosing this option must have a detailed thesis proposal approved by at least two faculty members in the Odette School of Business and by one faculty member external to the School but from within the University. An oral defence will be required.

The thesis will be graded, will receive twelve credits and will substitute for four 600-level course electives.

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# Spring 2016 Graduate Calendar

ODETTE SCHOOL OF BUSINESS

MASTER OF BUSINESS ADMINISTRATION DEGREE (FAST-TRACK PROGRAM)

*Note: Admissions to the MBA Co-op Program will be suspended as of Fall 2008.*

This program is designed for students who have graduated from a four-year honours business program. Fast Track M.B.A. students are exempt from the first (qualifying) year of the regular program, entering directly into the second (candidate) year. It includes not only traditional academic course work but also a co-operative work placement with selected organizations. The program is purposely designed to provide practical knowledge based experience usually not available at an undergraduate level.

FAST TRACK M.B.A. PROGRAM STUDY SEQUENCE

**Fall Term**  
76-660. Management Skills Development  
plus workshops and four 600-level Business courses

**Winter Term**  
76-711. Work Term

**Summer Term**  
75-698. Strategic Management  
plus workshops and four 600-level Business courses

Students who are unable to complete the work term (76-711) will write a major paper (76-796).

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## ODETTE SCHOOL OF BUSINESS

### M.B.A FOR MANAGERS AND PROFESSIONALS

The M.B.A for Managers and Professionals is an accelerated program geared toward students who are employed full-time and have accumulated significant experience in management and business practices. For additional information contact the Centre for Executive Education at [www.uwindsor.ca/execed](http://www.uwindsor.ca/execed).

#### Admission Requirements

- 1) Four-year (honours) undergraduate degree;
- 2) Three years of work experience in managerial or professional positions;
- 3) Applicants must achieve a satisfactory score on the GMAT to be granted admission to the MBA for Managers and Professionals. Applicants who hold an M.B.A from a non-Canadian University or a Ph.D. (or equivalent degree) in any discipline will not be required to write the GMAT. The GMAT requirement may be waived for applicants who can demonstrate the following: (1) Successful performance in a job that has an extensive quantitative component (comptroller, quality assurance supervisor, engineer, *etc.*); and (2) a 70% average or better in an undergraduate degree that emphasizes quantitative skills (such as Engineering, Mathematics, Statistics, and the like), or performance at the 70% or better level in a recent Mathematics or Statistics course at a recognized University. The GMAT will strengthen the application.
- 4) An applicant whose first language is not English and who has not worked in an English-speaking environment for at least three years would have to demonstrate adequate command of English by an appropriate score on the TOEFL, CAEL, or other recognized test;
- 5) Satisfactory performance on a personal interview. Interviews will be conducted for prospective students.

#### Students with an Honours B.Comm.

Applicants who have a four-year B.Comm. or equivalent business degree could be admitted directly to the second year of the Professional M.B.A if they meet the above criteria and furthermore:

- (a) have completed their degree no more than five years before the cut-off date for applications;
- (b) had an average of 70% or higher in their program.

#### Program Curriculum

*Total courses: 20*

As with the regular M.B.A. program, all required courses are offered by the Odette School of Business Administration. In this program students will follow a prescribed sequence of courses in cohort fashion, with no electives - an approach that is not uncommon in M.B.A. programs directed at working managers and executives.

#### Program Sequencing

Courses are scheduled on alternate weekends; contact time is supplemented by Web-based instruction and team assignments. Students complete two courses concurrently before moving to the next two courses.

##### Year 1

- 77-521. Core Concepts of Accounting I
- 77-522. Introduction to Financial Management
- 77-523. Quantitative Techniques in Management
- 77-524. Managing People in Organizations
- 77-525. Business Research Methods
- 77-531. Core Concepts of Accounting II
- 77-532. Financial Management
- 77-533. Management Information Systems
- 77-534. Managing Human Resources
- 77-535. Marketing Management

##### Year 2

- 77-620. Reporting, Analyzing, and Using Accounting Information
- 77-621. Leadership and Organizational Change
- 77-623. Maximizing the Value of the Organization
- 77-624. Managing in the International Arena
- 77-625. Strategic Management
- 77-626. Strategic Implementation for Technologies Management
- 77-627. Business Negotiation and Problem Solving
- 77-628. Entrepreneurship and Intrapreneurship

77-629. Current Issues in Business

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## ODETTE SCHOOL OF BUSINESS / FACULTY OF LAW

### INTEGRATED M.B.A./J.D. PROGRAM

This special program provides students interested in a career combining management and legal skills with an opportunity to complete the M.B.A. and J.D. degrees in four years. The program is jointly administrated by representatives of the Odette School of Business, the Faculty of Law, and the Faculty of Graduate Studies.

#### Admission Requirements

The admission procedure for the integrated program consists of two stages. At the first stage, students applying to the program must meet the admission requirements of both the M.B.A. and J.D programs. Therefore separate applications must be submitted to the Faculty of Law and the Faculty of Graduate Studies for admission to the regular degree program in Law and the M.B.A. To facilitate academic and career planning, it is strongly suggested that these applications be made simultaneously. Students who are accepted to both the M.B.A. and J.D programs will be accepted to the integrated program, and will proceed to attend first year in either Faculty. Such students will be granted a deferred admission to the other Faculty in the program.

This special deferred admission will be revoked if the applicant's performance in the first program fails to meet the first-year academic standards of the program. In such case the applicant may re-apply for regular admission to the second degree program.

Applications will also be considered for entry to the program from candidates who are attending the first year of either the J.D or M.B.A. programs. They must meet the admissions requirements and application deadline for the program for which they are seeking entry.

#### Application Deadlines

Faculty of Law - November 1 (J.D)

Faculty of Graduate Studies - June 1 (M.B.A.)

For application materials please contact each of the following separately:

#### For the J.D:

Ontario Law School Application Service  
P.O. Box 1328  
170 Research Lane  
Guelph, Ontario  
N1G 5E2  
Telephone: (519) 823-5232  
Website: [www.ouac.on.ca/olsas](http://www.ouac.on.ca/olsas)

#### For the M.B.A:

Odette School of Business  
M.B.A. Admissions  
University of Windsor  
Windsor, Ontario  
N9B 3P4  
mba@uwindsor.ca  
Website: [www.uwindsor.ca/mba](http://www.uwindsor.ca/mba)

#### TERM PLANNING

The M.B.A./J.D. Program offers students the opportunity to experience two enriching education experiences, two degrees, in an accelerated, integrated manner.

**M.B.A./J.D. students can enter into the program** in one of two ways:

- i) Defer law studies for one year, complete 18 course credits toward the MBA (with only the Major Paper (04-76-796), weighted at two course credits, remaining for completion) and then study Law in the regular manner for three years.
- ii) Complete Year 1 of law studies and take a one-year leave of absence from Law. Once at the Odette School of Business, complete 18 course credits toward the MBA (again, with only the Major Paper (04-76-796) remaining for completion) and then return to Law and study in the regular manner for the remaining two years.

Option (i) is preferred because it allows the student to study with a cohort in both programs; however, students interested in the MBA who have completed only the first year of Law at the University of Windsor will have no problem completing the requirements in the two remaining years of study.

**The sequence of courses** would be identical to those studied by all MBA students, with two exceptions (noted in italics). In Module 2 and extending into Module 3, MBA/JD students will be required to complete one extra credit, an independent study (Directed Study 04-76-661), to bring their eventual total to 18 course credits. This independent study is a business course



(Directed Study 04-76-661), completed through Odette, and it should not be confused with the Supervised Research Option available through Law. With earning the 18 M.B.A. course credits, only the major paper (again, worth the equivalent of two courses) would remain to complete the program. The sequence is presented below:

**Please note** that students will be registered in Module 4 for the Major Paper (76-796), which will receive 'IP' status at the end of the module.

- Module 1: Business Fundamentals  
76-501 Interpersonal Dynamics  
76-502 Core Concepts of Accounting I  
76-503 Introduction to Financial Management  
76-505 Marketing Management.  
76-511 Research Methodology

- Module 2: New Ventures  
76-510 Core Concepts of Accounting II  
76-512 Financial Management.  
76-513 Human Resources Management.  
75-690 Entrepreneurship: New Venture Formation and Management  
+ 76-661 Directed Study (for MBA/JD students only)

- Module 3: Managing Growth  
76-504 Quantitative Techniques in Management  
71-600 Business Ethics and Sustainability  
74-631 Consumer Behaviour  
75-611 Project Planning I

- Module 4: Managing in a Mature Market  
71-646 Dynamics of Business Negotiations  
75-698 Strategic Management  
76-514 Management Information Systems.  
75-612 Project Planning II  
+ 76-796 Major Paper (for MBA/JD students only)

To complete the two degrees, as stated, students commence (or return to) law studies in September. They are registered in Law and finish the remaining two or three years of the program (whichever is applicable). During the final year of Law studies (likely in the winter semester), the students will also submit and present their major papers. Once completed, a grade is assigned for the Major Paper and the 20 course credits required for the MBA are fulfilled.

The sequence conforms as closely as possible to the parameters that guided the old program sequence. In fact, the present model is actually simpler, without the multiple changes in program status that were required with the old two-year MBA.

The registration of students is straightforward. While studying for the core 18 course credits of the M.B.A., all students are registered full-time in the MBA (from September until August). However, when they return to Law the following autumn, the students will revert to full-time Law. They will complete the Major Paper (04-76-796) under that status, using the MBA/JD program status in SIS. Once completed, the Major Paper (04-76-796) will have its “IP” status converted to the grade that was earned.

**Sample Progression through the J.D. Program  
(with MBA courses completed before LAW I or between Law I and II)\***

The following chart sets out a typical path through the MBA/JD. All program requirements in Law and the MBA must be met regardless of the entry point into the program.

	Fall Required Courses (# Credits)	Winter Required Courses (# Credits)	Summer	Comments
Law I	JD program as prescribed		N/A	
Law II	Torts and/or Civ Pro (4) Business Associations (4) + 6 credits as electives Total Credits: 14	Torts and/or Civ Pro (4) + 11 electives Total Credits: 15	N/A	13/29 and 18/32 rule applies
Law III	Evidence (4) Supervised Research(3)*** Law Electives (8) Total Credits: 15	Judicial Review (4)** Law Electives (10) Total Credits: 14  MBA Major Paper (04-76-796) Defense	N/A	13/29 and 18/32 rule applies - 3 MBA Major Paper credits permissible by application

\*Law students must earn a minimum of 13 credits per term and 29 credits over the year and a maximum of 18 per term and

32 over the year. They must also meet Law's other curricular requirements. To that end and to facilitate the writing of the MBA Major Paper (04-76-796), Law students may apply to allocate three credits to MBA Major Paper work and to count these credits towards the 13/29 minimum requirement in Law III. Students must ensure that they apply to the Academic Program Committee of the Faculty of Law via the Office of the Associate Dean at the beginning of their term to have their MBA Major Paper (04-76-796) work apply to their Law minimum credit requirement. Application deadlines are posted on the Faculty of Law's website.

The MBA Major Paper (04-76-796) for the purposes of the MBA/JD is to have a legal relevance, although the supervisor will be from Odette and a member of Faculty of Graduate Studies (FGS). The reader may be from Law if he or she is a member of the FGS. Otherwise, Odette may consult with Law about the paper and/or include a representative as a third committee member.

The MBA major paper will be approximately 50 pages in length, inclusive of bibliography and appendices (based on 250 words per page).

\*\*\*Students may also register for a Law Supervised Research Paper as part of electives in Law II or III. The Supervised Research Paper may be adapted for use in the MBA Major Paper but not form a chapter of the Major Paper. Supervised Research papers worth three credits are approved by the Office of the Associate Dean, whereas papers worth four credits are approved by the Academic Program Committee. Supervised papers worth four credits generally require an empirical component. Students who intend to adapt the Supervised Research to their MBA Major Paper (04-76-796) (or visa versa) should discuss their proposal with supervisors in both programs.

The MBA Major Paper (04-76-796) is to be defended during Law III year with timing determined by Odette in consultation with Law

Total Law credits over 3 years:  $34 + 26 + 26 = 86$  [minimum required by Federation of Law Societies for Dual/Joint Program is 80, minimum for a regular JD student is 90]

\*\*These courses are highly recommended but not currently required. They may become required for all students graduating from Law in 2015 and beyond. Students intending to practice law are encouraged to take these courses to satisfy the competency requirements identified by the Federation of Law Societies. These courses may be taken in any term but the 13/29 rule must be met.

**ODETTE SCHOOL OF BUSINESS: [PROGRAM INFORMATION \(MBA\)](#)**

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## CHEMISTRY AND BIOCHEMISTRY

### THE MASTER OF SCIENCE DEGREE

In addition to the University's general requirements and stipulations for the Master's degree, the following requirements must be met by students proceeding to the M.Sc. degree.

- 1) *Course Work*: Candidates must complete successfully at least three courses chosen from the available graduate offerings in the student's field or from related and cognate courses, with the approval of the Program Committee. The student may be required to take additional courses, as stipulated by the student's Master's committee.
- 2) *Seminars*: In addition to the above course work, students must attend the regular departmental Seminar (59-795) throughout their M.Sc. studies as a fulfilment of this requirement.
- 3) *Thesis*: A student must undertake original research and embody the results in a thesis(59-797). The student will then be examined by a committee.

A student who fails to achieve satisfactory performance in all aspects of the program (e.g., course work, seminars, thesis work or major critique) may be required to withdraw.

- 4) *Master's Committee and Final Examinations*: The Master's committee is chosen in the manner described under Master's Program Requirements. The final examination will take the form of an open seminar in the presence of the Master's committee. The examination will be open to the public.

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## CHEMISTRY AND BIOCHEMISTRY

### THE DOCTOR OF PHILOSOPHY DEGREE

In addition to the University's general requirements, the following requirements must be met by all students proceeding to the Ph.D. degree:

1) *Course Work*: Candidates must complete successfully at least six courses, including [59-710](#) (or three courses if the candidate enters the program with an MSc degree) chosen from the available graduate offerings in the student's field or from related and cognate courses, with the approval of the Program Committee. The student may be required to take additional courses, as stipulated by the student's Doctoral committee.

2) *Seminars*: In addition to the above course work, students must attend the regular departmental Seminar (59-795) throughout their Ph.D. studies and present at least one seminar on their research as a fulfilment of this requirement.

3) *Dissertation*: The principal requirement for the Ph.D. degree is the presentation of a dissertation which embodies the results of an original investigation (59-798). For general requirements of the dissertation, see Ph.D. The Dissertation.

A student who fails to achieve satisfactory performance in all aspects of the program (e.g., course work, seminars, and dissertation work) may be required to withdraw.

4) *Doctoral Committee*: The Ph.D. committee is chosen in the manner described under Ph.D Program Requirements. This committee will meet with the student annually to review his or her progress. As part of this review the student will present a short seminar on his or her research progress.

5) (a) *Transfer to the Ph.D. program*: M.Sc. students with a minimum of an 80% average in a minimum of two courses taken as a graduate student may transfer directly to the Ph.D. program following a meeting with the Graduate Advisory Committee (with participation of the Outside Reader optional) at which approval to transfer is recommended. Such transfers will normally take place between the 12th month to the 24th month after admission to the M.Sc. II program.

(b) *Comprehensive Examination*: Students in the Ph.D. program will be required to complete an oral comprehensive examination within the first twelve months following admission into the Ph.D. program. The examination will take the form of a ten to twenty minute presentation of the student's research work to date, followed by a question and answer session in which the student's depth of knowledge of the field of research and the underlying chemical and/or biochemical principles will be examined. The student will be assessed by a committee of three members comprised of the research advisor and two other faculty members from Chemistry and Biochemistry, with additional members optional. As a guide to the student, the committee may provide some directed readings prior to the examination. The student will be expected to understand the subject matter and background of these topics. A grade of Pass or Fail will be given. In the event of a failing grade, the student may be allowed a second examination within one month, or a specific assignment for subsequent evaluation at the discretion of the examining committee. It may be possible that the student will not be allowed to repeat the examination.

(c) *Final Examination*: Each candidate will take a final oral examination in defense of the dissertation on the recommendation of the doctoral committee. An external examiner, chosen for acknowledged scholarship in the appropriate field of chemistry or biochemistry, will normally be present during the oral examination. The external examiner will be selected by the doctoral committee, subject to the approval of the Dean of Graduate Studies. The examination will be public and will involve a short seminar presentation by the candidate. The examination will be chaired by the Dean of Graduate Studies or delegate.

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## FACULTY OF ENGINEERING

[DEPARTMENTS: CIVIL AND ENVIRONMENTAL ENGINEERING; ELECTRICAL AND COMPUTER ENGINEERING; MECHANICAL, AUTOMOTIVE AND MATERIALS ENGINEERING]

MAsc program requirements are common for all Engineering program areas.

The following requirements are supplementary to the University's general requirements as set out by the Faculty of Graduate Studies.

## THE DEGREE OF MASTER OF APPLIED SCIENCE

### Areas of Specialization

The areas of specialization are listed by Department.

### Admission Requirements

A candidate for the degree of Master of Applied Science shall hold the degree of Bachelor of Applied Science from this University or an equivalent degree in Engineering or Applied Science. In addition, the applicant must have at least second-class standing or its equivalent in the final year and be recommended by the Program Graduate Committee in which the candidate plans to undertake studies.

Applicants with degrees in related fields will be considered but will normally require strengthening of their background in Engineering. At the discretion of the Program, the Graduate Record Examination (GRE) may be required.

All applicants whose native language is not English are required to satisfy the English proficiency requirement as described in the [application procedures](#) listed in this calendar.

Possession of the minimum requirements does not automatically ensure acceptance.

### Degree Requirements

The specific minimum program requirements for the M.A.Sc. include the successful completion of:

1) *Course Requirements*: Satisfactory completion of courses comprising between twelve and twenty-four term hours, depending on the term hour equivalence assigned to the mandatory thesis or major paper. A thesis may be equivalent to as many as eighteen term hours, and a major paper to as many as six term hours of the total minimum requirement of thirty term hours.

2) Either a thesis or a major paper as specified below:

(a) *Thesis*: A thesis incorporating the results of an original investigation is required of all candidates except those students who are doing non-thesis research toward a major paper. Before writing the thesis the student must meet with the Master's committee to obtain permission to write the thesis. The Master's committee will grant this permission when the student has shown sufficient competence and has accomplished substantial research. After completion of the thesis, each candidate will be required to make a satisfactory oral presentation and defence of the thesis as described below.

(b) *Major Paper*: For those candidates doing non-thesis research, a major paper is required. The topic of the major paper is normally research based on the existing literature in the field of study. The candidate will be required to make an acceptable oral presentation to the Master's committee based on the major paper (see below).

3) Mechanical Engineering students must take 92-595 (Graduate Seminar)

4) Industrial Engineering students must additionally take 91-595 (Graduate Seminar). They are expected to register in it every semester offered. Normally in the final year of their degree, they are to give a seminar presentation and will receive a Pass/Fail grade. For the M.A.Sc. thesis or Major Paper in Industrial Engineering the final grade is "Satisfactory" or "Unsatisfactory".

*Residence and Time Limits*: The minimum period of study for a Master's candidate is twelve months. The maximum duration of full-time study as a Master's candidate is three years. Part-time Master's candidates will undertake the equivalent of a minimum of one year of full-time study. For a part-time Master's candidate the maximum time limit generally will not exceed five calendar years. Master's candidates who expect to require an extension of these time limits must petition the Dean of Graduate Studies, giving reasons for the request and plans for completion of the work. The Chair of the Program Graduate Committee will then make a recommendation to the Dean of Graduate Studies.

*Committees*: Research undertaken as part of a Master's program is normally directed and supervised by a Master's committee. Whereas the student's advisor provides day-to-day guidance and direction, the committee is ultimately responsible for the overall supervision to ensure that adequate progress is maintained. The Master's committee will consist of at least three members with the student's advisor as chairperson. The advisor must be a member of graduate faculty.

At least one member shall be from a Program within the University of Windsor other than the one in which the student is majoring. The student's advisor will propose the names of the Master's committee and these will be subject to the approval of the Program Graduate Committee and the Executive Committee of the Faculty of Graduate Studies. Within one month after registration, each student will be assigned to a Master's committee.

The final appraisal of the thesis and the conduct of the final oral examination of the dissertation will be carried out by the examining committee. The examining committee will consist of the Master's committee and the Chair of the Program Graduate Committee or designate of the Dean of Graduate Studies as chairperson (non-voting).

*Examinations:* At the discretion of the Program Graduate Committee a qualifying examination may be required. A qualifying examination is one in which the student is asked to demonstrate a reasonable mastery of the fundamentals in the major subject; it is designed to test the student's preparation for advanced graduate work. If such an examination is required, it must be administered and passed before the student registers for the final candidate year of Master's work.

In addition to the usual examination on course work, all students must meet the following requirements:

1) *Review of Progress on Research or Major Paper:* Within the first year a full-time student will present in the form of a seminar an outline of his or her proposed thesis research or outline the content of his or her major paper. This will be presented to the Master's committee, who must approve, with or without modifications, or reject the proposal. Thereafter, at least once a year, the student will report his or her progress in the form of a seminar.

2) *Final Examinations:* The passing of the final oral examination on the thesis (or the major paper) requires both an adequate thesis (or major paper) and a satisfactory defence. The examination will be conducted by the examining committee and the thesis defence will be chaired by the Chair of the Program Graduate Committee or appointed designate. If the examining committee cannot arrive at a unanimous decision to award a passing grade, a majority decision will be accepted provided there is no more than one dissenting vote. If there is more than one dissenting vote, the student may be required to carry out additional work if the thesis is judged to be adequate in all other respects, or the student may be required to withdraw.

*Grading:* The grading system is outlined in "[Faculty Regulations](#)".

The Faculty of Engineering requires that students maintain at least a 70% average at all times.

Courses in which a grade of 70% or higher is received will be accepted for graduate credit. In addition, upon the positive recommendation of the Chair of the Program Graduate Committee and advisor concerned, credit may be granted by the Faculty of Graduate Studies for not more than two term courses in which a grade between 65-69% has been obtained.

If a student fails to obtain credit in a course, the course may be repeated only once, at the discretion of the Chair of the Program Graduate Committee concerned and the Dean of Graduate Studies. No student may repeat, or replace with another course, more than two term courses in which credit was not obtained.

All research work for which a letter grade is assigned must be graded 70% or better to receive credit.

Make-up courses will not count for graduate credit. Make-up courses are those courses required to compensate for deficiencies in the student's academic background.

In exceptional cases, at the discretion of the Chair of the Program Graduate Committee and the advisor, a graduate student may take one undergraduate course for credit.

#### **INTEGRATED B.A.Sc./M.A.Sc.**

The Faculty of Engineering offers a Bachelor's/Master's Integrated Engineering Degree program which allows students with outstanding academic ability to achieve both a B.A.Sc. and M.A.Sc. degree in a time period as short as five years. This program treats the educational process through the B.A.Sc. to the M.A.Sc. degree as a single coherent integrated whole, while ensuring that the requirements for both degrees are fully satisfied. This structured program represents a complementary alternative to the existing separate undergraduate and graduate degree programs.

Application to the integrated B.A.Sc./M.A.Sc. can be made early in the Winter semester of the student's third year of undergraduate B.A.Sc. study. Normally, only applicants who have a cumulative average of at least 77%, and a semester average of 77% in the Fall semester of their third year of undergraduate B.A.Sc. study may be granted admission to the integrated program which confers conditional admission status to the M.A.Sc. program.

Contact the appropriate Engineering Department for more information.

#### **RESEARCH IN OUTSIDE INSTITUTIONS**

Research for the Ph.D. or M.A.Sc. degree, in part or in whole, may be carried out in an outside institution (e.g., industrial, governmental, or academic university). A student who does research at an outside institution must fulfil the same requirements as a student doing on-campus research. The only exception is that the time spent doing the off-campus research relevant to the thesis or dissertation will be credited toward the residence requirement. In addition to the general requirements, a student applying for permission to do research at an outside institution must provide:

1) A detailed statement of the research proposal, including arrangements for supervision, and of the circumstances under which the research is to be carried out;

2) Evidence that the institution has adequate facilities for the research; and that the applicant will be able to pursue independent research;

3) A proposed time schedule;

4) A letter of support from a responsible person in the outside institution giving approval of the proposal and accepting these regulations.

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## FACULTY OF ENGINEERING

The following requirements are supplementary to the University's general requirements as set out by the Faculty of Graduate Studies.

## THE DEGREE OF MASTER OF ENGINEERING

### Faculty of Engineering

Master of Engineering (MEng) Degree in Civil Engineering, Environmental Engineering, Electrical Engineering, Electrical Engineering with Computer Engineering Field<sup>^</sup>, Industrial Engineering, Mechanical Engineering and Engineering Materials

#### 1. General

The Master of Engineering (MEng) degree offered at the University of Windsor is a course work professional program open to students who satisfy the admission requirements. The MEng Program takes three to five semesters to complete but is structured in such a way that it may be completed in one year by a full-time student. The minimum period of full-time registration for the MEng degree is three semesters and the maximum allowable time is five semesters. For part-time students, the minimum period of registration for the MEng degree is six semesters and the maximum allowable time is fifteen consecutive semesters. Practical work-experience placements (paid and unpaid) may be available for full-time students only, but cannot be guaranteed.

#### 2. Degree, Course and Credit Requirements

Eight (8) courses, equivalent to 24 credits, taken from the 400 and 500 courses (or courses acceptable for graduate credit) and one (1) technical/professional writing course for engineers, are required for graduation. The professional writing course can be waived at the discretion of the department.

**2.1** A candidate, with the permission of the host Department, may register for at most one senior undergraduate course (400-level) in the MEng Program. All courses must be for credit only. Auditing a course is not permitted.

**2.2** A candidate must complete a minimum of 6 (six) courses, equivalent to 18 credits from the Faculty of Engineering, with a minimum of 5 (five) courses, equivalent to 15 credits taken in the specific program.

**2.3** For non-engineering courses, candidates will be expected to choose courses from an approved list and must receive permission from the Departmental MEng Coordinator and the Faculty of Engineering Coordinator. No more than 2 (two) non-engineering courses, equivalent to 6 credits, can be taken from another graduate program.

**2.4** MEng students will be generally expected to choose their courses from the MEng Course List. Special permission from the MEng Coordinator will be needed for registering in a course outside the MEng Course List.

**2.5** The candidate must obtain a pass in all courses credited to her or his program, with a minimum overall average of 72%. A grade of less than 63% in any course counts as a failure.

#### 2.6 Co-op/Internship - Work Term Option

**85-701.** The work term is offered on a pass/fail basis. It provides the opportunity for students to enhance academic learning with valuable industrial experience, and to develop transferable skills in an applied setting. Students must apply for admission to the Co-op/internship option in either their first or second study term. (Prerequisite: Departmental permission) Students can complete either a four (4) or eight (8) month work term.

All Co-op/Internship positions must be full-time, paid, related to the degree program and approved by the University. The process of securing a Co-op/Internship position is competitive. Co-op/Internship students will apply for work opportunities as advertised by the Centre for Career Education using an Internet-based software program and employers will make interview and hiring decisions. Students are also encouraged to seek Co-op/Internship employment outside of the advertised postings by completing a guided job search process facilitated by the Centre for Career Education.

Withdrawal from the Co-op/Internship program will be granted on an exception basis only as it must be determined that the student has no outstanding commitments to employers. Students who wish to withdraw must meet with a Co-op Coordinator and complete a withdrawal form. However, the only time a student may withdraw from an undergraduate Co-op/Internship program without further Co-op/Internship fee payment implications is by the 1st Friday of classes after their first Co-op/Internship work term. Students who withdraw from Co-operative Education at any other time will be liable for paying the Co-op/Internship fee for the term in which they are dropping and one additional term. This will help offset the costs of developing another student for placement.

In the interest of building solid partnerships with employers, students who have accepted a co-op employment offer (either by ranking a position in round 1 of the job competition or by accepting a position either verbally or in writing in later rounds) must honour that commitment. Therefore, once students have accepted an offer of employment for a work term, they will be considered registered in the appropriate work term course and must remain in the Co-op/Internship program until they have completed their work term requirements. Failure to honour these commitments and/or to complete all work term



requirements will lead to being required to withdraw from the Co-op/Internship program and will result in a failing grade on his/her transcript for that work term.

Master of Engineering co-op/internship students will be registered for a work term course for each four month term of their placement. This course will be evaluated on a pass fail basis. In order to receive a passing grade, students must:

- Submit learning objectives at the beginning of each 4 month work term
- Receive a satisfactory mid work term assessment from supervisor
- Must submit and receive a passing grade on a work term report (guidelines prepared by faculty and report evaluated by faculty)
- Complete and receive a satisfactory post work term presentation (evaluated by Co-op Coordinator and Faculty)
- Receive a satisfactory final work term performance evaluation by employer

### 3. Schemes of Study

The Master of Engineering may be taken by full-time students or those who wish to study on a part-time basis while remaining in full-time employment external to the University. All applicants for the MEng program are expected to be entirely self-funded and no financial assistance will be provided by the Faculty of Engineering or the University of Windsor. International students are admitted as full-time students only.

#### 3.1 Full-Time Students will be:

- 3.1.1 required to register for a maximum of three courses per semester,
- 3.1.2 required to register for a minimum of two courses per semester,
- 3.1.3 expected to complete all degree requirements within 5 academic semesters.

#### 3.2 Part-Time Students will be:

- 3.2.1 required to register for a maximum of admissible two courses per semester,
- 3.2.2 required to complete all degree requirements within 15 academic semesters and should not have more than two semesters of continuous "inactive" status

### 4. Admission Requirements

The Department should approve the application and in addition, MEng applicants shall be recommended for admission by the Faculty of Engineering Coordinator. Official admission to any program of graduate studies is in the form of a "Letter of Acceptance" issued by the Faculty of Graduate Studies. Please note that the following are minimum requirements and do not guarantee admission.

4.1 Undergraduate degree (BASc / B.Sc. / B.Eng. degree or equivalent\*) with at least 73% average over the last two years. International applicants are advised to refer to the specified minimum admission requirements, listed by country, at the Faculty of Engineering's Professional and Graduate Studies (FEPGS) website and the Faculty of Graduate Studies website.

\*Candidates with degrees in such areas as Mathematics, Physics and Computer Science will also be considered. Students whose undergraduate degree programs do not provide them with sufficient background in Design, Applied Science and Professional/Technical communications are required to enter a qualifying program of courses at the undergraduate level before admission to candidature for the MEng degree. Students entering and successfully completing the MEng qualifying program may receive an Advanced Certificate in Engineering.

4.2 A candidate who has not fulfilled the minimum requirement of 73% average may be admitted to the MEng Program as a probationary student\*\* provided that he/she has either:

4.2.1 at least 2 years of industrial or engineering experience following graduation

or

4.2.2 achieved at least 77% overall standing in the Final Year of the graduation.

\*\*Such candidates will be required to achieve a grade of at least 73% in the first two MEng courses to be regularized in the MEng Program.

4.3 The language of instruction for the MEng courses is English. Applicants will be required to provide certification of English language proficiency, if he or she has:

4.3.1 not completed three or more years of post-secondary work at a Canadian institution or at an institution at which English was the primary language of instruction\*\*\*,

\*\*\* Countries in which English is the Official Language of Instruction, as recognized by the Faculty of Engineering are listed on the Faculty of Engineering's FEPGS website and the Faculty of Graduate Studies website. English Language proficiency may be met by the language coursework at the secondary school level in the countries listed on the FEPGS website.

or

4.3.2 not been employed for a similar period of time in a position in which English was the primary language of business.

**4.4** Where applicable a student's certification of English language proficiency can be demonstrated by a minimum score set by the department. For minimum requirements in other equivalent exams, information is available in the Faculty of Graduate Studies web-site. The Faculty of Engineering and the Faculty of Graduate Studies reserve the right to require further demonstration of English Language proficiency.

**4.5** The Department may consider for admission to its degree programs students from outside Canada who have excellent academic preparation, but who do not meet the usual standards of English language proficiency. Successful completion of the English Language Improvement Program (ELIP) will be considered as a means to gain admission to the Department for such students.

**4.6** Students who do not meet the academic requirements outlined above may be considered for admission to a transitional, probationary or qualifying program depending on their academic background.

**4.7** Students seeking admission to the Department's MEng programs must also complete the Department's Graduate Student Information Form and the Faculty of Graduate Studies Admission Reference form.

## **5. Degree Program Transfers (MEng, MASc and PhD)**

**5.1** The MEng is a course-based professional degree and does not require a research thesis. As admission to the Department's PhD program requires a demonstrated record of research capabilities, MEng graduates are not eligible for direct admission to the PhD program, see 5.2.

**5.2** On successful completion of the MEng degree with an overall average of at least 77%, a student may apply for admission into the Department's MASc (fast-track) program, see section 6.

**5.3** A full-time MEng student may apply for transfer into the MASc research degree track after successfully completing 5 MEng courses from the Department's MEng approved course list with an overall average of at least 77%. A maximum of two courses of advanced standing may be granted towards the requirements of the MASc degree. Applications for admission to the MASc from the MEng program must conform to the general regulations for admission to the MASc program. Admission to the MASc program also requires that a faculty member in the department is able and willing to act as a research advisor. Admission is not guaranteed.

**5.4** While strongly discouraged, a full-time MASc student may apply for admission into the MEng degree track. A maximum of two courses of advanced standing may be granted towards the requirements of the MEng degree provided the courses are on the Department's approved MEng course list. Applications for admission to the MEng from the MASc program must conform to the general regulations regarding admission to the MEng program. Admission is not guaranteed. Students transferring from the MASc research degree to the MEng course based degree will be expected to be self-supporting and can expect no financial assistance from the Department or University during the remainder of their studies.

**5.5** MASc students transferring to the MEng will not be eligible for continuing occupation of a research student office and will be required to return any computer equipment provided for their use as an MASc research student.

## **6. MEng-MASc Fast-Track Program**

**6.1** As described in section **5.2 above**, on successful completion of the MEng degree with an overall average of at least 77%, a student may apply for admission into the Department's MASc program. Applications for admission to the MASc from the MEng program must conform to the general regulations for admission to the MASc program.

**6.2** Admission to the fast-track MASc program also requires that a faculty member in the department is able and willing to act as a research advisor.

**6.3** The fast-track MASc program which can only be entered following the successful completion of the MEng degree, as described above, consists of a research project which must be completed within 6 semesters for a part-time student or 3 semesters for a full-time student after completion of the MEng degree. A major paper may be substituted for the research project at the discretion of the Department and the student's advisor.

**6.4** The MASc thesis must conform to the general regulations regarding Master's theses as described in the Faculty of Graduate Studies regulations and guidelines. A maximum of two courses of advanced standing may be granted towards the requirements of the MASc degree (subject to the approval of FGS). The nature of the remaining two or more courses is at the discretion of the supervisor.

^Contact the department for the specific courses in Computer Engineering.

## **COURSE TRANSFERS:**

Students who have either failed to complete, or cannot continue in, the Degree of Master of Engineering (M.Eng.), and have been accepted into the Honours Certificate in Electrical Engineering, can be allowed to retain as credit a maximum of four (4) graduate courses in which they have received a grade of 70% or higher. The transfer of the courses is at the discretion of the Department Head and Associate Dean Academic, Faculty of Engineering. Students who transfer to the HCP from the MEng, and have successfully completed the HCP with the required GPA for entrance to graduate studies, may reapply for admission into an Engineering Graduate program but will not be given credit for any courses they previously transferred to the HCP.

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## FACULTY OF ENGINEERING

### PROGRAMS

**Civil Engineering (PhD), Electrical Engineering (PhD), Environmental Engineering (PhD), Engineering Materials (PhD), Mechanical Engineering (PhD)** [*PhD program requirements are common for the following Engineering programs*]

### PhD in Industrial and Manufacturing Systems Engineering

### THE DEGREE OF DOCTOR OF PHILOSOPHY

**Civil Engineering (PhD), Electrical Engineering (PhD), Environmental Engineering (PhD), Engineering Materials (PhD), Mechanical Engineering (PhD)**

### Areas of Specialization

The areas of specialization are listed by Department.

### Admission Requirements

An applicant for admission to a course of graduate studies leading to the Doctor of Philosophy degree in Engineering must normally be a graduate of a recognized university with a Master's degree in Engineering or Applied Science. Applicants with degrees in related fields will be considered but will normally require strengthening of their background in engineering. At the discretion of the Program Graduate Committee, Graduate Record Examinations (GRE) may be required.

All applicants whose native language is not English are required to satisfy the English proficiency requirement as described in the application procedures listed in this calendar.

Possession of the minimum requirements does not automatically ensure acceptance to the degree program.

*Candidacy:* Admission to graduate study does not imply admission to candidacy for a degree. The candidacy of a student normally will be determined within the second year after initial registration in the doctoral program.

Candidacy will be granted to students who meet all of the following requirements:

- (a) satisfactory completion of the comprehensive examination;
- (b) demonstration to the doctoral committee of ability to conduct independent research;
- (c) acceptance by the doctoral committee of the research proposal.

The doctoral committee will assess the student's competence to continue research on the basis of (a), (b) and (c), and inform the Chair of the Program Graduate Committee.

### Program Requirements

The specific minimum program requirements for the Ph.D. include the successful completion of:

- 1) *Course Requirements:* Satisfactory completion of at least four courses, comprising a minimum of eight term hours, beyond the courses required for the Master's degree.
- 2) A comprehensive examination.
- 3) Satisfactory progress in research within each review period. The doctoral committee will establish by periodic review, which will include at least one formal seminar a year, that adequate progress in research has been accomplished by the candidate. The doctoral committee will also grant permission to write the dissertation when it decides the candidate has achieved sufficient competence in carrying out research, and when the candidate has done substantial research.
- 4) A dissertation on the research. Each candidate will be required to make an oral presentation of the dissertation research and will be examined orally on the subject of the dissertation and related fields.

*Residence and Time Limits:* Every student will undertake a full program of study for a minimum of three years beyond the Baccalaureate of Engineering or its equivalent. Credit for one of these years may be given for the time spent in proceeding to a Master's degree. Credit for one of these years may also be given for work done at another institution. However, in no case shall the student spend fewer than two of the three required years of residence in full-time attendance at the University of Windsor.

A student admitted to a Ph.D. program requiring the student's attendance for a minimum of three years must complete all requirements within seven years. Students admitted to a program requiring a minimum of two years' residence must complete all requirements within six years.

*Committees:* Research undertaken as part of a doctoral program is normally directed and supervised by a doctoral

committee. Whereas the student's advisor provides day-to-day guidance and direction, the committee is ultimately responsible for the overall supervision to ensure that adequate progress is being maintained. The doctoral committee will consist of at least four members, with the student's advisor as chairperson. The advisor must be a member of graduate faculty. At least one member shall be from a program area within the University of Windsor other than the one in which the student is majoring.

The student's advisor will propose the names of members for the doctoral committee, and these will be subject to the approval of the Program Graduate Committee and the Executive Committee of the Faculty of Graduate Studies. Within one month after initial registration, each student will be assigned to a doctoral committee.

The final appraisal of the dissertation and the conduct of the final oral examination of the dissertation will be carried out by an examining committee. The examining committee will consist of the doctoral committee, the Dean of Graduate Studies or designate as chairperson (non-voting), and an external examiner.

*Examinations:* At the discretion of the doctoral committee a qualifying examination may be required. A qualifying examination is one in which the student is asked to demonstrate a reasonable mastery of the fundamentals in the major subject; it is designed to test the student's preparation for advanced graduate work. If such an examination is required, it must be administered and passed before the student registers for the second year of Ph.D. work.

In addition to the usual examinations on course work, all students must meet the following requirements:

1) Review of Progress on Research: Within the first year, the student will present in the form of a seminar an outline of his or her proposed thesis research. This will be presented to the doctoral committee who must approve, with or without modifications, or reject the proposal. Thereafter, at least once a year the student will report his or her progress in the form of a seminar.

2) Comprehensive Examination: Students who have previously obtained a Master's degree must attempt this examination within twelve months of registering for the Ph.D. program. Other students must take it within twenty-four months of registration for the Ph.D. program. This set of examinations requires the students to demonstrate an adequate background in the general discipline of engineering, and an advanced knowledge in their fields of specialization. The comprehensive examination will be conducted by a program comprehensive committee in one or two sections at the discretion of the Program Graduate Committee:

(a) a scheduled, supervised written portion, of at least three hours' duration, designed to test the student's general knowledge on core subjects in the field of study, with questions set and answers evaluated by the program comprehensive committee;

(b) an oral examination to be evaluated by the program comprehensive committee. The objective of this part of the examination is to test the student's ability to integrate general knowledge from different areas of the field of study in order to solve problems the student has not previously encountered.

The student's overall success in the comprehensive examination will be determined by the program comprehensive committee. If the student is unsuccessful, the committee may require:

(a) that the student repeat all or part of the comprehensive examination at a specified time,

(b) that the student take and pass remedial coursework before repeating all or part of the examination, or

(c) after consultation with and approval by the doctoral committee, that the student withdraw from the program.

3) *Final Examination:* The passing of the final oral examination of the dissertation requires both an adequate dissertation and a satisfactory defence of the dissertation. This examination will be conducted by the examining committee. Following the acceptance and provisional approval of the dissertation by the doctoral committee, and a satisfactory preliminary report from the external examiner, a date for the oral examination can be set. Except under very unusual circumstances, the external examiner must be present at the oral examination. If the examining committee cannot arrive at a unanimous decision to award a passing grade, the majority decision will be accepted provided that there is no more than one dissenting vote. However, if the dissenting vote is that of the external examiner, a new external examiner may be appointed and another oral examination will be required. If the new examiner also gives a dissenting vote, the dissertation will not be accepted.

## RESEARCH IN OUTSIDE INSTITUTIONS

Research for the Ph.D. or M.A.Sc. degree, in part or in whole, may be carried out in an outside institution (e.g., industrial, governmental, or academic university). A student who does research at an outside institution must fulfil the same requirements as a student doing on-campus research. The only exception is that the time spent doing the off-campus research relevant to the thesis or dissertation will be credited toward the residence requirement. In addition to the general requirements, a student applying for permission to do research at an outside institution must provide:

1) A detailed statement of the research proposal, including arrangements for supervision, and of the circumstances under which the research is to be carried out;

2) Evidence that the institution has adequate facilities for the research; and that the applicant will be able to pursue independent research;

3) A proposed time schedule;

4) A letter of support from a responsible person in the outside institution giving approval of the proposal and accepting these regulations.

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## COMMUNICATION, MEDIA, AND FILM

### THE MASTER OF ARTS DEGREE

#### M.A. IN COMMUNICATION AND SOCIAL JUSTICE

**Admission Requirements**  
Applicants should submit a portfolio consisting of : (i) a completed application form; (ii) a personal profile in accordance with the format prescribed by the Program; (iii) a C.V.; (iv) an official transcript of grades attained in undergraduate courses; (v) two letters of reference; and (vi) a sample of writing from undergraduate courses. Normally, successful applicants will have an Honours B.A. in Communication or a cognate discipline; however, students lacking this formal requirement but having equivalent qualifications (for example, significant experience with a social justice agency or having engaged for a significant time in social justice related activities) are also encouraged to apply. Students lacking formal admission requirements may be required to enroll in a make-up year.

**Program Curriculum Structure**  
Students must complete five courses, three of which must be 40-500, 40-501, and 40-502. They must also prepare a major paper which may evolve from one of the courses. The presentation of the major paper defense will be open to all faculty and students. Students completing a thesis must take four courses, three of which must be 40-500, 40-501, and 40-502. The thesis option is available only with faculty recommendation. (Courses taken in other programs may be counted for credit with the prior permission of the Graduate Coordinator )

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## COMPUTER SCIENCE (With and without Co-op Option)

### THE MASTER OF SCIENCE DEGREE

#### Admission Requirements

Graduates of the University of Windsor or of other recognized colleges or universities may be admitted to programs leading to the Master's degree. A student with an honours Bachelor's degree or equivalent with adequate specialization in Computer Science and with at least a 70% average in the major subject may be admitted to a minimum one-year Master's program (II Master's Candidate). A student with an honours Bachelor's degree in a related subject and with at least a 70% average in the major subject may be admitted to a minimum two-year Master's program (I Master's Qualifying followed by II Master's Candidate) or to a minimum two-year II Master's Candidate program depending upon prior qualifications.

Students with deficiencies in some areas of Computer Science may be required to make up those deficiencies by registering in undergraduate courses prior to or as part of their graduate program or by following a program of supervised reading.

Students eligible to participate in the proposed co-op education will have successfully completed at least one semester of full-time study at the Master's level in the School of Computer Science at the University of Windsor, which includes fulfilling the requirement of attending regular departmental seminars.

