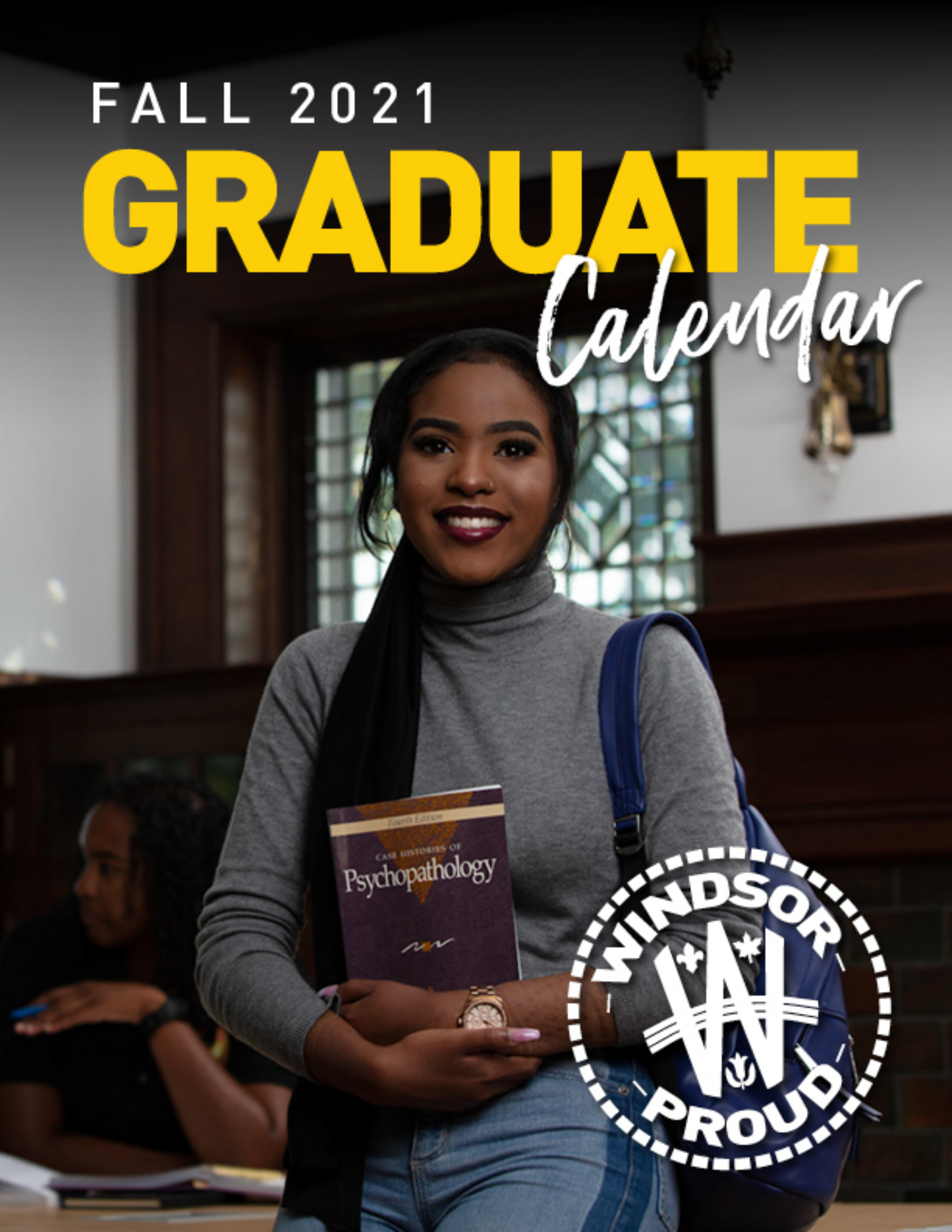
FALL 2021

GRADUATE *Calendar*



Graduate Calendar
Fall 2021

FOREWORD

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
Iona College

The University of Windsor is a full member of the Association of Universities and Colleges of Canada, and the International Association of Universities.

University of Windsor

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RESPONSIBILITY/DISCLOSURE NOTIFICATIONS

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.

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.

PROGRAM AND COURSE LEARNING OUTCOMES

Program and Course Learning Outcomes can be found online in the Curriculum Mapping and Design (CuMa) database, which is an online tool that contains an archive of the official program and course learning outcomes at the University of Windsor

Programs https://ctl2.uwindsor.ca/cuma/public/programs/
Courses: https://ctl2.uwindsor.ca/cuma/public/courses/

ACADEMIC REGULATIONS

FACULTY REGULATIONS FOR THE DOCTOR OF PHILOSOPHY

Admission Requirements for the Doctor of Philosophy (PhD)
Graduates of recognized universities may apply for admission. In general, admission to graduate study is granted only to those students who have good academic records and who are adequately prepared to undertake graduate work in their field of specialization. In particular, an applicant for admission to a graduate program leading to the degree of Doctor of Philosophy must have either a Master's degree or, in exceptional cases, a four-year Bachelor's degree, or the equivalent; with a minimum average of 77% (or equivalent). Possession of the minimum requirements does not ensure admission.

Fast Track Admission to the Degree of Doctor of Philosophy (PhD)
This process allows a student to enter the PhD program without first completing the Master's degree. Recommendations from the program must be made no earlier than Term 3, and be approved prior to the completion of Term 4 of the Master's degree. Recommendations received beyond the end of Term 4 will not be considered. To be eligible, the student must have completed all graduate courses for the Master's degree and must have obtained a minimum 80% average. The supervisory committee must recommend the transfer, in writing, based on demonstrated excellence in research and provide evidence of a complete plan of research for the doctoral degree. All applications must be approved by the Faculty of Graduate Studies.

Program Requirements for the Degree of Doctor of Philosophy

Residence
Residence requirements are intended to provide for each student an adequate contact with the University, with the faculty in the field of specialization, and with the library, laboratories, and other facilities for graduate study and research. Every student in a program leading to the degree of Doctor of Philosophy must be registered in a full-time program of study for a minimum of three calendar years, normally in succession. Credit for one of these years may be given for the time spent in proceeding to a Master's degree.

Transfer credits will only be granted at the time of admission, and recommendations must be included with the offer of admission. Normally, credits must have been received in the last 5 years with a minimum grade of 70%, and no credits used towards a previously completed certificate, diploma, or degree or used as a basis of admission will be approved as credit toward a Windsor graduate degree. A maximum of 50% of the Windsor course degree requirements will be approved for transfer credit, excluding internship/practicum, thesis, dissertation, or comprehensive examination courses.

If transfer credit is granted, the student may be required to take alternate course(s) as recommended by the program. Approved transfer credit will appear on the student's transcript.

A full-time residence year indicates that a student is in full-time work under the direction of a faculty member at the University of Windsor.

Candidacy
Admission to graduate study does not imply admission to candidacy for a degree. Admission to candidacy for the degree of Doctor of Philosophy is granted by the Dean of Graduate Studies, upon recommendation of the program concerned, when a student has satisfied the requirements for candidacy of the Faculty of Graduate Studies and of the program, as may be specified in program listings in the calendar. Admission to candidacy

is normally to be regarded as recognition that a student has given adequate evidence of superior capability and achievement in graduate study. A student may not be admitted to candidacy for the degree of Doctor of Philosophy before passing a comprehensive examination in the field of specialization.

Time Limit
A student admitted to a PhD program must complete all requirements for the PhD. within six consecutive years.

If an extension of the time limit becomes necessary, the student should address a petition to the Dean of Graduate Studies giving reasons for the request and plans for the completion of the work. A student who exceeds the time limit may be required to take additional qualifying examinations or additional course work, or both.

Course of Study
Course requirements are specified in the program listings. Planning and direction of the student's course of study are the responsibility of the program coordinator or a designated departmental advisor. A specific program of study should be worked out at the time of the student's first registration, in consultation with the program.

Since in several programs only a few courses listed will be offered each year, students are advised to ascertain from the program area which courses will be offered in any given year.

In consultation with their program area, all students must complete an Annual Report, which is to be submitted to their department by May 31 of each year.

It is expected that students working toward the degree of Doctor of Philosophy will maintain a superior average in all course work. Normally, graduate credit will be given only for courses in which a minimum 70% grade has been achieved. See also Senate Policy on Grading and Calculation of Averages.

Committees
Research undertaken as part of a doctoral program is normally directed by a faculty supervisor and advised by a doctoral committee.

By the end of the first term of registration in the dissertation, the program will recommend the appointment of members of the doctoral committee, whose appointments must be approved by the Faculty of Graduate Studies. At the same time the candidate will be required to validate the Non-Exclusive License to the University of Windsor authorizing the University to archive, reproduce, and distribute the dissertation.