#### Program Requirements (Major Requirements)

- 1) The requirements for the degree of Master of Science will be satisfied by pursuing a program of studies consisting of five approved courses and a thesis. (A thesis is a major research project which must involve substantial innovative work generally culminating in original results.)
- 2) In addition to the above course work, students must attend regular departmental seminars throughout their M.Sc. studies, as a fulfilment of this requirement.
- 3) With prior approval of the graduate coordinator, candidates may be permitted to include graduate courses offered by other departments in their program.
- 4) No student will be allowed to include in his or her program a course which substantially overlaps a course previously taken.
- 5) All candidates' programs are subject to approval by the Computer Science program graduate committee.
- 6) Students must maintain a minimum overall average of 70%, and obtain a passing grade in all courses to remain in good standing in the program. A grade of less than 70% in a graduate course will be considered as a failure for that course.
- 7) A student who fails to maintain the minimum overall average of 70% will be automatically placed on probation in the following term.
- 8) A student who obtains a grade below 60% in any course will be automatically placed on probation in the following term.
- 9) A student who fails to achieve satisfactory performance in any aspect of the program (course work, thesis or major paper) may be required to withdraw.

The Master's thesis committee is chosen in the manner described under the section titled, [The Program Requirements for the Master's Degree](#). The final examination will take the form of an open seminar in the presence of the Master's committee. The examination will be open to the public.

Each student must obtain approval of his or her program, in writing, from the graduate coordinator within three weeks of registration. Subsequent changes require written approval from the graduate coordinator.

#### Co-op Program Requirements

Recruitment and selection into the co-op element of this program will take place in each of the fall, winter and summer semesters. Admission and pre-employment readiness training will be held in one semester, students will compete for positions in the next semester and complete one eight-month placement (equivalent of two work terms) in the following two semesters.

In addition to the Program Requirements for the Master of Science Degree, students participating in the co-op option must satisfy the following conditions:

- 1) Have been a full-time student in the Master's program in Computer Science;
- 2) Have successfully completed a minimum of one study term prior to applying for admission to the co-op stream;
- 3) Can not be on a leave of absence in the two terms immediately prior to the work terms;



- 4) Have at least one semester of study remaining upon completion of their work terms in a maximum of three years in the Master's program;
- 5) Have obtained written permission from the academic supervisor/co-supervisors;
- 6) Have their placement(s) confirmed by the Centre for Career Education
- 7) Are not planning to take courses during the work terms.

All Co-op positions must be full-time, paid, related to the degree program and approved by the University. The process of securing a co-op position is competitive. Co-op students will apply for work opportunities as advertised by the Centre for Career Education using an Internet-based software program and employers will make interview and hiring decisions. Students are also encouraged to seek co-op employment outside of the advertised postings by completing a guided job search process facilitated by the Centre for Career Education.

Withdrawal from the co-op program will be granted on an exception basis only as it must be determined that the student has no outstanding commitments to employers. Students who wish to withdraw must meet with a Co-op Coordinator and complete a withdrawal form. However, the only time a student may withdraw from an undergraduate co-op program without further co-op fee payment implications is by the 1st Friday of classes after their first co-op work term. Students who withdraw from Co-operative Education at any other time will be liable for paying the co-op fee for the term in which they are dropping and one additional term. This will help offset the costs of developing another student for placement.

In the interest of building solid partnerships with employers, students who have accepted a co-op employment offer (either by ranking a position in round 1 of the job competition or by accepting a position either verbally or in writing in later rounds) must honour that commitment. Therefore, once students have accepted an offer of employment for a work term, they will be considered registered in the appropriate work term course and must remain in the co-op program until they have completed their work term requirements. Failure to honour these commitments and/or to complete all work term requirements will lead to being required to withdraw from the co-op program and will result in a failing grade on his/her transcript for that work term.

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## COMPUTER SCIENCE

### THE DOCTOR OF PHILOSOPHY DEGREE

The general regulations for the Degree of the Doctor of Philosophy (Ph.D.) at the University of Windsor, as set out in the section titled, [The Degree of Doctor of Philosophy](#), will apply together with the more specific requirements for the degree of Ph.D. in Computer Science given in the following section. For admission, continuation in good standing, and graduation, students must satisfy both the general university regulations and the specific regulations for Computer Science.

#### Admission Requirements

In order to be considered for admission to the doctoral program in Computer Science, applicants must have completed a thesis-based Master's degree in Computer Science, or, have completed a course-based Master's degree in Computer Science, and have demonstrated to the Admissions Committee, the ability to conduct independent research through the completion of research-oriented project work or appropriate research experience in industry or academia, or have completed an honours undergraduate degree in Computer Science, and a thesis-based Master's in a closely related field.

#### Outline of Degree Requirements

All Ph.D. students must fulfill the following graduate academic requirements:

- (a) A qualifying examination within four months after entering the program.
- (b) No less than two and usually no more than four graduate courses.
- (c) A comprehensive examination within two years after entering the program.
- (d) A research proposal within two years of entering the program.
- (e) Submission of an annual progress report.
- (f) Presentation of three seminars, including the research proposal.
- (g) A final examination consisting of a Ph.D. dissertation defense (60-798).

#### Qualifying Examination

The qualifying examination must be taken by all students entering the doctoral program.

The qualifying examination is intended to ensure that the student has a mastery of the fundamentals in Computer Science in order to undertake research. This is a breadth requirement in that it does not require the student to be able to undertake research in each of the fundamental areas. Rather, the student must demonstrate knowledge, in each of the fundamental areas, at a level that would be expected of a graduate from a four-year honours Computer Science university-degree program.

The student must obtain at least an overall grade of 70% in the tests and/or course works done for the qualifying examination.

#### Graduate Courses

Each student must complete no less than two and usually no more than four graduate Computer Science courses, not including those taken for credit in a Master's degree, and not including seminar or thesis courses. Graduate course selection will be determined by the student's Doctoral Committee. Graduate credit will be given for a grade of 70% or higher in a graduate course.

#### Comprehensive Examination

The comprehensive examination is one in which the student is asked to demonstrate a reasonable mastery of the field of specialization; it is designed to test the student's command of knowledge and ability to integrate that knowledge, after completion of all or most of the graduate course work. Normally, this examination is completed during the second year of graduate study and is a prerequisite to admission to candidacy.

#### Admission to Candidacy

A student is admitted to candidacy when the student has passed the qualifying examination, has completed all of the required graduate courses, and has passed the comprehensive examination.

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## SOCIOLOGY, ANTHROPOLOGY AND CRIMINOLOGY

To change from one program to another requires the approval of the graduate committee.

## THE MASTER OF ARTS DEGREE IN CRIMINOLOGY

### Admission Requirements

For admission to the Criminology MA, applications must hold an Honours (4 year) Degree in Criminology, Sociology, or related field from an accredited university. Applicants must apply by February 28 for fall enrolment.

The admission criteria are as follows:

The Department's current admission criteria are as follows:

- 1) 77% minimum cumulative average in the final two years of study (full-time equivalent) of the 4-year undergraduate degree;
- 2) Strong recommendations based on faculty observation of student's performance, work experience, or community involvement demonstrating clear commitment to and understanding of sociological concerns;
- 3) Applicant's background preparation and graduate faculty resources available in the area of specialization indicated on the application.
  - a) Applicants with an Honours degree in Criminology or a related field from an accredited University may be admitted into the candidate year of this M.A. program.
  - b) Applicants without an Honours degree in Criminology or related discipline may be required to take additional courses.
  - c) Students transferring into Criminology from a non-related discipline and those with insufficient preparatory background may be required to take additional courses before proceeding into the candidate year. At least an overall 77% cumulative average must be maintained.
- 4) Full-time registered students admitted to the programme must normally complete all requirements for the Criminology MA Thesis within 24 months from commencement of study or 12 months for Criminology MA course stream. During the end of the first year of registration, all graduate students are required to complete a progress report detailing the achievements of the previous year and the objectives for the next year. At this time, students in the Criminology MA Thesis will be required to declare a title and provide an abstract for their thesis as well as to list the members of their supervisory committee. Permission to continue to register in the program depends on a satisfactory report.

### Program Curriculum Structure

The graduate course offerings and proposed graduate Criminology course offerings, and related graduate courses from other areas within the Department of Sociology, and Anthropology, and Criminology will complement the research focus of the core faculty in the area of criminology.

## PROGRAM REQUIREMENTS

### CRIMINOLOGY MASTER OF ARTS – THESIS OPTION

The essential components of the Master of Arts degree in Criminology – Thesis Option are course work and a thesis. Students are expected to complete all 5 courses in two (2) consecutive semesters; 48-790 should be taken during the 2nd semester.

Course selections and course changes must be made in consultation with a faculty advisor (provisional).

Students accepted directly into the candidate year will proceed towards the degree by achieving at least a 77% cumulative average in all five courses.

The program requirements are as follows:

Course requirements: Satisfactory completion of 5 graduate courses plus the thesis.

Total courses: Five (5) 600-level graduate courses\*, plus the thesis.

Major Requirements:

48-664 Contemporary Criminological Theory;  
48-605 (Quantitative and Analysis ) or 48-616(Qualitative Research Design Methodology I) or 48-607 (Survey Data);  
Two other courses from 48-6XX, one of which must be 48-661, 48-662, 48-665, 48-667, 48-671 or 48-668;  
48-690 (Directed Readings: Development of the Thesis Proposal);  
48-797. MA Thesis

\*One (1) course may be taken outside of the Department (48-) with prior permission from the Graduate Committee.

Faculty advisors may recommend particular courses to develop the skills necessary for thesis work. After completion of the courses, the focus shifts to the thesis which is an independent research project conducted in consultation with an advisor and thesis committee.

The minimum passing grade in a graduate course is 70%. A student who fails to achieve a grade of 70% in a graduate course may repeat the course once (scheduling considerations may require the Graduate Committee to substitute an alternative course). If a student fails to achieve a grade of 70% in their second attempt, or fails to achieve a grade of 70% in two courses, a recommendation will normally be made to the Dean of Graduate Studies and Research that the student be required to withdraw from the program. Students are required to achieve an overall 77% cumulative average in all five courses. Students have the option of taking one graduate course outside the Department. Permission may be required from the department or program offering the course. Advance permission from the Departmental Graduate Committee is required in order to take courses outside the Department.

2. Satisfactory progress in research within each review period: The graduate committee in the Department of Sociology, and Anthropology, and Criminology will conduct a periodic review, to establish that the candidate is making adequate progress.

3. The Proposal: Normally within the first year of the program, the student will present in the form of a seminar an outline of their proposed thesis research. This will be presented to the MA committee who must approve, with or without modifications, or reject the proposal. The proposal will be assigned a percentage grade.

4. The Thesis: Normally completed within the second year of the program, the student will present their main research findings in the form of a seminar. This will be presented to the MA committee who must approve, with or without modifications, or reject the thesis. Graduate students in the Criminology MA will work on specific thesis topics within the scope of the Criminology program area. Their program of studies will be formulated in consultation with their thesis supervisor, who would normally be from Criminology.

### **CRIMINOLOGY MASTER OF ARTS – COURSE OPTION**

The Master of Arts degree in Criminology – Course Option involves course work only.

Course selections and course changes must be made in consultation with a faculty advisor.

Students accepted directly into the candidate year will proceed towards the degree by achieving at least a 77% cumulative average across all seven courses. The minimum passing grade in a graduate course is 70%. A student who fails to achieve a grade of 70% in a graduate course may repeat the course once (scheduling considerations may require the Graduate Committee to substitute an alternative course). If a student fails to achieve a grade of 70% in their second attempt, or fails to achieve a grade of 70% in two courses, a recommendation will normally be made to the Dean of Graduate Studies and Research that the student be required to withdraw from the program.

Students have the option of taking one graduate course outside the Department. Permission may be required from the department or program offering the course. Advance permission from the Departmental Graduate Committee is required in order to take courses outside the Department.

The program requirements are as follows:

**Course requirements:** Satisfactory completion of 7 graduate courses.

**Total courses:** Seven (7) 600-level graduate courses\*

#### **Major Requirements:**

48-664 Contemporary Criminological Theory;

48-605 (Quantitative Statistics and Analysis) or 48-606 (Qualitative Methodology) or 48-607 (Survey Data)

Five (5) additional 600-level courses, three (3) of which must be selected from 48-661, 48-662, 48-665, 48-667, 48-668, 48-671.

Two (2) of these courses may be selected from any 48-6XX course offerings.

\*One (1) course may be taken outside of the Department (48-) with prior permission from the Graduate Committee. Students may not take more than three (3) courses in a single term.

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### THE MASTER OF SCIENCE DEGREE IN EARTH SCIENCES

#### Program Requirements

1) *Course Requirements:* The candidate for a Master's degree will be required to take 61-580 and 61-582, plus a minimum of two graduate courses normally from Earth and Environmental Sciences but may include courses from cognate disciplines with prior approval. Not more than one course may be in Special Topics (61-590), and not more than two courses may be from the same instructor. Additional 500-level Science or Engineering courses may be taken on the recommendation of the student's Master's Committee. Up to three additional courses may be required to be taken as prerequisites or required background courses. The total of all courses taken shall not exceed eight. The student's Master's Committee shall recommend to the program coordinator all courses to be taken for graduate credit after discussion with the candidate. In addition, original research work must be pursued and embodied in a thesis submitted for degree credit. Credit for graduate study previously undertaken may be given for a maximum of two courses, but the duration of study at the University of Windsor may not be reduced to less than the minimum of one year.

2) *Examination Requirements:* The final examination of a candidate for the Master's degree shall be an oral defense of the thesis at a public lecture.

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## EARTH AND ENVIRONMENTAL SCIENCES

### THE DOCTOR OF PHILOSOPHY DEGREE IN EARTH SCIENCES

In addition to the general requirements outlined in the section titled, [The Degree of Doctor of Philosophy](#), the following requirements must be met by all students proceeding to the Ph.D. degree.

#### Admission Requirements

The normal requirement for entry into the Ph.D. program shall be an M.Sc. in Earth Sciences or an appropriate degree in a cognate discipline. Students who have enrolled in the M.Sc. program may apply to transfer to the Ph.D. program after one year of registration, and must have achieved a minimum 80% average in course work and have a strong recommendation from their thesis committee.

#### Program Requirements and Structure

Students entering the Ph.D. program with an M.Sc. degree will be required to:

- take a minimum of four, one-semester courses, including the doctoral research proposal and graduate seminar courses.
- Additional courses may be required if the doctoral committee feels that a particular area of the student's background needs to be strengthened.

The required courses will be chosen in the context of the student's previous education to ensure a sufficient intellectual challenge, commensurate with the Ph.D. degree.

Students transferring into the Ph.D. program after having completed one year of the M.Sc. degree will be required to take a minimum of six courses in total, including the doctoral research proposal and graduate seminar courses.

*Grading:* The minimum passing grade in graduate courses is 70%. Any student whose performance is deemed unsatisfactory in course work or research will be required to withdraw.

*Doctoral Committee:* The doctoral committee shall comprise the advisor(s), two other faculty members from the Department of Earth Sciences and one faculty member from another department at the University of Windsor. Other committee members can be added where appropriate (e.g. from other universities or from industry).

*Research Proposals:* Doctoral candidates will be required to prepare research proposals that must be successfully defended in a public forum, prior to continuation in the program. Presentation of the research proposal will normally be at the end of the first calendar year after enrollment.

*Dissertation:* The student will be required to submit a dissertation that is a compilation of original research carried out by the student, under the supervision of the student's advisor(s) and the doctoral committee. The dissertation may be submitted in a traditional format or as a compilation of published papers and/or manuscripts, linked by introductory and conclusion chapters. In the latter case, the contribution of the student to any jointly authored papers must be clearly stated and justified.

*Progress reports:* The student will submit annual research progress reports to the doctoral committee. Continuation in the program is dependent on a satisfactory progress report. The Faculty of Graduate Studies also monitors student progress via an annual progress report submitted by the student and supervisor.

#### Examinations

*Comprehensive Examination:* The comprehensive examination will normally occur at the end of the first year and will typically be held in conjunction with the defense of the research proposal. However, the two may be held at different times for logistical or other reasons. The comprehensive exam is complementary to the defense of the research proposal, and is designed to assess whether the student's scientific knowledge is appropriate for continuance in the Ph.D. program, and to ensure that the student has the background knowledge that is required for their research. A pass/fail decision will be by a majority vote of the committee. If a student should fail the comprehensive exam, he or she will be allowed to re-sit the exam within a four-month period after the first exam. The student will be required to withdraw from the program should he or she fail the second exam.

*Defense:* The dissertation will be defended by the student and examined by an examination committee in a public defense. The examination committee will comprise the student's doctoral committee and an external examiner.

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- THE MASTER OF ARTS DEGREE
- Admission Requirements

1) A student with an honours Bachelor's degree in Economics or its equivalent, with at least a major average of 70%, may be admitted to a minimum one-year Master's program. Applicants are expected to have completed one course in each of calculus, linear algebra and statistics. Applicants who have not completed the above mathematics requirements are encouraged to do so prior to beginning their graduate course work. 2) A student with a general degree, or an honours graduate in another discipline, with at least a 70% standing, may be admitted to a minimum two-year Master's program.

### Program Requirements

- 1) Students in the two-year program are required to take a make-up or qualifying year in their first year of the M.A. program. Selection of courses is to be made in consultation with a graduate advisor.
- 2) Students in the one-year M.A. program (Candidate year) are required to complete:
- a) seven graduate courses and a major paper normally to be in conjunction with one of the courses OR eight graduate courses (no major paper);
  - b) at least one course in microeconomics, one in macroeconomics and one in econometrics. Students intending to enter a Ph.D. program are advised to take 41-501, 41-502, 41-503, 41-504, 41-541, and 41-542.

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## FACULTY OF EDUCATION

### THE MASTER OF EDUCATION DEGREE

The objectives of the Master of Education program are to provide candidates with opportunities to develop:

- 1) a commitment to intellectual enquiry and scholarship as a basis for continuing professional growth;
- 2) a knowledge of current theory and research relevant to the curriculum and administration of elementary and secondary schools; and
- 3) an understanding of, and respect for, the principles of educational research.

### Admission Requirements

1) In addition to the requirements set forth in the section titled Application Information and the section titled, the [Admission Requirements for the Master's Degree](#), for admission to the [Faculty of Graduate Studies](#), and to programs leading to a Master's degree, applicants to the Master of Education program must:

(a) present an undergraduate degree from an approved university with standing in the 70% range overall and at least 70% average in the final two years of study;

(b) submit a "Statement of Personal Objectives" outlining the applicant's professional background and reasons for seeking a graduate degree in education.

2) Applicants who do not identify their area of studies with the K-12 educational system may present alternatives, although the following items are considered to be assets:

(a) present a Bachelor of Education degree with standing in the 70% range or the equivalent professional preparation;

(b) have at least one year of successful professional experience in education. In exceptional cases, consideration may be given to applicants who do not possess a Bachelor of Education degree or equivalent, but who:

(i) hold an honours Bachelor's degree or the equivalent with standing in the 70% range overall and at least a 70% standing in the last two years;

(ii) can demonstrate experience, interests, and motivation that make them appropriate applicants to the program.

Applicants who do not have at least one year of successful professional experience may be considered if they hold an honours Bachelor's degree or the equivalent with standing in the 70% range overall and at least 70% average in the final two years of study.

3) *Advanced Standing*: Applicants may be granted credit for up to two graduate term courses completed before application to the Master of Education program and taken in another program at the University of Windsor or at another accredited institution. Requests for advanced standing will be considered only at the time of application and only for graduate courses completed with at least 70% average. The Faculty will not grant credit for any course taken more than seven years before all the requirements for the degree have been fulfilled.

4) Admission to the Master of Education program is to the II Master's Candidate level.

### Program Requirements

1) Candidates for the Master of Education degree will pursue studies in the following areas of concentration:

(a) Curriculum Studies (CS);

(b) Educational Administration (EA);

(c) Second Language Acquisition, Culture, and Society (SLACS).

3) In addition to the general requirements for a Master's degree set forth in the section titled, [Faculty Regulations for the Master's Degree](#), candidates in the thesis and major paper streams are required to successfully complete the following courses;

(a) Three compulsory courses: 80-510 (Statistics in Education), 80-527 (Research in Education), and 80-524 (Fundamentals of Curriculum Theory and Development) or 80-529 (Theories of Educational Administration) or 80-539 (Theories and Approaches in Language Acquisition and Instruction), depending on the area of concentration;. Candidates in the Second Language Acquisition, Culture and Society concentration are additionally required to complete two of the following four courses: 80-540 (Language Culture and Society), 80-542 (Language Systems Analysis), 80-543 (Special Education and Language Acquisition), and 80-591 (32) (Language Assessment). It is important to note that with regard to these four courses, SLACS candidates are encouraged to take, as available, the two remaining courses not taken as compulsory courses as part of the Electives list specified for this concentration.

(b) A research project resulting in either a major paper (80-796), with the value of two term courses, or a thesis (80-797), with the value of four term courses;

(c) For CS and EA candidates proceeding to the degree by major paper, five additional courses, at least three of which must be chosen from the option courses listed for the area of concentration: For SLACS candidates proceeding to the



degree by major paper, three additional courses, at least two of which must be chosen from the option courses listed for the area of concentration.

(d) For CS and EA candidates proceeding to the degree by thesis, three additional courses, two of which must be selected from the option courses listed for the area of concentration. For SLACS candidates proceeding to the degree by thesis, one additional course which must be chosen from the option courses listed for the area of concentration.

\*Students in the Thesis stream are required to submit a thesis proposal to their Supervisor and Internal Reader for approval prior to starting the thesis. (Before registering for the Thesis Proposal (80-794), students must have completed all required courses in their program. The Thesis Proposal may be completed concurrently with one elective in the final semester of coursework. Thesis stream students must enrol in 80-794 (Thesis Proposal) and do so for each subsequent term until the thesis proposal has successfully been defended. Students may enrol concurrently in the Thesis Proposal (80-794) and the Thesis (80-797) if all course work is complete. If students register for the Thesis Proposal (80-794) and the Thesis (80-797) concurrently, then only upon completion of the thesis proposal may thesis stream students begin their Thesis. They must enrol in 80-797 (Thesis) for each subsequent term until the successful completion and deposition of the thesis.

Candidates in the course-based stream are required to successfully complete:

(a) three compulsory courses: 80-527 (Research in Education), 80-795 (Final Project Seminar), and 80-524 (Fundamentals of Curriculum Theory and Development) or 80-529 (Theories of Educational Administration) or 80-539 (Theories and Approaches in Language Acquisition and Instruction), depending on the area of concentration; Candidates in the Second Language Acquisition, Culture and Society concentration are additionally required to complete two of the following four courses: 80-540 (Language Culture and Society), 80-542 (Language Systems Analysis), 80-543 (Special Education and Language Acquisition), and 80-591 (32) (Language Assessment). It is important to note that with regard to these four courses, SLACS candidates are encouraged to take, as available, the two remaining courses not taken as compulsory courses as part of the Electives list specified for this concentration.

(b) one of 80-510 (Statistics in Education) or 80-530 (Qualitative Methods in Educational Research);

(c) For CS and EA candidates six additional courses, at least four of which must be chosen from the option courses listed for the area of concentration. For SLACS candidates four additional courses, at least two of which must be chosen from the option courses listed for the area of concentration.

## STUDIES IN THE AREA OF CONCENTRATION

### Compulsory Courses

80-510. Statistics in Education

80-524. Fundamentals of Curriculum Theory and Development\*

80-527. Research in Education

80-529. Theories of Educational Administration\*\*

80-539. Theories and Approaches in Language Acquisition and Instruction\*\*\*\*

Two of the following four courses: 80-540 (Language Culture and Society), 80-542 (Language Systems Analysis), 80-543 (Special Education and Language Acquisition), and 80-591 (32) (Language Assessment)\*\*\*\*

80-794. Thesis Proposal\*\*\*

80-795. Final Project Seminar\*\*\*

80-796. Major Paper\*\*\*

80-797. Thesis\*\*\* (Note: Students in the Thesis stream must have successfully completed the Thesis Proposal (80-794) before work may begin on the Thesis.)

\* Compulsory for students in Curriculum Studies.

\*\* Compulsory for students in Educational Administration.

\*\*\* All students must complete either a Final Project, a Major Paper or a Thesis.

\*\*\*\*Compulsory for students in Second Language Acquisition, Culture and Society

### Language, Acquisition, Culture and Society Options

80-539. Theories and Approaches in Language Acquisition and Instruction

80-556. Approaches to Literacy Development

80-557. The English Language Arts

80-527. Research in Education

80-530. Qualitative Methods in Educational Research

80-524. Fundamentals of Curriculum Theories and Development

80-550. Issues in Education

80-551. Information and Communication Technologies (ICT) for Teaching and Learning

80-515. Comparative and International Education

80-533. Survey Design and Research

80-534. Individual Reading

80-565. Sociological Aspects of Education

80-540. Language Culture and Society

80-542. Language Systems Analysis

80-543. Special Education and Language Acquisition

80-591 (32). Language Assessment

### **Educational Administration Options**

80-515. Comparative and International Education  
80-529. Theories of Educational Administration  
80-530. Qualitative Methods in Educational Research  
80-531. Supervision of the Instructional Process  
80-532. Organization and Administration of the School  
80-533. Survey Design and Research  
80-534. Individual Reading  
80-535. Organizational Behaviour in Educational Institutions  
80-536. Introduction to Educational Policy Analysis  
80-538. The Arts and Education  
80-550. Issues in Education  
80-551. Information and Communication Technologies (ICT) for Teaching and Learning  
80-545. Teaching for Sustainability: An Introduction to Environmental Education  
80-555 Strategies for the implementation of Change  
80-556. Approaches to Literacy Development  
80-558. Psychology of Learning Problems  
80-559. The Recent History of Education in Ontario  
80-560. Politics of Education  
80-561. Legal Aspects of Education  
80-562. Educational Finance  
80-565. Sociological Aspects of Education  
80-566. Interpersonal Relationships in Education  
80-591. Special Topics in Education

### **Curriculum Studies Options**

80-503. The Psychology of Learning and Teaching  
80-515. Comparative and International Education  
80-524. Fundamentals of Curriculum Theory and Development  
80-530. Qualitative Methods in Educational Research  
80-533. Survey Design and Research  
80-534. Individual Reading  
80-537. Language Arts in the Elementary School  
80-538. The Arts and Education  
80-539. Theories and Approaches in Language Acquisition and Instruction  
80-541. The Social Sciences Curriculum  
80-545. Teaching for Sustainability: An Introduction to Environmental Education  
80-547. Learning in Science  
80-550. Issues in Education  
80-551. Information and Communication Technologies (ICT) for Teaching and Learning  
80-552. Curriculum Developments in Mathematics Education  
80-553. The Teaching and Learning of Mathematics  
80-554. Fundamentals of Instructional Design  
80-555 Strategies for the implementation of Change  
80-556. Approaches to Literacy Development  
80-557. The English Language Arts  
80-558. Psychology of Learning Problems  
80-565. Sociological Aspects of Education  
80-572. Theory and Practice in Early Childhood Education  
80-591. Special Topics in Education

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## FACULTY OF EDUCATION

### THE MASTER OF EDUCATION DEGREE (INTERNATIONAL COHORT) *[Available to international students.]*

The objectives of [all Master of Education programs](#) are to provide candidates with opportunities to develop:

- a commitment to intellectual enquiry and scholarship as a basis for continuing professional growth;
- a knowledge of current theory and research relevant to the curriculum and administration of elementary and secondary schools; and
- an understanding of, and respect for, the principles of educational research.

In addition to these objectives, the Master of Education (International Cohort) will place an added emphasis on developing research through an internship and on understanding educational theory from a comparative viewpoint between Canadian education and that of their own country.

### Admission Requirements

Preference will be given to candidates who exceed the minimum requirements as listed below. Applicants should have at least one year of successful professional experience in education. These requirements are already in line with the minimum requirements for students entering into the other Master of Education programs.

- Confirmation of successful completion of a Bachelor of Education (or equivalent) from an academic institution approved the University of Windsor. Applicants with a four year honours degree in related fields may be considered
- Evidence of having obtained a cumulative grade point average in the B range overall and at least a B standing in the last two years of your academic studies (when converted to Ontario standards)
- Demonstrated English proficiency by meeting or exceeding a 7.0 score in the IELTS test or a TOEFL score of 100 (ibt)
- Three letters of reference (should address the applicant's ability to engage in academic work and scholarly study)
- A successful interview with a representative from the University of Windsor
- A personal statement discussing why you wish to do graduate studies in the area of educational studies and how it fits into your plan for entry into the workforce as a working professional and / or scholar

The Centre for English Language Development (CELD) offers an English Language Improvement Program that will be made available to students who are academically qualified but must demonstrate higher English language proficiency prior to the start of their academic program. English language training is at an additional. Students who demonstrate sufficient language proficiency but experience difficulties with language will be referred to CELD which offers additional student support programs in English Pronunciation and English Writing Development.

Enrolment is limited.

### Program Requirements

Candidates will pursue studies in one of two areas of concentration:  
(a) Curriculum Studies;  
(b) Educational Administration.

### Preparatory Program Work

Academic Preparatory Program

#### Term 1

80-551 Information and Communication Technologies  
80-529 Theories of Educational Administration (EA)\* OR 80-524 Curriculum Theory and Development (CS)\*\*  
80-515 Comparative and International Education

#### Term 2

80-527 Research in Education  
80-510 Statistics in Education (EA)\* OR 80-530 Qualitative Methods in Educational Research (CS)\*\*  
80-565 Sociological Aspects of Education

#### Term 3

80-535 Organizational Behavior in Education Institutions  
80-536 Introduction to Educational Policy Analysis  
80-556 Approaches to Literacy Development

**Term 4**

80-793 Educational Research Internship

\*EA = Education Administration concentration course

\*\*CS = Curriculum Studies concentration course

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## FACULTY OF EDUCATION

### JOINT DOCTOR OF PHILOSOPHY IN EDUCATIONAL STUDIES

The Joint Ph.D. in Educational Studies is offered jointly by [Brock University](#), [Lakehead University](#), and the University of Windsor. The designation of "home university" is applied to the home university of the doctoral candidate's dissertation supervisor. The student has the right to take courses and seminars or to use the academic facilities at any of the participating universities in accordance with the approved plan.

The regulations governing the preparation of theses and conduct of examinations will be those of the supervisor's home university.

The degree requirements, regulations and procedures for the Joint Ph.D. program have been approved by the appropriate governing body of each institution. Where there is a conflict in regulations and procedures:

- (a) in academic matters, the regulations of the institution offering the course will prevail;
- (b) in non-academic matters, the regulations of the institution at which the student is registered will prevail.

### PROGRAM GOALS AND OBJECTIVES

The joint program will accomplish the following goals:

- 1) provide greater access to advanced study in education for qualified candidates across a wider geographic range in the province;
- 2) promote the growth of research activity and professional development through collaboration among practitioners, scholars, educational institutions, and Faculties of Education;
- 3) foster inter-university links and promote partnerships among Ontario universities;
- 4) further the expansion of research culture and service throughout the province; and
- 5) contribute to the renewal of the professoriate and educational leadership in Ontario during the upcoming period of heavy retirement in the universities and school systems.

The objectives of the program are to produce graduate students who will:

- 1) contribute to the development of knowledge and expertise in teaching/ learning at all levels on the education continuum;
- 2) contribute to the solution of problems/issues in Canadian education;
- 3) promote scholarly enquiry and the development of methodological advances in the study of education;
- 4) integrate theory and practice in education; and
- 5) assume positions of leadership in Faculties of Education, school systems, and other public- and private-sector institutions concerned with education.

### ADMISSION REQUIREMENTS

Normally, the minimum academic requirement for admission to the Ph.D. is successful completion of a Master of Education or Master of Arts in Education with an A standing.

In exceptional circumstances, applicants with lower formal academic qualifications but with a strong track record of professional experience related to the proposed area of doctoral study may be admitted. In these cases, however, the Admissions Committee may place additional requirements upon the applicant. Additional requirements will be stated on the offer of admission.

Applicants must provide evidence of research competence normally demonstrated by a master's thesis.

English is the primary language of communication and instruction in the program. Applicants from other countries who have not completed a degree at a university where the primary language of instruction is English must pass the Test of English as a Foreign Language (TOEFL) with a minimum score of 600 (250 computer-based) or an equivalent demonstration of proficiency.

Candidates who are working on the degree at a distance from the home university must purchase the software and access to the internet which will enable them to participate fully in the required courses.

### ADMISSION WITH ADVANCED STANDING

Students may receive advance credit for a maximum of one-half course specialization elective at the graduate level provided that this course has not been credited to a degree or certificate already awarded, is relevant to the proposed area of study

and has been taken within three years of admission. Requests for advanced credit must be declared prior to admission. No substitution may be made for Core Seminars I and II or the Joint Specialization Elective via distance education.

### *RESEARCH PLAN*

Applicants must submit a description of their proposed area of research (approximately 2-3 typed pages). When an applicant meets the basic requirements for admission, the potential supervisor and/or the Program Director will assist the applicant in developing a plan of study which will be presented to the Program Committee for approval. If approved, the applicant will proceed to register as a doctoral student at the home university of the dissertation supervisor and will be subject to the general degree regulations of that university. The offer of admission will be made to the applicant by the home university.

Dissertation supervisors will be required to report candidates' progress annually to the Program Committee and to appropriate authorities at the participating universities. Normally, candidates will be expected to complete course requirements and the comprehensive portfolio, and to submit a research proposal within three years of their initial registration. Changes to the approved plan of study must be approved in advance by the Program Director in consultation with the candidate and the supervisor.

### *PROGRAM FIELDS OF STUDY*

1) Cognition and Learning: Cognition and learning draws primarily upon cognitive, developmental, social, and educational psychology as well as science and technology, to examine critically the cognitive, behavioural, emotional, and social processes of educators and students as they engage in teaching and learning. Integral components of this field include, but are not limited to, issues concerning best practices, remedial and contemporary instruction, assessment and evaluation, professional development, curriculum development and implementation, metacognition, and learning theories.

2) Educational Leadership and Policy Studies: This field of study encompasses a range of humanities and social science disciplines to explore the morale, social, and cultural purposes of educational organizations, policy and leadership. It draws upon the works of key scholars in organizational, administrative and policy studies to articulate the philosophical, theoretical and methodological frameworks that inform scholarship and practice. These frameworks situate the major issues and debates confronting educational systems within their larger socio-political and socio-cultural contexts.

3) Social/Cultural/Political Contexts of Education: Education occurs in a dynamic, complex, and contested milieu. The Social/Cultural/Political Contexts of Education field of study critically explores the interplay between culture and education from varied historical, philosophical, and theoretical perspectives with the intent of fostering emancipatory research and democratic practice. Consideration is given but not limited to social constructs of race, class, gender, sexuality, and ability/disability, and how they intersect and influence educational experiences.

Applicants to the program must declare a field of study prior to admission to the program.

### *PROGRAM REQUIREMENTS*

Doctoral candidates must be familiar with the academic regulations governing graduate studies at the home university.

#### **Course Requirements**

- (a) Doctoral Seminar I (80-602) and Doctoral Seminar II (80-604);
- (b) The Specialized Elective (80-651). Candidates may meet this requirement through a graduate level course offered at any of the participating institutions;
- (c) One Joint Ph.D. Specialization Elective Course (one of 80-621, 80-631, 80-641)
- (d) Research Proposal Colloquium (80-669) (via distance education). (Prerequisite: must have completed two terms of full-time residency or equivalent.)

#### **Comprehensive Portfolio**

The Comprehensive Portfolio (80-680) requires doctoral candidates to demonstrate their potential as scholars through the satisfactory completion of authentic tasks. The criteria used by the dissertation supervisory committee to set tasks and assess a candidate's performance are:

- (a) an understanding of the concepts, theories, and issues in the field of study;
- (b) a knowledge of current literature and research methods in the field of study;
- (c) the ability to analyze and synthesize current literature on a specific problem within the field of study;
- (d) an understanding of and ability to critique research in the field of study and research paradigms.

The tasks candidates are expected to complete include the dissertation research proposal, and three other tasks. Candidates must defend their portfolios.

The candidate's defence will be evaluated by the dissertation supervisory committee and at least one other member of the core faculty selected by the Program Director. Candidates are required to present their completed portfolio to an audience in a forum such as the Core Seminar.

Candidates may not begin their dissertation research until the portfolio requirements have been completed successfully.

#### **Dissertation**

The Dissertation supervisory committee will involve faculty from at least two participating universities, including whenever possible and reasonable, a member from the university closest to the candidate's home to serve as co-supervisor in cases where the supervisor is at some distance. The regulations and procedures governing the preparation of theses and conduct of examinations will be those of the supervisor's university.

**Residence**

Candidates must meet a minimum residency of four terms. Two terms of residency may be fulfilled by completion of the Core Seminars I and II. The other two terms of residency must be consecutive. It is strongly recommended that candidates complete two of the terms of residency after they have defended their comprehensive portfolio and are authorized to commence their doctoral research. Credit for residency may be given, with the approval of the Program Committee and the home university, for research carried out off-campus.

Candidates are required to maintain continuous registration. They shall complete the requirements for the degree within a minimum of three years and a maximum of six years.

Recommendations for a time extension or leave of absence are subject to the regulations and procedures at the home university and must be approved in advance by the supervisor and the Joint Program Committee.

*DOCTORAL COURSES*

**Core Seminars**

- 80-602. Doctoral Seminar I: Research, Theories, and Issues
- 80-604. Doctoral Seminar II: Research, Theories, and Issues

**Specialization Elective Courses**

- Policy and Leadership*
- 80-621. Educational Leadership and Policy Studies

- Sociocultural Contexts of Education*
- 80-631. Social/Cultural/Political Contexts of Education

- Cognition and Learning*
- 80-641. Conceptual Bases for Cognition and Learning

- Other Required Courses*
- 80-651. The Specialized Elective
- 80-669. Research Proposal Colloquium
- 80-680. Comprehensive Portfolio
- 80-798. Doctoral Dissertation

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## FACULTY OF ENGINEERING/ODETTE SCHOOL OF BUSINESS (JOINT PROGRAM)

**Master of Engineering Management** (*This program is offered jointly between the Odette School of Business and the Faculty of Engineering*)

The Master of Engineering Management provides a business and management foundation within a technical context to allow students to understand all aspects of engineering management. The program aims to help engineering students utilize appropriate business practices and become managers and administrators within their field of practice by providing skills and knowledge to manage projects, resources, people and processes within technical environments. It also encourages independent learning by allowing students to apply business practices in solving practical problems.

Graduates from this program will ultimately be able to take on senior roles in project, operations, manufacturing and facility management. As well, given the diversity of the curriculum, students may be able to occupy marketing and product management roles and fulfil duties that combine sales, finance and economics within technology enterprises. For those who are interested in pursuing entrepreneurial career, the program offers a basic foundation to conduct essential feasibility studies, business planning and financial modeling tasks.

### ADMISSION REQUIREMENTS

Admission will be granted, within the limits of program availability to students with the following credentials:

- Bachelor of Applied Science degree in engineering (or other undergraduate degree (or equivalent) with related technical background) with an average of at least B (73%) from an accredited university
- Proof of English language proficiency IELTS: 7.0 / iBT TOEFL: 100
- Two reference letters
- CV/Resume
- Statement of purpose letter
- Preference will be given to candidates who have at least two years of relevant work experience in engineering or a related field

Fall semester enrollment only.

**Total courses:** lectures will be on Fridays (17:00-21:00) and Saturdays (8:00-18:00) every second weekend, for 6 weeks a semester (36 hours in total). The program includes existing courses as well as new courses. Students are required to complete 9 courses or a total of 30 credits for graduation. Courses will be divided into A) Core Courses (6 courses for a total of 18 credits), B) Non-core Courses (2 courses for a total of 6 credits), and C) Capstone Project Course (two semester course for a total of 6 credits)

### DEGREE REQUIREMENTS:

**A) Core Courses:** all students need to complete the following 6 mandatory core business and engineering courses before taking any non-core courses:

**Core Business Courses:**  
76-5XX. Financial and Managerial Accounting  
76-5XX. Applied Finance  
75-511(20). Research Methods

**Core Engineering Courses:**  
91-523. Product Innovation and Design Management  
91-519. Work Organization: Analysis and Design  
88-590-40. Technology Entrepreneurship

**B) Non-core Courses:** students select 1 non-core course from each of the following course groups:

**Non-core Business Courses:**  
**Choose One:**  
73-604. Operations Management  
75-602. IT Project Management  
76-505. Marketing Management  
75-682. Manufacturing Strategy  
78-613. Managing Employees  
75-692. Special Topics (depending on semester)

**Non-core Engineering Courses**  
**Choose One:**  
91-514. Engineering Design, Methodology & Applications  
91-522. Supply Chain Management and Logistics  
92-506. Thermal Systems Design  
93-550. Sustainability: Principles and Practice



88-590-2. Electronic Commerce  
85-550. Engineering Project Management

**Course restrictions under B):**

Students can only take one of 73-604. Operations Management and 75-682. Manufacturing Strategy  
Students must take one of 75-602. IT Project Management and 85-550. Engineering Project Management

**C) Capstone Project Course:** all students must complete a capstone course offered jointly by the Faculty of Engineering and Odette School of Business. This course, **76-540/85-540 Engineering Management Capstone\*** allows students to practice their theory by completing one of: **1)** an engineering management report **2)** engineering feasibility study, or **3)** new venture business plan. Coordinators and associate deans from engineering and business will appoint instructors for this course. The teams and projects in this course should be managed in a manner similar to the existing corporate MBA project and with emphasis on student mentorship and project supervision by subject matter experts.

**D) Mandatory Workshops (1 workshop per semester, each workshop is 1 session during 10:00-17:00 on a Saturday of a week that doesn't have classes):**

The workshops could include these areas:

- Team building and development
- Intellectual property with focus on engineering technology
- Negotiation skills and practices
- Pre-capstone team formation workshop (Semester 4)

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## ENGLISH LANGUAGE, LITERATURE AND CREATIVE WRITING

### THE MASTER OF ARTS DEGREE

#### Programs of Study

The English department offers two fields within the M.A. Program in English: Language and Literature and, Creative Writing and Language and Literature. Within the Language and Literature field, there are two options: the Thesis Option and the Course Work Option.

The Creative Writing and Language and Literature field allows students to combine graduate-level study of literature with advanced work on creative writing in a two-term workshop and by developing a significant independent writing project. Within the Language and Literature field, the Course Work Option offers exposure to a wide variety of topics in literature, composition and rhetoric, and theory. The Thesis Option allows students to investigate a single topic in depth through independent, extended research with faculty supervision.

The specific requirements for each field are:

#### *M.A. IN ENGLISH: CREATIVE WRITING AND LANGUAGE AND LITERATURE*

Four graduate seminar courses  
26-591. Creative Writing Seminar A  
26-592. Creative Writing Seminar B  
26-794. Creative Writing Project (a novel, a play, a collection of poems or short stories)

#### *M.A. IN ENGLISH: LANGUAGE AND LITERATURE*

THESIS OPTION  
Five graduate seminar courses  
26-797. Thesis/Project (of at least 20,000 words)

COURSE WORK OPTION  
Eight graduate seminar courses.

For both fields, students must include 26-500, Scholarship and the Profession (or equivalent) in their program in addition to their regular course load.

#### Admission Requirements

In addition to the requirements under section titled, Application Procedures and under section titled, The Master's Degree - Admission Requirements, for admission to the Faculty of Graduate Studies and to programs leading to the Master's degree, applicants for admission to the Candidate year in the programs leading to the Master of Arts degree in English should have the following undergraduate preparation:

- 1) Some courses, normally four, in the pre- and early-modern periods, that is, from Old English through the Eighteenth Century;
- 2) Some courses, normally four, in the modern period, that is, the Nineteenth and Twentieth Centuries, including Canadian and American;
- 3) Some courses, normally two, from the areas of Critical History, Theory and Approaches, Scholarship and Bibliography, and Language and Linguistics;
- 4) Additional courses from any of the above areas to make up the total number of courses required for a four-year English B.A.

Students who do not have a four-year B.A. or its equivalent may be admitted to the Faculty of Graduate Studies in a qualifying (M1) program. In such a program, the student is expected to register in appropriate undergraduate courses in order to satisfy the requirements above. Alternatively, students who are deficient in any of the stated requirements for admission may be invited or may request to write a qualifying examination (see below, "Qualifying or Placement Examination").

Students who are admitted to the Faculty of Graduate Studies in the M.A. program will be expected to select courses in their first year to complete the requirements specified above.

In addition to the documents required, applicants must submit a "Proposal of Studies" (about 500 words) with their applications indicating the program and option to which they are applying and discussing such issues as their areas of academic or creative interest, their undergraduate training, and their academic or career goals. Students applying to the field in Creative Writing must submit, with their application, a portfolio of representative creative work (20-25 pages). Students with a four-year B.A. in English may apply to either of the fields and to any of the options. Students with interdisciplinary

interests, with honours degrees combining English with another discipline, or with abilities or backgrounds that do not correspond to the particular requirements for admission listed above, but who have an overall average of 80%, apply to either field but may be required to take additional courses.