The doctoral committee will include as a minimum a research supervisor or co-supervisors from the program, who is(are) a member of graduate faculty, two other program readers, and one outside program reader from the University of Windsor. The outside program reader may not be cross appointed to the program in which the student is registered. Additional members may be added with the approval of the program and the Faculty of Graduate Studies. This committee will, from time to time, review the student's progress.

The majority of the members of an advisory committee must have graduate faculty status and the supervisor must have full graduate faculty status. In the case of co-supervision one of the co-supervisors must have full graduate faculty status, see Senate Policy on Graduate Faculty Designation.

The doctoral committee is also charged with conduct of the final examination of the doctoral candidate

For the defense of the dissertation (final oral examination), the committee will be supplemented by an independent, external examiner who, as an expert in the field in which the candidate's research is carried out, will appraise the dissertation and ordinarily will also be present at the final oral examination.

The external examiner will be recommended by the doctoral committee, subject to the approval of the program area and the Dean of Graduate Studies. The external examiner must not be involved in the preparation of the dissertation before it is submitted to him or her for final evaluation.

If the research involves information gathered from or about human participants (including primary data collection, use of human biological materials, and secondary uses of information), the faculty supervisor and graduate student are responsible for the ethical conduct of the study, the completion of the project as described in the ethics application cleared by the Research Ethics Board (REB) and the protection of the rights and welfare of human participants. The supervisor ensures that all required clearances and permissions are obtained prior to commencement of the research. The graduate student and faculty supervisor submit an application to the Research Ethics Board (REB) Research involving human subjects cannot begin until ethics clearance has been obtained. (Consult with the Research Ethics Board (REB)).

All research conducted at the University of Windsor is subject to the institutional policies as described in Research Integrity and the Responsible Conduct of Research and University of Windsor Guidelines for Research Involving Human Research Participants. If the research involves animal care, biohazards, health and safety, radiation, or any other procedure that requires certification, the supervisor of the research is responsible for obtaining prior approval from the respective committees. (Consult with the Office of Research and Innovation Services).

The Dissertation for the Degree of Doctor of Philosophy

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.

The regulations of individual programs should be consulted for details of their dissertation procedures. The general format is prescribed in the Guidelines for Major Papers, Theses, and Dissertations, which may be obtained from the Faculty of Graduate Studies or from www.uwindsor.ca/graduate. Within the dissertation, the student should use formats approved for scholarly publication in the field of specialization and approved by the program. Final checking of the general format of the dissertation is the responsibility of the Faculty of Graduate Studies, but the student should consult the doctoral committee for instructions as to the internal form of the dissertation.

Copies of a PhD dissertation are to be provided to all members of the doctoral committee and two copies to the Faculty of Graduate Studies, of which one copy will be transmitted to the external examiner, at least four weeks before the expected date of defense. Before the dissertation is forwarded to the external examiner, all members of the doctoral committee must read and provide feedback on the dissertation, and it must be approved by the majority of the committee. No changes may be made to the dissertation document or composition of the doctoral committee between these deadline dates and the defense except under the most extraordinary circumstances and with approval of the Executive Committee of Graduate Studies. The oral presentation should be completed at least three weeks prior to the Convocation for which the candidate has applied to receive the degree. A public notice of defense must be received in the Office of Graduate Studies and posted in the academic unit at least eight days in advance of the oral presentation.

A doctoral committee shall notify the Faculty of Graduate Studies whether, in its view, notice of defense is to be posted, but the decision to proceed shall be contingent upon the report of the external examiner to the Dean of Graduate Studies.

The candidate will present the dissertation at a public defense. The Chair of a PhD defense will be the Dean of Graduate Studies or designate, such as the Associate Dean of Graduate Studies, Dean of a Faculty or senior member of graduate faculty from outside the program, to be named by the Dean of Graduate Studies at the time the defense is publicly announced. The chair is non-voting. Questions will be permitted from the general audience at the discretion of the chair. The general audience may remain until the defense is completed and the committee begins its deliberations on the outcome. These deliberations are held in camera.

The minimum basis for acceptance of a PhD dissertation shall be positive unanimity less one vote providing the dissenting vote is not by an external examiner who is present at the defense, and the chair of the defense determines that the examination by the external examiner has been fair to the candidate. Unless an examining committee is unanimously negative, a candidate may resubmit the dissertation once, after a minimum period of three months and before a maximum period of twelve months. The second decision shall be final.