*Qualifying or Placement Examination:* An applicant for admission to the Candidate year for the Master's degree who is deficient in any of the stated requirements for admission to this level of graduate study may be invited, or may request, to write a qualifying examination. A similar examination is available as a placement test, on the basis of which students in the two-year M.A. program may be granted advanced standing.

Students from other universities may arrange to take these examinations in other centres provided the program coordinator is notified well in advance.

*Counselling:* Students admitted to one of the fields of the M.A. program in English will be assigned a faculty advisor who will be available to counsel them on all aspects of their work. The program coordinator (or a delegate) must approve a student's program of study before registration.

*Grades:* After admission to candidacy, graduate students in the M.A. program in English must maintain at least a 70% average, but graduate credit is given only at the 80% and 70% level. A student whose grade in a graduate course is less than 70% may be allowed to repeat the course or to substitute another for it, at the discretion of the Dean of Graduate Studies and the program coordinator. The student may not repeat more than one course.

#### **ENGLISH LANGUAGE, LITERATURE AND CREATIVE WRITING: COURSES**

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# Spring 2016 Graduate Calendar

## FACULTY OF SCIENCE

### THE MASTER OF SCIENCE DEGREE IN ENVIRONMENTAL SCIENCE (Great Lakes Institute for Environmental Research (GLIER))

In addition to the general requirements, the following requirements must be met by all students proceeding to the M.Sc. degree.

#### Admission Requirements

Applicants must submit a letter of intent that clearly outlines his/her interest in the program, proposed focus of study and the prospective supervisor.

Prospective students will be encouraged to contact a potential supervisor before applying for admission to the GLIER graduate program. If a suitable supervisor cannot be identified, the student will be dissuaded from applying for admission.

For admission to the M.Sc. program, applicants must hold an appropriate Honours Bachelor's degree (or equivalent) from a recognized university. Students must maintain no less than a 77% average in their final two years of undergraduate, full-time study to be eligible for admission into the GLIER M.Sc. program.

#### Program Requirements

- (a) compliance with regulations outlined in University of Windsor Graduate Calendar;
- (b) successful completion of the GLIER Multidisciplinary Graduate Seminar course (this course is taken over the first two semesters and is equivalent to two credits). The course will be graded in accordance with university standards. Following successful completion of this course, all M.Sc. students will be required to continue registering in this course as an audit;
- (c) successful completion of the GLIER Environmental Research Proposal course (M.Sc. level). The course will be graded according to university standards.
- (d) any additional course work mandated by the student's Examining Committee to eliminate perceived weaknesses in the student's background preparation or to increase awareness of other disciplines;
- (e) submission for publication of an original research article derived from the thesis to a refereed journal. Exemption from this requirement is granted only with permission from the GLIER Graduate Committee;
- (f) submission of a Research Progress Report to the Master's Committee every six months and a meeting with the committee to review progress and problems encountered during the preceding six months and to plan future work;
- (g) completion of an original research project reported in a thesis;
- (h) defense of the thesis in a public lecture and before the Master's Committee.

#### ENVIRONMENTAL SCIENCE: **COURSES**

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	<b>FACULTY OF SCIENCE</b>
	<b>THE DOCTOR OF PHILOSOPHY DEGREE IN ENVIRONMENTAL SCIENCE (Great Lakes Institute for Environmental Research (GLIER))</b>
	<p>In addition to the general requirements, the following requirements must be met by all students proceeding to the Ph.D. degree.</p>
	<b>Admission Requirements</b>
	<p><i>Initial Application Procedure:</i> The initial application procedure for students who wish to enrol in the Ph.D. program through GLIER includes:</p>
	<ol style="list-style-type: none"> <li>1) Completion of the "Application for Admission to the Faculty of Graduate Studies " form;</li> <li>2) two official transcripts of all undergraduate and graduate studies from all colleges and universities attended;</li> <li>3) three confidential letters of reference;</li> <li>4) Graduate Record Examination, if required; and TOEFL results, as required;</li> <li>5) letter of intent by the student that clearly outlines his/her interest in the program, proposed focus of study and the prospective supervisor.</li> </ol>
	<p>Prospective students will be encouraged to contact a potential supervisor before applying for admission to the GLIER graduate programs. If a suitable supervisor cannot be identified, the student will be dissuaded from applying for admission.</p>
	<p>Two streams of Ph.D. applicants are envisaged. Applicants holding an M.Sc. degree from the University of Windsor or from another recognized university may be admitted directly to the GLIER Ph.D. program. Alternatively, students enrolled in the M.Sc. program who are making exceptional progress may transfer to the PhD program after one year on the recommendation of their Master's Committee and with the approval of the GLIER Graduate Committee and the Faculty of Graduate Studies. Students eligible for transfer will have made outstanding progress in both course work and research, and have a first-author research article submitted to a refereed journal at the time of transfer.</p>
	<b>Program Requirements</b>
	<p>(1) Students entering the program with an M.Sc. degree must fulfill all requirements listed below:</p>
	<p>(a) compliance with regulations outlined in University of Windsor Graduate Calendar;</p>
	<p>(b) successful completion during the first year of enrolment in the program of an oral qualifying exam, administered by the student's Doctoral Committee. Students will be required to possess comprehensive knowledge of their field of study as well as any ancillary fields relevant to the dissertation topic (as determined in advance by the Doctoral Committee). Students will be evaluated on a satisfactory/ unsatisfactory basis;</p>
	<p>(c) successful completion of the GLIER Multiple Stressors and Environmental Modelling course (one credit). The course will be graded in accordance with university standards;</p>
	<p>(d) successful completion of the GLIER Multidisciplinary Graduate Seminar course (this course is taken over two semesters and is equivalent to two credits). The course will be graded in accordance with university standards. All Ph.D. students who have successfully completed this course will be required to audit the course each year following their first year of residency;</p>
	<p>(e) any additional course work mandated by the student's Doctoral Committee to eliminate perceived weaknesses in the student's background preparation or to increase awareness of other disciplines;</p>
	<p>(f) submission of a Research Progress Report to the Doctoral Committee every six months and meetings with the committee every six months to discuss progress and research plans;</p>
	<p>(g) completion of an original research project reported in a dissertation;</p>
	<p>(h) defence of the dissertation in a public lecture and before the Doctoral Committee; and</p>
	<p>(i) publication of at least one original research article and submission of at least one additional article derived from the dissertation in a refereed journal. Exemption from this requirement is granted only with permission of the Graduate Program Committee.</p>
	<p>(2) Students transferring to the Ph.D. program must have received no grade less than 80% or satisfactory for all course work taken in the GLIER M.Sc. program. In addition, transfer students must have at least one first-author research article submitted to a refereed journal at the time of transfer. Transfer can be granted only by the Faculty of Graduate Studies acting on a recommendation from the student's Doctoral Committee and the Graduate Program Committee. Students</p>

approved for transfer into the Ph.D. program must comply with regulations (a) through (j) above.

In addition to courses offered in the GLIER programs, students will be advised to enroll in additional courses in other AAUs, as needed. It is expected that these courses will offer intensive treatments of particular topics to assist students in resolving perceived weaknesses. These courses are offered in a variety of AAUs including Earth Sciences, Biological Sciences, and Chemistry and Biochemistry and involve various combinations of theory and lab work. All graduate students must complete the GLIER Multidisciplinary Graduate Seminar course and must complete the CLIER Environmental Research Proposal course. The Multiple Stressors and Environmental Modelling Course is required for all Ph.D. students. Other courses will supplement core GLIER courses, be offered on a rotating basis, and be mandated by Doctoral Committees, depending on students' perceived deficiencies in background preparation.

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## SCHOOL OF CREATIVE ARTS

### MFA IN FILM AND MEDIA ARTS

#### Admission Requirements

Graduates of four-year or their equivalent undergraduate programs in media arts and film production, as well as graduates from undergraduate programs from cognate disciplines from the University of Windsor or other universities, who are engaged in the study of art and/or, culture, including English, Anthropology and Sociology, Language and Literatures, Performing Arts, journalism, cinema and media studies, film and video production, and Music, among others, depending on the quality of their record, are eligible for admission into the proposed MFA program. Student admission will be determined by GPA, portfolio submission, and a clear statement of interest describing their intended film thesis production. A Media Arts thesis could be any of the following: audio/sound art, audio responsive installation, experimental video, animation, video installation art, interactive art, multimedia performance, and any fusion thereof.

**Total Courses:** Four Courses

#### Major requirements:

One theory course:  
28-660 Seminar on Contemporary Issues  
*and*  
Three film production courses  
*27-565 Studio Production I*  
*27-566 Studio Production II*  
*28- 600 Directed Individual Study (Thesis Proposal)*

Course work will culminate in the defense of the Thesis. For Film, the thesis proposal includes a rationale, a budget, funding sources, production and post-production schedule, and other elements as appropriate to the project. For Media Arts, the thesis proposal includes a thesis project proposal, a draft of the thesis support document and an annotated bibliography of major sources used in the support document.

#### Other requirements:

*“Thesis Film/Media Arts”*

This is worth 12 graduate credits and will be conducted under faculty supervision. Students will defend their thesis at the end of the year before a thesis panel. Those that fail the defense will have the option to appear before the thesis panel again after 6 months.

#### Recommended options (if any):

Students will be encouraged to attend local and national as well as online film and new media festivals to keep abreast with developments in the field.

## VISUAL ARTS: COURSES

## VISUAL ARTS: PROGRAM

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# Spring 2016 Graduate Calendar

- HISTORY
- THE MASTER OF ARTS DEGREE
- Admission Requirements

The normal requirement for admission to the M.A. program is an honours degree in History, with at least a 75% major average in undergraduate History courses. Students with an honours degree in fields other than History will be considered on the basis of their academic background and standing, and may be required to complete extra undergraduate courses as part of their program. Students with a three-year degree will be required to complete a full year (ten courses) of undergraduate courses (I Masters Qualifying -- see section titled Application Procedures – Admission Levels).

## MA In History

### Program Requirements

Students must successfully complete six courses and a Major Paper. Students must take two required courses: 43-503 and 43-504 as well as four more History graduate courses. A student may, with the consent of the Graduate Advisor or AAU Head, take one course in another University of Windsor graduate program or in History at Wayne State University. Students usually complete the coursework in their first two semesters. The Major Paper will normally be written under the supervision of two History faculty members.

Although it is possible for students to complete the master's program in one calendar year (three terms in residence), many students complete in 4-5 semesters.

- HISTORY: COURSES
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## HUMAN KINETICS

### THE MASTER OF HUMAN KINETICS DEGREE

#### General Nature of the Program

There are two streams to the program, Sport Management and Applied Human Performance: both streams include a thesis option which normally will lead to doctoral work. Both offer an Internship option which combines coursework with practical work term placement designed to serve as an enrichment experience.

#### Admission Requirements

1) In addition to the general admission requirements of the Faculty of Graduate Studies and Research outlined in the section titled, Application Procedures, and in the section titled, The Master's Degree - Admission Requirements, the following are employed in the determination of a candidate's admission status:

(a) Thesis students must have a faculty research advisor before being admitted into one of the following areas of specialization:

- i) Applied Human Performance
- ii) Sport Management

(b) A person who holds a three-year degree in another discipline is required to complete the requirements for the Master's degree as outlined in the Graduate Calendar. Up to ten Kinesiology undergraduate courses beyond the minimum requirement may be deemed necessary by the graduate committee.

(c) A person who holds a four-year degree in another discipline will be required to take up to five Kinesiology undergraduate courses prior to taking graduate courses.

Normally, the makeup courses are to be selected from the areas of specialization: Applied Human Performance and Sport Management.

Undergraduate courses, assigned at the discretion of the admissions committee and the student's advisor to form the make-up requirements, may be found in the Undergraduate Calendar (under section titled [Human Kinetics - Courses](#)).

#### Program Requirements

1) In addition to the general requirements for the Master's degree, the candidate must:

(a) complete a minimum of four graduate-level courses and a thesis; and pass a oral examination based on a thesis,

or

(b) complete a minimum of seven graduate-level courses and an internship; and present an internship report

2) Only one Special Problems (95-510) course may be taken regardless of area of specialization.

3) *Master's Committee and Advisors:* Prior to a candidate's initial registration, the Graduate Coordinator will assign a program advisor for each candidate.

The appointed advisor may or may not act as chairperson of the Master's thesis committee, which will include at least two additional members, one of whom shall be a faculty member from outside Human Kinetics. An additional member from the graduate faculty of another university may be invited to serve on the Master's thesis committee.

4) *Examinations*

(a) *Thesis Option:* The thesis committee will conduct the oral examination of the thesis proposal. When the thesis has been completed, the thesis committee, in consultation with the candidate, will determine whether to proceed with or postpone the final oral examination. For the final oral examination of the thesis, the committee will be supplemented by another member of the Kinesiology graduate faculty who will act as the chairperson. Following the successful defense, the candidate will deposit all copies of the thesis in the Office of the Faculty of Graduate Studies and Research for binding and distribution (two copies for the Leddy Library, a copy to the Faculty of Human Kinetics).

(b) *Internship Option:* The internship consists of a minimum of 360 hours of applied work experience in a sport management or applied human performance setting. The internship option is open to students who have completed four graduate courses. Students develop an internship experience in conjunction with a graduate faculty member prior to registering for the internship. Students are required to complete the "Internship Objectives Form" prior to completing 50 hours of their experience. Their work experience is supervised and evaluated (mid-term and final evaluation) by the cooperating field professional. Students are also required to prepare and defend a research report. Final evaluation is on a Pass/Non-Pass basis and the student is required to pass both the experience and the research report components of the internship. Following the successful completion, the candidate deposits two copies of the internship and research report in the Faculty

of Human Kinetics.

**APPLIED HUMAN PERFORMANCE**

The program focuses on the application of movement science in sport, the workplace, and activities of daily living. Students pursue course work, thesis research, and internships that examines the basic and applied principles of human biomechanics, motor performance and exercise physiology. To fulfil the degree requirements, each candidate must complete the following:

Thesis Option

- 1) Three courses from 95-504, 95-510, 95-511, 95-522, 95-523, 95-524, 95-525, 95-526, 95-527, 95-528, 95-595
- 2) A Thesis (95-797).
- 3) One other graduate course chosen in consultation with the thesis advisor.

Internship Option

Five of 95-504, 95-511, 95-522, 95-523, 95-524, 95-525, 95-526, 95-527, 95-528, 95-595  
Two other graduate courses chosen in consultation with the internship advisor.  
Internship (95-795).

**SPORT MANAGEMENT**

The program focuses upon the understanding of the components of organizational behaviour in the context of amateur and professional sport environments. Students will pursue course work and either thesis research or an internship that focuses on topics such as leadership, organizational effectiveness, sport marketing, organizational change, and legal, philosophical and social issues of management. To fulfil the degree requirements, each candidate must complete all of the following:

Thesis Option

- 1) Two courses from 95-500, 95-501, 95-502, 95-503, 95-505, 95-506, 95-508, 95-510, 95-595
- 2) Research Methods (95-562)
- 3) A Thesis (95-797)
- 4) One other graduate course chosen in consultation with the thesis advisor

Internship Option

- 1) Four courses from 95-500, 95-501, 95-502, 95-503, 95-505, 95-506, 95-508
- 2) Research Methods (95-562)
- 3) Two other graduate courses chosen in consultation with the internship advisor
- 4) Internship (95-795)

**KINESIOLOGY: COURSES**

**KINESIOLOGY: PROGRAM**

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FACULTY OF ENGINEERING

THE DOCTOR OF PHILOSOPHY  
Industrial and Manufacturing Systems Engineering (Multi-Disciplinary Program)

*Program Overview*

The objective of the multi-disciplinary Ph.D. program is to impart multi-disciplinary education and skills in an environment that fosters excellence in research and awareness of the many challenges of modern Industrial and modern Manufacturing Systems. The program will provide students with an opportunity to acquire, through courses, seminars and networking, advanced academic and professional knowledge in the multi faceted area of industrial and manufacturing systems and related subjects as well as develop basic and applied research skills to become independent research investigators capable of disseminating knowledge and research results through scholarly publications.

The multi-disciplinary Ph.D. program in Industrial and Manufacturing Systems Engineering is based in, and coordinated by, the Department of Mechanical, Automotive and Materials Engineering, in collaboration with faculty from other Faculties. The participating faculty for the Multi-Disciplinary PhD program in Industrial and Manufacturing Systems Engineering are drawn from several disciplines and departments within the University, namely, Department of Mechanical, Automotive and Materials Engineering, the Faculty of Human Kinetics (Department of Kinesiology), the Odette School of Business, the Faculty of Science (Operational Researchers), Electrical and Computer Engineering Department and the School of Computer Science.

***Faculty involved in the program***

- A. Alfakih, Ph.D., Mathematics and Statistics
- D. Andrews, Ph.D., Human Kinetics
- A. Azab, Ph.D., Mechanical, Automotive and Materials Engineering (MAME)
- <sup>[1]</sup><sub>SEP</sub>W. Abdul-Kader, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)
- <sup>[1]</sup><sub>SEP</sub>F. Baki, Ph.D., Business. Cross-appointed to MAME<sup>[1]</sup><sub>SEP</sub>
- R. Caron, Ph.D., Mathematics and Statistics, Cross-appointed to MAME<sup>[1]</sup><sub>SEP</sub>
- X. Chen, Ph.D., P.Eng., Electrical and Computer Engineering<sup>[1]</sup><sub>SEP</sub>
- H. ElMaraghy, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME), [Tier 1 Canada Research Chair (CRC) Manufacturing Systems]. Chair of the Program<sup>[1]</sup><sub>SEP</sub>
- W. ElMaraghy, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)
- M. Hlynka, Ph.D., Mathematics and Statistics
- R. Lashkari, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)
- <sup>[1]</sup><sub>SEP</sub>L. Oriet, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)<sup>[1]</sup><sub>SEP</sub>
- Z. Pasek., Ph.D., Mechanical, Automotive and Materials Engineering (MAME), Graduate Coordinator
- <sup>[1]</sup><sub>SEP</sub>J. Urbanic, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)
- M. Wang, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)<sup>[1]</sup><sub>SEP</sub>
- G. Zhang, .Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)<sup>[1]</sup><sub>SEP</sub>
- X. Yuan, Ph.D., Computer Science

***Admission Requirements***

The Ph.D. program in Industrial and Manufacturing Systems Engineering will be governed by the general regulations regarding the Ph.D. degree of the Faculty of Graduate Studies. ([click here for general admissions regulations.](#))

***Program Curriculum Structure***

***Total courses:***

Satisfactory completion of at least four graduate courses, comprising a minimum of twelve semester hours, beyond the courses required for the Master's degree. See Section on "Major Requirements" for details.

***Major requirements:***

The graduate course offerings through the Department of Mechanical, Automotive and Materials Engineering and selected related courses from other areas are designed to complement the research focus of the core faculty in the area of Industrial and Manufacturing Systems Engineering. The minimum course requirement for the multi disciplinary Ph.D. Program is 4; at least 2 from the 91-5XX courses listed in category A and a minimum of one from category B would be selected. This is addition to the Graduate Seminar course (91-595). Students will be required to register throughout the entire program and give presentations, and all students will be expected to attend each seminar (no less than 75% of all seminars). The course will be graded on a PASS/FAIL basis (1 Lecture/ Hour a week). This course will include presentations by graduate students, staff, and visiting scientists.

The current list of A and B courses will be made available to the students through the Department.

***Area of Specialization:***

Research within the Industrial and Manufacturing Systems Ph.D. program focuses on modern manufacturing systems that are flexible and well integrated. It deals with various modules such as: 1) physical components of the system (machines, robots, inspection devices, material handling equipment, etc.), 2) effective information systems for controlling, monitoring, scheduling and operating in a dynamically changing environment, 3) human related issues such as ergonomics, interaction

among people and between people and machines as well as human modeling, 4) management of technologies and operational issues throughout the manufacturing enterprise, and 5) integration of all elements to ensure achieving the desired competitiveness.

### ***Candidacy***

Admission to graduate study does not imply admission to candidacy for a degree. The candidacy of a student normally will be determined within the second year after initial registration in the doctoral Program.

Candidacy will be granted to students who meet all of the following requirements:

- (a) Satisfactory completion of the comprehensive examination;
- (b) Demonstration to the doctoral committee of ability to conduct independent research;
- (c) Acceptance by the doctoral committee of the research proposal.

The doctoral committee will assess the student's competence to continue research on the basis of (a), (b) and (c) above, and make a recommendation accordingly to the Dean of the Faculty of Graduate Studies through the Chair of the Graduate Program.

### ***Program Requirements***

The specific minimum Program requirements for the Ph.D. degree include the successful completion of:

1) Course requirements: Satisfactory completion of at least four graduate courses, comprising a minimum of twelve semester hours, beyond the courses required for the Master's degree. See Section "4.2.5 Graduate Courses" below for requirements details, as well as the Section: "Major Requirements" above.

2) A comprehensive examination. (See details under examinations)

3) Satisfactory progress in research within each review period. The doctoral committee will conduct a periodic review, which will include at least one formal seminar a year, after the first year of residency, to establish that adequate progress in research has been accomplished by the candidate. The doctoral committee will also grant permission to write the dissertation when it decides that the candidate has achieved sufficient competence in carrying out research and when the candidate has done substantial research. During the annual seminar, Ph.D. students will be required to review their research progress and results. The Ph.D. Supervisory Committee will complete the evaluation.

4) A dissertation on the research. A dissertation embodying the results of an original investigation in the field of specialization is required of all candidates for the degree of Doctor of Philosophy. Each candidate will be required to make an oral presentation of the dissertation research and will be examined orally on the subject of the dissertation and related fields.

***Residence and Time Limits:*** Every student will undertake a full Program of study for a minimum of three years beyond the Baccalaureate of Engineering or its equivalent. Credit for one of these years may be given for the time spent in proceeding to a Master's degree. Credit for one of these years may also be given for work done at another institution. A student admitted to a Ph.D. Program requiring the student's attendance for a minimum of three years must complete all requirements within seven years. Students requiring a minimum of two years' residence must complete all requirements within six years.

***Committees:*** Research undertaken as part of a doctoral Program is directed and supervised by a doctoral committee, which is assigned within the first term of registration. Whereas the student's advisor provides day to day guidance and direction, this committee is ultimately responsible for the overall supervision to ensure that adequate progress is being maintained.

The doctoral committee will be composed of at least 4 faculty members including:

- 1) the student's advisor,
- 2) two other faculty members from within the program, and
- 3) one internal external faculty member outside the student's department and within the University of Windsor.

The student's advisor will recommend the members of the doctoral committee, whose appointment must be approved by the Executive Committee of Graduate Studies and Research.

### ***Examinations:***

***Qualifying Examination.*** At the discretion of the doctoral committee, a qualifying examination may be required. A qualifying examination is one in which the student is asked to demonstrate a reasonable mastery of the fundamentals in the major subject; it is designed to test the student's preparation for advanced graduate work. If such an examination is required, it must be administered and passed before the student registers for the second year of Ph.D. work.

***The Proposal:*** Normally within the first 2 years, the student will present in the form of a seminar an outline of their proposed thesis research. This will be presented to the doctoral committee who must approve, with or without modifications, or reject the proposal. Thereafter, at least once a year the student will report their progress in the form of a seminar.

***Comprehensive Examination:*** Students who have previously obtained a Master's degree must attempt this examination very early between twelve to eighteen months of registering for the Ph.D. Program. Other students must take it within twenty four months of registration for the Ph.D. Program. A comprehensive examination committee will conduct the comprehensive examination. The committee will consist of the chair, three members of the supervisory committee, including the supervisor, and an additional member who has a scholarly interest in the student's general area of specialization.

This set of examinations requires the students to demonstrate an adequate background in the general discipline of applied science, and an advanced knowledge in their fields of specialization and research.

The comprehensive examinations will be conducted in two parts:

- a) In the first part, a scheduled supervised written portion, of three hours duration, designed to test the student's general knowledge on core subjects in the field of study as approved by the examination committee, with questions set and answers evaluated by the examination committee;
- b) An oral examination to be evaluated by the examination committee. The objective of this part of examination is to evaluate the student's ability to integrate general knowledge from different areas into their research plan. The candidate will be required to submit a report, up to 25 pages in length, on the proposed research program. The report must include: (i) a critical survey of the directly related literature in the field, and (ii) an outline of the proposed research program, including its justification, the approach to be taken, specific analytical or experimental methods, perceived or anticipated problems, and a proposed timetable to accomplish the task. Five copies of the report must be in the hands of the examining committee at least seven days prior to the date of the oral examination. The oral examination will be conducted in two sessions. In the first part, the candidate will be required to present their report in a summary fashion to the committee followed by questions directly related to the proposal and the candidate's specific area of research. The second part of the oral examination will emphasize the candidate's comprehension as well as breadth and depth of knowledge of their discipline area. The duration of the two parts of the oral examination is expected to be about one and half hours each, separated by a recess of half an hour .

It is the responsibility of the examining committee chair to call a meeting of the committee at least seven days prior to oral examination to: (i) examine the candidate's records and the type of background necessary to carry on their research successfully, and (ii) assign the preparation of the written questions for the first part, to members of the committee, other than the supervisor. The supervisor will not participate in the preparation of the written questions but is expected to participate in the oral examination.

The Examination Committee will determine the student's overall performance and success in the comprehensive examination. If the student is unsuccessful, the committee may require:

- i. That the student repeats all or part of the comprehensive examination at a specified time;
- ii. That the student take and pass remedial course work before repeating all or part of the examination; or
- iii. After consultation with, and approval by, the doctoral committee, that the student withdraws from the program.

***Final Examination.*** The final appraisal of the dissertation and the conduct of the final oral examination of the dissertation will be carried out by an examining committee. The examining committee will consist of the doctoral committee, the Dean of Graduate Studies and Research (or designate) as chairperson (non voting) and an external examiner. The final examination normally follows a public seminar by the candidate, open to the public. The passing of the final oral examination of the dissertation requires both an adequate dissertation and a satisfactory defence of the dissertation. The examining committee will conduct this examination, in accordance with the Faculty of Graduate Studies procedures.

This set of examinations requires the students to demonstrate an adequate background in the general discipline of Industrial and Manufacturing Systems, and an advanced knowledge in their fields.

## **INDUSTRIAL AND MANUFACTURING SYSTEMS ENGINEERING: COURSES**

### **FACULTY OF ENGINEERING: PhD**

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## PhD in Kinesiology

*Total courses:* A minimum of 4 courses

*Major requirements:* All students must complete the following 3-credit courses and a dissertation for successful completion of the degree:

- 95-692. Independent Study
- 95-698. Community Internship
- 95-695. Doctoral seminar (must register for 6 terms)
- Minimum of one additional graduate level course

*Other requirements:*  
Students must have graduate level competency in statistics and/or research design. Depending on graduate level courses taken at the Masters level, students may be asked to complete either 95-507 (Quantitative Analysis in Kinesiology) or 95-562 (Research Methods), or their equivalent.

Demonstration of teaching competency – In addition to preparing doctoral candidates as researchers, they will also receive preparation for University level teaching in the completion of teaching competency units. All doctoral students must accumulate 10 teaching component points over the course of their degree, with no more than half the points being accumulated in one area.

## KINESIOLOGY: COURSES

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**FACULTY OF LAW**

**PROGRAM**

**Master of Laws (LLM)**

**JOINT PROGRAMS**

**Juris Doctor/Master of Social Work (JD/MSW) Joint Program**  
Note: For information on the Juris Doctor, visit the Law Calendar at the Faculty of Law website:  
<http://www.uwindsor.ca/law/law-calendar-1>

**LLM: COURSES**

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## ODETTE SCHOOL OF BUSINESS

### MASTER OF MANAGEMENT

The Master of Management is a program specifically designed for a cohort of international students. Students enrolled in the program may select a concentration from one of the four following fields: 1) Manufacturing Management; 2) Logistics and Supply Chain Management; 3) Human Resource Management; and 4) International Accounting and Finance. Please note that these concentrations are approved, but not necessarily offered. For more information contact the Centre for Executive and Professional Education at [www.uwindsor.ca/execed](http://www.uwindsor.ca/execed).

#### Admission Requirements

Admission to the Master of Management program will be open to applicants who meet the following criteria:

- 1) Bachelor-level degree in an acceptable discipline from an academic institution approved by the University of Windsor;
- 2) The equivalent of a 70% average in undergraduate studies;
- 3) Where appropriate a TOEFL score of at least 560 (or proof of equivalent English language proficiency, such as MELAB or CAEL tests);
- 4) A successful interview with a representative from the Odette School of Business.

#### Program Curriculum Structure

*Total courses:* 12

As with the regular M.B.A. program, all required courses are offered by the Odette School of Business Administration. In this program students will follow a prescribed sequence of courses in cohort fashion, with no electives. In addition, the academic program itself will be preceded by an intensive 8-week program of English language instruction and introductory courses to Canadian culture and business practices.

#### Program Sequencing

**Pre-program:** Intensive ESL instruction and orientation to Canadian culture and business practices.

#### First Term

- 78-611. Accounting concepts and techniques
- 78-612. Finance in a global perspective
- 78-613. Managing employees
- 78-614. Marketing

#### Second Term

- Common Core Courses:**
- 78-631. International Business
- 78-632. Quantitative Studies

#### Manufacturing Field

- 78-633. Introduction to Business Logistics Management
- 78-634. Leadership and Organizational Change

#### Logistics and Supply Chain Management Field

- 78-633. Introduction to Business Logistics Management
- 78-635. Purchasing and Procurement

#### International Accounting and Finance Field

- 78-636. International Financial Reporting
- 78-637. International Financial Management

#### Human Resources Management Field

- 78-638. Human Resources Management
- 78-634. Leadership and Organizational Change

#### Third Term

- Common Core Courses:**
- 78-651. Business Strategy (capstone course)



***Manufacturing Field***

- 78-652. Marketing Strategy and Planning
- 78-653. Manufacturing Strategy
- 78-654. Manufacturing and Globalization (Stream capstone)

***Logistics and Supply Chain Management Field***

- 78-655. Domestic Transportation and International Shipping
- 78-656. Quantitative Analysis for Logistics and Supply Chain Management
- 78-657. Supply Chain Management (Stream capstone)

***International Accounting and Finance Field***

- 78-661. Consolidated financial statements
- 78-662. Accounting Systems Control and Auditing
- 78-663. Corporate Governance (Stream capstone)

***Human Resources Management Field***

- 78-665. International Management
- 78-666. Managing for High Performance
- 78-667. Current HR Trends (Stream capstone)

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**ODETTE SCHOOL OF BUSINESS: PROGRAMS**

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## MATHEMATICS AND STATISTICS

### THE DOCTOR OF PHILOSOPHY DEGREE IN MATHEMATICS AND STATISTICS

#### Admission Requirements

For admission requirements and period of study, the general regulations of the Faculty of Graduate Studies should be consulted (see the section titled, The Degree of Doctor of Philosophy ). Qualifying examinations will not normally be required.

#### CANDIDACY

Students will be recommended for candidacy (see section titled, The Degree of Doctor of Philosophy - Admission Requirements) only after successful completion of the Comprehensive Examinations and course work.

#### Program Requirements for the Ph.D. (Statistics Field)

1) *Course Work*: Students admitted with an M.Sc. or equivalent must successfully complete at least four graduate courses numbered with the prefix 65-; further graduate courses may be assigned by the Graduate Studies Committee in consultation with the advisor. Transfer credits will not be allowed. (Up to two courses prefixed 65- may be replaced by 62-510 and/or 62-511.)

Students admitted with an Honours B.Sc., or equivalent, which is done only in exceptional cases, must successfully complete at least twelve graduate courses, eight of which must be numbered with the prefix 65-; further graduate courses may be assigned by the Graduate Studies Committee in consultation with the advisor. Transfer credits will not be allowed.

It is strongly recommended that all Ph.D. students in Statistics take a measure theoretic probability course.

Students registered in the Dissertation are required to register in Seminar 65-795. Students must attend no less than 75 percent of all seminars in the first 3 years. Every doctoral student is required to give a presentation prior to dissertation defense.

2) *Doctoral Committee*: within the student's first term of study at the doctoral level, a doctoral committee will be appointed by the Head of the Department upon the advice of the Graduate Studies Committee. The doctoral committee must be approved by the Executive Committee of the Faculty of Graduate Studies and Research. The doctoral committee shall include the student's advisor as chairperson, at least two other members of the Department, one faculty member from outside the Department, and an external examiner, who shall not be involved in the preparation of the dissertation. The selection of the external examiner is subject to the approval of the Dean of Graduate Studies and Research. Members of other departments may also be invited to join the committee (see section titled, The Degree of Doctor of Philosophy - Program Requirements).

3) *Dissertation*: The dissertation shall be defended at an oral examination (see section titled, The Degree of Doctor of Philosophy - Program Requirements).

1) *Course Work*: Students admitted with a MSc. or equivalent must successfully complete at least two graduate level courses from any of the following areas of mathematics: Algebra, Analysis, and Operational Research. All course selections require the approval of the student's Doctoral committee, the supervisor, or the departmental graduate committee. The student may be required to take additional courses as stipulated by the student's Doctoral committee.

Students are required to register in Seminar 62-795. Students must attend no less than 20 seminars. Every doctoral student is required to give a presentation to the department prior to dissertation defense.

2) *Doctoral Committee*: within the student's first term of study at the doctoral level, a doctoral committee will be appointed by the Head of the Department upon the advice of the Graduate Studies Committee. The doctoral committee must be approved by the Executive Committee of the Faculty of Graduate Studies. The doctoral committee shall include the student's advisor as chairperson, at least two other members of the Department, one faculty member from outside the Department, and an external examiner, who shall not be involved in the preparation of the dissertation. The selection of the external examiner is subject to the approval of the Dean of Graduate Studies. Members of other departments may also be invited to join the committee (see section titled, The Degree of Doctor of Philosophy - Program Requirements).3) *Dissertation*: The dissertation shall be defended at an oral examination.(see section titled, The Degree of Doctor of Philosophy - Program Requirements).4) *Comprehensive Examinations*: A student must pass a series of three written comprehensive examinations two of which must be chosen from the following areas: Algebra, Analysis and Operational Research. The third exam, which may be written or oral, is in the area of specialization to be set by the student's doctoral supervisor and doctoral committee.

If a student fails an examination, it may be repeated once, but if the examination is failed a second time, the student must withdraw from the program (see section titled, The Degree of Doctor of Philosophy - The Dissertation). In any case, these examinations must be successfully completed within twenty-five months of first registration in the doctoral program. If this deadline is not met, the student must withdraw from the program.

4) *Comprehensive Examinations*: A student must pass a series of three written comprehensive examinations as follows:  
i.Paper I-Mathematical Statistics and Probability  
ii.Paper II-Statistics OR Probability

iii. Paper III-Topics (two topics mutually agreed upon by the advisor and student).

If a student fails an examination, it may be repeated once, but if the examination is failed a second time, the student must withdraw from the program (see section titled, The Degree of Doctor of Philosophy - The Dissertation). In any case, these examinations must be successfully completed within twenty-five months of first registration in the doctoral program. If this deadline is not met, the student must withdraw from the program.

#### **Program Requirements for the Ph.D. (Mathematics Field)**

1) *Course Work*: Students admitted with a MSc. or equivalent must successfully complete at least two graduate level courses from any of the following areas of mathematics: Algebra, Analysis, and Operational Research. All course selections require the approval of the student's Doctoral committee, the supervisor, or the departmental graduate committee. The student may be required to take additional courses as stipulated by the student's Doctoral committee.

Students are required to register in Seminar 62-795. Students must attend no less than 20 seminars. Every doctoral student is required to give a presentation to the department prior to dissertation defense.

2) *Doctoral Committee*: within the student's first term of study at the doctoral level, a doctoral committee will be appointed by the Head of the Department upon the advice of the Graduate Studies Committee. The doctoral committee must be approved by the Executive Committee of the Faculty of Graduate Studies. The doctoral committee shall include the student's advisor as chairperson, at least two other members of the Department, one faculty member from outside the Department, and an external examiner, who shall not be involved in the preparation of the dissertation. The selection of the external examiner is subject to the approval of the Dean of Graduate Studies. Members of other departments may also be invited to join the committee (see section titled, The Degree of Doctor of Philosophy - Program Requirements). 3) *Dissertation*: The dissertation shall be defended at an oral examination. (see section titled, The Degree of Doctor of Philosophy - Program Requirements). 4) *Comprehensive Examinations*: A student must pass a series of three written comprehensive examinations two of which must be chosen from the following areas: Algebra, Analysis and Operational Research. The third exam, which may be written or oral, is in the area of specialization to be set by the student's doctoral supervisor and doctoral committee.

If a student fails an examination, it may be repeated once, but if the examination is failed a second time, the student must withdraw from the program (see section titled, The Degree of Doctor of Philosophy - The Dissertation). In any case, these examinations must be successfully completed within twenty-five months of first registration in the doctoral program. If this deadline is not met, the student must withdraw from the program.

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## CHEMISTRY AND BIOCHEMISTRY

### THE MASTER OF MEDICAL BIOTECHNOLOGY DEGREE

The Master of Medical Biotechnology (MMB) is a professional program that provides students with both a solid foundation of the theoretical concepts and practical industrially applicable laboratory technique experiences used in medical biotechnology industries. In addition, students will also receive training in business plan development and product commercialization.

#### Admission Requirements

In accordance with our current admission requirements for the MSc program, students entering this program must have a four (4) year BSc or BSc (Honours) degree in Biochemistry, Biology, Chemistry, or accepted equivalent from an academic institution approved by the University of Windsor.

They must have the equivalent of a 70% average or higher in their undergraduate studies when converted to Ontario standards.

Candidates must demonstrate English proficiency by meeting or exceeding an IELTS score of 6.5 (or equivalent – i.e. 83 TOEFL Internet Based Test). If an applicant receives an English language proficiency score of less than 6.5 (or equivalent) they may be offered a conditional letter of acceptance pending successful completion of an approved English Language Training program.

Applicants must pass a successful interview with a representative or agent acting on behalf of the University of Windsor and submit two letters of reference.

This is a premium program as such enrolment is limited. Preference will be given to candidates who exceed the minimum requirements and those who have demonstrated work experience in the field of biotechnology.

#### Program Requirements

**Total courses:** 12 credits (10 courses, two of which are worth two course credits)

##### Major requirements:

- 59-670. Protein Structure and Function
- 59-672. Proteomics and Biological Mass Spectrometry
- 59-673. Drugs: From Discovery to Market
- 59-674. Clinical Biochemistry
- 59-675. Biochemistry and Cell Biology of Lipids and Membranes
- 59-676. Human Physiology and Mechanisms of Disease
- 59-677. Biotechnology Laboratory (equivalent to two (2) semester-length courses)
- 59-690. Biotechnology Entrepreneurship (2 course credits)
- 78-614. Marketing

##### Other requirements:

- One of the following two:
- 78-612. Finance in a Global Perspective
  - 78-651. Business Strategy

#### Suggested Program Sequencing

##### Fall Semester (Term 1):

- 59-670
- 59-676
- 59-675
- 78-614

##### Winter Semester (Term 2):

- 59-672
- 59-674
- 59-673
- One of 78-612 or 78-651

##### Summer Semester (Term 3):

- 59-677

##### Fall Semester (Term 4):

- 59-690

**Standing Required for Continuation in the Program and for Graduation**

Students must not have obtained a grade of less than 70% in any course in the MMB program.

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## NURSING

### THE DOCTOR OF PHILOSOPHY DEGREE IN NURSING (PhD in Nursing)

The PhD program, focusing on health outcomes and health services research, will involve four years of full-time study. It will combine coursework, comprehensive exams and a dissertation. This program will prepare graduates to assume leadership roles in academic and practice settings. Research and scholarly activities will prepare graduates to contribute to nursing practice, the design and delivery of health care, and policy development.

#### Admission Requirements

Applicants must have a completed Master's degree normally with thesis from a nursing and/or nursing related program. Applicants must be registered or eligible for registration with the College of Nursing of Ontario. Applicants must also submit three letters of reference, a statement of academic interest and professional plan, and a CV.

A minimum 77% average in their Master's program is required. For international students, successful completion of an English Language Proficiency Exam is required.

The Ph.D. program will normally involve four years of full-time study consisting of course work (most of it in Year 1), a comprehensive exam (normally in Fall of Year 2) and a dissertation. The dissertation requires independent, original research and makes up at least two thirds of the time normally required for the program.

#### Total courses:

Minimum of four courses prior to beginning dissertation proposal.

#### Degree requirements:

63-610. Philosophy of Science in Nursing

63-625. Advanced Perspectives on Quantitative and Qualitative Research Methods

One of the following: 63-620. Applied Biostatistics for Nursing and Health Research; or, 63-630. Qualitative Data Analyses for Health Research

One graduate level course

63-600. Seminar Course

63-741 Comprehensive Exam

63-798. Dissertation

#### Description of Comprehensive Process:

The comprehensive exam process is designed to be completed in one term. Students will have been assigned an advisor/supervisor upon acceptance into the program. Students may request a supervisor when they apply to the program but ultimately, the supervisor will be determined by the Graduate Coordinator, based on faculty who meet the advising criteria and who have expertise in the student's area of research interest. Upon successful completion of the comprehensive oral and written exam the student will proceed to register for the dissertation.

#### Comprehensive Exam Process:

a.) Within the first week of the term in which the student has registered for the comprehensive exam the student will meet with his/her supervisor/advisor and discuss a research topic and potential committee members (i.e. one nursing faculty member and one faculty member external to Nursing but internal to the University). The final committee composition will be approved by the Graduate Program Coordinator.

b) Once the Comprehensive Exam committee members have been confirmed, the student will meet with the Committee to identify the research topic. The student will then spend time researching the topic.

c) Within a 2 – 3 week period the student will prepare and present to the committee a 1-2 page outline describing his/her research topic and potential methodology. The comprehensive paper topic will be mutually agreed upon by the student and committee members.

d) The student will prepare 1 paper on methodology or content (approximately 20 - 25 pages (excluding references and appendix)). The student has 6 weeks to write the paper. As this is an exam the student will not receive guidance as the paper is written.

e) The oral exam date will be pre-booked 2 weeks after the written submission due date. A Chair for the defense will be assigned from the Faculty of Nursing graduate faculty.

f) After reading the comprehensive exam paper the committee members will prepare questions for the oral defense.

g) The student is deemed to have passed their Comprehensive Exam upon successful completion of both the oral and written components.

h) If students are unsuccessful with the written exam they do not move forward with the oral exam. They have the option to resubmit the paper within a 3 week time period, or if major corrections are required, they register for another term and redo the paper. If a student fails the oral exam, a second exam will be given within 3 weeks.

#### Description of Dissertation process:

The composition of the dissertation committee will be confirmed within the first term of registration in the dissertation. The comprehensive exam committee members may also serve on the student's dissertation committee, with the addition of another nursing faculty member.

1) Proposal Development: Student engages in independent reading and analysis of the theoretical, empirical, and methods

literature to develop dissertation research proposal under the guidance of an approved doctoral committee, as per the Faculty of Graduate Studies regulations. This phase involves regular consultation and feedback from the student's supervisor and advisory committee and should normally be completed in a maximum of 2 terms of study. It will be guided by a proposal development process with expectations and timelines.

2) Proposal Approval: Student will submit a hard copy of the full proposal to each committee member by the due date negotiated. Committee members will independently review the proposal and meet to determine if the proposal is well-designed, feasible, and appropriately grounded in the relevant research literature. Upon committee agreement, the student will proceed to the Dissertation Proposal Oral Examination within a four week time frame. If agreement is not reached that the proposal is satisfactory, feedback will be provided to the student, who will be given an opportunity to revise and resubmit the proposal within a maximum of one term.

3) Proposal Oral Examination: Student who passes the proposal development proceeds to the oral examination of the dissertation proposal. A student who achieves PhD candidacy on successful completion of the Oral Examination then proceeds to ethics review of the proposal and the dissertation research.

4) Dissertation Defense: Upon approval of the completed written dissertation by the Committee, the student proceeds to oral examination of the dissertation research. For the final oral defense the committee will be supplemented by an independent, external examiner in accordance with the Faculty of Graduate Studies regulations.

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## NURSING

### THE MASTER OF SCIENCE DEGREE IN NURSING

#### Admission Requirements

- 1) All general regulations of the Faculty of Graduate Studies and Research admission requirements are applicable.
- 2) Applicants must have a Bachelor of Science in Nursing or equivalent which includes physical assessment, and courses in research and statistics. Consideration may be given to nurse applicants holding degrees in other cognate disciplines.
- 3) Applicants must have maintained an overall 70% average in their undergraduate nursing program.
- 4) Applicants must be eligible for a current certificate of registration with the College of Nurses of Ontario.
- 5) Three Faculty of Nursing confidential reports must be completed by academic/professional referees, with at least one from an academic who has taught the applicant and one from a recent employment supervisor.
- 6) An "Applicant Profile" must be completed which includes a section addressing goals in seeking graduate education (narrative statement).
- 7) Applicants whose native language is not English must submit certification of English proficiency (official TOEFL score or equivalent MELAB).
- 8) Applications for admission must be completed by February 15 (or until seats have been filled).
- 9) An interview may be required.