The dissertation must be deposited with the Faculty of Graduate Studies at least two weeks prior to Convocation.

Arrangements for the deposit, including online electronic submission, binding the dissertation and payment of binding fees, where applicable, should be made with Graduate Studies. The University will add the dissertation to the “Scholarship at UWindsor” online institutional repository and transmit a copy of the dissertation to Library and Archives Canada, under the authority of a "Thesis/Dissertation Non-Exclusive License", supplied by the Faculty of Graduate Studies and validated by the candidate. The license authorizes Library and Archives Canada and Leddy Library to publish, reproduce, and transform the dissertation in any format, print or online. The deposited dissertation becomes the property of the University.

Occasionally, it is necessary to withhold the dissertation from public circulation, especially where the student's interests (e.g., patent rights) would be jeopardized by publication. In such cases, a thesis may be held from the public domain, i.e., the online repository, the Leddy Library and Library and Archives of Canada. Such delay in circulation may be requested for six months without cause being given, and an additional period of six months with good cause. Forms for withholding dissertation are available from the Faculty of Graduate Studies.

Dissertation Requirement Synopsis for the Doctor of Philosophy

1.Dissertation format must be as prescribed in Guidelines for Major Papers, Theses, and Dissertations.

2. Copies of the dissertation must be provided to all committee members and two copies to the Faculty of Graduate Studies at least four weeks before the oral defense, which must occur at least three weeks prior to the Convocation at which the candidate has applied to receive the degree.

3. Public notice of defense must be received in the Faculty of Graduate Studies and posted in the academic unit at least eight (8) days in advance of the defense date.

4. Following successful defense, the candidate will deposit the dissertation in the Faculty of Graduate Studies, as prescribed in Guidelines for Major Papers, Theses, and Dissertations.

5. The candidate will validate a “Thesis/Dissertation Non-Exclusive License”, supplied by the Office of Graduate Studies, authorizing Library and Archives Canada to publish, and reproduce the dissertation.

PhD Examinations

In addition to the usual examinations on course work, there are three types of special examinations which that may be required (see individual program regulations) in the program leading to the degree of Doctor of Philosophy:

1.**Qualifying Examinations**: 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 within one year after a student enters a graduate program.

2.**Comprehensive Examinations**: A 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, these examinations are completed by the end of the second year of graduate study and are a prerequisite to admission to candidacy.

3. **Final Examinations**: The final examination of a doctoral candidate is an oral defense of the dissertation.

FACULTY REGULATIONS FOR THE MASTER'S DEGREE

Admission Requirements
Graduates of recognized universities may be admitted to programs leading to the Master's degree. A student with a four-year degree or equivalent in the discipline to which s/he is seeking admission, and who has an academic standing equivalent to 70% or better in the final two years of study (full time equivalent) may be admitted to a Master's program (M2).

An applicant who holds a four-year degree in a related discipline, and who has an academic standing equivalent to a 70% or better overall and in the final year of study and the major subject, may also be admitted to a Master's program as a transitional student. Transitional students are normally required to complete a program of no more than five specified undergraduate courses in addition to the graduate courses required of regular students. Upon completion of these extra courses, with a minimum grade as specified by the program, the student may continue in the Master's program as a regular student (M2).

An applicant who does not meet minimum departmental program admission requirements, but who can present evidence of leadership, and/or substantial related work experience, may be considered for probationary admission upon the recommendation of the program. Students who are accepted on probation will be required to satisfactorily complete two specified graduate courses in the first term of registration, in addition to any other admission requirements, before conditions are waived. Graduate credit will be given for the graduate courses after the conditions are waived. The final decision on probationary admission rests with the Faculty of Graduate Studies.

An applicant who holds a three-year degree in the discipline to which they are applying, or a four-year degree in another discipline, and who has an academic standing equivalent to 70% or better overall and in both the final year of study and major subject may be admitted as a qualifying student, with a recommendation for advancement to M2 level contingent upon completion of a prescribed set of qualifying courses, with a minimum grade as specified by the program. Since qualifying students are not candidates for a degree, a qualifying student is not considered a graduate student (M1).

Applicants are urged to apply as early as possible to enable the program and the Faculty of Graduate Studies to evaluate qualifications.

Possession of the minimum requirements does not ensure admission.