#### Program Requirements

- 1) Candidates for the Master of Science degree in Nursing will pursue studies in one of two fields:
  - (a) Advanced Clinical Nursing
  - (b) Nursing Leadership
- 2) The requirements may be satisfied by pursuing a program of studies consisting of six compulsory courses and a thesis, or six compulsory courses, two elective courses and a major project/paper. Those who wish to include a thesis in their program must request approval from the Graduate Committee of the Faculty of Nursing.

Additional information concerning the procedure for theses and major papers may be obtained from the coordinator of graduate studies (see section titled, The Master's Degree - Thesis or Major Paper).

- 3) Compulsory courses:

63-581. Theoretical Foundations of Nursing  
63-582. Advanced Statistics  
63-583. Research Methods in Nursing  
63-599. Clinical Judgment in Nursing

and either 63-592 and 63-594, or 63-596 and 63-597, depending on the selected area of focus.

- 4) Clinical Judgement in Nursing Practice will involve one term of full-time study in a setting selected in consultation with the student. Students will select individuals, families, groups, populations and/or communities in various health care facilities, and/or community settings, to develop their knowledge and skill for advanced nursing practice.

- 5) All candidates' programs are subject to approval by the graduate coordinator.

- 6) The minimum grade required in all graduate courses is 70%. Any student who does not successfully complete a course may repeat it once at the discretion of the Dean of the Faculty of Nursing and the Dean of Graduate Studies and Research. The student may not repeat more than one course.

- 7) The maximum time limit for part-time is five years; full-time is 3 years.

- 9) Students of the Faculty of Nursing are required to demonstrate behaviours consistent with the "Professional Standards for Registered Nurses and Registered Practical Nurses, Standards for the Therapeutic Nurse-Client Relationship and the Ethical Framework for Nurses in Ontario" of the College of Nurses of Ontario, and "Explanation of Professional Misconduct" of the College of Nurses of Ontario," and the academic policies of the University of Windsor. Failure of any Nursing student to conform to the principles of these documents may result in dismissal from any of the Faculty of Nursing's programs.

The Master's thesis committee is chosen in the manner described in the section titled, The Master's Degree - Program

Requirements of this Graduate Calendar. The final examination will be conducted by the Master's committee.

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## NURSING

### THE MASTER OF NURSING (MN) (ADVANCED CLINICAL FIELD and LEADERSHIP FIELD)

#### Admission Requirements

- 1) All general regulations of the Faculty of Graduate Studies are applicable.
- 2) Applicants must have a Bachelor of Science in Nursing or equivalent which includes physical assessment, and courses in research and statistics. Consideration may be given to nurse applicants holding degrees in other cognate disciplines.
- 3) Applicants must have maintained an overall 70% average in their undergraduate nursing program.
- 4) Applicants must be eligible for a current certificate of competence as Registered Nurses in Ontario.
- 5) Three Faculty of Nursing confidential reports must be completed by academic/professional referees, with at least one from an academic who has taught the applicant and one from a recent employment supervisor.
- 6) An "Applicant Profile" must be completed which includes a section addressing goals in seeking graduate education (narrative statement).
- 7) Applicants whose native language is not English must submit certification of English proficiency (official TOEFL score or equivalent MELAB).
- 8) Applications for admission must be completed by February 15 (or until seats have been filled).
- 9) An interview may be required.

#### Program Requirements

It should be noted that two areas of concentration - Advanced Clinical and Nursing Leadership - are the same as the M.Sc. program. There is also a third area of concentration available through the Master of Nursing: the [Primary Health Care Nurse Practitioner Field](#).

*Total courses:* Ten (10) courses

*Major requirements:* Students in the course-based master's (MN) must take the same six (6) compulsory courses required of students in the Master of Science Program (MSc):

- 63-581. Theoretical Foundations of Nursing
- 63-582. Advanced Statistics
- 63-583. Research Methods in Nursing
- 63-599. Clinical Judgment in Nursing

and either 63-592 (Health of Individuals Families and Groups) and 63-594 (Community and Population Health) .

or 63-596 ( Theoretical Foundation of Nursing Leadership) and 63-597 (Innovations in Nursing Leadership) .

Other requirements: Students are required to take four elective courses, at least two of which must be nursing. Nursing electives may be selected from any of the following seven existing elective nursing courses:

- 63-570. Counselling Process in Nursing
- 63-572. Women and Health
- 63-574. Organizational and Management Theories Relevant to Health Care Organizations
- 63-576. Management of Resources in Nursing
- 63-578. Seminar in Current Nursing Issues
- 63-580. Selected Readings in Nursing
- 63-589. Summer Institute of Clinical Health Research

Two graduate course courses from other disciplines.

#### Course Sequencing

##### YEAR I

##### *Fall Semester*

- 63-581. Theoretical Foundations of Nursing
- 63-583. Research Methods In Nursing

##### *Winter Semester*

63-582. Advanced Statistics  
63-592. Health of Individuals, Families and Groups  
or  
63-596. Theoretical Foundations of Nursing Leadership

***Summer Semester***

Nursing/Open Elective(s)

YEAR II

***Fall Semester***

Nursing/Open Elective  
63-594. Community and Population Health  
or  
63-597. Innovations in Nursing Leadership

***Winter Semester***

63-599. Clinical Judgment in Nursing Practice

***Summer Semester***

Nursing/Open Elective(s)

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## NURSING

### THE MASTER OF NURSING (MN) (PRIMARY HEALTH CARE NURSE PRACTITIONER FIELD)

#### Admission Requirements

- 1) All general regulations of the Faculty of Graduate Studies and Research admission requirements are applicable.
- 2) Applicants must have a Bachelor of Science in Nursing or equivalent which includes physical assessment, and courses in research and statistics. Consideration may be given to Registered Nurses (RN) applicants holding degrees in other cognate disciplines.
- 3) Applicants must have maintained an overall B average in their undergraduate nursing program.
- 4) Applicants must have a current certificate of registration as a Registered Nurse with the College of Nurses of Ontario.
- 5) Three Faculty of Nursing confidential reports must be completed by academic/professional referees, with at least one from an academic who has taught the applicant and one from a recent employment supervisor.
- 6) An "Applicant Profile" must be completed which includes a section addressing goals in seeking graduate education (narrative statement).
- 7) Applicants whose native language is not English must submit certification of English proficiency (official TOEFL score or equivalent).
- 8) Applications for admission must be completed by February 15.
- 9) An interview may be required.

#### In addition:

Applicants must have the equivalent of two years full-time relevant nursing practice within the past five years.

Preference will be given to Ontario residents whose work experience in nursing has been continuous and who have clinical experience in one or more of the following areas: primary health care, ambulatory care, public health, community health, long term care, emergency care, outpost nursing.

Note: This is a limited enrolment program. Therefore, possession of minimum published requirements does not guarantee admission

Information/NP application can also be obtained on the internet at <http://np-education.ca>.

#### Standing Required for Continuation in Program and for Graduation

The Faculty of Graduate Studies and Research requires that students maintain at least a 70% cumulative average at all times. A minimum grade of 70% is required in each Primary Health Care Nurse Practitioner course. A student in the Primary Health Care Nurse Practitioner program who does not obtain credit in any course may repeat the course once only. There may be no more than a 3-year lapse between Nurse Practitioner courses. Application review will begin March 1st; applications should be made through the Ontario Universities' Application Centre (OUAC).

#### Program Requirements

This is a 24-month program designed for nurses who have a BScN.

**Total courses:** 10 courses (45 credit hours)

#### YEAR I

##### Fall

63-581 Theoretical Foundations

63-550 Pathophysiology for the Nurse Practitioner (3 credit hours, 2 terms)

63-557. Advanced Health Assessment and Diagnosis I (4.5 credit hours)

##### Winter

63-550. Pathophysiology for the Nurse Practitioner (3 credit hours, 2 terms)

63-558. Advanced Health Assessment and Diagnosis II (4.5 credit hours)

#### YEAR II

##### Fall

63-583 Research Methods in Nursing

63-552. Roles and Responsibilities of the Nurse Practitioner in Primary Health Care (3 credit hours, 2 terms)

63-561. Therapeutics in Primary Health Care I (4.5 credit hours)

**Winter**

63-582 Advanced Statistics

63-552. Roles of the Nurse Practitioner in Primary Health Care (cont'd)

63-562. Therapeutics in Primary Health Care II (4.5 credit hours)

**Summer**

63-595. Integrative Practicum (12 credit hours)

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## NURSING

### GRADUATE DIPLOMA - PRIMARY HEALTH CARE NURSE PRACTITIONER

#### Admission Requirements

- 1) All general regulations of the Faculty of Graduate Studies and Research admission requirements are applicable.
- 2) Applicants must have a Master's degree in Nursing.
- 3) Applicants must have maintained an overall B average in their undergraduate nursing program.
- 4) Applicants must have a current certificate of registration as a Registered Nurse with the College of Nurses of Ontario.
- 5) Three Faculty of Nursing confidential reports must be completed by academic/professional referees, with at least one from an academic who has taught the applicant and one from a recent employment supervisor.
- 6) An "Applicant Profile" must be completed which includes a section addressing goals in seeking graduate education (narrative statement).
- 7) Applicants whose native language is not English must submit certification of English proficiency (official TOEFL score or equivalent).
- 8) Applications for admission must be completed by February 15.
- 9) An interview may be required.

#### In addition:

Applicants must have the equivalent of two years full-time relevant nursing practice within the past five years.

Preference will be given to Ontario residents whose work experience in nursing has been continuous and who have clinical experience in one or more of the following areas: primary health care, ambulatory care, public health, community health, long term care, emergency care, outpost nursing.

Note: This is a limited enrolment program. Therefore, possession of minimum published requirements does not guarantee admission

Information/NP application can also be obtained on the internet at <http://np-education.ca>.

#### Standing Required for Continuation in Program and for Graduation

The Faculty of Graduate Studies and Research requires that students maintain at least a 70% cumulative average at all times. A minimum grade of 70% is required in each Primary Health Care Nurse Practitioner course. A student in the Primary Health Care Nurse Practitioner program who does not obtain credit in any course may repeat the course once only. There may be no more than a 3-year lapse between Nurse Practitioner courses. Application review will begin March 1st; applications should be made through the Ontario Universities' Application Centre (OUAC).

#### Program Requirements

This is a twelve-month program designed for nurses who already have a Master's in Nursing

##### ***Fall***

- 63-550. Pathophysiology for the Nurse Practitioner (3 credit hours, 2 terms)  
63-552. Roles and Responsibilities of the Nurse Practitioner in Primary Health Care. (3 credit hours, 2 terms)  
63-557. Advanced Health Assessment and Diagnosis I (4.5 credit hours)  
63-561. Therapeutics in Primary Health Care I (4.5 credit hours)

##### ***Winter***

- 63-550. Pathophysiology for the Nurse Practitioner (cont'd, 3 credit hours, 2 terms)  
63-552. Roles of the Nurse Practitioner in Primary Health Care (cont'd, 3 credit hours, 2 terms)  
63-558. Advanced Health Assessment and Diagnosis II (4.5 credit hours)  
63-562. Therapeutics in Primary Health Care II (4.5 credit hours)

##### ***Summer***

- 63-595. Integrative Practicum (12 credit hours)

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## NURSING

### GRADUATE DIPLOMA IN ADVANCED PRACTICE ONCOLOGY/PALLIATIVE CARE

#### Graduate Diploma in Advanced Practice Oncology/Palliative Care

The Graduate Diploma in Oncology/Palliative Care is designed for health care professionals who desire a series of courses to facilitate the clinical and psychosocial care of oncology/palliative clients.

#### Admission Requirements

- 1) All general regulations of the Faculty of Graduate Studies admission requirements are applicable.
- 2) Completed BScN or health-related 4 year honours degree. Preference will be given to those who have completed or are currently enrolled in a Master's or PhD degree program.
- 3) A minimum B standing in all degrees previously obtained.
- 4) Evidence of registration or license in her/his own province/country (for registered nurses only).
- 5) Minimum of two years' experience in healthcare. Preference will be given to those with Oncology/Palliative care experience.
- 6) Current curriculum vitae
- 7) Original post-secondary transcripts
- 8) Three confidential reports must be completed by academic/professional referees, with at least one from an academic who has taught the applicant and one from a recent employment supervisor.
- 9) A narrative statement must be submitted, which will address the candidate's rationale for seeking the graduate diploma.
- 10) Applicants whose native language is not English must submit certification of English proficiency (official TOEFL score or equivalent MELAB).
- 11) Applications for admission must be completed by February 15 (or until seats have been filled).
- 12) Completed Application form and application fee
- 13) An interview may be required.

#### Required Courses:

- 1) 63-530. Advanced Health Assessment, Diagnostics, and Therapeutics of the Oncology/Palliative Patient (Part I)
- 2) 63-532. Advanced Health Assessment, Diagnostics, and Therapeutics of the Oncology/Palliative Patient (Part 2)
- 3) 63-533. Interprofessional Psychosocial Oncology: Introduction to Theory and Practice (one course)
- 4) 63-531. Leadership and Management in Oncology/Palliative care settings (one course)
- 5) 63-534. Advanced End of Life Care (one course)
- 6) 63-535. Oncology/Palliative Simulation and Practicum with two phases: 1) Simulation; and, 2) Preceptorship

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## PHILOSOPHY

### THE MASTER OF ARTS DEGREE

#### General Nature of the Program

The aim of the program is to give students the opportunity to deepen their philosophical understanding both by broadening their undergraduate background and/or by allowing them to concentrate their studies in one of the two specific areas of focus in our program. The first area is informal logic, the theory of argument, and the theory of critical thinking; the second is twentieth-century continental philosophy. It is expected that theses and major papers will be written in one of these two areas. The possibility of concentrating in some other area exists, but is conditional upon staffing resources, which are subject to change. The Philosophy M.A. program is structured in such a way as to encourage maximum participation by students in seminars and to allow extensive contact with professors outside of formal class time.

#### Admission Requirements

See 1.6.1 for general requirements for admission into an M.A. program at the University of Windsor. The Philosophy program normally requires the equivalent of twenty one-term courses in philosophy for admission to the one-year Master's program and the equivalent of ten one-term courses in philosophy for admission to the two-year Master's program.

#### Program Requirements

For general requirements for the Master's degree, see section titled, The Master's Degree - Program Requirements. The following are particular requirements for the M.A. in Philosophy:

- 1) The student may proceed to the degree in any one of the following ways:
  - (a) successfully complete eight courses, two of which may be in a cognate field.
  - (b) successfully complete six courses, two of which may be in a cognate field, and satisfactorily complete a major research paper on which there shall be an oral examination;
  - (c) with permission, successfully complete at least four and not more than six graduate courses (the fifth and sixth courses may be in a cognate field), and satisfactorily complete a thesis on which there shall be an oral examination.
- Note:*
  - i. Students considering doctoral studies should consult with faculty members in the relevant fields to determine the optimal stream, coursework, major paper, or thesis.
  - ii. Students in stream C must submit to the Graduate Committee an acceptable thesis proposal by the end of their second full-time term.
- 2) All students proceeding to the degree must:
  - (a) include the Departmental Seminar (Philosophy 34-590) among their courses for the degree;
  - (b) successfully complete the Master's Examination in Philosophy.
- 3) M.A. Qualifying Year: Students at the I Master's level are required to take 34-491 (Honours Seminar) (see section titled, [Philosophy Courses](#) in the Undergraduate Calendar).
- 4) Program Approval: Each student must have his or her projected program authorized by the Graduate Coordinator.

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PHYSICS

THE MASTER OF SCIENCE DEGREE

Admission Requirements

The basic qualification for admission consists of a Bachelor's degree with adequate specialization in Physics, obtained with minimum cumulative and major averages of 70%. Students with deficiencies may be required to make up these deficiencies by registering in undergraduate courses or by following a program of supervised reading.

Applicants whose academic credentials are difficult to assess may be required to write the Graduate Record Examination (GRE) administered by the Educational Testing Service. Inquiries should be made at the time of application. Details of the examination may be obtained from the Educational Testing Service, Princeton, New Jersey, U.S.A., 08540.

Program Requirements

- (1) The requirements for the degree of Master of Science may be satisfied by pursuing a program of studies consisting of:
- Option (a) at least 4 courses and a thesis; or
- Option (b) at least 6 courses and a major paper; or
- Option (c) not less than 8 courses.
- (2) 64-550 (Advanced Quantum Theory I), 64-510 (Seminar for MSc Students) and at least one further physics course at the 500 level or higher is required of all candidates.
- (3) Additional courses needed to fulfill the requirements in (1) above may be chosen from graduate courses in the Department of Physics. Alternatively, candidates may include in their program, with the permission of the Graduate Coordinator and with the approval with the Supervisor,
- Option (a):one undergraduate course in physics (at the 400-level), or one course from another Department <sup>†</sup>.
- Option (b): *either* (i) up to two undergraduate courses in physics (at the 400-level), and one course from another department<sup>†</sup>, *or* (ii) up to one undergraduate course in physics (at the 400-level), and two courses from another department<sup>†</sup>,
- Option (c):up to two undergraduate courses in physics (at the 400-level), and three courses from another department<sup>†</sup>.

<sup>†</sup> normally at the 400 level or higher and from the Faculty of Science or the Faculty of Engineering.

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## PHYSICS

### THE DOCTOR OF PHILOSOPHY DEGREE

#### Admission Requirements

The basic qualification for admission consists of a Bachelor's degree with adequate specialization in Physics, obtained with minimum cumulative and major averages of 70%. Students with deficiencies may be required to make up these deficiencies by registering in undergraduate courses or by following a program of supervised reading.

Applicants whose academic credentials are difficult to assess may be required to write the Graduate Record Examination (GRE) administered by the Educational Testing Service. Inquiries should be made at the time of application. Details of the examination may be obtained from the Educational Testing Service, Princeton, New Jersey, U.S.A., 08540.

#### Program Requirements

**Period of Study:** A minimum of three years in full-time graduate studies is required. Credit for one of the three years may be given for a Master's degree obtained in Physics at the University of Windsor or for graduate work carried out at another institution. Not more than seven years should elapse between registration and completion of the requirements for the degree; an extension of this period may be granted only on recommendation from the program coordinator and approval by the Faculty of Graduate Studies and Research.

Candidates with a Master's degree in Physics (or equivalent): a minimum of 4 graduate courses:

- (1) 64-520: Classical Electrodynamics, 64-550: Advanced Quantum Theory I and 64-551: Advanced Quantum Theory II must be taken, if previous equivalent credit has not been obtained.
- (2) At least one course chosen from: (a) 64-630: Statistical Physics I and (b) 64-650: Classical and Quantum Field Theory I is required.
- (3) 64-610 (Seminar for PhD Students) will be required of all candidates.
- (4) Candidates may include in their program, with the permission of the Graduate Coordinator and with the approval with the Supervisor, other graduate courses in Physics and up to one graduate-level course from another department (normally from the Faculty of Science or the Faculty of Engineering).
- (5) The student may be required to take up to two additional courses, as stipulated by the Doctoral Committee.

Candidates who do not have a Master's degree in Physics (or equivalent): a minimum of 7 courses:

- (1) 64-520: Classical Electrodynamics, 64-550: Advanced Quantum Theory I and 64-551: Advanced Quantum Theory II, or equivalent, are required.
- (2) At least one course chosen from: (a) 64-630: Statistical Physics I and (b) 64-650: Classical and Quantum Field Theory I is required.
- (3) 64-610 (Seminar for PhD Students) is required of all candidates. [Note: 64-510 (Seminar for MSc Students) cannot be taken for credit.]
- (4) Candidates may include in their program, with the permission of the Graduate Coordinator and with the approval with the Supervisor, other graduate courses in Physics and up to:

- (i) one undergraduate course in physics (at the 400-level) or one course from another department<sup>†</sup> (normally at the 400 level or higher), and
  - (ii) one graduate-level course from another department<sup>†</sup>.
- <sup>†</sup> normally from the Faculty of Science or the Faculty of Engineering.

- (5) The student may be required to take up to two additional courses, as stipulated by the Doctoral Committee.

**Doctoral Committee:** Within one month after registration each student will be assigned to an advisory committee consisting of a research advisor and two other faculty members in Physics.

This committee will, from time to time, review the student's progress (see the section titled, The Degree of Doctor of Philosophy - Program Requirements).

For the defense of dissertation (final oral examination) the advisory committee will be supplemented by one professor from outside Physics and an external examiner who, as an expert in the field of physics in which the candidate's research is carried out, will appraise the dissertation and ordinarily will also be present at the final oral examination.

**Dissertation:** In order to qualify for the degree each candidate must present a dissertation embodying the results of an original investigation in a branch of physics. Graduate courses form an important but subsidiary part of the program.

The candidate, when requested, shall submit to the chief advisor from time to time portions of the dissertation and a complete draft on a date specified by the advisor, and place four typewritten copies of the completed dissertation in the hands of the advisor at least six weeks before Convocation. Rules governing binding, quality of paper, etc., of the dissertation can be found in Procedures to Follow in Preparing a Thesis or Dissertation (see the section titled, The Degree of Doctor of Philosophy - The Dissertation).

**Examinations:** In addition to the examinations in the courses, all candidates must pass qualifying examinations covering

the general field of physics at the level of the honours program given at this university. The examinations must be passed after the completion of the M.Sc. degree, not later than one year after registration as a graduate student proceeding to the Ph.D. Other examinations (written or oral) may be set at the discretion of the program coordinator.

Each candidate will, on recommendation of the advisory committee, submit to a final oral examination in defense of the dissertation.

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## POLITICAL SCIENCE

### THE MASTER OF ARTS DEGREE

#### **Admission Requirements**

The normal requirement for admission to the one-year M.A. program is an honours degree or combined honours degree in Political Science, or an honours degree in a related discipline, such as International Relations, with a 77% average. Honours graduates in fields other than these will be considered on the basis of their academic background and standing. Those with less than a four-year degree, or with minor deficiencies, will be required to take additional courses, or to enter a two-year program.

#### **Program Requirements**

*Major requirements:* Completion of the M.A. degree will follow one of three routes:

##### **A. Major Paper**

- (1) Successful completion of 45-500 (Scope and Approaches to Political Science).
- (2) Successful completion of five further graduate classes (one of which may be taken outside of the department subject to the approval of the graduate chair)
- (3) Completion of a major paper. The major paper will be written under the direction of a committee normally composed of two Political Science faculty members. A successful oral defence of the major paper is required.

##### **B. Thesis**

1. Successful completion of 02-45-500
2. Successful completion of three further graduate classes (one of which may be taken outside of the department subject to the approval of the graduate chair)
3. Completion of a thesis. The thesis will be written under the direction of a committee composed of two Political Science faculty members plus a member outside Political Science, but from within the University. A successful oral defense of the thesis is required.

##### **C. Internship**

- (1) Successful completion of 45-500 (Scope and Approaches to Political Science).
- (2) Successful completion of five further graduate classes (one of which may be taken outside of the department subject to the approval of the graduate chair)
- (3) Successful completion of an Internship (02-45-795), which includes:

One 6 month internship. This is graded on a pass/fail basis.

One 40 page Major Internship Paper (MRP) written on a topic relating to the student's internship placement. This will be graded on a pass/fail basis as with the existing major paper stream.

A poster presentation of the research paper held at a public event marking the culmination of the internship.

After successful completion of three graduate courses, the graduate committee will request applications from students interested in participating in the internship stream (C).

The committee will select the successful students. The Political Science Graduate Committee will evaluate the performance of the remaining students and recommend completion of the degree by route (A) or (B).

All students must successfully complete 02-45-500 in order to complete the degree. Any student securing a failing grade will normally be asked to withdraw from the program.

Additional Information that pertains to all program streams:

All students must successfully complete 45-500 in order to complete the degree.

Any student securing a failing grade will normally be asked to withdraw from the program.

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POLITICAL SCIENCE

UNIVERSITY OF MICHIGAN (DEARBORN) MASTER OF PUBLIC POLICY (MPP) (ARTICULATION AGREEMENT)

The articulation agreement will enable students in the [Political Science Masters program](#) to receive transfer credit for their graduate political science courses towards the University of Michigan (Dearborn campus) Master of Public Policy program.

Students will be admitted separately into the two programs, through a joint admissions committee, but will complete the degrees concurrently.

For additional information, contact the Faculty of Political Science.

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## PSYCHOLOGY

### THE DOCTOR OF PHILOSOPHY DEGREE

*[The first phase of the doctoral program involves the completion of the Master's degree in the first two years of the program.]*

In addition to the general requirements, the following requirements must be met by all students proceeding to the Ph.D. degree.

#### Admission Requirements

Applicants with a four year undergraduate psychology degree or its equivalent will be considered for admission.

Applicants will be assessed with respect to their academic qualifications including grades, Graduate Record Examination (GRE) scores, letters of recommendation, and career-related achievements. GRE scores (Verbal, Quantitative, Analytical, and Advanced Test in Psychology) are required of all students seeking admission to the Department of Psychology. Possession of the minimum academic requirements does not ensure acceptance. Applications for admission must be completed by January 15.

#### Program Requirements

1) *Master's degree*: The first phase of the doctoral program involves the completion of the Master's degree in the first two years of the program, the requirements for which include a thesis. Further advancement in the doctoral program depends on the quality of performance in fulfilling the requirements for the Master's degree.

2) *Course Work*: Students must complete successfully a minimum of twelve graduate courses after the honours B.A. or its equivalent. Requirements vary, however, according to areas of specialization. Up to six courses may be accepted for credit from another university. The course work includes a core curriculum involving a general statistical methodology course, a methodology course in the student's area of specialization, and a course in ethical and professional issues in psychology. All students are required to take at least one course that places considerable emphasis on cultural, cross-cultural, or multicultural issues. All students in the Clinical Program, and students in the Applied Social Program who are planning to become registered psychologists with the College of Psychologists of Ontario, must demonstrate competence in the four core areas of biological bases of behaviour, cognitive bases of behaviour, (or in the case of students in the Applied Social program, cultural bases of behaviour) social bases of behaviour, and the historical and philosophical foundations of psychology. The minimum passing grade in graduate courses is 70%. A student who fails one course may repeat it once at the discretion of the Head of the Department and the Dean of Graduate Studies and Research. The student may not repeat more than one course. If a student has failed two courses, a recommendation will normally be made to the Dean of Graduate Studies and Research that the student be required to withdraw from the program. Together with the above requirements, students must complete an internship. The clinical internship is approximately 2000 hours and the applied social internship is approximately 1000 hours.

3) *Academic Advisor*: Each student is assigned an academic advisor at the beginning of his or her first year of graduate studies.

4) *Doctoral Committee*: Research undertaken as part of a doctoral program is directed by a doctoral committee. The membership of the doctoral committee must be appointed by the Head of the Department and approved by the Executive Committee of the Faculty Council of Graduate Studies and Research. When the student is deemed ready to undertake such research, he or she proposes the name of a research advisor and, in consultation with the proposed advisor, the names of other members of the committee consisting of at least two other members of the Psychology Department and one extra-departmental member of faculty. For the defense of the dissertation, an external examiner will be selected by the doctoral committee, subject to the approval of the Department Head and the Dean of Graduate Studies and Research. The external examiner is from outside of the University of Windsor and is nationally or internationally recognized as having expertise in the area of psychology in which the candidate's research is carried out. The external examiner shall not participate in the direction of the research project, but will appraise the dissertation and ordinarily will be present at the final oral examination (see below, 6).

5) *Dissertation*: The principal requirement for the Ph.D. degree in Psychology is the presentation of a dissertation which embodies the results of an original investigation. The results so presented should constitute a significant and original contribution to knowledge.

6) *Examinations*: In addition to examinations in courses, the student must meet the following requirements:

(a) *Comprehensive Examination*: After completion of all course requirements (with the exception of internship courses), the student must pass a comprehensive examination in his or her area of specialization. Successful completion of the examination admits the student to candidacy for the Ph.D. degree. If a student fails the comprehensive examination, he or she may retake the examination once only at the discretion of the Head of the Department and the Dean of Graduate Studies and Research.

(b) *Final Examination*: Each candidate will, on the recommendation of his or her doctoral committee, submit to a final oral examination in defense of the dissertation.



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## SOCIAL WORK

### THE MASTER OF SOCIAL WORK DEGREE

#### MSW Admission Requirements

To be considered for admission to the MSW programs, the School of Social Work requires applicants to have an average of 70% or above, calculated based on the last 20 courses of their qualifying degree. Applicants also must have relevant work, volunteer, or practica experience; excellent reference letters; a strong personal statement; and evidence of successful completion of one undergraduate course in statistics and one in research methods both of which must be related to social sciences. If you have not completed one or both of the required courses, the coordinator of the program can provide you with options for accomplishing these if required prior to admission.

#### Regular Track Full-time M.S.W.

This program is open to students with an Honours degree in a related discipline and takes five (5) consecutive semesters (approximately two years) to complete. It includes a required Foundation Practicum in the first year of study and the completion of an Advanced Practice Internship (API) in the second year of study. The Foundation Practicum and the API may involve travel and/or weekend hours, and students are responsible for transportation to and from their field placement or internship location.

Students are required to complete a total of eleven (11) courses, one of which is a practicum in the Foundation year (first year of study): 47-503, 47-504, 47-523, 47-531, 47-532, 47-533, 47-534, 47-547, 47-550, 47-570, and, 47-571 (Foundation Year Practicum – 6.0 credit hours). Students are required to complete a total of seven (7) courses, one of which is an internship in the second year of study: 47-610, 47-611, 47-621, 47-622, 47-640, 47-680, and 47-681 (Advanced Practice Internship – 6.0 credit hours).

#### Advanced Standing M.S.W. \*

\*This program is available to students with a BSW and starts in May of each year in order for students to graduate at June Convocation.

This program takes three (3) consecutive semesters (one year) to complete and includes the completion of an Advanced Practice Internship (API). The API may involve travel and/or weekend hours, and students are responsible for transportation to and from their internship location. Students are required to complete a total of nine (9) courses, one of which is an Internship: 47-523, 47-547, 47-610, 47-611, 47-621, 47-622, 47-640, 47-680, and 47-681 (Advanced Practice Internship – 6.0 credit hours).

#### Master of Social Work for Working Professionals

##### Regular Track Full-time MSW for Working Professionals

This program is available to students who are working in a social service delivery position and who hold an Honours degree in a related discipline. This program takes eight (8) consecutive semesters (32 months) to complete and includes a required Foundation Practicum and an Advanced Practice Internship (API). The Foundation Practicum and the API may involve travel and/or weekend hours, and students are responsible for transportation to and from their field placement or internship location.

Students are required to complete a total of eleven (11) courses, one of which is a practicum in the Foundation level of study: 47-503, 47-504, 47-523, 47-531, 47-532, 47-533, 47-534, 47-547, 47-550, 47-570, and 47-571 (Foundation Practicum – 6.0 credit hours). Students are required to complete a total of nine (9) courses, one of which is an internship in the Advanced level of study: 47-610, 47-611, 47-621, 47-622, 47-640, 47-680, and 47-681 (Advanced Practice Internship – 6.0 credit hours).

##### Advanced Standing Full-time MSW for Working Professionals

This program is available to students who are working in a social service delivery position and who have completed a BSW degree from a Canadian Association for Social Work Education or Council on Social Work Education accredited program. The program takes four consecutive semesters (16 months) to complete and includes the completion of an Advanced Practice Internship (API). The API may involve travel and/or weekend hours, and students are responsible for transportation to and from their internship location.

Students are required to complete a total of nine (9) courses, one of which is an Internship: 47-523, 47-547, 47-610, 47-611, 47-621, 47-622, 47-640, 47-680, and 47-681 (Advanced Practice Internship – 6.0 credit hours).

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## SOCIAL WORK

### THE DOCTOR OF PHILOSOPHY DEGREE

#### Admission Requirements

Admission criteria include the following:

1. Completion of an MSW with a minimum 77% average.
2. A statement of interest demonstrating a commitment to advanced scholarly study in research, teaching and leadership related to civic engagement in Social Work (this includes an identified area of interest and goals for addressing that interest in the Ph.D. program).
3. A curriculum vitae demonstrating experience in Social Work, experience in their field of study, and research experience or potential.
4. A sample of professional or academic writing.
5. Three letters of reference.
6. Applicants will be assessed on the basis of past academic achievement and demonstrated or potential capacity for doctoral level study. Applicants who do not meet the above criteria may be considered for admission with exceptional work experience, circumstances inhibiting performance, or applications deemed strong in most areas with one weak criterion.

#### Program Requirements

The proposed program is designed as a full-time doctoral program. All students complete a minimum of 10 - 3 credit courses during the two-year residency period. As stated above, the courses are designed to give a full breadth of advanced research and practice knowledge in addition to a focus on pedagogy and leadership. In addition, a comprehensive proposal is due by April 15 of the first year. Once the comprehensive proposal is approved, the student is required to complete the comprehensive paper which is due by August 30 of the first year, and is expected to be reviewed by committee members by September 30th of the second year. The thesis proposal is then due at the end of the second term in the second year.

#### *Comprehensive Paper*

The comprehensive paper will include:

1. an identification of a substantive area of interest;
2. an identification of the lens through which the student approaches the topic;
3. an analysis and critique of the literature addressing the scope, relevance, and severity of the issue;
4. a description and critical analysis of the theoretical frameworks through which this issue has been addressed in the literature; and
5. an analysis and critique of the interventions, and if possible the intervention research, that has been conducted in relation to the substantive area; and
6. an analysis and critique of research studies conducted in this area with a focus on the implications of the research and the effectiveness of the methods used to inform practice and/or policy

The comprehensive proposal must be approved by the student's supervisor. The comprehensive paper must be approved by the student's supervisor and one other faculty member in the School of Social Work who typically will become the second reader on the thesis committee.

Once the comprehensive paper is approved, the student will proceed to Ph.D. candidate status. A supervisory committee must be established within one month after the comprehensive paper is approved. The supervisory committee must include at least three, and no more than five, faculty members who are appointed to the University of Windsor Faculty of Graduate Studies. This includes the supervisor. The committee is required to have one member who is external to the School of Social Work.

#### *Progress reports*

After the two-year residency period, all students will be required to demonstrate advancement in the program by completing an annual report to be submitted to the student's supervisor. This report will describe the accomplishments made over the previous year and outline the goals for the upcoming year.

#### *Thesis evaluation procedures*

Consistent with the Graduate Studies regulations, the student must successfully defend the thesis at an oral examination presided over by an Examination Committee. The committee consists of at least six members: the supervisory committee; an external member from outside the School of Social Work and within the University of Windsor; an external member outside the University of Windsor; and a representative of the Dean as approved by the Graduate Program Coordinator and the Faculty of Graduate Studies.

#### *Language requirements*

Proof of language proficiency is not required if English is the applicant's first language or if the applicant has completed at least two years of advanced full-time study at an accredited university in a country where English is the language of instruction. Where the above criteria are not met, a minimum TOEFL score of 600 (paper based) or 250 (computer based) or

YELT score of Band 1 or equivalent will be required.

For more information, contact the School of Social Work.

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## SOCIAL WORK AND JURIS DOCTOR (MSW/JD)

The MSW/JD program allows students who are interested in social justice issues at the intersection of law and social work to obtain both degrees a full year sooner than would be possible had they chosen to pursue the degrees independently. Applicants who hold a Bachelor of Social Work (BSW) degree may be able to complete the program in 3 years, while students without a BSW may be able to complete it in 4 years.

**Admission Requirements**  
Applicants to the MSW/JD program must meet the independent admission criteria of the Faculty of Law and the School of Social Work. Once an applicant has met the minimum requirements of the Faculty of Law and the School of Social Work, a joint committee will convene to determine the applicant's suitability for the MSW/JD program.

**Program Requirements**  
Students in the MSW/JD program must successfully complete the independent degree program requirements for the MSW and the JD. For more information, contact the School of Social Work (ext 6096) or the Faculty of Law (ext 2923, 2929).

For more information, contact the School of Social Work (ext 6096) or the Faculty of Law (ext 2923, 2929).

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## SOCIOLOGY, ANTHROPOLOGY AND CRIMINOLOGY & PSYCHOLOGY

### THE MASTER OF ARTS DEGREE

#### MA in Social Data Analysis

*(Note: As of Fall 2014 there are no new admissions to this program.)*

Private and public sector organizations are in constant need of institutional, market and population research. They regularly encounter data that cannot be easily summarized and put into practice. They require skilled individuals who can analyze information, draw conclusions and suggest practical implications and policies. This one-year, three semester course-based Master's program responds to this growing demand for highly qualified data analysts who can work with complex data sets, draw conclusions and make recommendations for policy.

#### Program Requirements for MA in Social Data Analysis

*Admission Requirements:*

- 1) Applicants to the program must hold an Honours Degree in one of social sciences or closely related discipline.
- 2) Minimum major and cumulative averages of 70%.
- 3) At least 2 semester length undergraduate statistics courses with a 77% minimum average in these courses.
- 4) A Statement of Interest
- 5) Three reference letters

*Program Requirements:*

*Total courses:* Eight (8) 500- or 600-level graduate courses

*Major requirements:* 46-511, 48-505, 48-507/48-508 (cross listed as 46-507/46-508), 48-794/48-795 (cross listed as 46-794/46-795), and two of 46-512, 46-513 or 48-605.

*Recommended options (if any):* Students may substitute 46-513 for 48-605.

*Program Sequencing:*

Students will complete their 6 courses in term 1 and 2 and complete their Final Project (48-794/48-795 cross-listed as 46-794/46-795) during the Spring/Summer semesters.

Fall: 46-511, 48-505, 48-507 (cross listed as 46-507)

Winter: 48-508 (cross listed as 46-508), and two of 46-512, 46-513 or 48-605

IS: 48-794/48-795(cross listed as 46-794/46-795)

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#### SOCIOLOGY, ANTHROPOLOGY AND CRIMINOLOGY: COURSES

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	<b>SOCIOLOGY, ANTHROPOLOGY AND CRIMINOLOGY</b>
	<b>THE MASTER OF ARTS DEGREE IN SOCIOLOGY</b>
	<b>Admission Requirements</b>
	Applicants must apply by February 28 for fall enrolment.
	1) Applicants with an Honours degree in Sociology or a related field from an accredited university may be admitted into the candidate year of this M.A. program.
	2) Applicants without an Honours degree in Sociology or related discipline may be required to take additional courses.
	3) Students transferring into Sociology from a non-related another discipline and those with insufficient preparatory background may be required to take additional courses before proceeding into the candidate year. At least an overall 77% average must be maintained.
	The Department's current admission criteria are as follows:
	(a) 77% minimum cumulative average;
	(b) strong recommendations based on faculty observation of student's performance, work experience, or community involvement demonstrating clear commitment to and understanding of sociological concerns;
	(c) applicant's background preparation and graduate faculty resources available in the area of specialization indicated on the application.
	<b>PROGRAM REQUIREMENTS</b>
	<b>SOCIOLOGY MASTER OF ARTS – THESIS OPTION</b>
	The essential components of the Master of Arts degree in Sociology – Thesis Option are course work and a thesis. Students are expected to complete all 5 courses in two (2) consecutive semesters; 48-690 should be taken during the 2nd semester.
	Course selections and course changes must be made in consultation with a faculty advisor (provisional).
	Students accepted directly into the candidate year will proceed towards the degree by achieving at least a 77% average in all five courses.
	The program requirements are as follows:
	Course requirements: Satisfactory completion of 5 graduate courses plus the thesis.
	Total courses: Five (5) 600-level graduate courses*, plus the thesis.
	Major Requirements: 48-600 (Sociological Theories) or 48-601 (Classical Social Theories and Beyond); 48-605 (Quantitative Statistics and Analysis) or 48-616(Qualitative Research Design) or 48-607 (Survey Data); Two other courses from 48-6XX, 48-690 (Directed Readings: Development of the Thesis Proposal); 48-797. MA Thesis
	*One (1) course may be taken outside of the Department (48-) with prior permission from the Graduate Committee.
	Faculty advisors may recommend particular courses to develop the skills necessary for thesis work. After completion of the courses, the focus shifts to the thesis which is an independent research project conducted in consultation with an advisor and thesis committee.
	The minimum passing grade in a graduate course is 70%. A student who fails to achieve a grade of 70% in a graduate course may repeat the course once (scheduling considerations may require the Graduate Committee to substitute an alternative course). If a student fails to achieve a grade of 70% in their second attempt, or fails to achieve a grade of 70% in two courses, a recommendation will normally be made to the Dean of Graduate Studies and Research that the student be required to withdraw from the program.
	Students have the option of taking one graduate course outside the Sociology program Department. Permission may be required from the department or program offering the course. Advance permission from the Departmental Graduate Committee is required in order to take courses outside the Department.
	<b>SOCIOLOGY MASTER OF ARTS – COURSE STREAM OPTION</b>
	The Master of Arts degree in Sociology – Course Option involves course work only.
	Course selections and course changes must be made in consultation with a provisional faculty advisor.



Students accepted directly into the candidate year will proceed towards the degree by achieving at least a 77% cumulative average across all seven courses.

The program requirements are as follows:

Course requirements: Satisfactory completion of 7 graduate courses.

Total courses: Seven (7) 600-level graduate courses\*

Major Requirements:

48-600 (Sociological Theories) or 48-601 (Classical Social Theories and Beyond);

48-605 (Quantitative and Analysis) or 48-606 (Qualitative Methodology) or 48-607 (Survey Data)

Five (5) additional 600-level courses.

\*One (1) course may be taken outside of the Department (48-) with prior permission from the Graduate Committee. Students may not take more than three (3) courses in a single term.

The minimum passing grade in a graduate course is 70%. A student who fails to achieve a grade of 70% in a graduate course may repeat the course once (scheduling considerations may require the Graduate Committee to substitute an alternative course). If a student fails to achieve a grade of 70% in their second attempt, or fails to achieve a grade of 70% in two courses, a recommendation will normally be made to the Dean of Graduate Studies and Research that the student be required to withdraw from the program.

Students have the option of taking one graduate course outside the Department. Permission may be required from the department or program offering the course. Advance permission from the Departmental Graduate Committee is required in order to take courses outside the Department.

Notes:

1) Seminar classes require active class participation. Instructors may therefore take into account class participation in grading students, in accordance with Senate regulations.

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## SOCIOLOGY, ANTHROPOLOGY AND CRIMINOLOGY

### THE DOCTOR OF PHILOSOPHY DEGREE IN SOCIOLOGY WITH SPECIALIZATION IN SOCIAL JUSTICE

In addition to the general requirements (see section titled, The Degree of Doctor of Philosophy listed in this calendar), the following requirements must be met by all students proceeding to the Ph.D. degree in Sociology.

#### Admission Requirements

For admission to the PhD program in Sociology applicants must hold a Master's degree in Sociology (or equivalent) from an accredited university. Possession of the minimum academic requirements does not ensure acceptance.

Applicants must apply by January 31.

Applicants must include the following:

(a) transcripts from all post-secondary institutions attended. (Transcripts must be sent directly from the institution);

(b) a statement (up to 500 words) addressing the two following questions: (i) How have you been involved in social justice issues through research, work, or community activity; And (ii) How do you envision your research contributing to social justice;

(c) a statement of a proposed area for dissertation research;

(d) a sample of written work (e.g., a term paper, thesis proposal, published work);

(e) three letters of reference in sealed envelopes with the referee's signature across the seal. At least two should be academic references. One letter should be from the MA supervisor; one can be from a non-academic referee who has been in a supervisory or mentor role. These may be sent by the applicant or under separate cover by the referees.

In addition to assessing the submissions made by the applicant to determine admissibility, the Graduate Committee takes into account (i) the availability of faculty to advise, supervise, and provide funding and research training in conjunction with their own research projects, and (ii) the diversity of subject areas represented in the applicant pool.

#### Program Overview

Doctoral Committee

Upon admission to the Ph.D. program, the Graduate Committee will assign a provisional faculty advisor whose research and teaching coincide with the applicant's area of interest. Students may submit a request to the Graduate Committee for a particular advisor.

Research undertaken as part of the doctoral program is directed by a doctoral committee consisting of an advisor from the graduate faculty of the Department of Sociology, and Anthropology, and Criminology two other faculty members from inside the department, and one faculty member from outside the department. The student should select the doctoral committee by the end of the first academic year. The membership of the doctoral committee must be approved by the Faculty of Graduate Studies and Research.