Candidacy: A student in an M2 program is also a candidate for the Master's degree. Students in the two-year M1 program followed by the M2 program are not admitted to candidacy until they have satisfactorily completed the M1 program. A positive recommendation from a program and approval of that recommendation are required for a student to proceed to the M2 program.

Program Requirements for the Master's Degree

Residence

Residence requirements are intended to provide for each student an adequate contact with the University, faculty in the field of specialization, the library, laboratories, and with other facilities for graduate study. It is expected, therefore, that every full-time student in a program leading to the Master's degree will undertake a full program of study at the M2 level for a minimum of one calendar year or its equivalent. Application and interpretation of the residence requirement is the responsibility of the Dean of Graduate Studies. If a student does not expect to fulfill the residence requirement in the normal way, reasons for departing from the norm should be submitted in writing to the Dean and approval secured for the plan before beginning the graduate program. See also the section on "Duration of Study".

The residency requirement is not intended to apply to students admitted to graduate programs on a part-time basis.

Duration of Study

The minimum duration of study for the Master's degree is one calendar year beyond the honours Bachelor's degree, or its equivalent.

Transfer credits will only be granted at the time of admission, and recommendations must be included with the offer of admission. Normally, credits must have been received in the last 5 years with a minimum grade of 70%, and no credits used towards a previously completed certificate, diploma, or degree or used as a basis of admission will be approved as credit toward a Windsor graduate degree. A maximum of 50% of the Windsor course degree requirements will be approved for transfer credit, excluding internship/practicum, thesis, dissertation, or comprehensive examination courses.

If transfer credit is granted, the student may be required to take additional courses. Residency still applies. Approved transfer credit will appear on the student's transcript.

Time Limit

Work on a Master's degree must be completed within three consecutive calendar years after the student's first registration, except for certain Master's programs available on a part-time basis. In these latter programs, the time limit will depend on the nature of the program but will not normally exceed five consecutive years.

If an extension of these time limits becomes necessary, the student should address a petition to the Dean of Graduate Studies giving reasons for the request and plans for the completion of the work. A student who exceeds the time limit may be required to take additional qualifying examinations or additional course work, or both.

Course of Study

Course requirements are specified in the program listings. Planning and direction of the student's course of study are the responsibility of the program area. A specific program of study should be worked out at the time of the student's first registration, in consultation with the program area. Students are directed to obtain the approval of the program area for changes in the program of study. Training in methodology may be required, at the discretion of the program.

In consultation with their program, all students must complete an Annual Report which is to be submitted to their program by May 31 of each year.

Students working toward the Master's degree must maintain at least a 70% average in all course work. See also Senate Policy on Grading and Calculation of Averages for details including restrictions on repeating courses.

Committees

Research undertaken as part of a Master's program is normally directed by a faculty supervisor and advised by a Master's committee. By the end of the first term of registration in the thesis, the program will recommend the appointment of members of the Master's committee, whose appointments must be approved by the Faculty of Graduate Studies. At the same time the candidate will be required to validate the Non-Exclusive License to the University of Windsor authorizing the University to archive, reproduce, and distribute the thesis.

The Master's thesis committee will include as a minimum a research supervisor or co-supervisors from the program, who is(are) a member of graduate faculty, one other program reader, and one outside program reader from the University of Windsor. The outside program reader may not be cross appointed to the program in which the student is registered. Additional members may be added with the approval of the program and the Faculty of Graduate Studies.

The majority of the members of an advisory committee must have graduate faculty status and the supervisor must have full graduate faculty status. In the case of co-supervision one of the co-supervisors must have full graduate faculty status, see Senate Policy on Graduate Faculty Designation.

The Master's committee is also charged with conduct of the final examination of the Master's candidate.

If the research involves information gathered from or about human participants (including primary data collection, use of human biological materials, and secondary uses of information), the faculty supervisor and graduate student are responsible for the ethical conduct of the study, the completion of the project as described in the ethics application cleared by the Research Ethics Board (REB) and the protection of the rights and welfare of human participants. The supervisor ensures that all required clearances and permissions are obtained prior to commencement of the research. The graduate student and faculty supervisor submits an application to the REB. Research involving human subjects, cannot begin until ethics clearance has been obtained. (Consult with REB.)