#### Course work

*Total courses:* Five (5) 600-level graduate courses\*

#### Major Requirements:

48-602 Social Theory and Social Justice or 48-601 Classical Social Theories and Beyond or 48-600 (Sociological Theories) (Recommendation on the particular course to be taken will be made by the graduate committee and be based on applicant's previous theoretical background).

48-615 (Statistics and Quantitative Methods) or 48-616 (Qualitative Research Design) Three other courses from 48-6XX,

A PhD student who has previously completed an M.A. in Sociology (or equivalent) may not use previously taken courses (or equivalent) towards their PhD. The five required courses taken during the PhD must be courses they have not taken before.

Permission may be required from the department or program offering the course. Advance permission from the departmental Graduate Committee is required in order to take courses outside the Department.

Comprehensive Examinations and Dissertation Proposal

After completion of all course requirements, students must demonstrate mastery of two established and distinct fields of sociological inquiry through satisfactory completion of two comprehensive examinations. Comprehensive examinations serve as preparatory work for the dissertation and enable students to develop recognized areas of expertise for teaching and career purposes.

#### Comprehensive Exams:

- (a) Comprehensive exams are required in two of the following areas: Social Theory, Methodology, Crime and Regulation, Culture and Power, Social Inequality, or Social Change, at least one of which must be in either Social Theory or Methodology.
- (b) Students may nominate a Comprehensive Examination Committee of three faculty members for each area in which they will be examined from a list of graduate faculty in that area of competence. The Graduate Committee must approve the composition of each committee.
- (c) Responsibility for setting each exam rests with the Comprehensive Examination Committee. It is the responsibility of the committee to ensure that the questions for a student's two comprehensive exams are distinct and without duplication. These exams and committees will be monitored by the Graduate Committee.
- (d) The comprehensive examinations will have a take-home format. The exam will be given to the student seven (7) days before it is due. The students will be given three (3) questions and must answer two (2) of the questions.
- (e) Once a written comprehensive examination is submitted to the Comprehensive Examination Committee, the Committee has up to four weeks to schedule an oral defense meeting. At the end of the oral defense, a grade of pass or fail will be assigned by the Committee based on both components. Individual Committee members may submit written feedback to the student. In the event that a student fails the comprehensive examination, the Committee is required to provide a written explanation within five (5) working days.
- (f) If a student fails a comprehensive examination, the student may retake the examination once only at the discretion of the Head of the Department and the Dean of Graduate Studies and Research.
- (g) Students failing a comprehensive exam after a second attempt will be required to withdraw from the program.
- (h) Students cannot move on to another comprehensive exam until one comprehensive exam has been successfully completed.
- (i) The student has a right to appeal a failed comprehensive exam by sending a written letter to the Graduate Committee, detailing the reason(s) for the appeal.

#### Dissertation Proposal

The dissertation proposal should be a concise document of no more than 20 pages that discusses: the central research topic of the dissertation; the significance and advancement research literature; the theoretical framework guiding the research; proposed research methods; a plan and schedule for completion of the thesis; the feasibility of the research project; and ethical issues raised by the research. The grant proposal format mandated by such major funding agencies as the Social Sciences and Humanities Research Council or the Canadian Institutes for Health Research can be used as a standard format for the proposal.

The dissertation proposal must be approved at a meeting of the doctoral committee before the research can proceed. The purpose of the meeting is to reach an agreement that the research is well-designed, feasible, and appropriately grounded in the relevant research literature. All doctoral students are required to comply with the ethical principles, values, and standards of The Tri-Council and any other professional body, as appropriate. A proposal for doctoral research involving human subjects must be approved by the University of Windsor Ethics Review Board before dissertation research can begin.

#### Dissertation Research

The dissertation is normally a book-length manuscript that makes an original contribution to knowledge. The dissertation should display a sophisticated awareness of the theoretical, methodological, and practical choices made during the research process and the implications of the research.

Dissertation research and writing processes vary significantly, depending on the methods used and preferences in working style. The student and supervisor should meet often during the research process, reviewing written work at regular intervals. The full doctoral committee shall meet for an assessment of progress at least twice a year.

The dissertation research process culminates with an oral defence. The doctoral committee will recommend to the candidate when the thesis is ready to defend. An examiner from outside the university will be selected by the doctoral committee for the final defence of the dissertation, subject to the approval of the Department Head and the Dean of Graduate Studies and Research. The external examiner must be a nationally or internationally recognized expert in the area of the candidate's research. The external examiner does not participate in the direction of the research project, but appraises the dissertation and participates in the final oral examination.

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## SCHOOL OF CREATIVE ARTS

### THE MASTER OF FINE ARTS DEGREE IN VISUAL ARTS

The program provides two years of advanced education and creative development in the student's chosen areas of research. The program functions to stress studio production and the exploration of ideas and technical skills within a critical framework. Areas of research within the M.F.A. program are Painting/Drawing, Sculpture, Printmaking, and Integrated Media (Video, Sound, Photography and Digital Arts).

Students with a B.F.A. degree from the University of Windsor are encouraged to seek their Master's degree elsewhere.

#### Admission Requirements

1) In addition to the requirements set forth in the section titled, Application Process and the section titled, The Master's Degree - Admission Requirements, for admission to the Faculty of Graduate Studies and Research, applicants for admission to the Master of Fine Arts program must satisfy the following particular requirements:

- (a) have an honours B.A. with a major in Visual Arts or Bachelor of Fine Arts degree from an approved college or university; an applicant with a general B.A. with a major in Visual Arts may be admitted with the stipulation that deficiencies will be made up;
- (b) present twenty slides of recent work for evaluation by the departmental graduate acceptance committee;
- (c) have attained at least a 70% cumulative average in undergraduate art courses;
- (d) have six courses in art history;
- (e) present transcripts of all university and/or college-level work;
- (f) present three letters of recommendation.

- 2) An applicant who has graduated from a recognized professional institution may be required to apply for entry into a special program prerequisite to admission into the M.F.A. program.
- 3) Students who are deficient in any of these requirements may be asked to register in appropriate undergraduate courses in order to satisfy the requirements.
- 4) Applications for admission to the Master of Fine Arts program should be complete by February 10 for Fall admission; applications received after that date may not be considered.

#### Program Requirements

- 1) Ten courses are required:
  - (a) four courses in Studio Practice (27-561, 27-562, 27-563, 27-564);
  - (b) 28-660: Contemporary Issues;
  - (c) 28:600: Directed Individual Studies Stuides;
  - (d) Graduate Seminars (27-596, 27-597, 27-598, 27-599);
  - (e) Early in the second term of their first year, students must participate in a first year M.F.A. group exhibition. This exhibition will be evaluated by faculty members to determine the advisability of a student continuing in the program.

2) *Thesis (27-797)*: The thesis will consist of an exhibition of a body of original creative works within the candidate's area of research. The thesis will be planned with, and executed under the direction of the candidate's principal faculty advisor. This final exhibition should be regarded as the equivalent of the scholarly thesis of an academic discipline.

3) *Committees*:

(a) *Guidance Committee*: Each student will choose a guidance committee, approved by the Visual Arts Graduate Program Committee, at the beginning of the second term of his or her Master's program. This committee will meet with the student periodically throughout the time required to complete the M.F.A. program and to assess his/her work and progress through the program.

(b) *Thesis Defence Committee*: This committee will assess the student's thesis exhibition, conduct the oral examination, decide if the M.F.A. degree should be awarded and determine the thesis grade. The thesis committee will be constituted as follows: a member of the graduate faculty appointed by the Dean of Graduate Studies and Research serving as a non-voting chair, the student's principal advisor and two additional faculty members, one of whom will not have been a member of the student's guidance committee. In addition a professional artist or artist-educator not from the University of Windsor or the Windsor area will be chosen as an external member of the committee. The student will choose the last three members of this committee with the approval of the Visual Arts Graduate Program Committee and subject to the approval of the Executive Committee of the Faculty of Graduate Studies and Research.

4) *Examination and Thesis Requirements*:

- (a) a solo exhibition of the completed creative thesis acceptable to the student's thesis committee;
- (b) a written and photographic documentation of the thesis to be retained by Visual Arts;
- (c) a formal oral defense of the thesis before the student's thesis committee;
- (d) written support document given to each member of the Thesis Committee two weeks prior to the scheduled defense.

5) *Residence Requirements:* The M.F.A. program will require a minimum of two academic years (four terms). Transfer credits will be evaluated and may be accepted.  
Work on an M.F.A. degree should ordinarily be completed within three consecutive years after a student's enrollment.

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## BIOLOGICAL SCIENCES

### PROGRAMS

#### Biological Sciences (MSc)

#### Biological Sciences (PhD)

Students may pursue one of the following fields within the MSc and PhD in Biological Sciences: 1) Molecular/Cellular Biology; 2) Ecology, Evolution, Environment, and Behaviour; and 3) Neuroscience and Behaviour.

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ODETTE SCHOOL OF BUSINESS

PROGRAMS

**[Business Administration \(MBA\)](#)**  
**[Business Administration \(MBA\) \(Co-op\)](#)**  
**[Business Administration \(MBA\) \(Fast-track\)](#)**  
**[Business Administration \(MBA\) \(For Managers and Professionals\)](#)**  
**[Business Administration/Bachelor of Laws \(Integrated MBA/JD\)](#)**  
**[Master of Management \(MM\)](#)**  
**[Master of Engineering Management](#)** *(This program is offered jointly between the Odette School of Business and the Faculty of Engineering)*

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## CHEMISTRY AND BIOCHEMISTRY

### PROGRAMS

[Chemistry and Biochemistry \(MSc\)](#)  
[Medical Biotechnology \(MMB\)](#)  
[Chemistry and Biochemistry \(PhD\)](#)

Facilities are provided for students wishing to proceed to the degrees of Master of Science and Doctor of Philosophy in Chemistry and Biochemistry. Additional requirements may be found in the [Chemistry and Biochemistry](#) Graduate Handbook.

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## CIVIL AND ENVIRONMENTAL ENGINEERING

### PROGRAMS

[Civil Engineering \(MAsc\)](#)  
[Civil Engineering \(MEng\) \(with/without Co-op/Internship Option\)](#)  
[Civil Engineering \(PhD\)](#)  
[Environmental Engineering \(MAsc\)](#)  
[Environmental Engineering \(MEng\) \(with/without Co-op/Internship Option\)](#)  
[Environmental Engineering \(PhD\)](#)

### CIVIL ENGINEERING AREAS OF SPECIALIZATION

Within Civil Engineering, the available fields are Structural Engineering and Water Resources Engineering. In the Structures field, research encompasses ACM, structural dynamics, fatigue damage assessment, steel, concrete technology, soil mechanics, and foundations. In the Water Resources field, research is in hydraulics, hydrology, and hydrogeology.

### ENVIRONMENTAL ENGINEERING AREAS OF SPECIALIZATION

In the Environmental Engineering program, research focuses on air and water quality and modeling, wastewater and industrial waste treatment, and ground water contamination.

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COMMUNICATION, MEDIA, AND FILM

PROGRAM

**Communication and Social Justice (MA)**

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**COMPUTER SCIENCE**

**PROGRAMS**

**Applied Computing (MAC)**  
  
**Computer Science (MSc)** (with and without Co-op)  
  
**Computer Science (PhD)**

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SCHOOL OF CREATIVE ARTS

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**Film and Media Arts (MFA)**  
**Visual Arts (MFA)**

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**ECONOMICS**

**PROGRAM**

**Economics (MA)**

**Applied Economics and Policy (MAEP)**

**ECONOMICS: COURSES**

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FACULTY OF EDUCATION

PROGRAMS

[Education \(MEd\)](#)  
[Education \(MEd - International Cohort\)](#)  
[Educational Studies \(PhD\)](#)

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## ELECTRICAL AND COMPUTER ENGINEERING

### PROGRAMS

[Electrical Engineering \(MASC\)](#)  
[Electrical Engineering \(MEng\) \(with/without Co-op/Internship Option\)](#)  
[Electrical Engineering \(PhD\)](#)

ELECTRICAL ENGINEERING AREAS OF SPECIALIZATION  
Research is carried out in the broadly defined area of Signals and Systems. Within the area of Signals and Systems such research topics as digital signal processing, microsystems, communications and computers are investigated.

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ENGLISH LANGUAGE, LITERATURE AND CREATIVE WRITING

PROGRAMS

English (MA)

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**FACULTY OF SCIENCE**  
**GREAT LAKES INSTITUTE FOR ENVIRONMENTAL RESEARCH (GLIER) PROGRAMS**  
**Environmental Science (MSc)**  
**Environmental Science (PhD)**  
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**HISTORY**

**PROGRAM**

**History (MA)**

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**FACULTY OF HUMAN KINETICS  
(KINESIOLOGY)**

**PROGRAM**

**Human Kinetics (MHK)**

**Kinesiology (PhD)**

**KINESIOLOGY: COURSES**

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## MECHANICAL, AUTOMOTIVE AND MATERIALS ENGINEERING

### PROGRAMS

[Engineering Materials \(MASC\)](#)

[Engineering Materials \(MEng\)](#)

[Engineering Materials \(PhD\)](#)

[Industrial Engineering \(MASC\)](#)

[Industrial Engineering \(MEng\) \(with/without Co-op Internship/Option\)](#)

[Industrial and Manufacturing Systems Engineering \(PhD\) \(Multi-Disciplinary Program\)](#)

[Mechanical Engineering \(MASC\)](#)

[Mechanical Engineering \(MEng\) \(with/without Co-op/Internship Option\)](#)

[Mechanical Engineering \(PhD\)](#)

[Automotive Engineering \(MASC/Laurea Magistrale\) \(International Master of Engineering with Politecnico di Torino \(Dual Degree Program\)\)](#)

## MECHANICAL, AUTOMOTIVE AND MATERIALS ENGINEERING AREAS OF SPECIALIZATION

### ENGINEERING MATERIALS

Ph.D., M.A.Sc. and M.Eng. graduate programs in Engineering Materials are administered by Mechanical, Automotive and Materials Engineering upon the advice of its Graduate Studies Committee for Engineering Materials. Research is concentrated on the physical, mechanical, tribological, chemical and processing aspects of materials. The program hosts one NSERC/ Industrial Research Chair: i) Chair in Tribology of Light-weight Materials. Particular research topics include:

**Material Design, Development:** Aluminum alloys (wrought, cast, particulate, reinforced), structure refinement, nanocrystalline alloys, solidification and precipitation processing, metal hydrides for energy applications, ceramics and cementitious materials, metallic forms, materials for batteries and fuel cells, smart materials, computational materials science.

**Material Processing:** Surface coatings, surface modification technologies (PVD, CVD, thermal spraying) welding, machining, galvanizing and galvannealing of steels, steel fabrication, nanofabrication.

**Mechanical Properties of Materials:** Creep and fatigue behaviour, deformation mechanisms, computer simulation of deformation, corrosion, erosion, impact testing, crashworthiness evaluation.

**Light Metals Casting Technology:** Advanced foundry processes for lightweight castings for automotive engines; aluminum and magnesium alloys; new generation foundry materials, solidification modelling, die casting process control.

**Tribology (Wear) Research:** Friction and wear of metal matrix composites, coatings for tribological applications, development of wear resistant materials for automotive applications, micromechanical modeling of tribological processes.

### INDUSTRIAL ENGINEERING

Ph.D., M.A.Sc. and M.Eng. graduate programs in Industrial Engineering are administered by Mechanical, Automotive and Materials Engineering.

### MECHANICAL ENGINEERING

Ph.D., M.A.Sc. and M.Eng. graduate programs in Mechanical Engineering are administered by Mechanical, Automotive and Materials Engineering upon the advice of its Graduate Studies Committee for Mechanical Engineering. Ph.D., M.A.Sc. and M.Eng. programs are offered in the areas of Machine Dynamics and Design, and Thermo-Fluids. In addition, at the masters level, a third Automotive field is available. In addition, the Department offers a separate **M.Eng. in Mechanical Engineering (Automotive Field)** (with or without co-op/internship) specifically designed for a cohort of international students, particularly foreign-trained engineers. For other additional information on this program contact the Centre for Executive Education at [www.uwindsor.ca/execed](http://www.uwindsor.ca/execed).

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## NURSING

### PROGRAMS

[Nursing \(PhD\)](#)  
[Nursing \(MScN\)](#)  
[Nursing \(MN\) - Advanced Clinical and Nursing Leadership Field](#)  
[Nursing \(MN\) - Primary Health Care Nurse Practitioner Field](#)  
[Graduate Diploma - Advanced Practice Oncology/Palliative Care](#)  
[Graduate Diploma - Primary Health Care Nurse Practitioner](#)

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**PHILOSOPHY**

**PROGRAM**

**Philosophy (MA)**

**PHILOSOPHY: COURSES**

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**PHYSICS**

**PROGRAMS**

**Physics (MSc)**

**Physics (PhD)**

**PHYSICS: COURSES**

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## POLITICAL SCIENCE

### PROGRAMS

[Political Science \(MA\)](#)  
[Master of Arts in Political Science and Master of Public Policy Articulation](#)

### POLITICAL SCIENCE: COURSES

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## PSYCHOLOGY

### PROGRAMS

#### Psychology (PhD and MA)

**Social Data Analysis (MA)** *(Note: As of Fall 2014 there are no new admissions to this program.)*

### PSYCHOLOGY: COURSES

### GRADUATE STUDIES FACULTY REGULATIONS

#### GENERAL INFORMATION

The graduate programs of study are Adult Clinical Psychology, Child Clinical Psychology, Clinical Neuropsychology, and Applied Social Psychology.

All graduate students in Psychology are required to comply with the most recent ethical principles, values, and standards of the Canadian Psychological Association and the American Psychological Association, and with the current standards for research with human subjects adopted by the University of Windsor.

Failure of a student to adhere to the principles, values, and standards defined above will constitute sufficient cause to warrant dismissal from the graduate program in Psychology.

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**SOCIAL WORK**

**PROGRAM**

**Social Work (PhD)**

**Social Work (MSW)**

**Juris Doctor/Master of Social Work (JD/MSW) Joint Program**

**SOCIAL WORK: COURSES**  
**MSW/JD: COURSES**

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SOCIOLOGY, ANTHROPOLOGY AND CRIMINOLOGY

## PROGRAMS

**Criminology (MA)** *(Thesis Option and Course Option)*  
**Sociology (MA)** *(Thesis Option and Course Option)*  
**Social Data Analysis (MA)** *(Note: As of Fall 2014 there are no new admissions to this program.)*  
**Sociology with Specialization in Social Justice (PhD)**

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## BIOLOGICAL SCIENCES: COURSES

*All courses listed will not necessarily be offered each year.*

*Biological Sciences provides three types of courses, each with a different primary purpose and format.*

1) *Fundamentals Courses:* Fundamentals courses cover subject matter that is considered central to a comprehensive knowledge of principles and theories in the department's areas of research emphasis. The scope of these courses extends beyond that provided at the undergraduate level. These courses may entail formal lectures, laboratory instruction and/or directed readings and discussion, but the onus is on the course instructor to ensure that students are exposed to balanced and comprehensive coverage of the range of topics considered to represent the field. Because of their central importance to the Biological Sciences, these courses are offered on a regular, recurring basis.

2) *Special Topics Courses:* Special topics courses provide detailed expertise in theory and/or techniques in areas of researchers' expertise that are especially relevant to students' thesis research. Although no less rigorous than fundamentals courses, these courses may provide greater depth of information over a narrower subject range. The scope of these courses extends beyond that provided at the undergraduate level. These courses may involve a combination of lectures, laboratories, discussion, readings and/or student presentations under the guidance of the instructor. A Special Topics course will have an explicit subtitle indicating the theme of a particular offering. Some Special Topics courses will be offered each year. The themes will vary among years to reflect the expertise of the instructors available and the current needs of the graduate students.

3) *Selected Readings Courses:* The primary goal of the Selected Readings courses is to develop students' skill in objective, critical analysis of scholarly work among individuals with broadly similar research interests and backgrounds. An equally important aspect of these courses is to promote interaction among students and faculty and to help participants become aware of new research across a range of subdisciplines. The role of students in selecting and presenting relevant material is central to these courses.

### 55-516. Techniques in Molecular Biology

A course designed to introduce the student to a variety of biochemical, cellular, and molecular techniques. This course is composed of a series of topics from which students are required to participate in a minimum of four. The topics include: chromatography, electrophoresis, immunocytochemistry, electron microscopy, cell culture, cloning and nucleic acid analysis, computer-based protein and nucleic acid analysis, and radioisotope methods. Students should consult with their research advisors and supervisory committees in choosing the topics for study. (Prerequisite: consent of instructor.) (2 lecture hours, 4 laboratory hours a week for selected experiments during the year, both terms.) (One term course credit.) (Offered in alternative years.)

### 55-518. Experimental Design and Analysis in Biological Research

Discussion of philosophical and quantitative approaches used to investigate biological systems, with emphasis on design and implementation of efficient and unbiased experiments. Students will use expertise acquired in lectures and readings to constructively evaluate their own and others' research proposals through round table discussions and individual presentation. (Prerequisite/corequisite: 55-320, or consent of instructor.) (2 discussion hours a week.)

### 55-520. Selected Readings in the Biological Sciences

Current publications on common themes of potential significance in students' area of study will be chosen for round table oral presentation and discussion. Multiple sections, each with enrollment of 8-12 students will be offered in the fall term of each year as required. This course is intended for graduate students in Biological Sciences only. (2 discussion hours a week.)

### 55-521. Selected Readings in the Biological Sciences

Current publications on common themes of potential significance in students' area of study will be chosen for round table oral presentation and discussion. Multiple sections, each with enrollment of 8-12 students will be offered in the winter term of each year as required. This course is intended for graduate students in Biological Sciences only. (2 discussion hours a week.)

### 55-528. Molecular Biology of Growth and Development I

An analysis at the molecular level of the growth and development of prokaryotes, lower eukaryotes, and their plasmids. (Required: consent of instructor.) (2 discussion hours a week.) (Offered in alternate years.)

### 55-529. Molecular Biology of Growth and Development II

An analysis at the molecular level of the growth and development of plants and animals. (Required: consent of instructor.) (2 discussion hours a week.) (Offered in alternate years.)

### 55-570. Fundamental Topics in Population and Evolutionary Biology

Major topics may include the evolution of mating systems, population structure and demography, population genetics and life history variation, theory of optimal resource use. (Prerequisite/corequisite: 55-324, or consent of instructor.) (3 lecture/discussion hours a week.) (Offered in alternate years.)

### 55-581. Fundamental Topics in Community Biology

Major topics include niche and diversity theory, trophic complexity and community stability, assembly of guilds, ecosystem

structure and function, biogeography. (Prerequisite/corequisite: 55-325, or consent of instructor.) (3 lecture/discussion hours a week.) (Offered in alternate years.)

**55-601. Special Topics in Molecular and Developmental Biology**

This is a regularly offered course covering subjects that reflect current graduate program needs and departmental expertise in specific areas. The course addresses one or more theme subjects in any particular term. Students receive a course credit for each term in which they register for this course provided that a particular theme is not repeated. Where a theme parallels an undergraduate course listing, students may be required to attend some portion of the undergraduate course as a prerequisite or corequisite. Subjects that may be offered as special topics include but are not limited to the following: biology of cell transformation; electron microscopy; genetic engineering and its applications; advanced topics in immunochemistry; advanced topics in microbial physiology and ecology; advanced topics in physiology; plant hormones and development; virology. (Prerequisite: consent of instructor.) (2-3 discussion hours and/or up to 5 laboratory hours a week.)

**55-602. Special Topics in Population and Environmental Biology**

This is a regularly offered course covering subjects that reflect current graduate program needs and departmental expertise in specific areas. The course addresses one or more theme subjects in any particular term. Students receive a course credit for each term in which they register for this course provided that a particular theme is not repeated. Where a theme parallels an undergraduate course listing, students may be required to attend some portion of the undergraduate course as a prerequisite or corequisite. Subjects that may be offered as special topics include but are not limited to the following: animal behaviour; advanced topics in aquatic ecology; biogeography, conservation biology, ecotoxicology, quantitative ecology. (Prerequisite: consent of instructor.) (2-3 discussion hours and/or up to 5 laboratory hours a week.)

**55-603. Special Topics in Biological Sciences I**

Special Topics in the Biological Sciences courses may be used to introduce a new graduate offering, typically on a "trial" basis. Approved courses taken at Wayne State University or elsewhere, or courses offered by visiting professors may also fall into the category of Special Topics in the Biological Sciences. A limited number of these courses may be included in the program of graduate student.

**55-604. Special Topics in Biological Sciences II**

Special Topics in the Biological Sciences courses may be used to introduce a new graduate offering, typically on a "trial" basis. Approved courses taken at Wayne State University or elsewhere, or courses offered by visiting professors may also fall into the category of Special Topics in the Biological Sciences. A limited number of these courses may be included in the program of a graduate student.

**55-797. Thesis Research**

An original research project embodied into a concisely written thesis which conforms to the style and format of a recognized journal in the field of specialization. The student should register for this course during each term (including Summer) of residency at the University; however, this course may not be used for credit toward fulfilling the course requirements in the Master's program.

**55-798. Dissertation Research**

An original research investigation the results of which will be embodied in a concisely written dissertation conforming in style and format to a recognized journal in the field of specialization. The final paper should be of the highest quality possible and suitable for publication. The doctoral student should register for this course commencing the summer term of the first year of residency and subsequently for each term during which dissertation research will be carried out. In no case, however, may this course be used for credit toward fulfilling the course requirements in the Ph.D. program.

**NEUROSCIENCE AND BEHAVIOUR FIELD**

**55-501. BCN Training Course**

This short, intensive course examines specialized topics in Behaviour, Cognition and Neuroscience through collaborative presentations with leaders in the field. Students are required to understand the background of the specialized topic, and to participate in colloquia and laboratory experiments with visiting BCN scientists.

**55-505. Sensory Ecology**

This seminar/lecture course will examine interconnections between sensory biology and ecology as they relate to the evolution of signal reception. Special emphasis is placed on a comparative approach to understanding sensory neurobiology and the current state of the field of sensory ecology. (*Note: It is recommended that students taking this course have completed Principle Neuroscience (55-258) or equivalent.*)

**55-510. Behavior and Physiology of Fishes**

The goal of this course is to increase one's understanding of current research in the behaviour and physiology in fishes by synthesizing and evaluating current literature, leading class discussions, assessing presentations of others and by preparing a review paper based on research ideas presented in the course. (Prerequisite: Any two of the following undergraduate courses or their equivalents from other universities: 55-204, 55-210, 55-425 or 55-440.)

**55-557. Comparative Cognition**

Evidence of general and specialized cognitive processes in human and non-human organisms will be investigated. Topics to be covered include perception, attention, and memory, concept formation, ecological and evolutionary bases of cognitive processes. Current research on these and other topics will be reviewed and discussed in a seminar format. (Prerequisite: Any two of the following undergraduate courses or their equivalents from other universities: 46-353, 46-358 or 46-335.) (Also offered as 46-557; cross-listed with 46-457)

**55-605. Advanced Behavioural Neurobiology**

In depth case analyses will be conducted to show how animals have developed neural mechanisms to solve behavioral problems encountered in their specific environmental niches. Topics will cover sensory processes, motor strategies, and plastic changes of behavior. General principles in behavioral neurobiology will be discussed after examination of individual cases. Important research methods in behavioral neurobiology will also be introduced.(Co-requisite: 55-483.) *(Note: It is recommended that students taking this course have completed Principle Neuroscience (55-258) or equivalent.)*

**55-610. Advanced Topics in Neurophysiology**

This course emphasizes synaptic organization of the brain. It examines how physical stimuli are converted by neurons into sensations and how movement is controlled through integrative neuronal action. The mechanisms of learning and memory will be discussed at the neuronal and molecular levels. Important experimental approaches in contemporary neurophysiology will also be introduced.*(Note: It is recommended that students taking this course have completed Principle Neuroscience (55-258) or equivalent.)*

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## ODETTE SCHOOL OF BUSINESS: COURSES

Courses below are listed according to the internal administrative units of the Odette School of Business.

All courses listed will not necessarily be offered in a particular term or year.

Special permission to enter courses without the stated prerequisites must be arranged with the Dean and the instructor involved.

### FIRST-YEAR M.B.A. COURSES

#### 76-501. Interpersonal Dynamics

Provides students with the behavioural skills to be effective in organizations. Active listening, conflict resolution, running effective meetings, *etc.*, will be taught with a great deal of emphasis on the practice of these skills. The framework for this module will be the team environment, which many successful companies are moving toward. This module will help students prepare for the teamwork which will be required by all the concurrent modules.

#### 76-502. Core Concepts of Accounting I

An introduction to the role and importance of accounting information in the decision-making process and how to use and interpret various types of accounting information found in financial statements and annual reports. Core concepts of financial accounting will be examined, including the determination of income and the recognition, measurement and reporting of assets, liabilities, and owners' equity. The impact of ethical, regulatory and environmental aspects on the interpretation and application of accounting information will be considered.

#### 76-503. Introduction to Financial Management

Concerned with the concepts and principles of financial management of the business enterprise within the global financial environment. After an introduction to domestic and international financial markets and instruments, the module covers the concepts of value, risk, and efficient markets followed by an introduction to capital budgeting, financial analysis and planning, and short-term financial management.

#### 76-504. Quantitative Techniques in Management

Provides students with a basic but solid background in the quantitative techniques used by successful business organizations. This module will focus on the important aspects of probability and statistics as they relate to the effective presentation of data and to decision-making under uncertainty; and on the use of mathematical modelling as it relates to problem-solving within an organization.

#### 76-505. Marketing Management

Introduces appropriate marketing management concepts and techniques that can be applied to private sector business as well as to not-for-profit organizations' marketing and communication activities. Emphasis will be on the marketing mix elements of product, price, place, and promotion.

#### 76-506. Managing Employees

Familiarizes students with the knowledge, roles, responsibilities and skills required of today's managers. Three approaches will be examined: systems, process, and behavioural. The contingency view of management as the process of organizing resources to set and accomplish organizational goals will be emphasized.

#### 76-510. Core Concepts of Accounting II

Further examines the use and interpretation of accounting information within the context of business and business decision-making. It will explore some of the ways in which accounting information may be utilized for business planning and to solve common business management problems. Core concepts of financial and managerial accounting such as financial statement analysis, tax considerations, cost-volume-profit analysis, budgeting, cost allocation, job order and process costing will be covered. As with 76-502, the impact of ethical, regulatory, and environmental aspects on the interpretation and application of accounting information will be considered. (Prerequisite: 76-502.)

#### 76-511. Research Methodology

Provides students with a broad understanding of methodological issues in research with a specific focus on marketing. Students will develop an understanding of research issues and processes from a marketing perspective through classroom lectures as well as a hands-on, practical marketing research project. Both quantitative and qualitative methods of research will be discussed. (Prerequisites: 76-504 and 76-505.)

#### 76-512. Financial Management

Focus is on the firm's long-term financial decisions. The sources and the mechanics of obtaining long-term financing are covered, together with the discussion of strategic decisions involving capital structure and dividends. The module includes a broader study of financial markets and instruments, including options, with applications in financial management. (Prerequisite: 76-503.)

#### 76-513. Human Resources Management

Concerned with the role of human resources activities in facilitating the achievement of organizational effectiveness. Students will gain an understanding of the principles of human resources management and develop some skills they can apply in solving actual people problems at work. Particular attention is given to the roles of labour relations and trade



unionism as they pertain to human resources activities. Students will be provided with exposure to both a management and labour perspectives to H.R. issues.

#### **76-514. Management Information Systems**

Learn how to envision, design and evaluate computer-based solutions to typical business problems. Emphasis will be on the contemporary and emerging hardware /software tools, the managing of information, and information technology.

#### **76-540 Engineering Management Capstone**

This is a jointly instructed and administered course between the Faculty of Engineering and the Odette School of Business. The course is the last course students take in the Masters of Engineering Management program and has mandatory prerequisites. The goal is to allow students to practice all business and management theory they learned in previous courses by completing one of: 1) an engineering management report 2) an engineering feasibility study, or 3) a new venture business plan. This course is entirely project-based. (Prerequisites: All 6 mandatory core courses within the MEM program) (2 semester, 6.0 credit course) (Cross-listed with Engineering 85-540)

#### **CANDIDATE YEAR COURSES**

The prerequisite for all candidate year (600-level) courses is candidate-level standing in the M.B.A. program or equivalent preparation.

#### **ACCOUNTING**

##### **70-650. Managerial Accounting and Analysis**

Examines approaches to generating, analyzing and using accounting information in performing managerial functions such as planning, controlling, performance evaluation and decision making.

##### **70-651. Reporting, Analyzing, and Using Accounting Information**

Examines alternative approaches to generating, analyzing and using accounting information. It will emphasize the understanding and the application phases of accounting information by users. Topics include: Accounting entity-concepts of control and significant influence; accounting policy choice; internal control; elements in the consolidated financial statements, such as owners' equity, minority (non-controlling) interest and goodwill; profitability, liquidity and solvency analyses; working capital management; and business valuation.

##### **70-659. Topics in Accounting**

A reading and research seminar which deals with major concepts and important current problems in Accounting. The precise topic to be covered in a particular term will vary according to current interest and faculty availability, and will be announced in the previous term.

#### **MANAGEMENT AND LABOUR STUDIES**

##### **71-600. Business Ethics and Sustainability**

Business practitioners confront issues involving business ethics daily, and environmental sustainability is an important and often central component of an organization's strategic management. All organizations have an influence on, and are influenced by, their social and natural environment. Students will be exposed to the major issues of business ethics and sustainability, developing an orientation to them and acquiring related practical skills through a series of case studies, field trips, a debate, and an applied team project.

##### **71-613. Leadership and Organizational Change**

Provides an analytical framework to understand organizational transformation through (a) leadership and vision building, (b) strategic human resources planning (c) restructuring and redesigning and (d) organization environment interactions. Students will focus on the practical aspects of diagnosing the need for change and supporting, facilitating, or leading the change process.

##### **71-643. International Management**

Focuses on the problems and issues that confront managers in the area of international business. Background materials, cases, and exercises will involve the students in the challenges facing the international manager. A major objective is to develop a sensitivity that will enhance the student's ability to operate in the complex environment of multicultural businesses.

##### **71-646. Business Negotiation and Problem Solving**

Highlights the role of effective negotiation for resolving conflict and sharing resources and power in complex organizations. Students will be exposed to various styles of negotiating, problem solving and bargaining strategies as well as communication approaches aimed at enhancing organizational performance.

##### **71-647. Managing Diversity in Workplace**

Addresses the dynamics of increasing diversity of the work force and the major challenges faced by organizations and their managers such as maintaining fairness and justice, making effective decisions for performance improvement, allowing flexibility and managing diversity in the global environment. The course also analyzes the legal frameworks in place which value and protect employee and employer rights related to gender, race, age, religion, sexual orientation, ability, and other dimensions of diversity.

##### **71-648. Topics in Management and Labour Studies**

A reading and research seminar which deals with major concepts and important current problems in the areas covered by Management and Labour Studies. The precise topic to be covered in a particular term will vary according to current interest and faculty availability, and will be announced in the previous term.

## FINANCE

### **72-670. Investment Analysis and Management**

Economic background to security analysis; types of corporate securities for investment; theory and mechanics of investment; general analysis and valuation procedures; valuation of fixed income securities and common stocks; procedures in analysis of government, industrial, financial and public utility securities; and portfolio management.

### **72-671. Portfolio Management**

Objectives of individual and institutional portfolios. Security selection, diversification, marketability, risk and return in portfolio construction. Timing and formula plans, bond portfolio problems, performance measurement, trading problems, tax planning, supervision, quantitative techniques for portfolio management, and regulations.

### **72-672. Cases in Financial Management**

An advanced case course in financial management. Financial concepts and principles of managing a business enterprise are illustrated. Planning for the acquisition and use of funds so as to maximize the value of the business is examined through the use of case analysis.

### **72-673. Topics in Finance**

An in-depth study of topical issues in finance. A reading and research seminar dealing with major concepts and problems in the area of financial management. Precise topics to be covered during a term will vary according to current trends in the literature.

### **72-674. International Financial Management**

A study of the problems facing the international financial manager. Topics include: international markets, spot and forward currency fluctuations, positioning corporate funds, investment decisions, hedging and exposure management.

## MANAGEMENT SCIENCE

### **73-602. Topics in Management Science**

A reading and research seminar which deals with major concepts and important current problems in the areas of management science, operations management, or management information systems. The precise topic to be covered in a particular term will vary according to current interest and faculty availability, and will be announced in the previous term.

### **73-603. Management Science Models**

Study of spreadsheet-based practical quantitative decision-making models relevant to major functional areas of business. Topics include linear and non-linear programming models, network models, and simulation models for problems involving uncertainty.

### **73-604. Operations Management**

Study of relevant topics recognized as important factors for successful management of business operations. Topics include: processes and their measurement in manufacturing and services, forecasting, aggregate planning, inventory management, quality control, and supply chain management.

### **73-606. Strategic Implementation for Technologies Management**

Strategic management of technology and innovation in established firms. The overall course objectives are to help students gain competence in (1) understanding the basic framework for the relationships among a business strategy, an information systems strategy and an organizational strategy; (2) developing an awareness of the range, scope and complexity of the issues and problems related to the strategic management of technology and innovation; (3) developing a conceptual framework for assessing and auditing the innovative capabilities of a business organization and (4) developing insight concerning the skills necessary to be effective in managing the innovation process. The course will use SAP, an enterprise resource planning software, as a simulation tool to explore the strategic use of information systems in a large organization.

## MARKETING

### **74-631. Consumer Behaviour**

A study of analytical concepts and research techniques derived from the behavioural sciences or developed from consumer behaviour research. A significant objective of the course is the application of such concepts and techniques to the solution of marketing problems.

### **74-632. Marketing Research**

An advanced course assuming familiarity with the conceptual research process, characteristics of basic data collection modes and measurement, hypothesis testing, regression analysis, and analysis of variance. Utilizing a discussion format, the course offers a review of current marketing research literature concerning: 1) examination of properties of familiar data collection and analysis techniques; 2) examples of their application; and 3) introduction to more advanced data collection and analysis methods.

### **74-635. International Marketing Strategy**

A study of the problems faced by Canadian businesses when exploring and distributing to foreign markets. A significant objective of the course is to explore, through research findings, strategies that would improve Canada's international marketing efforts.

### **74-638. Topics in Marketing**

This course is of varying content dealing with topical issues in marketing. The course might focus on a specific functional

area in marketing or a particular environment for the application of marketing concepts. Administration of the course varies as appropriate with its content and might take on a literature survey, research project, experiential, or other format.

#### **74-639. Marketing Strategy and Planning**

An analysis of the formation of marketing strategies and plans. Topics covered will include business definitions, developing marketing objectives, selecting market targets, developing all aspects of the marketing mix, and evaluating marketing performance. Marketing decision models, portfolio techniques, generic strategies, PIMS, and related topics will also be covered.

### **BUSINESS STRATEGY AND ENTREPRENEURSHIP**

#### **75-611. Project Management I**

Students devote their time to two basic tasks, learning and applying the fundamentals of project management while drawing from the knowledge and experience gathered in previous classes. Students will examine approaches to project management and apply them to projects with industry partners. Project planning and strategies for project implementation will be discussed relative to industry sectors. Problem - solving, market research, and critical - thinking skills based on scientific inquiry in business will provide students with the foundations for competencies in project management. Projects will be focused on the early stages of the industry/product life cycle, including the management of entrepreneurship, product/service introduction, and/or innovation.

#### **75-612. Project Management II**

Students devote their time to two basic tasks, learning and applying the fundamentals of project management while drawing from the knowledge and experience gathered in previous classes. Students will examine approaches to project management and apply them to projects with industry partners. Project planning and strategies for project implementation will be discussed relative to industry sectors. Problem - solving, market research, and critical - thinking skills based on scientific inquiry in business will provide students with the foundations for competencies in project management. Projects will be focused on the later stages of the industry/product life cycle, including the management of mature products/services and/or turnaround.

#### **75-680. Managing the International Enterprise**

This survey course gives students a basic understanding of the international business environment and of the decisions that managers make in international firms. The course begins by considering the historical development of international business and the current global focus of international firms. It then examines the international global environment, including theories of trade and foreign direct investment, balance of payments and international institutions and models for evaluating the environment in order to select the best international strategy or mode of entry for a particular location. Finally, the course briefly examines the functional decisions made in international firms-financial, marketing, operational, human resources-and issues associated with international structure and control.

#### **75-682. Manufacturing Strategy**

Examines the use of manufacturing and operations as weapons in the firm's competitive arsenal. It addresses strategic questions related to the choice of proper process technology, the determination of plant size and location, the extent of vertical integration and the continuous pursuit of quality and productivity.

#### **75-690. Entrepreneurship: New Venture Formation and Management**

Aiming at opening up the entrepreneurial option for students, this course examines entrepreneurship as an economic and a business phenomenon with special emphasis on the process of new venture creation. Through a mix of seminars, case studies, and field research, students explore the topics of finding new venture ideas, developing business ideas and business concepts, conducting feasibility studies, developing business plans, preparing deal structures and financing strategies, launching new ventures, and initial entrepreneurial management beyond the start-up phase. Students are expected to undertake a new venture creation project culminating with a detailed business plan.

#### **75-692. Topics in Strategic Management**

This is an investigation and discussion of contemporary issues in strategic management and entrepreneurship. The topics to be covered will vary from term to term according to current developments in the business world.

#### **75-696. Enterprise Development Consulting**

Students will perform business consulting and market research for local organizations, giving them opportunities to network while applying skills and knowledge learned in the classroom to real life business situations. Semester-long projects covering different business areas are performed in small supervised teams. Weekly class time is a round-table discussion format used for collaboration of ideas and strategy with the rest of the class. Students will be evaluated on participation along with formal reports and presentations regarding the projects. Highly motivated students from a variety of business-related disciplines will make-up the consulting team. (Prerequisites: Approval of instructor.) (Open to Semester 7 and above students only).

#### **75-698. Strategic Management**

This is the capstone course of the M.B.A. program. It integrates the knowledge gained in prior courses and focuses it on the functions of top management of an organization. Discussion of concepts and current practice are combined with case studies of strategic leadership and strategy formulation and implementation in a domestic and international environment. (Prerequisites: candidate-year standing and all other required courses.)

### **GENERAL M.B.A COURSES**

#### **76-660. Management Skills Development**

This course is designed to provide students with the management skills required for providing feedback, dealing with

problem employees, coaching, and problem-solving. It is a practical course with ample opportunity for students to practice the skills in different settings and receive feedback on their performance. (Required for, and open only to, Fast Track students)

**76-661. Directed Study**

Under faculty supervision, students undertake an in-depth, individualized program of study to pursue a topic of relevance to business and to develop, apply, and integrate the knowledge acquired in the program.

**76-701. M.B.A. Co-op Work Term I**

**76-702. M.B.A. Co-op Work Term II**

**76-711. Fast-Track M.B.A Co-op Work Term**

**76-796. Major Paper** (weight: 2 courses)

**76-797. Thesis** (weight: 4 courses)

**COURSES IN THE M.B.A FOR MANAGERS AND PROFESSIONALS**

**77-521. Core Concepts of Accounting I**

An introduction to the role and importance of accounting information in the decision-making process and how to use and interpret various types of accounting information found in financial statements and annual reports. Core concepts of financial accounting will be examined, including the determination of income and the recognition, measurement and reporting of assets, liabilities, and owners' equity. The impact of ethical, regulatory and environmental aspects on the interpretation and application of accounting information will be considered.

**77-522. Introduction to Financial Management**

Concerned with the concepts and principles of financial management of the business enterprise within the global financial environment. After an introduction to domestic and international financial markets and instruments, the module covers the concepts of value, risk, and efficient markets followed by an introduction to capital budgeting, financial analysis and planning, and short-term financial management.

**77-523. Quantitative Techniques in Management**

Provides students with a basic but solid background in the quantitative techniques used by successful business organizations. This module will focus on the important aspects of probability and statistics as they relate to the effective presentation of data and to decision making under uncertainty; and on the use of mathematical modelling as it relates to problem solving within an organization.

**76-524. Managing People in Organizations**

Familiarizes students with the knowledge, roles, responsibilities and skills required of today's managers. Three approaches will be examined: systems, process, and behavioural. The contingency view of management as the process of organizing resources to set and accomplish organizational goals will be emphasized.

**77-525. Business Research Methods**

Provides students with a broad understanding of methodological issues in research. Students will develop an understanding of research issues and processes through classroom lectures as well as a hands-on practical research project. Statistical analysis and both quantitative and qualitative methods of research will be discussed.

**77-531. Core Concepts of Accounting II**

Further examines the use and interpretation of accounting information within the context of business and business decision-making. It will explore some of the ways in which accounting information may be utilized for business planning and to solve common business management problems. Core concepts of financial and managerial accounting such as financial statement analysis, tax considerations, cost-volume-profit analysis, budgeting, cost allocation, job order and process costing will be covered. The impact of ethical, regulatory, and environmental aspects on the interpretation and application of accounting information will be considered.

**77-532. Financial Management**

Focus is on the firm's long-term financial decisions. The sources and the mechanics of obtaining long-term financing are covered, together with the discussion of strategic decisions involving capital structure and dividends. The module includes a broader study of financial markets and instruments, including options, with applications in financial management.

**77-533. Management Information Systems**

Learn how to envision, design and evaluate computer-based solutions to typical business problems. Emphasis will be on the contemporary and emerging hardware/software tools, the managing of information, and information technology.

**77-534. Managing Human Resources**

Concerned with the role of human resources activities in facilitating the achievement of organizational effectiveness. Students will gain an understanding of the principles of human resources management and develop some skills they can apply in solving actual people problems at work. Particular attention is given to the roles of labour relations and trade unionism as they pertain to human resources activities. Students will be provided with exposure to both management and labour perspectives to H.R. issues.

#### **77-536. Marketing Management**

Introduces appropriate marketing management concepts and techniques that can be applied to private sector business as well as to not-for-profit organizations' marketing and communication activities. Emphasis will be on the marketing mix elements of product, price, place, and promotion.

#### **77-620. Reporting, Analyzing, and Using Accounting Information**

Examines alternative approaches to generating, analyzing and using accounting information. It will emphasize the understanding and the application phases of accounting information by users. Topics include: Accounting entity concepts of control and significant influence; accounting policy choice; internal control; elements in the consolidated financial statements, such as owners' equity, minority (non-controlling) interest and goodwill; profitability, liquidity and solvency analyses; working capital management; and business valuation.

#### **77-621. Leadership and Organizational Change**

Provides an analytical framework to understand organizational transformation through (a) leadership and vision building, (b) strategic human resources planning (c) restructuring and redesigning and (d) organization environment interactions. Students will focus on the practical aspects of diagnosing the need for change and supporting, facilitating, or leading the change process.

#### **77-622. Maximizing the Value of the Organization**

An advanced case course in financial management. Financial concepts and principles of managing a business enterprise are illustrated. Planning for the acquisition and use of funds so as to maximize the value of the firm is examined through the use of case analysis.

#### **77-623. Marketing Strategy and Planning**

An analysis of the formation of marketing strategies and plans. Topics covered will include business definitions, developing marketing objectives, selecting market targets, developing all aspects of the marketing mix, and evaluating marketing performance. Marketing decision models, portfolio techniques, generic strategies, PIMS, and related topics will also be covered.

#### **77-624. Managing in the International Arena**

Focuses on the problems and issues that confront managers in the area of international business. The course examines the international global environment, including theories of trade and foreign direct investment, balance of payments and international institutions and models for evaluating the environment in order to select the best international strategy or mode of entry for a particular location. A major objective is to develop a sensitivity that will enhance the student's ability to operate in the complex environment of international business.

#### **77-625. Strategic Management**

This is the capstone course of the M.B.A. program. It integrates the knowledge gained in prior courses and focuses it on the functions of top management of an organization. Discussion of concepts and current practice are combined with case studies of strategic leadership and strategy formulation and implementation in a domestic and international environment.

#### **77-626. Strategic Implementation for Technologies Management**

Strategic management of technology and innovation in established firms. The overall course objectives are to help students gain competence in (1) understanding the basic framework for the relationships among a business strategy, an information systems strategy and an organizational strategy; (2) developing an awareness of the range, scope and complexity of the issues and problems related to the strategic management of technology and innovation; (3) developing a conceptual framework for assessing and auditing the innovative capabilities of a business organization and (4) developing insight concerning the skills necessary to be effective in managing the innovation process.

#### **77-627. Business Negotiation and Problem Solving**

Highlights the role of effective negotiation for resolving conflict and sharing resources and power in complex organizations. Students will be exposed to various styles of negotiating, problem solving and bargaining strategies as well as communication approaches aimed at enhancing organizational performance

#### **77-628. Entrepreneurship and Intrapreneurship**

Aiming at developing entrepreneurial thinking in students, this course examines entre- and intrapreneurship as an economic and a business phenomenon with special emphasis on the process of new venture creation. Students explore the topics of finding new venture ideas, developing business ideas and business concepts, conducting feasibility studies, developing business plans, preparing deal structures and financing strategies, launching new ventures, initial entrepreneurial management beyond the start-up phase and the successful development of such initiatives within a corporate environment.

#### **77-629. Current issues in Business**

This is an investigation and discussion of contemporary issues and current challenges to businesses. The topics to be covered will vary for each offering according to current developments in the business world and will be announced in the previous term.

### **COURSES IN THE MASTER OF MANAGEMENT**

#### **78-611. Accounting Concepts and Techniques**

An examination of the core concepts of financial accounting, which includes the determination of income and the recognition, measurement and reporting of assets, liabilities, and owners' equity. Different methods of the utilization of accounting information for business planning and management problem solving will be explored. Core concepts of financial and managerial accounting such as financial statement analysis, tax considerations, cost-volume-profit analysis, budgeting, cost allocation, job order and process costing will be covered. The impact of ethical, regulatory, and environmental aspects



on the interpretation and application of accounting information will be considered.

**78-612. Finance in a Global Perspective**

A study of concepts and principles of financial management of the business enterprise within the global financial environment. Emphasis will be placed on the contemporary and emerging hardware/software tools, information management, and information technology. Following an introduction of domestic and international financial markets and instruments, the concepts of value, risk, and efficient markets will be covered. Capital budgeting, financial analysis and planning, and short-term financial management will also be introduced. With these concepts in hand, the student will learn how to envision, design, and evaluate computer-based solutions for typical business problems.

**78-613. Managing Employees**

An analysis of the knowledge, roles, responsibilities, and skills required of today's managers. Three approaches will be examined: systems, process, and behavioural. An emphasis will be placed on the contingency view of management with respect to the process of organizing human resources to set and accomplish organizational goals.

**78-614. Marketing**

An introduction of marketing management concepts and techniques that can be applied to private sector business as well as to not-for-profit organizations' marketing and communication activities. Emphasis will be placed on the marketing mix elements of product, price, place, and promotion.

**78-631. International Business**

A survey course providing a discussion of the international business environment and the decisions made by managers in international firms. Historical development of international business and the current global focus of international firms will be considered. The international global environment, including theories of trade and foreign direct investment, balance of payments and international institutions, and models for evaluating the environment in order to select the best international strategy or mode of entry for a particular location will be examined. Finally, the functional decisions made in international firms – financial, marketing, operational, human resources – and issues associated with international structure and control will be briefly examined.

**78-632. Quantitative Studies**

A focus on the important aspects of probability and statistics as they relate to the effective presentation of data and to decision making under uncertainty, and on the use of mathematical modelling as it relates to problem solving within an organization. A solid background in the quantitative techniques used by successful business organizations will be provided.

**78-633. Introduction to Business Logistics Management**

A discussion of major issues relating to distribution activities at a micro and macro level. The development of channel systems and the behavioural and legal aspects of channel relationships will be reviewed. Distribution systems will also be discussed and will include such topics as management transportation, inventory management, warehousing, materials handling, and customer order processing.

**78-634. Leadership and Organizational Change**

An exploration of an analytical framework to understand organizational transformation through leadership and vision building, strategic human resources planning, restructuring and redesigning, and organization environment interactions. Students will focus on the practical aspects of diagnosing the need for change and supporting, facilitating, or leading the change process.

**78-635. Purchasing and Procurement**

A discussion of effective purchasing techniques and strategies to lower total costs and increase quality within the organization. The course will focus on developing, implementing, and using purchasing systems and policies that support the acquisition of materials. Quality assurance, sourcing of supplies, and inventory management will be included.

**78-636. International Financial Reporting**

An exploration of the international environment of financial reporting. Particular emphasis is placed on International Accounting and Financial Reporting Standards. The preparation and presentation of financial statements, including such matters as accounting for tax, foreign currency transactions, and interim financial reporting will be reviewed.

**78-637. International Financial Management**

A study of the problems encountered by an international financial manager. Topics to be discussed include: international markets, spot and forward currency fluctuations, positioning corporate funds, investment decisions, hedging, and exposure management.

**78-638. Human Resources Management**

A study of the role of human resources activities in facilitating the achievement of organizational effectiveness. Exposure to both management and labour perspectives with regards to human resources issues will be provided by this course. Particular attention will be placed on the roles of labour relations and trade unionism as they pertain to human resources activities. Students will gain an understanding of the principles of human resources management and develop the skills required to solve people problems in the workplace.

**78-651. Business Strategy**

This is the capstone course of the Master of Management program. It integrates the knowledge gained in prior courses and focuses this knowledge on the functions of top management in an organization. Discussion of concepts and current practice are combined with case studies of strategic leadership and strategy formulation and implementation in a domestic and international environment.

**78-652. Marketing Strategy and Planning**

An analysis of the formation of marketing strategies and marketing plans. Topics to be covered will include business definitions, developing marketing objectives, selecting market targets, developing all aspects of the marketing mix, and evaluating marketing performance. Marketing decision models, portfolio techniques, generic strategies, PIMS, and related topics will also be covered.

**78-653. Manufacturing Strategy**

An analysis of the use of manufacturing and operations as weapons in the firm's competitive arsenal. Strategic questions related to the choice of proper process technology, the determination of plant size and location, the extent of vertical integration, and the continuous pursuit of quality and productivity will be addressed.

**78-654. Manufacturing Globalization** (*Manufacturing Management stream capstone*)

The impact of international trade and of global technology, production, marketing, and social changes on the past development and future prospects of the manufacturing sector will be examined in this special seminar course.

**78-655. Domestic Transportation and International Shipping**

A study of the regulatory, economic, and management aspects of transportation. The needs and interests of the carriers, governments, and the shipping industry will also be studied. An evaluation of carrier alternatives for both passengers and the cargo in terms of their relative advantages and disadvantages will be discussed.

**78-656. Quantitative Analysis for Logistics and Supply Chain Management**

An introduction to the use of quantitative approaches in decision-making. Linear programming (model formulation and applications, computer solution, sensitivity analysis, and interpretation), transportation models, project management, PERT/CPM, and inventory control will be among the topics discussed.

**78-657. Supply Chain Management** (*Logistics and Supply Chain Management stream capstone*)

A special seminar course designed as a capstone for the Logistics and Supply Chain Management stream. An integrative perspective of supply chain strategy, supply chain finance, supply chain information systems, product design, relationship building and ERP will be provided.

**78-661. Consolidated Financial Statements**

An in-depth review of such matters as definitions of subsidiaries, associates, and joint ventures; equity accounting; exclusions from consolidations; and the preparation, presentation, and analysis of consolidated balance sheets and income statements.

**78-662. Accounting Systems Control and Auditing**

An exploration, from an international perspective, of accounting systems control and auditing. The framework and regulation of controls and audits, planning and risk, internal controls, audit evidence, group audits and reporting will be covered.

**78-663. Corporate Governance** (*International Accounting and Finance stream capstone*)

An analysis of matters of corporate governance and managerial responsibility to the organization's stakeholders with special reference to the regulatory framework, business ethics, and the consequences of failures in governance.

**78-665. International Management**

Focus is placed on the problems and issues that confront managers in the area of international business. A major objective will be to develop a sensitivity that will enhance the student's ability to operate in the complex environment of multi-cultural business. Background materials, cases, and exercises will involve the students in the challenges facing the international manager.

**78-666. Managing for High Performance**

An examination of the preparation needed to manage the unexpected in a time of organizational turbulence and change. Primary focus will be placed on the organization's approaches required to develop their staff and their structures so they can meet challenges with flexibility rather than rigidity.

**78-667. Current HR Trends** (*Human Resources Management stream capstone*)

A reading and research seminar that examines major concepts and important current problems in international Human Resources Management. Issues such as executive and management compensation, implementation of international labour standards in developing societies, development of an effective workforce, and dealing with outsourcing of corporate activities will be covered.

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## COMMUNICATION, MEDIA, AND FILM: COURSES

### 40-500. Pro-Seminar

An introduction to themes of social justice and the common good; media and democratic communication. The course will also facilitate the development of intellectual skills and include an exploration of procedures and requirements relevant to graduate study and intellectual life. Students will produce proposals and literature reviews for their major research paper or thesis projects.

### 40-501. Critical Theories of Communication

A review of critical theories of communication in the context of social justice themes. Key topic areas include theories of commodification, ideology, cultural production and representation, art and politics, communication and democracy, information, and globalization.

### 40-502. Graduate Research Methods

This course provides an overview and applications of a range of contemporary research methods in communication studies. Both qualitative and quantitative approaches will be examined in this course, but the course may focus primarily on one or the other type of approach to communication research.

### 40-512. Communication and Social Movements

Examines the use of traditional and non-traditional forms of communication that have been used within, and by, a variety of social movements and social formations. The course draws upon a combination of new social movement theory and critical media and cultural studies. Areas of focus will include the following: an assessment of (i) the contribution of new communication technologies to social activism and social movements; (ii) the representations of social movements in the context of political/economic/social change; (iii) the diversity and importance of alternative media as a central component of movements for social justice.

### 40-513. History of Communication Thought and Technology

Examines the evolution of media technology from perspectives of dependency theory, political economy, and critical cultural studies. Communication thought from the Greeks to the present, with emphasis on Canadian and U.S. Communication thought and international communication from the perspective of social justice and the common good will be analyzed.

### 40-514. Political Economy of Communication

The course examines the historical roots of critical political economy in relation to media and communication studies and explores contemporary applications of, and current issues in, the political economy of communication. Students will read a series of books and documentary materials which help to bring to light the role played by mass media in power relations and the social construction of reality. The texts will be examined from the perspective of critical political economists (such as Noam Chomsky).

### 40-515. Media Representation and Reception

Any range of media modes and texts, such as documentary, experimental film, music-video, feature films, television, and the emerging digital formats, may be examined in terms of their aesthetics, poetics, history, and cultural politics. Theoretical approaches to representational analysis and/or audience reception will be presented for critical reflection.

### 40-518. City as Media

The seminar will explore theoretical approaches to the ways in which urban spaces, everyday life, and city stories are articulated and imagined through media, arts and technologies. Seminar participants will develop research papers and experience-based creative projects about Windsor and/or Detroit. Students will examine films, stories, sounds and other media objects that reflect the urban, but will also be encouraged to develop research methodologies that use old and new media to question and document the cities' urban and suburban life. In classroom seminars, a range of theoretical writings and media objects all oriented to the urban will be discussed. In research practice, students will work with techniques such as auto-ethnographies to develop creative documents around everyday urban life. (3 hour lecture.)

### 40-520. Directed Study

Normally reserved for students not writing a thesis. With approval of the graduate program director, a student may undertake to write an original paper on a specialized topic which will enhance his or her program of study. The course will involve directed supervision of readings and informal discussion with the student's course supervisor.

### 40-543. Advanced Film Theory and Criticism

Films are explored under the broad rubric of cultural studies; specific theoretical approaches employed to analyze cinema are examined. Case studies of genres as the emergent effective mode of understanding films are taken up. Films selected may belong to the silent or classical period to the contemporary. The readings provide tools to analyze formal aspects and critical interpretative frameworks applied to examine films. Writing assignments forge links between the written and the visual and between theory and film texts. (3 hrs/week: once a month, class will be extended due to in-class film screening.)

### 40-590. Selected Topics

Selected advanced topics in Communication Studies based on special faculty interests and opportunities afforded by the availability of visiting professors. Special topics courses are subject to Graduate Committee approval. (May be repeated for credit provided that the topics differ.) (3 lecture hours a week.)

### 40-796. Major Paper



(Credit Weight: 9.0)

**40-797. Thesis**

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## CHEMISTRY AND BIOCHEMISTRY: COURSES

All of the courses listed will not necessarily be offered in any one year. Topics courses may be taken several times provided the course content is different. Where prerequisites are not stated, consent of the instructor is required.

Click here for [Master of Medical Biotechnology courses](#).

**59-521. Special Topics in Analytical Chemistry**  
(Prerequisite: 59-321.) (2 lecture hours a week.)

**59-531. Special Topics In Organic Chemistry**  
Topics may include polymer chemistry, natural product chemistry, physical organic chemistry, or design and execution of organic syntheses. (Prerequisite: 59-331 or consent of instructor.) (2 lecture hours a week.)

**59-535. Advanced Organic Chemistry**  
Physical organic chemistry. Includes molecular orbital theory, stereochemistry, thermodynamics, and reaction mechanisms. (Prerequisite: consent of instructor.) (2 lecture hours a week.)

**59-541. Statistical Thermodynamics**  
A detailed picture of the current status of advanced experimental and theoretical research in modern reaction dynamics. Subjects to be discussed include transition state spectroscopy, coincidence imaging techniques, ion imaging applied to the study of chemical dynamics, nonlinear reaction dynamics in both stirred and reaction-diffusion media, theoretical dynamics treatment of chemical reactions. (2 lecture hours a week.)

**59-542. Nuclear Magnetic Resonance Spectroscopy**  
Theory and applications of NMR in chemical problems, including the origin of the NMR phenomenon, Fourier transforms and spectral processing, spectrometer hardware, pulse sequences, NMR interactions, relaxation and chemical exchange, double-resonance experiments and two-dimensional NMR. (2 lecture hours a week.)

**59-545. Special Topics in Physical Chemistry**  
(2 lecture hours a week.)

**59-546. Advanced Topics in Spectroscopy**  
Electronic and vibrational spectroscopy of gases, liquids, and solids. Theory and practice of infrared and Raman spectroscopy. Theory and applications of electron spin resonance spectroscopy. (2 lecture hours a week.)

**59-550. Special Topics in Inorganic Chemistry**  
A variety of subjects in inorganic chemistry are covered at the discretion of the instructor. The subjects covered may include: main group chemistry, transition metal chemistry, organometallic chemistry, inorganic materials, and group theory. (3 lecture hours a week.)

**59-552. Topics in Inorganic Chemistry and Organometallic Chemistry**  
Topics to be arranged by the instructor, based primarily upon new developments in the field as illustrated by the current research interests of the faculty, as well as by a study of the current literature. (2 lecture hours a week.)

**59-553. X-ray Crystallography**  
Theoretical and experimental aspects of single crystal X-ray diffraction methods for the determination of molecular structures. (2 lecture hours a week.)

**59-564. Advanced DNA Science**  
An advanced lecture and seminar course dealing with DNA science. The lectures cover the biochemistry of DNA and RNA at the molecular levels, the current research topics and their implications for the future research. The course also contains a seminar component in which a number of selected topics will be discussed and presented by and among participants. (Prerequisites: 59-468 or equivalent, or consent of instructor.) (2 lecture hours a week.)

**59-565. Membrane Biochemistry**  
The structure and function of artificial and natural membranes. Special consideration will be given to the identification and function of membrane proteins. (Prerequisites: 59-360 and 59-361 or 59-362 and 59-363, or equivalent.) (2 lecture hours a week.)

**59-570. Advanced Quantum Chemistry**  
Perturbation and variation theories. Theories of many electron atoms and general theories of chemical bonds in diatomic and polyatomic molecules. (Prerequisite: 59-341 or equivalent.) (3 lecture hours a week.)

**59-581. Analytical Toxicology**  
Analysis of drugs and other toxic substances in biological fluids. The metabolism of drugs as well as the symptomology of poisoning of common therapeutic drugs and the more common industrial chemicals will be discussed. (Prerequisites: 59-360 and 59-361 or 59-362 and 59-363, or consent of instructor.) (2 lecture hours a week.)

**59-600. Directed Special Studies**

A special course of studies with content and direction approved by the student's research advisor and supervisory committee. Although there may be no formal lecture requirements, the course will be equivalent to three one-hour lectures a week for one term. The student will be required (a) to produce a critical review which will be assessed by his or her supervisory committee; the presentation and standard of the review must be appropriate for publication in a scientific journal; (b) to spend one term working in an agreed industrial setting; the quality of work will be assessed by the supervisory committee. This work may be related to but not part of the research undertaken in 59-797 or 59-798. (Prerequisite: approval of the Program Committee.)

The course cannot be repeated for credit under (a) above. Under normal circumstances, M.Sc. students may take this course only once; Ph.D. students may register under (b) above for two terms of this industrial experience.

#### **59-620. Analytical Spectroscopy of Surfaces**

Surface spectroscopic techniques and their application to the analysis of chemisorbed and physisorbed species and monomolecular layers. (Prerequisite: 59-321 or equivalent.) (2 lecture hours a week.)

#### **59-630. Synthetic Methods in Organic Chemistry**

A study of some important organic reactions with emphasis on their practical application in synthesis. (Prerequisites: 59-330 and 59-331, or consent of instructor.) (2 lecture hours a week.)

#### **59-631. Advanced Topics in Organic Syntheses**

The design, execution, and methodology of total syntheses of complex molecules will be discussed. Emphasis will be placed on both retrosynthetic pathways and execution. (Prerequisites: 59-330 and 59-331, or consent of instructor.) (2 lecture hours a week.)

#### **59-633. Current Topics in Organic Chemistry**

Topics to be arranged by the instructor, based primarily upon new developments in the field as illustrated by the current research interests of the faculty, as well as by a study of the current literature. (Prerequisites: 59-331 or consent of instructor.) (2 lecture hours a week.)

#### **59-634. Advanced Topics in Organic Chemistry**

Special topics in organic chemistry will be described. Some of these may include natural product chemistry, organometallic chemistry or heterocyclic chemistry. (Prerequisite: consent of instructor.) (2 lecture hours a week.)

#### **59-636. Advanced Topics in Organic Materials Chemistry**

Synthetic approaches as well as physical properties of organic materials such as conducting structures, liquid crystals, dyes, and light emitters are covered. An in-depth understanding of structure-property relationships is the main goal.

#### **59-651. Organometallic Chemistry**

A detailed study of selected advanced topics in organometallic chemistry. Typical subjects include (at the discretion of the instructors) main group organometallic chemistry; thermochemical methods in organometallic chemistry; catalysis by organometallics; detailed structural studies. (2 or 3 lecture hours a week.)

#### **59-653. Advanced Topics in Organometallic Chemistry**

Topics to be arranged by the instructor, based primarily upon new developments in the field as illustrated by the current research interests of the faculty, as well as by a study of the current literature. (2 lecture hours a week.)

#### **59-655. Selected Topics in Inorganic Chemistry**

The chemistry and properties of inorganic materials. Typical topics include: methods of synthesis, methods of characterization, and applications of inorganic materials. (2 lecture hours a week.)

#### **59-660. Protein Chemistry I**

Protein chemistry; chemical modification, protein folding, post-translational modification, lipoproteins, and glycoproteins. (Prerequisite: 59-365 or equivalent.) (2 lecture hours a week.)

#### **59-661. Protein Chemistry II**

Biophysical chemistry; advanced kinetic techniques, pre-steady state, perturbation based methods, review of instrumentation, and examples of how these techniques are currently used to solve biochemical problems. (Prerequisite: 59-660.) (2 lecture hours a week.)

#### **59-663. Special Topics in Biochemistry**

(Prerequisites: 59-360 and 59-361, or 59-362 and 59-363, or equivalent.) (2 lecture hours a week.)

#### **59-671. Special Topics in Theoretical Chemistry**

Topics to be selected by registrants but will generally be molecular orbital calculations for organic and inorganic chemists. (2 lecture hours a week.)

#### **59-684. Cell Death and Diseases**

A detailed biochemical study of physiological (apoptosis) and pathological (necrotic) cell death in mammalian systems. Role of physiological cell death (apoptosis) during development and tissue homeostasis, immune system and cancer. Various inducers of cell death and mechanism of apoptotic cell death. Role of cell death in disease development: viral infections, stroke, and neurodegenerative disorders, oxidative stress, cell death and aging. Therapeutic opportunities: identification of new targets for drug development based on the biochemistry of cell death. Developing new therapeutic approaches e.g. combinatorial treatment for systemic diseases, new vaccine approaches and gene therapy. (2 lecture hours per week.)

#### **59-686. Advanced Bioanalytical Topics**

(Prerequisite: 59-360 or 59-362, or equivalent.) (2 lecture hours a week.)

#### **59-710. The Research Proposal**

This course focuses on the development and presentation of a research proposal, as well as the cultivation of a wide base of knowledge of the chemical and biochemical literature. Techniques of research proposal composition, with particular reference to subject area, budgetary considerations, and written and oral presentation techniques will be discussed. The student will be required to develop and defend his or her own research proposal in chemistry and/or biochemistry. The subject of this proposal must not be from the research work undertaken for the Ph.D. thesis. A written proposal will be submitted to the student's advisory committee and will be followed by an oral presentation and defense of the proposal. The advisory committee will evaluate the originality, the significance, the clarity of the written and oral presentation, and the student's knowledge of the area in the defense. (Prerequisite: registration in the Ph.D. program. The oral presentation and proposal defense will take place during the term of registration.)

#### **59-795. Seminar**

#### **59-797. Master's Thesis**

#### **59-798. Doctoral Dissertation**

### **MASTER OF MEDICAL BIOTECHNOLOGY (MMB) - COURSES**

#### **59-670. Protein Structure and Function**

This course will review and examine the principles of protein structure and how it applies to protein function. Moreover, how protein function is controlled and functional genomics will also be considered. Methodologies used in protein structure determination will also be highlighted. The laboratory section of the course will focus on web based computational programs as they apply to protein structure. (Enrolment restricted to MMB students.)

#### **59-672. Proteomics and Biological Mass Spectrometry**

This course will focus on the theory and applications of biological mass spectrometry with particular emphasis on its use in proteome platforms. The most common types of ionization methods and mass analyzers will be thoroughly presented including data interpretation. A major part of the course will cover the applications of this technique in identifying multi-protein complexes, mapping post-translational modifications, and quantitative proteomics. Finally, various techniques that are commonly interfaced with the mass spectrometer will be introduced in order to emphasize proper sample preparation and stimulate discussion on applying mass spectrometry to graduate student's own projects. (Enrolment restricted to MMB students.)

#### **59-673. Drugs: From Discovery to Market**

This course will introduce students to the relevant concepts and applications of organic synthesis and chemical characterization that lead to the discovery and rational design of therapeutic agents. In addition, the course will cover the fundamentals of the clinical trials process and best regulatory practise's in pharmaceutical industries. (Enrolment restricted to MMB students.)

#### **59-674. Clinical Biochemistry**

Clinical Biochemistry is concerned with the analysis and testing of bodily fluids and tissues. This field is fundamental to patient care and contributes significantly to the diagnosis, treatment, monitoring and prognosis of disease processes. This course is designed to introduce students to the field by covering areas including quality control in clinical testing, automation, clinical enzymology and biomarker discovery. In addition, the course will focus on the design, testing and commercialization of specific clinical tests for: liver function, abnormalities in lipid metabolism, diabetes and related metabolic disorders, fertility/reproduction, cancer and therapeutic drug monitoring. Upon completion of the course the students will get a broad exposure of the current state of the technology for the analysis of clinical samples as well as learning the basic principles in design and testing of clinical assays for a wide range of analytes. (Enrolment restricted to MMB students.)

#### **59-675. Biochemistry and Cell Biology of Lipids and Membranes**

This course focuses on the biochemistry and cell biology of lipids and their role in cellular signaling, with a particular emphasis on the experimental basis of current knowledge. Topics covered include lipid biochemistry, membrane biophysics, the biochemistry and metabolism of small molecules such as steroids and leukotrienes, and an integrative assessment of the role of lipids and membranes in cellular processes such as protein trafficking and intracellular signaling. (Enrolment restricted to MMB students.)

#### **59-676. Human Physiology and Mechanisms of Disease**

This course will cover the field of physiology as it relates to the further understanding, diagnostics, treatment, and human disease-mechanisms of disease. The course is taught from a holistic approach that provides key insights into cellular physiology and associated molecular aspects of biology related to human disease. The course will outline the principles and practice of cell and molecular physiology, pathological pathways, molecular pathogenesis, and molecular mechanisms of disease. It will be followed by investigations and discussion on the practice of molecular medicine and the translational aspects of molecular pathology: molecular diagnostics, molecular assessment, and personalized medicine. Students will be engaged in presentations and discussions of current and future industry trends, medical and research discoveries that are translational by enhancing the identification, diagnosis, and treatment of human diseases. Topics will include: molecular and cellular mechanisms of cancer; inflammation and immunology; cell death and regulation; stem cell and developmental biology; neurobiology; and gene regulation. (Enrolment restricted to MMB students.)

#### **59-677. Biotechnology Laboratory**

This intensive laboratory course will primarily simulate the discovery and rapid characterization of genes and gene products

(i.e. proteins). Laboratory experiments will include cutting edge biotechnology techniques and traditional biochemical methodology. Students will be introduced to techniques including nucleic acid isolation and amplification (i.e. PCR), regulation of gene expression, cloning, protein isolation and purification, enzyme functional assays and characterization (2-D electrophoresis, mass spectrometry). (Enrolment restricted to MMB students.) (Equivalent to 2 courses.)

**59-690. Biotechnology Entrepreneurship**

Entrepreneurship in Biotechnology will provide students an introduction to the complexities and unique problems facing the biotechnology industry. Students will be exposed to the topics most critical for successfully founding, financing and operating a life science company, and will be expected to perform many of the same tasks that founders would normally undertake. Discussions with life-science entrepreneurs, evaluation of existing biotechnology firms, case studies based on recent companies and hands-on work developing entrepreneurial endeavors all will be utilized. (Enrolment restricted to MMB students.) (Equivalent to 2 courses.)

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## COMPUTER SCIENCE: COURSES

Not all of the courses listed below will necessarily be offered in any one year. A component of certain courses will be offered in conjunction with an advanced undergraduate course; in such cases the undergraduate course work will comprise one half of the graduate course.

All courses are restricted to students enrolled in the Master's II Computer Science program who have all undergraduate qualifying courses and who have approval from the instructor and Computer Science program graduate committee.

Note: Certain courses listed below require more than one term to complete. Unless such courses are officially graded as "In Progress" (IP), regulations for incomplete grades will apply. See Faculty Regulations - Grading and Dropping Courses.

To remove any suggestion that the word "engineering" in the context of courses in Computer Science may be taken to cover the meaning of "engineering" as used in the context of courses in Professional Engineering, it is hereby acknowledged that Software Engineering is a collection of principles, models, methods, and techniques for the development, maintenance, evolution and reuse of software that meets functional, performance and quality requirements in an economic and competitive manner.

### 60-510. Literature Review and Survey

The purpose of this course is to prepare students for conducting the specific research on which their thesis will be based. Students are required to complete a thorough literature search on the general area in which they intend to conduct research and to undertake extensive supervised reading. Students must submit a comprehensive survey of relevant research, together with an annotated bibliography and references of important papers, theses, books, and conference proceedings. The bibliography should include names and current addresses of scientists working in the student's chosen area.

### 60-511. Advanced Software Engineering

Development and maintenance of software systems that satisfy their specifications. Topics include integrating informal and formal software design methodologies, software reuse, and software reliability.

### 60-512. Software Engineering for Distributed Systems

This course introduces to the students both formal and informal techniques used in software specification, verification and testing. The concentration is put on advanced methods and techniques in dealing with large-scale distributed concurrent systems. The aim of the course is to provide graduate students the opportunity of obtaining strong background and skills in developing complex software systems for their future work in industry.

### 60-513. Topics in Software Engineering

Some advanced selected topics in software engineering will be discussed in this course. Topics include software quality engineering, formal methods in software verification, and reverse engineering of software.

### 60-515. Middleware and Web Engineering

This course introduces software engineering concepts, principles and techniques in middleware and web-based systems. Selected topics include, but are not limited to: architecture design; web modelling in UML; testing techniques in web applications; software monitoring with CORBA interceptors; distributed object systems using CORBA; formal methods in message-oriented middleware.

### 60-535. Distributed Query Processing

This course will cover topics such as algorithms and techniques for query optimization in distributed databases; methods for evaluating algorithms and experimental procedures. Each student will be required to survey a topic in the area and present a report. Students will also be required to implement algorithms and comparatively evaluate techniques.

### 60-536. Multimedia Databases

This course focuses on the study of basic and advanced database techniques used to manage multimedia objects in multimedia database systems. Topics covered include: motivation for multimedia databases; fundamental database implementation techniques; characteristics of multimedia applications; multidimensional access structures; image databases; movie databases; further media types such as text and audio; multimedia databases; models and languages; storage techniques; and multimedia presentations.

### 60-537. Database Management Systems

Current developments in selected aspects of database management. Topics covered may include data models, database languages, database logics, database machines, and transaction management.

### 60-538. Information Retrieval Systems

Fundamental principles and advanced topics in the design of information retrieval systems. Theoretical as well as practical aspects will be discussed.

### 60-539. Emerging Non-traditional Database Systems

Course focuses on the study of one or more advanced, new and non-traditional database system(s) like data warehousing and mining, video database systems, mobile database systems, and distributed object-oriented database systems. Topics discussed include system architecture, components, features, implementation, applications and research issues. Both theoretical and practical contributions to further improve the system under study remain part of the course objective.



#### **60-540. Foundations of Programming Languages**

Current developments in the theory and practice of programming language design and implementation. Various languages will be considered and may include imperative, applicative, logic, constraint, object-oriented, and equational languages.

#### **60-549. Virtual Reality**

This course introduces the fundamental concepts, advanced techniques, and most recent practices of virtual reality research and applications. Topics include: web-based virtual interfaces design, object and behaviour modelling, animation and physical simulation, 3D human-computer interaction, real-time rendering of multi-sensory feedback, and virtual reality tools and applications. (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-550. 3D Animation and Data Visualization**

Introduction to visualization methods, especially in the context of 3D modeling and 3D animation; 3D geometric modeling, 3D computer animation; forward/inverse kinematics and rigid body dynamic techniques for animation. Students will learn interactive modeling/animation tools and their use to produce motion for animations.

#### **60-551. Visual Processing**

This course introduces fundamental aspects of visual processing. Topics include: image formatting, image processing, image acquisition, camera geometry, camera calibration, feature detection, 3D reconstruction, camera motion computation, feature matching, feature tracking, object recognition and vision for robotics.

#### **60-552. Computer Graphics**

Current developments in computer graphics. Topics covered will include hardware, software, interfaces, graphics standards, data structures, rendering algorithms, and visualization.

#### **60-554. Advanced Algorithms**

Methodology for developing efficient algorithms. Advanced data structures. Intractable computational problems and approximation algorithms.

#### **60-555. Parallel Computation**

Introduction to fundamental issues in parallel computation. Basic parallel computing platforms. Models of parallel computation such as shared data and message passing. Data parallel and other abstractions. Cost models and debugging. Programming for performance. Scalability. Workload balancing. Meta-computing in grid environments. Libraries and compilers. Parallel algorithms for numeric and non-numeric problems.

#### **60-556. Parallel Runtime Systems**

Introduction to fundamental issues in parallel runtime systems. Thread systems and communication libraries. VSM, I/O and checkpointing. Scheduling and load distribution, synchronization, dynamic memory management, representation. Interface to user and computer architecture. Multiple-strategy systems and configuration. (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-557. Computational Geometry and Its Applications**

This focus of this course is on the algorithmic issues in geometry and its various applications. Topics include: basic geometric algorithms pertaining to construction of convex hull, Voronoi diagram, triangulations, and other constructions of a point set; construction of the arrangement of a set of lines and its connection with the Voronoi diagram; applications of fundamental algorithms in areas such as computer graphics, robotics and geographical information processing.

#### **60-558. Topics in Bioinformatics**

The purpose of this course is to present a representative sample of computational problems in molecular biology, bioinformatics, genomics and proteomics and efficient algorithms to solve them. Topics may include: molecular biology, sequence alignment, genomics database, protein structure protein interaction, phylogenetic analysis, RNA structure, gene regulation, functional genomics, microarrays. Student will be required to investigate selected problems/methods in computational biology and bioinformatics. (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-559. Machine Learning and Optimization**

Focusing on several central learning problems, this course presents important machine learning techniques, such as supervised, semi-supervised, and unsupervised learning, and probabilistic model building; topics include decision trees, neural networks, Bayesian learning, instance based learning, and reinforcement learning. Optimization topics include: simulated annealing, tabu search or evolutionary algorithms, gradient methods, constraint optimization, ant-colony optimization, and other heuristic search methods. Efficiencies and limitations of each of these will be discussed and the correlation between the different approaches will be highlighted. (Prerequisites – B.Sc. [Hons, Computer Science] or with the permission of the instructor.)

#### **60-560. Advanced Computer Architecture**

Current developments in computer architecture covering advanced concepts in sequential and parallel architectures. Topics include memory hierarchy, homogeneous and heterogeneous architectures, shared-memory (SMP and DSM) and distributed-memory machines (Beowulf cluster to high-end parallel machines), dataflow and multi-threaded architectures, ILP and VLIW, pipelining, and vector machines. Systolic arrays and application/language specific architectures. Networks. Programming models for parallel machines. Programming for performance on different architectures.

#### **60-561. Artificial Neural Networks**

This course introduces the fundamentals of Artificial Neural Networks. Standard neural network architectures are discussed along with their associated set of learning algorithms. Application classes of neural networks are also presented. Topics include: supervised and unsupervised learning, associative learning, competitive learning, probably approximately correct

learning, adaptive learning, pattern recognition, linear separability, gradient-descent and optimization. Students will be required to investigate selected architectural and/or learning models of some neural networks. (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-562. Computational Grid Systems**

Introduction to computational grid system goals; issues in requirements acquisition and design, specification and development; computing, networking and institutional infrastructure development; relationship to cluster and super-computing approaches; mechanisms and approaches to account management; grid adaptation of programming model; information service provision and delivery; measurement and analysis of end-to-end performance of parallel and distributed applications; analysis and monitoring tools; issues related to remote access and transparency; resource scheduling and management; and, security issues in authentication, authorization and data integrity. (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-564 Security and Privacy on the Internet**

This course introduces the issues of security in public distributed networks. Topics include: security planning, policies and procedures, threats and strategies, security services and mechanisms, digital rights; topics in Internet related to security and privacy; secure protocols, DES, AES; public key algorithms; VPN; Internet sniffing and scanning tools; intrusion detection, intrusion analysis and tools; viruses and enterprise anti-virus tools; other applications such as digital cash, code signing and anonymous e-mail.

#### **60-567. Advanced Computer Networks**

This course will cover developments in modern communication networks. Topics may include: link-level design issues; network routing; network optimization and resource allocation; wireless networks and mobile IP; ATM technology; switching hardware; optical communications; and fault-tolerant networks.

#### **60-568. Advanced Internet Systems**

This course covers the internet design philosophy and its protocols, such as IPv4, IPv6, TCP and RTP/RTCP. Topics include emerging Internet multimedia services, Quality of Service (QoS), scheduling and policing mechanisms, routing, resource reservation, reliable multicast, flow and congestion control, integrated services, differentiated services, and adaptive applications. (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-569 Semantic Web**

The Semantic Web is an extension of the current world wide web in which information is given well-defined, machine-understandable meaning, thus enabling computers and people to work in cooperation. This course introduces both theoretical and practical aspects in semantic web. Topics will include: languages and representation issues in semantic web; cooperative software agents; web service technology; and information integration theory and practice.

#### **60-570. Introduction to Artificial Intelligence**

This course covers fundamental concepts in Artificial Intelligence including problem solving, knowledge representation and reasoning, planning, learning and natural language understanding. (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-572. Topics in Artificial Intelligence**

Students will study in depth selected fundamental topics in artificial Intelligence. The focus will be on theories, techniques and algorithms. (Prerequisite: 60-570 or permission of the instructor.)

#### **60-573. Natural Language Processing and Understanding**

This course covers the basic linguistic, logical and AI approaches to the development of natural language understanding systems. Topics covered include: syntactic/parsing strategies, formal semantics, pragmatics and the resolution of various types of ambiguities. Inference strategies involved in the resolution of ambiguities at the pragmatic level include a detailed discussion of the representation of and reasoning with commonsense knowledge. The course also includes the implementation of natural language interfaces and the application of linguistic approaches to the development of intelligent text retrieval systems. (Prerequisite: 60-570 or permission of the instructor.)

#### **60-574. Pattern Recognition**

This course is a general introduction to Pattern Recognition. Topics may include: Bayesian learning and classification, estimation, distance-based classifiers, linear and nonlinear methods, support vector machines, kernels, dimensionality reduction, feature extraction and selection, clustering, classifier evaluation. (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-575. Knowledge Representation and Reasoning**

This course covers advanced topics in knowledge representation and reasoning including Non-monotonic logic, Temporal and spatial representation and reasoning, Probabilistic approaches, Belief and decision networks, and an overview of the applications of these formalisms to diagnosis, navigation and decision making. (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-576. Advanced Search Methods**

This course covers advanced search methods including, for example, gradient-descent family of search methods, hill climbing, simulated annealing, evolutionary search, tabu search, hybrid techniques, adaptive techniques, constraint satisfaction search, forward checking, consistency enforcement and adversarial search (two player games). (Prerequisite: B.Sc. (Hons., Computer Science) or permission of instructor.)

#### **60-579. Topics in Applied Artificial Intelligence**

Topics in artificial intelligence focussing on intelligent systems and applications. Topics will be selected from areas such as



intelligent agents, intelligent tutoring systems, knowledge acquisition, intelligent scheduling, embedded intelligence, constraints satisfaction techniques, and knowledge discovery. (Prerequisite: 60-570 or permission of the instructor.)

#### **60-588. Advanced Programming Languages**

Current developments in the design, application, and implementation of pure lazy functional programming languages.

#### **60-590. Directed Special Studies**

With approval of the graduate program coordinator, a student may undertake to write an original paper on a specialized topic which would enhance his or her program of study. The course will involve directed supervised reading and informal discussion with the graduate supervisor. The work undertaken in fulfilling the requirements for this course will not be counted directly for credit in the evaluation of 60-797 (M.Sc. Thesis).

#### **60-592. Selected Topics**

Selected advanced topics in computer science.

#### **60-611. Advanced Software Engineering Topics**

This course addresses current practices in medium to large-scale software development projects. A comprehensive overview of important design patterns is provided, with emphasis on practical aspects of software analysis and design methodology, implementation techniques and system development paradigms, as well as software testing and verification practices. Strong technical communication and process documentation, including those associated with standard and agile practices, are a particular focus of the course. (This course is restricted to students in the Master of Applied Computing program.)

#### **60-615. Advanced Database Topics**

This course will introduce students to advanced topics in database design and information retrieval. Topics covered may include DBMS three-schema level architectures, data models (e.g., relational, object-oriented model), query languages (e.g. Oracle SQL, PL/SQL), file organization and indexing, transaction management, concurrency control, security and recovery procedures, information retrieval on the internet, and other advanced topics (e.g. online analytical processing -- OLAP, data warehouses and data mining).

#### **60-634. Internet Applications and Distributed Systems**

This course will introduce students to the latest tools and technologies for developing internet applications. Topics covered may include a review of client/server model and applications, multi-tier software architecture, content management systems, dynamic server-side applications, principles of parallel programming and distributed systems and techniques for solving complex problems using distributed systems. (This course is restricted to students in the Master of Applied Computing program.)

#### **60-654. Advanced Computing Concepts**

This course covers advanced topics in principles and applications of algorithm design and analysis, programming techniques, advanced data structures, languages, compilers and translators, regular expressions, grammars, computing and intractability. Cases studies and applications in current programming languages are explored in class and labs. (This course is restricted to students in the Master of Applied Computing program.)

#### **60-656. Advanced Systems Programming**

This course explores advanced topics in software development techniques for systems programming in the context of the Unix environments for different platforms, ranging from handheld devices to mainframes. Topics include; overview of Unix/Linux and Android operating systems, Shell programming, process control and communication, multi-threading, internet client/server application and service development.

#### **60-667. Networking and Data Security**

This course will introduce students to the fundamental concepts of computer networks, with an emphasis on network security. Topics will cover fundamental principles and protocols of computer networks, types of security threats and vulnerabilities and a variety of techniques for addressing security issues, such as security protocols, firewalls, intrusion detection/prevention. (This course is restricted to students in the Master of Applied Computing program.)

#### **60-699. Project/Internship**

This course will provide supervised experience in completing an approved software project. The focus will be on the application of technical knowledge and skills to a specific project and development of other transferable skills. Students may have the opportunity to complete their project in an approved career-related setting. (6.0 credit course.)

#### **60-701. Work Term**

The Work Term is offered on a Pass/Non-Pass basis. It provides the opportunity for students to enhance academic learning with valuable industrial experience, and to develop transferable skills in an applied setting. Students need departmental permission to enrol in the work term, and must have successfully completed a minimum of one-semester full-time study in the graduate program. (Pre-requisite: Departmental permission).

#### **60-797. M.Sc. Thesis**

#### **60-798. Doctoral Dissertation Research**

An original research investigation, the results of which will be embodied in a concisely written dissertation conforming in style and format to a recognized journal in the field of specification. The dissertation should be of the highest quality possible and suitable for publication. In no case may this course be used for credit toward fulfilling the course requirements in the Ph.D. program.