All research conducted at the University of Windsor is subject to the institutional policies as described in Research Integrity and the Responsible Conduct of Research and University of Windsor Guidelines for Research Involving Human Research Participants. If the research involves animal care, biohazards, health and safety, radiation, or any other procedure that requires certification, the supervisor of the research is responsible for obtaining prior approval from the respective committees. (Consult with the Office of Research and Innovation Services)

Thesis or Major Paper for the Master's Degree

A thesis incorporating the results of an investigation in the field of the major subject may be required of candidates for the Master's degree.

Candidates for some Master's programs may choose, instead of the course of study including a thesis, a program requiring additional course work and/or the submission of a major paper or project on which there will be a final evaluation.

The Major Paper/Project is a scholarly essay/research project that shows evidence of critical analysis and understanding on a topic approved by the student's supervisor and acknowledged by the program area.

The Major Paper/Project committee will include a supervisor, who is a member of graduate faculty, and one other program faculty member. Additional members may be added with the approval of the program area.

Upon completion of the Major Paper/Project each student will deliver a public oral presentation and defense which shall be announced publicly (with a copy sent to the Faculty of Graduate Studies) at least eight days in advance.

The Major Paper/Project is deposited in the Faculty of Graduate Studies at least two weeks prior to Convocation.

The regulations of individual programs should also be consulted for details of their thesis or major paper/project requirements. Numerical grades or Satisfactory/Unsatisfactory may be assigned for theses and major papers/projects, depending on program policy.

Although in some cases it may be acceptable for more than one candidate to make use of a common set of data or research findings, each candidate is responsible for a single-authored thesis/major paper.

The regulations of individual programs should be consulted for details of their procedures. The general format is prescribed in Guidelines for Major Papers, Theses, and Dissertations, which may be obtained from the Faculty of Graduate Studies. Within the thesis or major paper/project, the student should use formats approved for scholarly publication in the field of specialization and approved by the program. Final checking of the general format of the thesis or major paper/project is the responsibility of the Faculty of Graduate Studies, but the student should consult the Master's committee for instructions as to the internal form of the document.

Copies of the Master's thesis must be provided to all members of the Master's committee and one copy to the chair of the defense, at least two weeks before the expected date of defense. Students are advised to ascertain from the academic unit any prior deadline established by the unit. No changes may be made to the thesis or the Master's committee between these deadline dates and the defense except under the most extraordinary circumstances and with the approval of the Faculty of Graduate Studies. The oral presentation should be completed at least three weeks prior to the Convocation at which the candidate expects to receive the degree.

No later than eight days before a proposed defense a Master's committee shall notify the Office of Graduate Studies that a notice of defense is to be posted. The chair of a Master's defense will be a member of graduate faculty who has not served on the candidate's Master's committee, and who is appointed by the Department Head at the time the defense is publicly announced. The chair is non-voting. The general audience may remain until the defense is completed and the committee begins its deliberations on the outcome. These deliberations are held in camera.

The minimum basis for acceptance of a Master's thesis is positive unanimity by the examining committee less one vote. Unless an examining committee is unanimously negative, a candidate may resubmit the thesis once, after a minimum period of three months and before a maximum period of twelve months. The second decision shall be final.

The thesis must be deposited in the Faculty of Graduate Studies at least two weeks prior to Convocation.

Arrangements for the deposit, including online electronic submission, binding the dissertation and payment of binding fees, where applicable, should be made with Graduate Studies. The University will add the dissertation to the “Scholarship at UWindsor” online institutional repository and transmit a copy of the dissertation to Library and Archives Canada, under the authority of a "Thesis/Dissertation Non-Exclusive License", supplied by the Office of Graduate Studies and validated by the candidate. The license, authorizes Library and Archives Canada and Leddy Library to publish, reproduce, and transform the dissertation in any format, print or online.

The deposited thesis becomes the property of the University.

Occasionally, it is necessary to withhold the thesis or major paper/project from public circulation, especially where the student's interests (e.g., patent rights) would be jeopardized by publication. In such cases, a thesis or major paper/project may be held from the public domain, i.e., the online repository, the Leddy Library and Library and Archives Canada, where applicable. Such delay in circulation may be requested for six months without cause being given, and an additional period of six months with good cause. Forms for withholding a thesis or major paper/project are available from the Faculty of Graduate Studies.