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## EARTH AND ENVIRONMENTAL SCIENCES: COURSES

All courses listed will not necessarily be offered in any one year.

### 61-530. Crustal Fluids

Physical and chemical architecture of crustal fluid flow systems. Sources of fluids, fluid geochemistry, fluid-mineral equilibria and interactions, fluid inclusions, controls and mechanisms of fluid flow. The role of fluids in selected geological processes will be investigated. (3 lecture/seminar hours a week.)

### 61-531. Fluid Flow in Porous Media

Evolution and dynamics of fluids in porous media: theory for groundwater flow; multiphase flow; fluid-mineral equilibria and interactions; chemical transport and reactive flows. The role of fluids in selected low temperature environments will be investigated. (3 lecture/seminar hours a week.)

### 61-532. Numerical Simulation of Subsurface Fluid Migration

Numerical modelling theory, methods and implementation into computer software for subsurface fluid flow and mass transport; finite difference method; finite element method; integral equation method; conceptual model design and sensitivity analysis; applications to exploration, environmental and engineering issues. (3 lecture/seminar hours a week.)

### 61-544. Sedimentology of Detrital Deposits

Hydrodynamic significance of primary sedimentary structures, post-depositional modification of sediments; biostratification and trace fossils; sedimentary environments; sedimentological methods in economic geology. (3 lecture hours a week.)

### 61-545. Advanced Topics in Igneous Petrology and Global Tectonics

Petrochemistry of igneous rocks in important geotectonic settings and implications for mantle and crustal processes. Precambrian greenstone belt magmatism and crustal evolution. Major and trace element geochemistry and stable and radiogenic isotopic systematics of igneous rocks. (Prerequisite: 61-565 or consent of instructor.) (3 lecture and/or seminar hours a week.)

### 61-548. Advanced Topics in Environmental Geochemistry

An investigation into the effects of near-surface geochemical processes and activities on the migration of chemicals in the environment. Topics to be covered include current research in: geomicrobiology, analytical techniques, colloid chemistry, contaminant transport, and bioavailability. (3 lecture and/or seminar hours a week.) (Prerequisite: 61-565 or consent of instructor.)

### 61-549. Advanced Topics in Sedimentology and Sedimentary Geochemistry

Principles of facies models as derived from modern environments and ancient successions; geochemistry and mineralogy of sedimentary rocks and natural waters; chemistry and mineralogy of weathering; geochemical facies analysis; fractionation of elements and isotopes during sedimentation; chemical diagenesis; organic matter and mineral diagenesis; geochemical evolution of sedimentary rocks through geologic history. (Prerequisite: 61-565 or consent of instructor.) (3 lecture hours a week.)

### 61-555. Advanced Topics in Geophysics

Recent advances in selected geophysical topics. Subjects may include paleomagnetism and environmental magnetism, tectonophysics, modern analytical methods or exploration geophysics. Lectures and seminars on fundamentals and selected case histories. (Prerequisite: consent of the instructor.) (3 lecture and/or seminar hours per week.)

### 61-556. Applied Geophysical Techniques

The theory, methodology and application of selected geophysical techniques are studied through the design and implementation of a class project. Surveyed techniques may include: magnetic, gravitational, ground penetrating radar, induced polarization and others. (Prerequisite: consent of instructor.) (3 lecture and/or project hours a week.)

### 61-559. Underground Storage

Exploitation of subsurface space for storage of industrial products and wastes. Possible environmental impact of poorly planned underground storage. Economics of subsurface vs. surface storage. Emphasis on Canadian case histories. (3 lecture hours a week.)

### 61-560. Advanced Topics in Mineral Deposit Geology and Geochemistry

Discussion of current genetic models for selected types of mineral deposits. Ore-forming processes. Selected topics in hydrothermal geochemistry. (Prerequisite: 61-565 or consent of instructor.) (3 lecture and/or seminar hours a week.)

### 61-564. Research Methods in Geochemistry

Sampling of geological materials. Sampling statistics. Modern analytical methods in geochemistry theory and selected applications. Data analysis. (Prerequisite: consent of instructor.) (3 lecture and/or project hours a week.)

### 61-565. Advanced Topics in Geochemistry

A discussion of key concepts in geochemistry. Topics may include aqueous complexation and solubility, mineral stability, radiogenic and stable isotopes, fluid phase equilibria, trace elements, thermodynamics, and kinetics. (Prerequisite: consent of instructor.) (3 lecture and/or seminar hours a week.)

**61-574. Advanced Topics in Geoinformatics**

Selected analytical and processing techniques in geographical information systems (GIS), remote sensing (RS), environmental modelling, and spatial decision support systems (SDSS). Spatial data acquisition methods and database integration. Application examples and technical issues. (Prerequisite: consent of the instructor.) (3 seminar hours per week.)

**61-575. Advanced Integration of Remote Sensing and GIS Techniques**

Lectures, readings and practical projects will focus on image rectification, restoration, registration, and integration of digital photographic, multispectral scanner data, radar image data and ancillary data in a GIS environment. Multitemporal data merging, change detection procedures, and multi-source image classification decision rules will also be emphasized. (Prerequisite: 61-574 or consent of instructor.) (3 lecture, seminar, and/or project hours a week.)

**61-576. Environmental Modelling and Spatial Simulation**

The modelling process; integrating environmental models and GIS; spatial heterogeneity and representative areal units; measurement scales vs. process scales; sensitivity and uncertainty analysis; model complexity; effects of input data quality; simulation model experiments; technical and conceptual limits of environmental modelling. Students will complete a small research project. (Prerequisite: 61-574, or consent of instructor.) (3 seminar hours a week, plus project.)

**61-580. Graduate Seminar**

Discussion of current topics in the earth sciences in seminars given by students, faculty members, and visiting speakers. Students are expected to participate in discussions and present a seminar. (Students must register in this course in the Fall and Winter terms of full-time registration in the M.Sc. program and in the first two years of the Ph.D. program.) (1 hour a week.)

**61-582. Master's Thesis Proposal**

Preparation of a written report containing: a thorough review of the literature relevant to the proposed research topic; an outline of the proposed research including a discussion of the expected contributions to the subject area and how these relate to previous work; a description of the relevant methods; and the expected timetable to completion. The student shall be examined by his or her advisory committee on the content of the proposal and related background knowledge, and shall present the proposal in a public lecture.

**61-590. Special Topics**

(May be taken for credit more than once provided that the topics are different.)

**61-700. Doctoral Research Proposal**

Preparation of a written research proposal containing: a thorough review of the literature relevant to the proposed research topic(s); an outline of the proposed research including a discussion of the expected contributions to the subject area and how these relate to previous work; a description of the relevant methods; and the expected timetable for completion. The proposal shall be presented in a public lecture. The student shall be examined by his or her advisory committee on the content of the proposal. The student must demonstrate an understanding of the context of the research project in the light of published research on the topic(s) presented, an understanding of the objectives and the methods to be used, and be able to articulate the contribution that the research will make to the advancement of knowledge. (Prerequisite: registration in the Ph.D. program.)

**61-797. Master's Thesis**

**61-798. Doctoral Dissertation**

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## ECONOMICS: COURSES

All courses listed will not necessarily be offered in every term. Courses are normally three hours a week.

### **41-501. Microeconomic Theory I**

An intensive review of the theory of the firm and consumer theory.

### **41-502. Macroeconomics Theory I**

An intensive review of theories of the determination of aggregate output, employment and price level.

### **41-503. Microeconomic Theory II**

Additional topics in microeconomic theory.

### **41-504. Macroeconomic Theory II**

Additional topics in macroeconomic theory.

### **41-510. Theory of International Economics**

An introduction to the problem of international trade of goods and services, and the related issues of exchange rate determination and balance of payment; Domestic policies under alternative exchange rate regimes; Money and exchange rates in models with sticky or flexible prices.

### **41-516. Labour Economics I**

The demand and supply analysis; human capital; trade unions and collective bargaining; wage structures; labour mobility.

### **41-531. Industrial Organization**

A theoretical and empirical analysis of firms and markets.

### **41-541. Econometric Theory I**

The general linear model, selected single equation problems, and an introduction to simultaneous equations methods.

### **41-542. Econometric Theory II**

Additional topics in econometric theory (Prerequisite: 41-541.)

### **41-543. Applied Econometrics**

The specification, estimation and testing of economic models. Emphasis will be on the classical linear regression model, the implications or violations of its basic assumptions and diagnostic testing. (This course is not intended for students who take 41-541.)

### **41-550. Monetary Theory**

A survey of recent developments in the theory of money and monetary control of an economy, in addition to selected topics.

### **41-580. Models of Strategic Behaviour**

A review of game theory showing how strategic reasoning can be used as a tool in decision theory. Topics include solution concepts for Normal form and Extensive form games, plus applications.

### **41-581. Mathematical Economics**

The formal properties of selected economic models. Includes an examination of the problems of existence, uniqueness and stability of solutions.

### **41-582. Selected Topics in Economic Theory**

An examination of the most recent literature on one or two selected topics in theory.

### **41-590. Regional Economics**

Theoretical and policy issues relating to large regions, including, for example, distribution of wealth, distribution of productive resources, and migration.

### **41-591. Urban Economics**

Theoretical and policy issues relating to urban areas, including, for example, urban growth and land use.

### **41-594. Special Studies in Economics**

Research and reading course in a selected field approved by the Department.

### **41-796. Major Paper**

## APPLIED ECONOMICS AND POLICY (MAEP) COURSES

### **41-601. Applied Microeconomics**

This course offers a systematic presentation of consumer theory, theory of the firm, and market equilibrium. Topics covered include preferences and utility, exchange, production, pricing, market structures, and welfare economics. These concepts are then applied to various policy issues including price and quantity regulation, taxation of labor and capital, income

distribution, and the minimum wage.

#### **41-602. Applied Macroeconomics**

This course provides a systematic overview of the theory of aggregate output and employment, the rate of interest, and price level determination. Coverage includes the theories of consumption and investment, the demand and supply of money, inflation, unemployment, and economic growth. These topics are discussed in the context of contemporary empirical work on aggregative relationships. Finally, the theory developed is applied to various policy issues such as a zero inflation rule, full employment legislation, and a balanced budget amendment.

#### **41-603. Mathematics for Applied Economics**

This course focuses on the mathematical methodology to be used in economic analysis. Topics covered include differential calculus and their importance in economics, linear algebra and its applications, optimization, Taylor series and linear approximation. Particular emphasis is placed on learning about how to use these methods in order to analyze economic phenomena.

\*\* This course will be cross-listed with undergraduate course (41-306), with more advanced expectations set for students enrolled under the graduate number.

#### **41-604. Applied Econometrics 1**

In this course, students will perform applied econometric analysis and use various econometric methods. Topics include probability and sampling, distribution theory, hypothesis testing, estimation, and analysis of variance

#### **41-605. Applied Econometrics 2**

This is a continuation of 41-604. Students will use statistical methods to analyze economic data, including empirically testing some economic theories and making predictions. Students will perform applied econometric analysis and use advanced econometric methods. (Prerequisite: 41-604.)

#### **41-606. Business Communication**

This course aims to enhance students' communications skills and ability within a Canadian academic and employment context, including the opportunity to enhance their academic and occupational communication skills throughout a variety of relevant mediums.

#### **41-607. Research Project in Economic Policy and Seminar**

This course is intended to develop independent research and presentation skills. With the guidance of the Instructor, students will choose a research economic topic, pose a specific question to be addressed and investigate the question. Students will be expected to conduct a formal literature survey which will form the basis for their investigation. The resulting paper can be theoretical, empirical or qualitative in nature. Students will be assessed on the basis of classroom discussions, classroom presentations and written assignment. (Prerequisites: 41-601, 41-602, 41-605.)

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## EDUCATION: COURSES

Not all courses will necessarily be offered each year. All 600-level courses are restricted to students in the joint Ph.D. program.

### **80-502. Learning-Centred Teaching in Higher Education: Principles and Practice**

This course offers the opportunity to explore, apply, and evaluate principles and theories of learning-centred practice in contexts typical of higher education. Analysis and reflection on teaching practice constitutes a central theme of learning in the course. The course is of particular interest to teaching assistants and members of the professoriate from across the disciplines and professional fields, but prior teaching experience in higher education is not a prerequisite.

### **80-503. The Psychology of Learning and Teaching**

This course will provide students with an in depth view of psychological theory and research towards the understanding of learning and teaching. While both behavioural and cognitive perspectives will be discussed, the emphasis will be upon cognitive theory and application. Topics will include behaviourism, behaviour modification, information processing, metacognition, cognitive behaviour modification, cognitive strategy training, motivation and individual differences.

### **80-510. Statistics in Education**

This course will deal with the following: descriptive and inferential statistical procedures; commonly used one- and two-sample tests; an introduction to analysis variance and corresponding research designs.

### **80-515. Comparative and International Education**

The course is designed to introduce students, who are registered in both the Educational Administration and Curriculum stream of the M.Ed program, to important educational issues from a comparative and international perspective. Within this framework, the similarities and differences between Canadian education and educational practices in other countries of the world are examined. Key questions that guide the direction of the course include, although are not limited to the following: what can we learn from the educational, teaching and learning practices of other countries? What are the processes involved in educational policy formulation from an international perspective? What are the emerging global trends in education and how does globalization impact on education and teaching/learning practices in Canada? In addition, various international frameworks for promoting peaceful educational/school environments such as peace education, global, and intercultural education are explored. The local, national and global impact of the educational policies of international agencies such as the UN, UNESCO, the World Bank, and CIDA are also analyzed.

### **80-524. Fundamentals of Curriculum Theory and Development**

A survey of the major theories of curriculum that have influenced education. An outline of the techniques employed in curriculum development, including sources of influence and control, specification of outcomes, selection and coordination of activities, strategies, resources and evaluation.

### **80-527. Research in Education**

An overview of educational research methods: e.g., the interpretation of research literature, the identification and use of data bases, the design of research proposals and the application of specific methods to research projects.

### **80-529. Theories of Educational Administration**

This course will examine current knowledge in educational administration. Theory, research, and the practice of leadership within the educational system will be the main foci. Emphasis will be placed on administrative problems, such as staff development, team building, and motivation.

### **80-530. Qualitative Methods in Educational Research**

This course will examine the concepts and methods involved in carrying out educational research through naturalistic observation, participant observation, case studies, and other qualitative approaches.

### **80-531. Supervision of the Instructional Process**

A practice-oriented course designed to develop administrative competency in the supervision of instruction. The focus will be threefold: (1) awareness and recognition of specific technical skills, (2) the development of competence in interpersonal and group skills, and (3) a general examination of supervisory approaches.

### **80-532. Organization and Administration of the School**

This course will consider and analyze the many variables impacting upon school administrators as they organize their schools. The effects of administrative theory, past and present, will be considered.

### **80-533. Survey Design and Research**

This course will provide students with an overview of survey research and questionnaire design. Students will critique existing survey research, develop a working knowledge of survey research design, critique samples of survey questionnaires, and design a questionnaire based on a chosen research topic.

### **80-534. Individual Reading**

The Individual Reading course is intended to permit students with special interests in, and knowledge of, particular areas of education not covered in sufficient depth in available courses to pursue those interests through independent, supervised



study. (Permission of an advisor and of a subcommittee of the Graduate Studies Committee is required.)

### **80-535. Organizational Behaviour in Educational Institutions**

A study of theory and research in the socio-behavioral sciences which concerns the behaviour of individuals and groups in educational settings. Attention will be given to the implications of such theory and research for administration in educational institutions.

### **80-536. Introduction to Educational Policy Analysis**

This course focuses on a critical and disciplined examination of education policy issues drawing on a variety of theoretical orientations such as positivist, pluralist, post-positivist, poststructuralist and others. These perspectives provide different lenses to view current and past education reform and restructuring policies in Ontario and other jurisdictions in Canada, Australia, New Zealand, Finland, U.S.A, and the U.K. It reviews current theoretical approaches to the nature, development, and implementation of educational policy at all levels. The course critiques policy-makers' approaches to reform, and restructuring, and the potential short and long term impacts of these changes on the philosophy, content and practices in the public education arena. By thinking about what sort of people and voices inhabit the texts of policy, the course enables participants to think about how we engage with the social and collective identities of our research subjects in an attempt to capture the complex interplay of identities and interests, and coalitions, conflicts and uneasy 'settlements' within the processes and enactments of policy.

### **80-537. Language Arts in the Elementary School**

This course will examine issues in language arts instruction in the light of current language theories. The focus is on current research and its practical application, with special emphasis on methods of instruction, teacher strategies, student activities and evaluation practices.

### **80-538. The Arts and Education**

This course explores how the arts influence the construction of meaning in society, both within and beyond the classroom. Representation, through images, music, and text, traditionally serve to preserve cultural memory, but can also reflect changing social mores, challenge established ideas, and trigger new ways of thinking. Readings will include current research in the arts and education, and class activities will include the production and interpretation of images and artefacts.

### **80-539. Second Language Teaching: Theories and Applications**

This course reviews current thinking on the nature of language, communication and second-language learning and examines implications for teaching methods and curriculum design.

### **80-540 Language, Culture, and Society**

The New London Group (1996, 2000), an international group of literacy experts, coined the term "multiliteracies." In their manifesto, they suggested that literacy needs to focus on ensuring that people of diverse linguistic and cultural backgrounds be able to integrate in all societies without losing what is unique to their identities, and for accents and dialects to be recognized as a part of the English language (that there is no one true standard English). It is a matter of equity that we find genuine ways to embrace diversity. The other thrust of the New London Group's theory is that multiliteracies provide a better way to define literacy because it acknowledges the role that technologies, multimodalities, semiotics, and media play in literacy and how meaning is constructed and communicated. A multiliteracies theoretical framework has implications for systemic as well as individual changes in both schools and broader societies. This course will trace some of the historical roots of multiliteracies in critical theory as well as analyze how multiliteracies are developing in practical and theoretical terms in the current world.

### **80-541. The Social Science Curriculum**

An examination of trends and development of social science curricula. Curriculum theory will be applied to one or more of the social sciences within the context of provincial guidelines and the academic and professional qualifications of the students.

### **80-542. Language System Analysis**

This course is a broad introduction to the analytic study of human languages. It surveys language systems such as: phonology, morphology, syntax, semantics, and pragmatics. It explains how those systems interact with each other synchronically in discourse and diachronically in creating language families. Students have an opportunity to examine the universal features of all languages and their relationship to linguistic variety. Topics in historical linguistics, sociolinguistics, psycholinguistics, and neurolinguistics are explored. Various writing systems used in world languages are also discussed.

### **80-543 Special Education and Language Acquisition**

The relationship between language acquisition, perceived learning dis/abilities, and special education support has been the subject of ongoing debate. Key topics linked to this debate include: language impairment, needs assessment, access to support, method of support, program design, and disproportional representation. These matters have significant implications for language learners, educators, and program developers alike. Those involved in teaching-learning an additional language, whatever that language might be, face a number of important questions, including: What is language impairment? How should the needs of language learners be assessed? Who should access support? What should that support look like? What should inclusion look like in a language learning setting? Why have language learners been disproportionately represented in some special education programs? As these questions indicate, language learning is complicated, and is intertwined with a number of social justice issues. In this course, students will critically examine a range of current research, and draw conclusions about the discourse on the relationship between language acquisition, perceived learning dis/abilities, and special education support.

### **80-545. Teaching for Sustainability: An Introduction to Environmental Education**

This course will engage students in an analysis and investigation of the philosophical and pedagogical underpinnings of EE,

and the pragmatic relevance of learning for sustainability. To this end students will get an opportunity to critically discuss, analyze, and evaluate a variety of perspectives around the environmental debate and assist them in articulating, clarifying, and/or refining their own assumptions and position about the environment and implications for sustainability. Fundamental questions to be answered include, what is the rationale for teaching and learning for sustainability and what are the core principles and competencies that should drive this pursuit? Secondly, what pedagogical constructs are useful in effective teaching and learning for sustainability? Students will engage in investigations of real world environmental issues, and problem-solving, and experiential learning through field-trips.

#### **80-547. Learning in Science**

This course will consider current research and theory in the promotion of science as a process and product. Included will be a critical survey of recent issues in science education. The focus will be on their implications for curriculum and practice at the classroom level. An examination of some of the major difficulties in the design, development, implementation, and evaluation of science curricula.

#### **80-550. Issues in Education**

This course will examine current issues affecting contemporary Canadian education. Specific course content and instructors will be published in advance.

#### **80-551. Information and Communication Technologies (ICT) for Teaching and Learning**

This course explores how Information and Communication Technologies (ICT) can support teaching and learning within an educational context. It analyzes principles, strategies and related issues regarding the design of innovative educational technologies and creative learning environments. This course will include discussions based on assigned readings as well as hands-on learning activities. Students will gain an understanding of how various Information and Communication Technologies (ICT) enhance a student-centered approach to learning.

#### **80-552. Curriculum Developments in Mathematics Education**

This course will examine recent developments in curriculum, instruction, and evaluation in elementary and secondary mathematics education. Trends will be discussed in light of recent research findings, technological advances, and social goals. International comparisons will be made.

#### **80-553. The Teaching and Learning of Mathematics**

This course will examine research into students' learning and the teaching of mathematics. First, the motivational aspects of teaching and learning will be considered, including those related to the topic "Women in Mathematics." Second, specific mathematical topics will be dealt with, selected according to the interests of students.

#### **80-554. Fundamentals of Instructional Design**

This course will consider current principles, research, theory and practice in the design, development, implementation and evaluation of instruction within various learning and teaching settings.

#### **80-555. Strategies for the Implementation of Change in Education**

Procedures for dissemination, adoption, implementation, and integration of changes for teachers, administrators, and leaders of professional organizations. Attention will be given to theoretical models and their applications, change agency, and modification of organizational climate and structure.

#### **80-556. Approaches to Literacy Development**

This course will consider current research and theory in the development of reading and writing abilities, and will examine some aspects of assessing literacy development.

#### **80-557. The English Language Arts**

This course will examine current theories and issues in the English Language Arts with particular focus on their implications for curriculum and practice in the intermediate and senior divisions. Current issues at the local or provincial level, determined by the group, may be examined in detail.

#### **80-558. Psychology of Learning Problems**

This course will review current theories of learning disabilities and learning problems. Various approaches to diagnosis and remediation will be presented. Students will be expected to discuss case study examples during the course, and to develop a particular interest area to great depth.

#### **80-559. The Recent History of Education in Ontario**

This course examines major developments in Ontario education from the 1950s to the present day. Beginning with the postwar Hope Commission Report, and extending to the current attempts at reform, the Ontario school system for primary and secondary education has undergone a series of dramatic changes over the past half century. These changes will be investigated in the context of their historical evolution, and contemporary relevance.

#### **80-560. Politics of Education**

This course will examine the administration of education from a political perspective. Both the legal and extra-legal factors that influence educational outcomes will be examined. Their roles will be viewed in terms of comparative forms of educational administration. Finally, several administrative decisions will be analyzed using the perspectives gained throughout the course.

#### **80-561. Legal Aspects of Education**

This course will focus on legislation and court decisions dealing specifically with the educational process. Both the historical and philosophical basis of these and the practical application of the same in a contemporary setting will form the primary emphasis for the course.



#### **80-562. Educational Finance**

This course will be concerned with educational finance in Canada, with particular emphasis on Ontario. It will examine such topics as equity, accountability, efficiency, and adequacy of educational revenues and expenditures. Provincial grant systems will be analyzed within the contexts of political governance and the economics of education.

#### **80-565. Sociological Aspects of Education**

This course will examine the school and its occupants and their relationship to the contemporary social order. Analysis of topics such as student culture, learning and social class, roles within the school setting will occur. The focus will be on theoretical positions, representative research findings and representative research methods.

#### **80-566. Interpersonal Relationships in Education**

This course will analyze the importance and dynamics of interpersonal behaviour. Students will be given the opportunity to examine and develop their own skills in this area. Emphasis will also be placed upon a practical orientation toward utilizing these skills in the educational environment.

#### **80-572. Theory and Practice in Early Childhood Education**

An examination of theory and current practice in Early Childhood Education. The emphasis will be on the translation of theory into sound educational practice. Organization and management of Early Childhood programs will be of concern as well as teaching procedures.

#### **80-591. Special Topics in Education**

Selected advanced topics in Education based on new developments in particular areas, special faculty interests, and opportunities afforded by the availability of visiting professors. Special topics are subject to Graduate Committee approval and may be taken more than once provided the topics are different.

#### **80-591(32) Special Topics: Language Assessment**

This course introduces participants to international principles and practice of assessing language ability and engages participants in the debate on how to measure language fluency. A variety of national and global methods of language assessment will be critically discussed in this course. Participants will also compare and evaluate research that explores this subject as they justify their own analyses of language assessment research.

#### **80-602. Doctoral Seminar I**

In Core Seminar 1, the history and philosophical foundations of education are examined through the three fields of study. As well, students are introduced to qualitative methods of research in education, encompassing interview, phenomenological, ethnographic, constructivist, and case study approaches to data collection, analysis, and interpretation.

#### **80-604. Doctoral Seminar 2**

In Core Seminar 2 students examine research, theories, and issues in the fields of study via a specific theme which is identified annually. For example, the theme might be bullying, or caring education, or gender issues. As well, students are introduced to quantitative methods of research in education, encompassing true experiments, quasi experiments, and correlational studies.

#### **80-621. Educational Leadership and Policy Studies**

This course introduces students to the origins and intellectual traditions of theories that influence how we organize education. Students develop an understanding of sociological paradigms that have influenced educational systems over time, and develop perspectives that enable them to think critically and creatively about contemporary and future issues in educational leadership, policy, and organizations.

#### **80-631. Socio/Cultural/Political Contexts of Education**

This course centres around a critical examination of cultural, historical, and theoretical perspectives in education. Bodies of knowledge related to understanding the complexities of sociocultural influences in education are the main focus. Power relations at play and how they are negotiated in everyday practice are considered. Using the sociocultural framework developed in the course, students also investigate their specific areas of interest (for example, curriculum theory and practice).

#### **80-641. Cognition and Learning**

This course provides an analysis of epistemological theories through a critical examination of foundational and current research and a reflection on historical and philosophical orientations as they relate to contemporary issues in cognition and learning.

#### **80-651. The Specialized Elective**

The content for this course must relate to the students dissertation topic and field of study. The course may be selected from the graduate studies calendar of courses from one of the participating universities, or it may be taken as a directed study. A directed study takes place under the supervision of a faculty member with appropriate expertise. Usually, the student completes a sustained program of study relating to a topic of current theoretical and/or empirical interest leading to the production of a substantial research paper. Directed studies are intended for students with special interests which cannot be satisfied by calendar courses.

#### **80-669. Research Proposal Colloquium**

In this course students examine theory and research in relation to their intended dissertation topic. Students develop a topic idea in the form of a dissertation proposal, defining a research question and a theoretical base for intended study. Students examine research questions in relation to varied methodologies, so that a diverse examination of research frameworks takes place through WebCT based discourse.

### **80-680. Comprehensive Portfolio**

(3 course equivalencies.)

### **80-793. Educational Research Internship**

Candidates pursuing the course-based option as part of the International stream, under the guidance of the course instructor, field experience coordinator, and research partners in the field, will engage in a collaborative process leading to the production of a final paper on an issue or topic of inquiry of relevance to the research partners in the educational field. This course will present students with authentic assessment tasks that situates their on-going inquiries in a context that enables them to apply and further critique what has been learned previously. Students will engage in matters pertaining to research, program review, policy development, and so on, as appropriate. The spectrum of projects may, for example, address questions aimed at the improvement of literacy and numeracy skills, student motivation, curriculum integration, and leadership development. The final paper will be grounded in relevant research and show evidence of knowledge, skills of inquiry, reflection and problem-solving acquired through the other courses. It will normally be taken following completion of the other course-work. (Prerequisites: 80-515; 80-551; 80-529 OR 80-524; 80-527; 80-510 OR 80-530; 80-565; 80-535; 80-536; 80-566.)

### **80-794. Thesis Proposal**

Candidates pursuing a Masters thesis, under the guidance of the thesis supervisor, internal thesis reader, and other faculty where appropriate, will engage in the preparation and defence of a Masters thesis proposal. (Before registering for the Thesis Proposal (80-794), students must have completed all required courses in their program. The Thesis Proposal may be completed concurrently with one elective in the final semester of coursework.) Thesis stream students must enrol in 80-794 (Thesis Proposal) and do so for each subsequent term until the thesis proposal has successfully been defended.

### **80-795. Final Project Seminar**

Candidates pursuing the course-based option, under the guidance of the instructor and in consultation with other faculty where appropriate, will engage in a collaborative process leading to the production of a final project on an issue or topic of inquiry of relevance to professional practice. The final project will be grounded in relevant research and show evidence of knowledge, skills of inquiry, reflection and problem-solving acquired through the other courses. It will normally be taken following completion of the other course-work.

### **80-796. Major Paper**

Conducted under the guidance of at least two members of the Faculty, a major paper may analyze and evaluate a substantial body of scholarly literature or describe or interpret a research project undertaken by the student. The major paper is subject to an oral examination (see section titled, The Master's Degree - Thesis or Major Paper, and the section titled [Education - The Master of Education Degree - Program Requirements](#).)

### **80-797. Thesis**

(See section titled, The Master's Degree - Thesis or Major Paper, and the section titled [Education - Joint Doctor of Philosophy in Educational Studies](#).) Students may enrol concurrently in the Thesis Proposal (80-794) and the Thesis (80-797) if all course work is complete. If students register for the Thesis Proposal (80-794) and the Thesis (80-797) concurrently, then only upon completion of the thesis proposal; may thesis stream students begin their Thesis. They must enrol in 80-797 (Thesis) for each subsequent term until the successful completion and deposition of the thesis.

### **80-798. Doctoral Dissertation**

(See section titled, The Degree of Doctor of Philosophy - The Dissertation, and the section titled [Education - Joint Doctor of Philosophy in Educational Studies](#).) (10 course equivalencies.)

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## ENGINEERING: COURSES

**85-519, Engineering Technical Communications**  
Engineering Technical Communications will prepare Master of Engineering (MEng) students to communicate technical information clearly and concisely, in written, oral, and graphical form. Students will work through a logical thought process for organizing advanced concepts as well as practice technical writing styles to effectively write and organize advanced technical papers for presentation and publication. Students will also work in teams to prepare written technical papers and will present this information as part of a major project. (Open to Masters of Engineering students, excluding students in the MEng Auto Program. Open to engineering MASC/PhD students on permission of the department/faculty as a qualifying course only. Will not count for credit towards MASC/PhD degree.)

**85-540 Engineering Management Capstone**  
This is a jointly instructed and administered course between the Faculty of Engineering and the Odette School of Business. The course is the last course students take in the Masters of Engineering Management program and has mandatory prerequisites. The goal is to allow students to practice all business and management theory they learned in previous courses by completing one of: 1) an engineering management report 2) an engineering feasibility study, or 3) a new venture business plan. This course is entirely project-based. (Prerequisites: All 6 mandatory core courses within the MEM program) (2 semester, 6.0 credit course) Cross-listed with Business 76-540)

**85-545. Engineering Mathematics**  
The course will cover topics in advanced modern engineering mathematics not addressed in earlier courses and considered to be crucial for more advanced engineering courses at the graduate level. These topics include: Fourier series and Fourier transforms, with applications in the frequency domain modelling, solution of partial differential equations with applications in continuum mechanicals and electromagnetism, solution of integral equations with applications in acoustics and aerodynamics. (Open to Masters of Engineering students, excluding students in the MEng Auto Program. Open to engineering MASC/PhD students on permission of the department/faculty as a qualifying course only. Will not count for credit towards MASC/PhD degree).

**85-550, Engineering Project Management**  
This course will expose students to principles, concepts, and tools utilized in project management activities. This course will include topics such as defining project scope, and time, cost, risk, procurement and stakeholder management. The students will be engaged in working on a major project to develop proficiency in project management activities and tools. (Open to Masters of Engineering students, excluding students in the MEng Auto Program. Open to engineering MASC/PhD students on permission of the department/faculty as a qualifying course only. Will not count for credit towards MASC/PhD degree.)

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## CIVIL AND ENVIRONMENTAL ENGINEERING: COURSES

### *CIVIL ENGINEERING*

Courses offered by Civil Engineering at the graduate level are listed below. Students may take courses other than Civil Engineering with permission of the Head of the Department and the advisor.

All courses listed will not necessarily be offered in any given year.

#### **87-500. Theory of Elasticity and Plasticity**

Analysis of stress and strain; elastic and plastic stress-strain relations; general equations of elasticity; yield criteria; applications to elastoplastic problems, including rotating disks, thick-walled tubes, reinforced disks, torsion of various shaped bars; stress concentration. (3 lecture hours a week.)

#### **87-501. Finite Element Methods for Solids and Structures**

Structural idealization; stress analysis of 2-D and 3-D solids; error estimation and mesh adaptivity; elastic formulations and uses of beam, plate and shell elements; nonlinear formulations; structural stability; introduction to finite element methods in structural design optimization. (3 lecture hours a week.)

#### **87-502. Analysis and Design of Shell Structures**

General theory of thin shells. Membrane stresses in shells of revolution and shells of double curvature. Bending stresses in shells of revolution, cylindrical shells and folded plates. Design of cylindrical shell roofs. (Prerequisite: 87-500 or equivalent.) (3 lecture hours a week.)

#### **87-505. Theory of Stability**

This course is designed to give an insight into the basic phenomenon of structural stability. Elastic and plastic flexural-buckling of columns with axial and eccentric loads is studied. Energy and numerical methods are used. Stability functions are introduced and used to study trusses and rectangular frames, with and without sidesway. Some discussion of torsional and torsional-flexural buckling, lateral buckling of beams. (3 lecture hours a week.)

#### **87-511. Prestressed Concrete**

Materials, principles of prestressing systems; prestressing losses; analytical treatment of the effect of shrinkage, creep of concrete, and cable friction on stresses; analysis and design of statically determinate and indeterminate structures; design codes; research background; introduction to prefabricated concrete structures. (3 lecture hours a week.)

#### **87-513. Structural Dynamics**

Formulation of equations of motion; single degree-of-freedom systems: free vibration response and response to harmonic, periodic, impulse, and general dynamic loading; analysis of non-linear structural response; multi degree-of-freedom systems: equations of motion, structural property matrices, undamped free vibration, Raleigh's method, forced vibration response, practical vibration analysis; continuous systems: partial differential equations of motion, analysis of undamped free vibration, analysis of dynamic response, wave propagation analysis. (3 lecture hours a week.)

#### **87-514. FRP Reinforced Concrete Structure**

Advanced composite materials - constituents and products; structural applications, reinforced concrete members, prestressed concrete members, applications with chopped fibres, repair and rehabilitation; innovative applications. (3 lecture hours a week.)

#### **87-519. Advances in Soil Mechanics and Geotechnical Applications**

Consolidation and improvement methods; compressibility of soils and application of new modification techniques; frost action in soils; design of gravity, cantilever and mechanically stabilized retaining walls; recent advances in the bearing capacity of foundations on reinforced soils; pile foundations and pile groups; machine foundations on piles. (3 lecture hours a week.)

#### **87-521. Hydrology**

Analysis and synthesis of the hydrograph. Streamflow routing. The hydrograph as a function of drainage characteristics; estimation of runoff from meteorological data. Snowmelt. Flow in rivers with an ice cover. Infiltration theory. Sea water intrusion in coastal aquifers. Application of hydrologic techniques including statistical methods. (3 lecture hours a week.)

#### **87-522. River Mechanics**

Theory and analysis of uniform, gradually varied, rapidly varied and steady and unsteady flow in open channels; fluvial processes; design of channels; design of hydraulic control structures. (3 lecture hours a week.)

#### **87-523. Ground Water Contamination**

Introduction of Darcy's equation and governing equation; construction of flownets, flow quantification, and ground water resource evaluation; contaminant hydrogeology, mass transport equations, reaction, and adsorption; introduction to biodegradation and natural attenuation; simulation of ground water flow and transport. (3 lecture hours a week.)

#### **87-524. Advanced Hydromechanics**

Properties of scalar and vector fields; gradient, divergence and curl. Flow visualization. Flow kinematics: continuity equation, potential flow, stream function. Flow dynamics: transport theorems, integral and differential equations of motion. Boundary-

layer theory. Turbulent flow and turbulence models. (3 lecture hours a week.)

**87-526. Sediment Transport**

Regime approach; turbulence theories; suspended sediment; tractive force method; bedforms and bedload transport; the Einstein method; modified Einstein method; reservoir siltation; recent developments; design of mobile bed channels; design of sedimentation basins; channel degradation. (3 lecture hours a week.)

**87-590. Special Topics In Civil Engineering**

Selected advanced topics in the field of civil engineering. (3 lecture hours a week.)

**87-595. Graduate Seminar**

Presentations by graduate students, faculty and visiting scientists on current research topics. This course will provide students the opportunity to recognize new developments and technology in the field, to critique others' findings and to construct and present their ideas and results. Full time graduate students are required to register in every semester offered and give a presentation in the semester prior to thesis defence. All graduate students are expected to attend each and every seminar and no less than 75% of all seminars. This course will be graded on a PASS/FAIL basis (1 lecture hour a week) (Also offered as 93-595)

**87-796. Major Paper**

**87-797. Thesis**

**87-798. Dissertation**

***ENVIRONMENTAL ENGINEERING***

Courses offered by Environmental Engineering at the graduate level are listed below. Students may take courses other than Environmental Engineering with permission of the Head of the Department and the advisor.

All courses listed will not necessarily be offered in any given year.

**93-530. Water Pollution Control**

Water quality criteria; methods of wastewater disposal and their effects on ecology; theory and design of different unit operations and processes for water purification; theory and design of different design operations and processes of wastewater treatment; reuse and recycling of wastewater. (3 lecture hours a week.)

**93-531. Advanced Water Pollution Control**

Discussion on recent advances in the design of water and wastewater treatment plants and new developments in water pollution control practices. (Prerequisite: 93-530 or equivalent.) (3 lecture hours a week.)

**93-533. Solid Waste Management**

A study of municipal and industrial solid wastes, quantities, composition, methods of disposal or reclamation; economic viability of the various methods related to the quantities involved. (3 lecture hours a week.)

**93-534. Environmental Separation Processes**

Application of the principles of surface chemistry to separation processes involving phase equilibria, ion exchange, membrane separation, adsorption, absorption, flocculation, spherical agglomeration, sedimentation, filtration, and centrifugation. (3 lecture hours a week.)

**93-535. Water Quality Management**

Water quality criteria; methods of wastewater disposal and their effects on ecology; stoichiometry, reaction kinetics and material balance; movement of contaminants in water bodies; modelling of water quality in natural systems. (3 lecture hours a week.)

**93-537. Kinetics**

Basic concepts of chemical reaction kinetics; characterization of chemical and biochemical systems; reactor flow models and consideration of non-ideality. (3 lecture hours a week.)

**93-538. Biological Treatment of Wastewater**

Wastewater characteristics; biological kinetics; flow and loading variation; wastewater treatment processes; mass balances; aeration; sedimentation; lagoons; fixed-film processes; sludge characteristics. (3 lecture hours a week.)

**93-539. Industrial Wastewater Treatment**

Sources and characteristics of industrial wastewater; pretreatment and primary treatment; physical and chemical treatment; biological treatment; waste minimization; treatment of wastes from various industries. (3 lecture hours a week.)

**93-540. Numerical Modeling of Heat and Mass Transfer and Flow in Porous Media**

Introduction to finite difference and finite element approaches for simulation of the diffusion and the advection-dispersion equations; development of finite difference formulation of 1-D and 2-D transient heat transfer, nonlinear conductance and source/sinks; 1-D and 2-D mass transport with reaction; 1-D and 2-D heat transfer with finite element approach. (3 lecture hours a week.)

**93-541. Air Pollution from Mobile Sources**

Air pollutants; emissions from vehicles; testing vehicles for emissions; combustion thermodynamics; thermodynamics and kinetics of pollutant formation; measures to reduce emissions; modeling. (3 lecture hours a week.)

**93-542. Air Pollution Modelling**

Air quality standards; emission inventory, source estimation; development of transport models; models with chemical reactions. (3 lecture hours a week.)

**93-543 Occupational Hygiene and Pollution Prevention**

This course touches on an area of Environmental Engineering not currently covered in detail by other courses: the indoor environment. As well, students are introduced to the definition and methodology of pollution prevention (P2) in industrial settings. Topics include: environmental stressors, provincial and federal regulations, toxicology of contaminants, surveys of workplaces, measurements of airborne contaminants, engineering controls and steps in pollution prevention. (3 lecture hours a week.)

**93-550. Sustainability: Principles and Practices**

This course examines the evaluation, design, and management of products, processes, or projects to achieve sustainability. The main topics include: assessing and scoping environmental effects from engineering and other technical activities; eco-balance approaches; life cycle assessment; design-for-environment principles; and decision making for environmental and sustainability objectives. The course will discuss typical examples (e.g., automobiles, infrastructure, electronics), and also draw upon the industrial and research experience and knowledge of the class attendees. Class-based projects will focus on understanding, interpreting, and implementing the knowledge acquired. (Not open to students who attended 93-532, Engineering and the Environment, since 2002.) (3 lecture hours per week.)

**93-590. Special Topics In Environmental Engineering**

Selected advanced topics in the field of environmental engineering. (3 hours a week.)

Current topics include:

Air Pollution Control;

Transport Phenomena;

Environmental Law and Policy

Atmospheric Chemistry and Physics of Air Pollution.

**93-595. Graduate Seminar**

Presentations by graduate students, faculty and visiting scientists on current research topics. This course will provide students the opportunity to recognize new developments and technology in the field, to critique others' findings and to construct and present their ideas and results. Full time graduate students are required to register in every semester offered and give a presentation in the semester prior to thesis defence. All graduate students are expected to attend each and every seminar and no less than 75% of all seminars. This course will be graded on a PASS/FAIL basis (1 lecture hour a week) (Also offered as 87-595)

**93-796. Major Paper**

**93-797. Thesis**

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## ELECTRICAL AND COMPUTER ENGINEERING: COURSES

The graduate course offerings in Electrical Engineering are designed to complement the areas of specialization. Course requirements for the Ph.D., M.A.Sc., and M.Eng. degrees in Electrical Engineering will be selected from the courses listed below and related courses in other programs.

Graduate students will be associated with one of the areas of research. Their program of studies will be formulated in consultation with the graduate advisors and approved by the Chair of the Program Graduate Committee coordinator. Only a selected number of the courses listed below will be available each year. The current list will be provided by the Coordinator of Graduate Studies in Electrical Engineering.

**NOTE: Graduate Student Status is required for all graduate courses in the Department of Electrical and Computer Engineering.**

### 88-514. Advanced Power Systems

Synchronous machine models are developed from the voltage and flux linkage differential equations. Applying the developed models, numerical simulations are performed to determine the dynamic performances of synchronous machines. (3 lecture hours per week.)

### 88-521. Digital Signal Processing

Discrete Signals, discrete system models, z-transforms, Time Domain and Frequency Domain Analysis of Digital Filters, sampling theorem, Design and Realization of FIR and IIR filters, DFT and FFT, Stability and Stabilization of IIR Filters, Design of FIR and IIR Digital Filters Using Non-Linear Optimization Technique, Discrete Hilbert Transform, Sectioned and Fast Convolution, zero padding, digital signal processing applications. (3 lecture hours a week.)

### 88-522. Applied Time Signals Analysis and Processing

Continuous and discrete signals; sampling theory and practice; filtering, interpolation, coding, statistical concepts, transform methods; power density estimation, correlation functions, convolution. (3 lecture hours a week.)

### 88-523. System Theory

Continuous and discrete time systems, state formulation techniques, controllability and observability concepts, and system simulation. (3 lecture hours a week.)

### 88-524. Stochastic Processes

Development and applications of probability models in the analysis of stochastic systems; review of probability, random variables and stochastic processes; correlation functions applications to filtering, prediction, estimation and system identification. (3 lecture hours a week.)

### 88-525. 2-Dimensional Digital Signal Processing

Fundamentals of 2-D Signals and Transforms; Z, Fourier, discrete Fourier, etc., 2-D FFT, Design Techniques for 2-D FIR and IIR Digital Filters using Transformation and Optimization Techniques. Stability and Stabilization of 2-D Filters, Homomorphic Filtering, Reconstruction of Signals from their Projections. (3 lecture hours a week.)

### 88-527. Speech Processing

Production, perception, and acoustic-phonetic characteristics of speech signal; auditory models; linear prediction of speech; cepstral analysis; speech recognition; speech synthesis; spoken language processing; human-computer communications. (3 lecture hours a week.)

### 88-528. Image Processing

This course presents digital and hybrid representation of images, fundamentals of colour, 2-D systems, 2-D filter design and 2-D filtering of digital images, image enhancement techniques: homomorphic filtering, histogram equalization and modification techniques, median and statistical filtering, 2-D FFT algorithms, properties of digital images. Projects are given as a means of learning practical applications of the field. (3 lecture hours per week.)

### 88-529. Discrete Transforms and Number Theoretical Methods

Introduction to orthogonal transforms, DFT, DCT, DHT; implementation methods; fast algorithms, FFT, WFT; polynomial transforms; finite rings and fields; number theoretic techniques; residue number systems; conversion and computation; finite polynomial rings; VLSI implementation consideration. (3 lecture hours a week.)

### 88-531. VLSI Design

Overview of VLSI designs, CAD tools, application, technology; review of properties of silicon, solid state physics and devices; SPICE models; analog simulation; IC technology; target CMOS process; static CMOS logic; principles of standard cell CMOS design; dynamic characteristics of static CMOS logic; dynamic logic; system level considerations; hardware description languages; silicone compilers. (3 lecture hours a week.)

### 88-533. Computational Intelligence

Models of the human brain and sensory systems. Neural networks and learning algorithms. Fuzzy sets, fuzzy logic, and fuzzy systems. Evolutionary computation. Advanced topics in computational intelligence. (3 lecture hours a week.)

### 88-535. Nonlinear Systems

Introduction to the analysis and design of nonlinear control systems, mathematical preliminaries, second-order systems (including Lyapunov stability, center manifold theorem, input-output-stability) perturbation theory; control design for non-linear systems. (3 lecture hours a week.)

#### **88-536. Automotive Control Systems**

Introduction to automotive control systems; engine operation and dynamics; engine management and control; robust engine control; hybrid powertrain modelling and control; estimation of vehicle parameters and models; vehicle control system; automotive electronics. (Crosslisted with 92-545.)(3 lecture hours a week.)

#### **88-541. Low Power CMOS Design**

This course is designed to prepare students for advanced VLSI design where low power dissipation is of critical concern. Topics will include: Introduction to low power techniques for CMOS circuit design; design levels of abstraction; sources of power dissipation, capacitance analysis, and power estimation; simulation-based and probability-based power estimation; low-level and high-level power optimization; advanced techniques for modern IC fabrication, and low power design tools from an industrial perspective; recent advances in low power CMOS design (3 lecture hours per week plus project.)

#### **88-550. Adaptive Signal Processing**

This course presents topics on optimum linear filtering (Wiener filter, linear prediction, and Kalman filtering), constrained linear estimation, Newton's method, steepest-descent method, stochastic-gradient algorithms: least-mean-squares (LMS) algorithms, affine projection algorithms (APA), recursive least-squares (RLS) algorithms. Comparative performance analysis of adaptive filters: steady state error, tracking error, convergence rate; finite precision effects. The students are introduced to applications on adaptive noise cancellation, interference canceling, and system identification. ( 3 lecture hours a week.)

#### **88-551. Advanced Digital Signal Processing**

Review of discrete-time systems and digital filters. Multirate systems including decimators, interpolators, polyphase decomposition, Nyquist filters, two-channel, and M-channel filter banks. Adaptive equalization including equalization techniques for digital receivers, linear and non-linear equalizers, adaptive algorithms, and blind equalization. Analysis of finite wordlength effects including coefficient quantization, arithmetic round-off errors, dynamic range scaling, and low-sensitivity digital filter structures. (3 lecture hours a week.)

#### **88-552. Advanced Topics in Microelectromechanical Systems (MEMS)**

Review of advanced topics related to the theory and modeling of MEMS design and fabrication techniques. Topics to be covered include: advanced micromachining techniques, smart microelectromechanical sensing and actuation techniques, microfluidics, photonic MEMS, advanced materials, device modeling, MEMS design case studies, system integration, micropackaging, MEMS design methodology, and reliability issues related to MEMS devices. Emphasis is on theory, lumped element modeling, 3-D multi-domain finite element analysis, static and dynamic device behavior study using industry standard MEMS modeling tools, simulation of fabrication processes using actual fabrication process parameters, and design verification. (3 lecture hours a week.)

#### **88-553. Analysis of Electrical Machines**

This course is concerned with understanding and modeling of induction, reluctance and permanent magnet synchronous generators used in wind power application. In addition, numerical analysis and a review of the basic characteristics used in wind power application. In addition, numerical analysis and a review of the basic characteristics of the above-mentioned electrical machines will be performed. (3 lecture hours a week.)

#### **88-554. Automotive Sensor Systems**

This course describes topics on sensors, optics & lighting, image representation, feature extraction, image analysis, image classification, 3D imaging techniques, GPS, radar, lidar 3D range imaging, intelligent and night vision, sensor integration and fusion. The students will apply their theoretical knowledge to solve a practical problem by completing a course mini-project. (3 lecture hours a week.)

#### **88-555. Computer Arithmetic**

This course presents a detailed description of general class of fixed-radix number systems, floating-point representation, algorithms and architectures for sequential and fast computation of multiplication, division and square root extraction, elementary functions, logarithmic and residue number systems, finite field arithmetic operations, error control in arithmetic processors. Course assignments and mini-projects on practical aspects of the course are required. (3 lecture hours a week.)

#### **88-556. Computer Networks**

This course will cover concepts and protocols which enable heterogeneous computer networks to work with each other, including transport (TCP, UDP), network (IP, IPng), routing (RIP, OSPF), network management (SNMP, SNMPv2, RMON), and other important protocols like ARP, ICMP, DNS, BOOTP, DHCP and HTTP. Advanced topics like Mobile IP, real-time and reservation protocols (RTP, RSVP), IP multicast (IGMP, MBONE) and network security will also be examined. Emphasis will be on broad coverage, as well as hands-on programming experiences. Local area networks, performance of queueing, multiple access schemes, IEEE802 standards, wireless LANs and wireless personal area networks will also be covered. (3 lecture hours a week.)

#### **88-557. Multiuser Detection**

This course presents an introduction to multiple-access communication systems: time-division multiple access (TDMA), frequency-division multiple access (FDMA), and code-division multiple access (CDMA); linear receivers for synchronous and asynchronous CDMA systems, blind multiuser detection (direct methods and subspace methods), linear decorrelating and minimum mean-square-error (MMSE) detectors, group-blind multiuser detection in multipath channels, adaptive multiuser detection, space-time multiuser detection, and turbo multiuser detection. Practical applications are demonstrated through course assignments. (3 lecture hours a week.)



#### **88-558. Network Security**

The course presents a concise discussion on the discipline of cryptography- covering algorithms and protocols underlying network security applications, encryption, hash functions, digital signatures, and key exchange. Internet security vulnerabilities, firewalls and their limitations, cryptographic technology and services, PPP and data layer security, IPSec and key management for network layer security, TLS, SSH and transport layer security, secure e-mail, secure infrastructure protocols, Kerberos authentication, secure RPC, remote authentication, authorization and tunneling protocols, virtual private networks, secure remote access, multicast security are covered. Practical applications are covered through assignments. (3 lecture hours a week.)

#### **88-559. Physical Design Automation for VLSI and FPGAs**

Introduction to backend CAD flow for VLSI and FPGAs; algorithms and CAD tools for technology mapping, floor planning, partitioning, placement and routing; exposure to timing analysis and timing-driven layout; assignments will involve use of academic and/or industrial CAD tools as well as development of simple CAD tools for specific layout tasks. (3 lecture hours a week.) (Prerequisites: consent of the instructor.)

#### **88-560. Reconfigurable Computing**

History and evolution of reconfigurable computing (RC) systems; FPGA-based and multi-FPGA systems, CAD mapping tools, run-time reconfiguration, study of recent RC systems from academia and industry targeting a wide range of applications. Literature review and paper presentation on specific topics is also required. The course may require a mix of project and assignments. (3 lecture hours a week.)

#### **88-561. Statistical Communication Theory**

This course describes the fundamentals of Statistical Communications in detail. The topics covered include: hypothesis testing, Bayes and the Neyman-Pearson criteria, minimum variance unbiased estimation, Cramer-Rao bound, sufficient statistics, maximum likelihood estimation, minimum MSE and maximum a posteriori estimation, linear MMSE estimation, detection of signals in white/colored noise, detection of signals with unknown parameters, composite hypothesis testing, generalized likelihood ratio test, sequential detection, and Wald's test. Applications of digital communications, radar/sonar signal processing, seismology, and biomedical engineering are discussed. (3 lecture hours a week.)

#### **88-562. VLSI Implementation of Digital Signal Processing Systems**

The course provides a concise discussion on the various aspects of implementations for DSP algorithms. The course begins with an overview of DSP algorithms. Topics discussed are: implementation platforms, pipelining and parallel processing, systolic architecture, finite wordlength effects in digital filters, pipelined and parallel filters and adaptive filters, and bit-level arithmetic architectures. (3 lecture hours a week.)

#### **88-563. Wireless Communication Systems**

Overview of mobile communications, the characterization and modeling of time-variant fading and/or dispersive channels, digital communication system performance over fading dispersive channels, diversity reception, optimum receiver, trellis-coded modulation, (fundamentals, performance evaluation and applications to mobile communications), spread spectrum systems, and code division multiple access (CDMA), TDMA, FDMA, multiple access schemes, CSMA, Aloha. Concepts on wireless ad hoc networks will also be introduced, MAC, routing, QoS protocols for these networks will be covered. (3 lecture hours a week.)

#### **88-564. RF Integrated Circuit Design**

Design of RF integrated circuits for communications systems, matching networks, low noise amplifiers (LNAs), mixers, tuned amplifiers, oscillator design, phase locked loops (PLLs), frequency synthesizers, RF power amplifiers, coupling networks.(3 lecture hours a week.) (Credit cannot be obtained for both 88-564 and it if offered under 88-590 as a Special Topics course.)

#### **88-565. Introduction to Nanoelectronic Design**

The purpose of this graduate course is to study the emerging nanotechnologies with focus on single-electron tunneling (SET) device and circuit design. It covers various aspects of SET-based nanoelectronic design, including quantum phenomena with nanodevices, I-V characteristics of SET transistors, SET inverters, SIMON simulator, SET-based threshold logic design, hybrid SET-MOS architectures, reliability issues of SET circuits, and SET-based multiple valued logic and memory design. Assigned readings of recent advances in this area (including the instructor's recent research progress) will be actively discussed. The course projects/presentations are usually required. The students are expected to use SIMON tool and/or Cadence tools for circuit simulation. The students should have some background in digital logic design and CMOS integrated circuit design.(3 lecture hours a week.) (Credit cannot be obtained for both 88-565 and it if offered under 88-590 as a Special Topics course.)

#### **88-566. Data Security and Cryptography**

This is an introductory course on the techniques, algorithms, architectures and tools of data security and cryptography. Firstly, the theoretical aspects of data security and cryptographic algorithms and protocols are reviewed. Then we show how these techniques can be integrated to provide solutions to particular data and communication security problems. This course contents are of use to computer and communication engineers who are interested in embedding security services into an information system, and thus, providing integrity, confidentiality and authenticity of the data and the communicating parties.Main contents: classical cryptography techniques; mathematical foundations; secret key cryptography; public key cryptography; authentication and digital signature; network cryptographic protocols.(3 lecture hours a week.) (Credit cannot be obtained for both 88-566 and it if offered under 88-590 as a Special Topics course.)

#### **88-567. Advanced Analog Integrated Circuit Design**

MOS Models for Analog Design, Electronic Noise, Bandgap References, Operational Transconductance Amplifier (OTA) Design, Output Stages, Comparator Design, Sample and Hold Circuits, Analog-to-Digital (A/D) and Digital-to-Analog (D/A) Convertors. (3 lecture hours a week.) (Credit cannot be obtained for both 88-567 and it if offered under 88-590 as a Special

Topics course.)

**88-590. Special Topics**

Selected advanced topics in a field of research in the Electrical Engineering. (May be repeated more than once for credit if the topics are different.) (3 lecture hours a week.)

**88-797. Thesis**

**88-798. Dissertation**

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# Spring 2016 Graduate Calendar

## MECHANICAL, AUTOMOTIVE AND MATERIALS ENGINEERING: COURSES

### ENGINEERING MATERIALS

Course requirements for the Ph.D. and M.A.Sc. programs in Engineering Materials will be selected from the courses listed below and related courses in other programs. A student's course program will be formulated in consultation with the Graduate Studies Committee for Engineering Materials and requires approval of the research advisor and Chair of the Program Graduate Committee. Students will take no more than 2 of the 4 required courses from their supervisor(s).

All courses listed will not necessarily be offered in any given year.

#### 89-501. Advanced Crystallography

Application of X-ray diffraction principles to the study of materials, application of Fourier series, single crystal techniques, studies of preferred orientation, imperfections. (3 lecture hours a week.)

#### 89-502. Phase Transformations

Phenomenological treatment of transformation processes; diffusion controlled and diffusionless (martensitic) transformations; application of thermodynamic and phenomenological rate laws to transformations: nucleation, recrystallization, precipitation, spinoidal decomposition, ordering, eutectoid decomposition, etc. (3 lecture hours a week.)

#### 89-505. Strengthening Mechanisms in Materials

Dislocation-particle interactions, strengthening by dislocation substructures, particle and fiber reinforcement, strong microstructures from the melt, strong microstructures from the solid. (3 lecture hours a week.)

#### 89-506. Microscopy of Materials

The theoretical and technical aspects of the study of microstructure and composition of materials, optical microscopy, electron microscopy (scanning and transmission) including electron diffraction and image analysis principles, electron microanalysis, x-ray topography, field-ion microscopy, relationship of observed microstructures to the macroscopic properties of materials. (2 lecture, 2 laboratory hours a week.)

#### 89-507. Fracture Mechanics

The fracture mechanics approach to design; physical significance of fracture toughness; measurement of fracture mechanics parameters; non-destructive inspection techniques; principles of fracture-safe design; the relation between the microscopic and macroscopic aspects of plane-strain fracture; fracture of specific metallic and nonmetallic materials. (3 lecture hours a week.)

#### 89-510. Solidification Fundamentals

Fundamental principles of solidification theory including thermodynamics, kinetics, solid-liquid interface morphology and growth mechanics. Solidification mechanisms of pure metals. Heat flow phenomena in casting and crystal growth. Effect on solidification heat transfer of process variables, casting and mold properties, metal and mold temperatures. Students will apply the fundamentals of thermodynamics and kinetics to materials processes such as casting and welding. (3 lecture hours a week.)

#### 89-511. Casting: Modeling and Simulation

Review of casting fundamentals. Techniques for mathematical model formulation. Development of general numerical method based on control volume finite difference scheme to predict mold filling, heat transfer, and solidification phenomena. Treatment of gates, runners, risers, and overflow. Mesh generation for full casting. Applications using commercial casting-simulation software. Students will apply their knowledge of engineering mathematics and transport phenomena to the processes of manufacturing light weight automotive components. (3 lecture hours a week.)

#### 89-512. Metal Casting Technology

Introduction and historical overview of casting. Casting processes, mould design and materials, metallurgical simulation. Metallurgical considerations, liquid metal treatment, heat treatment, casting defects and their prevention. Discussion of challenges faced by today's foundries. (3 lecture hours a week.)

#### 89-513. Tribology: Materials and Manufacturing Aspects

This course will prepare students to perform experimental and analytical work on the materials and manufacturing aspects of tribology. Fundamental equations of wear, wear testing methods; micromechanisms of wear, modeling of surface contacts, frictional heating during sliding contact; tribology of internal combustion engines, friction and wear during machining operations; wear control via surface coatings, coatings for cutting tools. (3 lecture hours a week.)

#### 89-590. Special Topics in Materials

Selected advanced topics in the fields of engineered materials and materials Engineering. (3 lecture hours a week.)

Current topics include:

- Creep of Metals and Alloys
- Microscopy of Materials II
- Wear of Materials
- Composite Materials

Fatigue of Metals and Alloys  
Polymers  
Ceramics  
Welding  
Materials Degradation  
Polymer Injection Molding  
Thin Films and Coatings  
Computational Contact Mechanics in Tribology

**89-797. Thesis**

**89-798. Dissertation**

**INDUSTRIAL AND MANUFACTURING SYSTEMS ENGINEERING**

Students may take courses from outside Industrial and Manufacturing Systems Engineering with permission of the Chair of the Graduate Program and the advisor.

All courses listed will not necessarily be offered in any given year.

**91-500. Optimization**

Classical theory of optimization. Kuhn-Tucker conditions. Unconstrained optimization; gradient methods, conjugate gradient methods, variable metric methods, search techniques. Constrained optimization. Approximation methods, projection methods, reduced gradient methods; penalty function methods; computational algorithms. Recent advances in optimization. Use of computer software packages. (Prerequisite: 91-312 or equivalent.) (3 lecture hours a week.)

**91-501. Industrial Experimentation and Applied Statistics**

Distributions of functions of variables, estimations and tests of hypotheses, power of tests, non-parametric tests, sampling techniques, analysis of variance, randomized blocks. Latin squares and factorial experiments. (Prerequisite: 91-327 or equivalent.) (3 lecture hours a week.)

**91-502. Manufacturing Systems Simulation**

Discrete-event system simulation. Random number generation. Stochastic variate generation. Input parameters; identification and estimation. Output analysis. Static and dynamic output analysis; initial and final conditions; measures of performance and their variance estimation; confidence interval. Design of experiments. Various sampling techniques. Single and multifactor designs. Fractional designs. Response surfaces. Regeneration method for simulation analysis; Monte Carlo optimization. (3 lecture hours a week.)

**91-503. Production and Inventory Control Systems**

Analysis of production-inventory systems. Inventory systems; deterministic, single-item and multi-item models; quantity discounts; stochastic, single-period models; periodic review and continuous review models. Production planning. Static demand models; product mix and process selection problems; multi-stage planning problems. Dynamic demand models; multi product and multistage models. Operations scheduling; job shop scheduling; line balancing. New directions in production systems research. (Prerequisite: 91-413 or equivalent.) (3 lecture hours a week.)

**91-504. Advanced Operations Research I**

Theory and computational techniques for solving linear and integer programming problems. Theoretical foundations of the simplex algorithm. Duality and sensitivity analysis. Network flow methods. Integer programming problems. Branch and bound methods, implicit enumeration methods, cutting plane methods. Interior point methods and other recent developments. (Prerequisite: 91-312 or equivalent.) (3 lecture hours a week.)

**91-505. Advanced Operations Research II**

Probabilistic O.R. models. Markovian decision process. Queueing theory. Single channel and multichannel queueing systems. Queues with general arrival and service patterns. Bulk queues and priority queues. Applications of queueing models. Probabilistic dynamic programming. (Prerequisite: 91-412 or equivalent.) (3 lecture hours a week.)

**91-506. Computer-Aided Modeling of Complex Surfaces**

This course provides an understanding of complex surfaces and their applications, design, mathematical modeling and manipulation techniques. It provides a mathematical foundation of sculptured surfaces, with emphasis on NURBS. Topics include: Geometric modeling, Curves and surfaces representation, B-Spline basis functions, Rational B-Splines curves, and surfaces, Construction of NURBS surfaces, Development of prototype complex surfaces using CAD software and MATLAB, and Introduction of reverse engineering of complex surfaces, modeling, manipulation and prototyping. (Prerequisite: 06-91-311 and 91-315, or equivalent.) (3.0 Lecture hours per week)

**91-507. Advances in Industrial Ergonomics**

Ergonomics and work design; human workload measurement in industry; visual display terminals at the workplace; signal detection and visual inspection; user-computer interaction; human factors aspects of flexible manufacturing systems; effects of individual and combined environmental stressors on human performance. (3 lecture hours a week.)

**91-508. Reliability Engineering**

Basic reliability distributions. Constant failure rate models-exponential reliability function, Poisson process. Time dependent failure models-the Weibull, normal, log-normal distributions. State-dependent systems-Markov analysis. System reliability-system structure function. Reliability growth testing-non-parametric methods, censored testing and accelerated life-testing. Design for reliability-specification, reliability allocation, failure analysis, system safety. Maintainability and availability.

(Prerequisite: 91-327) (3 lecture hours a week.)

#### **91-509. Computer-Integrated Manufacturing**

Development of CIM; the CIM pyramid-key functions. System integration; standards for communications-MAP. Data base as the hub of CIM-types of data base. Role of simulation and support systems-decision support systems and expert systems. Sensor technology, robot vision, and group technology. Impact of CIM. Factory of the future. (3 lecture hours a week.)

#### **91-510. Advanced Engineering Economy**

Principles and methods for engineering analysis of industrial projects and operations. Criteria for economic decisions, project investment analysis, gain and loss estimating and techniques for economic optimization under constraint are included. Emphasis is placed on the construction and use of analytical models in the solution of engineering economy problems. Elements of risk and uncertainty are included through use of probabilistic techniques. (Prerequisite: 85-313 or equivalent.) (3 lecture hours a week.)

#### **91-511. Stochastic Processes**

Stochastic processes. The Poisson process-relationship to exponential, Erlang and uniform probability distributions. Markov chains-basic limit theorem. Continuous time Markov chains - birth-and-death processes, time-dependent probabilities, limiting probabilities, relationship to the exponential distribution, uniformization. Renewal theory-limit theorems, renewal reward processes, regenerative processes, computing the renewal function. Brownian motion and stationary processes. (Prerequisite: Statistics 91-412 or equivalent.) (3 lecture hours a week.)

#### **91-512. Manufacturing Systems Paradigms**

Manufacturing systems paradigms (including DML, Batch, Cells, FMS & RMS), components, characteristics, automation, operation, planning and control. Changeability and mass customization. Integrated products/systems design, process planning, GT & CIM. Special topics: Assembly, Robotics, Inspection, Quality and Cost. (3 lecture hours a week)

#### **91-514. Engineering Design, Methodology & Applications**

Engineering Design is a creative, iterative and often open-ended process subject to constraints. Topics include: design creativity & problem solving, engineering conceptual design & embodiment design, practices for product realization design theories and methodologies, parametric design, probabilistic design, industrial design, design and manufacturing integration, concurrent Engineering, materials selection in design, design for x (e.g. manufacturing, assembly), engineering design communication. Significant time is devoted to the applications of design theories and methodologies and to a product/process design realization. (3 lecture hours a week.)

#### **91-515. Artificial Intelligence Applications in Manufacturing**

The objective of this course is to teach graduate students how artificial intelligence techniques can be applied to manufacturing operations. Detailed topics to be discussed in this course include: basic knowledge representation methods and problem solving techniques; different search algorithms; introduction to AI high level languages; introduction to the CLIPS shell; AI application in Design; AI application in Operation Management; AI application in Diagnosis; and, AI application in Control. (3 lecture hours a week.)

#### **91-516. Computer-Aided Design (CAD)**

This course will focus on computer-aided methods and applications. The lectures present basic and generic principles and tools, supplemented with significant hands-on practice and engineering applications. Various topics are studied and practiced using CAD/CAE software, such as Engineering design and the role of CAD, geometric modelling systems, representation of curves and surfaces, surface modelling, solid modelling and applications, parametric representations, assembly modelling, computer-aided engineering (CAE) and applications, distributed collaborative design, and digital mock-up. (Prerequisite: 91-311 or equivalent.) (2 lecture hours a week and 2 laboratory hours a week.)

#### **91-517. Automotive Assembly Work Measurement**

A Graduate study of manufacturing driven product designs, assembled in a human orientated workplace. Learn the science of work measurement to continuously evaluate existing designs against internal and external better practices and utilize insights gained from hands-on product teardowns in the development of innovative patentable ideas & product redesign proposals that support the lean enterprises balance scorecard. (3 lecture hours a week)

#### **91-518. Manufacturing Systems: Modelling, Analysis and Performance Measures**

This course is specifically oriented toward performance issues that arise in Automated Manufacturing Systems (AMS). The main goal of this course is to introduce efficient analytical modeling tools. Examples related to serial manufacturing systems, and Flexible Manufacturing Systems will be presented to illustrate the theory and applications of these modeling tools. The reliability and maintainability techniques are also presented and integrated in the design, the analysis and the modeling of AMS. (Pre-requisites: 91-312)(3 Lecture Hours Per Week)

#### **91-519. Work Organization: Analysis and Design**

Introduction to the applications of organization theory for the analysis and design of work organizations (industrial enterprises). Assessment and improvement of organizations through integration of social and technical systems in order to achieve organizational purpose. Fundamentals of organization structure. Classical organization theories. Group decision processes (group and individual). Organizational culture and ethics. Organizations and manufacturing technology. Management of knowledge workers. Information and communication technologies in program in organizations. Innovation and creativity, change management. Organizational accidents and errors, risk management. Impact of globalization and international environment on organizational strategies. (Pre-requisite: Graduate Standing in Engineering or Business) (3 Lecture Hours Per Week)

#### **91-520. Engineering Applications in Health Care**

Introduction to the broad range of current technological and organizational issues in health care. Overview of health care

industry. Instrumentation for medical diagnostics (biomedical sensors, medical imaging). Medical diagnostics and decision making. Information technology in health care (information systems, electronic medical records). Principles of evidence-based medicine. Medical studies and statistics. Prosthetics and orthotics. Lab automation and surgical robotics. Manufacturing in health care. Health care facilities planning and design. Quality management in health care. (Prerequisites: graduate standing in engineering, business, nursing or human kinetics; 3 lecture hours a week).

#### **91-521. Sustainable Manufacturing**

The objective of this course is to introduce students to how the environment has been affected by the activities of the manufacturing industry and how this type of impact could be measured and reduced. Students will learn to identify design and manufacturing issues related to the environment. Topics discussed in this course include sustainable development, sustainability, environmentally conscious design and manufacturing concepts and practices, recycling and reuse, material selection and compatibility, de-manufacturing and re-manufacturing, life-cycle assessment, and ISO 14000. (3 Lecture Hours Per Week)

#### **91-522. Supply Chain Management and Logistics**

This course covers the major issues associated with the management of Supply Chain and Logistics, covering both technical and managerial issues with emphasis on the analytical decision support methods and tools. Topics include supply chain network design, inventory models and theories, transportation and logistics planning, outsourcing and pricing, and case study. (Pre-requisite: 91-312 or 91-391, or equivalent) (3 Lecture Hours Per Week)

#### **91-523. Product Innovation and Design Management**

This course covers the critical factors affecting product development and innovation and identifies the common characteristics of successful new products drawing upon best industrial practice. The aim is to provide students with an understanding of the managerial and technical processes commonly involved in product development and innovation. Three main themes will be covered throughout this course: Product Design and Innovation; Idea Generation Techniques; Design and Innovation Project Management. (3 Lecture Hours Per Week)

#### **91-524. Advanced Topics in Discrete Optimization**

This course is concerned with topics in discrete optimization, particularly in integer programming theory and techniques. Topics include: Analysis of algorithms, modeling and applications of discrete optimization, dynamic programming, branch and cut, Lagrangian duality, modern meta-heuristic methods, introductions to nonlinear integer programming and stochastic (integer) programming, software for solving discrete program, advances in discrete optimization. (Pre-requisite: 06-91-312 or equivalent.) (3 Lecture Hours Per Week)

#### **91-590. Special Topics**

Selected advanced topics in the field of Industrial Engineering. (3 lecture hours a week.)

#### **91-595. Graduate Seminar**

Presentations by graduate students, staff, and visiting scientists on current research topics. Graduate students are required to register and give a presentation in the semester prior to thesis defence. All graduate students are expected to attend each and every seminar and no less than 75% of all seminars. This course will be graded on a Pass/Fail basis. (1 lecture hour a week.)

#### **91-796. Major Paper**

#### **91-797. Thesis**

#### **91-798. Dissertation**

### **MECHANICAL ENGINEERING**

Course requirements for the Ph.D., M.A.Sc. and M.Eng. programs in Mechanical Engineering will be selected from the courses listed below and related courses in other programs. A student's course program will be formulated in consultation with the advisor and requires approval of the Graduate Studies Committee for Mechanical Engineering and the Chair of the Program Graduate Committee.

With the permission of the advisor and Department Head (and under consultation with the Graduate Coordinator), Mechanical Engineering courses with numbers greater than 449 only and related to the graduate field of study may be taken for graduate credit for students enrolled in the M.A.Sc. and M.Eng. programs. Not more than one undergraduate course (numbered greater than 449 only) shall count as credit towards the course requirements for the M.A.Sc. or M.Eng. degree. These courses are not available for course credit towards the Ph.D. degree.

In the case of M.Eng. students, the Chair of the Graduate Committee assumes the role of the advisor.

#### **92-503. Turbulent Flow**

General turbulence theories, wall turbulence and free turbulence. (3 lecture hours a week.)

#### **92-506. Thermal Systems Design**

Advanced systems design requiring the application of economics, heat transfer, simulation and optimization. (3 lecture hours a week.)

#### **92-507. Experimental Techniques in Flow Measurements**

A course covering the theory of flow and velocity measurement. Emphasis will be placed on hot wire instruments and turbulence measurements. (3 lecture hours a week.)



**92-509. Multiphase, Multicomponent Flows**

A thorough treatment of the basic techniques for analyzing one-dimensional multi-phase, multicomponent flows in order to predict flow regimes, pressure drop, etc. Practical applications in fluidization, sedimentation and boiling heat transfer. (3 lecture hours a week.)

**92-516. Industrial and Motor Vehicle Noise**

Hearing damage risk criteria and in-plant noise regulations; determination of permissible exposure levels due to continuous and intermittent noise. Measurement of machine noise and standard procedures. Fundamentals of noise control. Characteristics and levels of motor vehicle and traffic noise; motor vehicle noise control legislation and standard procedures for measurement. (3 lecture hours a week.)

**92-517. Automotive Applications for Noise, Vibration and Harshness Evaluation**

This course introduces the automotive applications and tools for the evaluation of noise, vibration and harshness. It includes reviews of measurement techniques presently used in the automotive industry to measure various aspects of noise, including the concept of sound quality, vibration and the quantification of the term harshness. The course consists of a review of papers which are to be presented to the class. Participants perform critical reviews on the presentations. Three lecture hours per week. Course evaluation is based on weekly reports, presentations of reviews of papers and critical reviews by participants. (3 lecture hours a week.)

**92-530. Combustion Engineering**

An introductory graduate course on combustion engineering, covering a broad range of topics of importance to the field including chemical thermodynamics and kinetics, flames and combustion rates, and detonation of gaseous mixtures. The emphasis is on the understanding of the combustion processes involved in practical systems. (Antirequisite: 92-590-01.) (3 lecture hours a week.)

**92-531. Numerical Heat Transfer and Fluid Flow**

This course is concerned with the ability of using numerical methods to predict heat transfer, fluid flow and related processes. The course consists of an introduction to Computational Fluid Dynamics, descriptions of the general governing differential equations, discretization methods for the differential equations, numerical simulation of conductive heat transfer, numerical treatment of convection and diffusion and calculations of flow fields. (Antirequisite: 92-590-02.) (3 lecture hours a week.)

**92-532. Modeling of Thermo-fluid Systems**

This course will cover the basic types of mathematical models that are used to describe Thermo-fluid systems. Lumped as well as distributed parameter models will be considered with analytical as well as numerical methods of solution. Modern solution tools such as Simulink, Maple, Fluent and Wave will be utilized whenever appropriate. The topics to be considered may include but are not limited to: two-phase flow, transient flow, turbulence, non-newtonian flow, boiling, evaporation, condensation and fluid-structure interaction. (Antirequisite: 92-590-07.) (3 lecture hours a week.)

**92-533. Turbulent Reacting Flows**

This course will cover the following topics: experimental investigation of flames, thermodynamics of combustion processes, transport phenomena, chemical kinetics, reactions mechanism, laminar premixed and diffusion flames, the Navier-Stokes equations for the reacting flows, turbulent premixed and non-premixed flames, low temperature oxidation and engine knock, and pollutants formation. (Antirequisite: 92-590-08.) (3 lecture hours a week.)

**92-534. Introduction to Computational Fluid Dynamics**

This course is intended to provide basic knowledge required to initiate research or applications in computational fluid dynamics. Topics include: numerical methods for model hyperbolic, parabolic and elliptic equations; analysis of difference schemes; numerical stability; explicit and implicit methods; artificial viscosity; linearization techniques; approximate factorization; preconditioning, iterative solutions, successive over-relaxation (SOR), successive line over-relaxation (SLOR), alternating direction implicit (ADI); two-dimensional structured grid generation; introduction to finite volume method. (Antirequisite: 62-577.) (3 lecture hours a week.)

**92-535. Advanced Topics in Computational Fluid Dynamics**

This course is a continuation of 92-534. Advanced topics in computational fluid dynamics (CFD) will be discussed, including: structured and unstructured grid generation on surfaces and three-dimensional; Navier-Stokes and Euler solvers; applications of finite volume method; turbulence modeling; current issues in CFD. Students will carry out project work using one or more commercial CFD packages.(Prerequisite: 92-534.) (Antirequisite: 62-587.) (3 lecture hours a week.)

**92-536. Fundamentals Of Clean Engine Technology**

This course focusses on the understanding of fuel properties, combustion processes, exhaust emissions, and pollution prevention in diesel and other lean-burn IC engines. Introduction to Stirling and other external combustion engines.

**92-540. Applied Finite Element Analysis**

This course focuses on the modeling aspects of the finite element method using three well known commercial Finite Element Analysis (FEA) software packages known as DYNA, IDEAS and ANSYS. A variety of stress analysis problems in two and three dimensions are studied and the accuracy of the simulations are assessed through comparison with available theoretical and experimental results. Both static and dynamic situations are covered. The students are expected to prepare a final report summarizing their work and an oral presentation. (Antirequisite: 92-590-03.) (3 lecture hours a week.)

**92-541. Introduction to Vibration Measurement and Modal Analysis**

This course is concerned with basic concepts of modal theory, basic modal parameter analysis, single degree of freedom methods, introduction to frequency response functions, general modal analysis and multiple degree of freedom and global

methods. The accuracy of Fast Fourier Transforms (FFT) and windowing, FFT analysis options, zoom, coherence and quality assessment, relationship to finite element modeling will also be considered. In addition, basic measurement techniques, calibration techniques, transient and steady state excitation techniques, general frequency response function interpretation, case study (laboratory experiment) and validation of measured and analyzed data are studied. (Antirequisite: 92-590-04) (3 lecture hours a week.)

**92-542. Advanced Topics in Mechanical Design**

The topics discussed in the course will be selected from the following: design and analysis of mechanical details such as welded and bonded joints, minimum constraint design, fluid power systems, mobile hydraulic systems, project planning, optimization, decision making methodology, ISO/QS9000 quality methods, concurrent engineering, design reports, design reviews, design for manufacture and assembly, design for quality, configuration design, design for minimum cost, parametric design, developing size ranges for families of products, geometric dimensioning and tolerancing, Taguchi methods, manufacturability and serviceability considerations and product warranties. (Antirequisite: 92-590-05.) (3 lecture hours a week.)

**92-543. Product Design and Development**

This course covers the process of new product creation including topics selected from: the product development team; the product development cycle; conceptual development; models including technology push products; platform products; process-intensive products and customized products; needs analysis - identifying the customer and their needs; establishing product specifications; concept generation; concept selection; product architecture; industrial design and ergonomics; prototyping; economics of the development process and project management. (Antirequisite: 92-590-06.) (3 lecture hours a week.)

**92-544. Finite Element Methods for Crashworthiness and Impact Analysis**

The topics include a brief history on the use of numerical tools in automotive/impact field, Explicit and Implicit time integration techniques, Shell and Solid finite element formulations for impact analyses - advantages and disadvantages, Zero Energy Modes (Hourglassing) and Hourglass control, Material modeling for large displacement problems, Finite element modeling for contact, Mesh Adaptivity, Arbitrary Lagrangian and Eulerian Meshes for large deformation problems, Use of implicit integration techniques for impact problems, Quasistatic simulations as well as the development of finite element models for impact analyses. (Antirequisite: 92-590-12.) (3 lecture hours a week.)

**92-545. Automotive Control Systems**

This course will address advanced control design techniques for automotive systems. The interdisciplinary goal of this course is to present the application of control system design to engine operation and vehicle mechanics as well as the approaches for parameter/model identification and estimation of automotive systems. For graduate students in electrical engineering, this course will make it possible for them to access automotive models and to understand engine dynamics, both for the purposes of applying control design techniques. For graduate students in mechanical engineering, this course will provide a chance for them to learn how to apply advanced control design strategies to automotive systems. It is expected that, after taking this course, graduate students from both engineering fields will be able to address automotive control problems from interdisciplinary point of views and to complement expertise in their own areas. (Prerequisite: 92-412.) (Antirequisite: 92-590-22) (Cross-listed with 88-536.) (3 lecture hours a week.)

**92-590. Directed Special Studies**

A special course of studies with content and direction approved by the student's chief advisor. Although there may not be formal lectures, the course will carry the weight of three lecture hours.

**92-593. Introduction to Finite Element Analysis**

This course covers the fundamentals of the Finite Element Analysis (FEA) with emphasis on solid mechanics and stress analysis. The subject of finite elements is treated using variational principles such as the principle of virtual work and total potential energy. The course deals with a variety of structural components such as springs, axially loaded bars, beams under bending, two-dimensional/axially symmetric/three-dimensional continuum elements and their formulation is static and dynamic analysis. In addition to three hours of lecture, a two-hour computer lab is mandatory where the students use different commercial FEA software. (Antirequisite: 62-593) (3 lecture hours a week and 2 laboratory hours a week.)

**92-595. MASc Graduate Seminar:**

MASc Graduate Seminar is a series of presentations by graduate students, faculty and invited speakers on engineering related topics, including but not limited to research, development, commercialization, management and leadership. All full-time and part-time MASc students are required to complete 36 hours of graduate seminar classes and give one seminar presentation in the MASc Graduate Seminar course during each of his/her graduate degree programs in Mechanical Engineering. Part-time students who are not able to take the MASc Graduate Seminar course have to take an additional 3-credit graduate course approved by his/her degree supervisor(s), if necessary, to fulfill the overall credit requirement for the degree. This seminar course will be graded on a pass/fail basis. (1 lecture hour/week)

**92-695. PhD Graduate Seminar**

PhD Graduate Seminar is a series of presentations by graduate students, faculty and invited speakers on engineering related topics, including but not limited to research, development, commercialization, management and leadership. All full-time and part-time PhD students are required to complete 36 hours of graduate seminar classes and give two seminar presentations in the PhD Graduate Seminar course during each of his/her graduate degree programs in Mechanical Engineering. Part-time students who are not able to take the PhD Graduate Seminar course have to take an additional 3-credit graduate course approved by his/her degree supervisor(s), if necessary, to fulfill the overall credit requirement for the degree. This seminar course will be graded on a pass/fail basis. (1 lecture hour/week)

**92-796. Major Paper**



**92-797. Thesis**

**92-798. Dissertation**

**MECHANICAL ENGINEERING (AUTOMOTIVE FIELD)**

**85-500. Special Topics in Automotive Engineering**

Selected advanced topics in the field of automotive engineering.

**85-511. Bluff Body Aerodynamics**

Atmospheric boundary layers. Flow around bluff bodies, separation and wakes. Lift and drag, pressure and force coefficients. Streamlined bodies, bluff bodies. Flow over flat plates and walls, rectangular prismatic shapes, circular cylinders. Fluctuating forces and pressures on bluff bodies. Wind tunnel testing, similarity requirements, wind tunnel techniques. Vehicle aerodynamics, drag and lift of passenger cars, cross wind stability, wind tunnel and road testing. Architectural aerodynamics, design wind speed, flow in and around building, wind-induced response of low-rise buildings, tall buildings, and large roof and sports stadium. Aerodynamics of Wind Turbines. (Pre-requisite: Undergraduate level Engineering Mechanics, Fluid Mechanics.)

**85-529. Automotive Paint and Industrial Coatings**

This course covers: functionality and application methods of automotive coating layers, concepts in polymer chemistry and suspensions, automotive coatings formulation, application of coatings by dip and spray processes, curing of coatings after application, appearance measurement and durability testing. Concepts of adhesion, corrosion resistance and surface pretreatment will also be covered. Powder coating and coating plastics. Each student will complete a literature review of a topic in coatings. (Anti-requisite: 93-590 Pollution Prevention in Manufacturing.)

**85-591. Engineering Venture Formation**

Designed for students who choose entrepreneurship as a career option, this course is an in-depth study of the process of drawing the blueprints for a new enterprise including: developing business ideas, developing business concepts, conducting feasibility studies, choosing a legal form or business, writing business plans, identifying and approaching sources of money, raising funds, and putting together a package of resources to start an enterprise. (Anti-requisites: 75-491.)

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# Spring 2016 Graduate Calendar

## ENGLISH: COURSES

All graduate courses are seminars. Enrolment is limited in these courses, because considerable contribution is expected from each member of the seminar. For such courses, the corresponding undergraduate survey course, or an acceptable equivalent, is ordinarily a prerequisite. This condition may be waived only by agreement of both the program coordinator and the professor offering the seminar. The specific topics of individual courses may vary, depending upon the interests and needs of professors and students. It is thus impossible to list in detail the many topics that may from time to time be offered. The schedule below lists only the major periods or forms of literature in which special topics courses may be available.

Special topics courses having the same course number may be taken more than once providing the course content is different and with the permission of both the program coordinator and the professor offering the course. More than one seminar or course numbered in sequence in any of the listed areas may be offered in a given term.

In the Fall term each year, the [Department of English](#) publishes a Graduate Handbook giving complete information as to specific topics of the courses to be offered in the upcoming academic year, with texts, reading assignments, and other details about requirements of the course, wherever possible. Students are welcome to write to or call the office for a copy of this handbook.

Not all of the following areas will necessarily be represented by course offerings in any one year.

- 26-500. Scholarship and the Profession**
- 26-501. Tutorials**
- 26-505. The English Language and Linguistics**
- 26-510. Literature of the Old English Period**
- 26-515. Literature of the Middle English Period**
- 26-520. Literature of the Renaissance**
- 26-525. Renaissance Drama**
- 26-530. Literature of the Restoration Period**
- 26-535. Literature of the Eighteenth Century**
- 26-540. Literature of the Romantic Period**
- 26-545. Literature of the Victorian Period**
- 26-550. Literature of the Twentieth Century**
- 26-555. Literature of the United States**
- 26-560. Literature of Canada**
- 26-565. Post-Colonial Literature**
- 26-570. Literary Genres: Poetry**
- 26-575. Literary Genres: Drama**
- 26-580. Literary Genres: Fiction**
- 26-585. Literary Genres: Criticism/Cultural Studies**
- 26-591. Creative Writing Seminar A**

The Creative Writing Seminar A is the capstone in Windsor's English program in Creative Writing. Its aim is to assist you, who have been chosen to participate in it as highly talented serious students, to become writers of distinction. The seminar will be run primarily as a workshop, where we read and discuss work-in-progress. There will also be occasional assigned reading and writing exercises, and guest speakers, for your challenge and inspiration.
- 26-592. Creative Writing Seminar B**

The Creative Writing Seminar B is a continuation of Seminar A as the capstone in Windsor's English program in Creative Writing. (Pre-requisite: 26-591 or portfolio approval).
- 26-596. Composition Pedagogy: Theory and Practice**

(Required for Graduate Assistants assigned to teach 26-100.)

**26-794. Creative Writing Project**

**26-797. Thesis/Project**

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## FACULTY OF SCIENCE

(Great Lakes Institute for Environmental Research (GLIER))

## ENVIRONMENTAL SCIENCE: COURSES

### **68-550. GLIER Multidisciplinary Graduate Seminar**

This course will be team-taught by core GLIER faculty who will be responsible for organizing seminar modules in their area of research expertise. Modules will include external speakers and encompass lectures and discussions utilizing a multidisciplinary approach to environmental research, and its role in developing ecosystem-based management decisions that affect large lakes and their watersheds. Students are expected to participate in discussions, prepare and deliver critiques of seminars, and present a seminar. (Required of all GLIER graduate students.) (2 hours per week for 2 semesters.) (6.0 credit course.)

### **68-570. Environmental Research Proposal**

A course aimed at developing proposal and grant writing skills for the academic environment. Students will prepare an original research proposal based on their research topic and defend it publicly. Students will engage in grant writing exercises, developing skills typical of those required by major funding agencies. Effective oral presentation skills will be developed. (Required of all M.Sc.

students.) (2 hours per week.) 3.0 credit course.)

**68-680. Multiple Stressors and Environmental Modelling**

A course aimed at developing an understanding of the nature of interactive, multiple stressors on large watersheds and lakes. Stressors considered will include chemical contaminants, nutrient enrichment, species invasions, climate change, population harvesting and land use changes. Students will model and gain appreciation for how single and interactive stressors affect large lakes and their watersheds, and how confounding issues can be isolated and explored. Students are expected to prepare and participate in critiques of the published literature, and contribute an original essay that explores these issues. (Required of all GLIER Ph.D. students.) (2 hours per week.) (3.0 credit course.).

**68-797. Thesis**

**68-798. Dissertation**