Thesis/Major Paper Requirements Synopsis for the Master’s Degree

1. Thesis or Major Paper format must be as prescribed by Guidelines for Major Papers, Theses, and Dissertations.

2. Copies of the thesis for Master's degree must be provided to all committee members, and one copy to the chair of the defense at least two weeks before the oral presentation, which must occur at least three weeks prior to the Convocation at which the candidate has applied to receive the degree.

3. Public notice of the defense must be received in the Office of Graduate Studies at least eight days in advance of the defense date.

4. Following successful defense, the candidate will deposit the thesis/major paper in the Office of Graduate Studies, as prescribed in Guidelines for Major Papers, Theses, and Dissertations.

5. Thesis only. The candidate will validate a "Thesis /Dissertation Non-Exclusive License", supplied by the Office of Graduate Studies, authorizing distribution to Library and Archives Canada.

Examinations for the Master’s Degree

In addition to the usual examinations on course work, the final examination of a candidate for a Master's degree is an oral defense of the thesis, major paper, or project.

ADDITIONAL DEGREES

The Senate Policy on Additional Degrees can be found online on the Central Policies website at: www.uwindsor.ca/policies.

EXAMINATIONS AND GRADING PROCEDURES

A program may require either oral or written examinations in graduate courses. By the first day of each course, the instructor must provide students with a written course outline which includes precise information concerning the following (see Bylaw 55: Graduate Academic Evaluation Procedures for complete details):

(a) the basis for determining the final grade in the course;
(b) the approximate dates for tests, essays, etc.

Note, as per Senate Bylaw 55, alterations in the announced procedure may be made by the instructor with the consent of the majority of the registered class.

APPEALS

In addition to appealing a grade informally (see Bylaw 55), students may formally appeal a grade.

Graduate appeals must be made in writing to the Dean of Graduate Studies, in accordance with the Graduate Appeals Policy as stated in Senate Bylaw 55: Graduate Academic Evaluation Procedures. Appeals must be received no later than three weeks after the final mark has been released by the Registrar.

REQUEST FOR CONSIDERATION BASED ON MEDICAL OR COMPASSIONAL GROUNDS

As per Senate Bylaw 55, a student who wishes to receive consideration based on medical or compassionate grounds should communicate with either the instructor or the Head of the AAU, or designate (e.g., program coordinator), offering the course as soon as possible. The form, Graduate Request for Consideration (for Health, Bereavement, or Extenuating Circumstances), should be completed and is available on the Office of the Registrar Forms and Application for Students page applications).

A letter of rationale and supporting documents (e.g. the attending physician's letter) must be included. In such cases, the Instructor may grant an aegrotat grade on the basis of term work or assign an "incomplete" grade indicating what further work is required and the deadline by which such work must be completed. It is recommended that at least 60% of the term work be completed in these cases. The instructor's response will be forwarded by the Head of the AAU offering the course to the Dean of Graduate Studies who, on the recommendation of the program and the Academic Standing Committee, may grant aegrotat standing in the subject(s) concerned on the basis of the term mark, approve an Incomplete grade, grant permission for a supplemental examination, or other accommodation.

POLICY ON GRADING AND CALCULATION OF AVERAGES

The Senate Policy on Grading and Calculation of Averages can be found online on the Central Policies website at: www.uwindsor.ca/policies

AUTHORSHIP

The Senate approved Policy on Authorship can be found online on the Central Policies website at: www.uwindsor.ca/policies

PLAGARISM

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, as per Bylaw 31: Academic Integrity. 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.

The Graduate Studies Policy on Plagiarism can be found online on the Central Policies website at: www.uwindsor.ca/policies

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 Faculty 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 filed with the Registrar's Office by the specified date prior to the Convocation at which the applicant expects to graduate.

For more information visit the Office of the Registrar at http://www.uwindsor.ca/registrar/

APPLICATION/ADMISSION INFORMATION

APPLICATION INFORMATION

Application for admission may be made online at www.uwindsor.ca/graduate.

Applicants are advised to check departmental listings for deadlines. If an earlier deadline is not specified, complete applications, 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.

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

Offers of admission are made for a specific term, and, with the approval of the program, acceptance may be deferred for the next available term only. Students wishing to be considered for admission at a later date will normally be required to complete a new application and to resubmit their documents.

DOCUMENTATION REQUIRED FOR ENGLISH LANGUAGE PROFICIENCY REQUIREMENT

All documents received become the property of the University and will not be returned. Action will be taken on an application for admission when all the documents listed below have been received:

1. The online application form properly completed.

2. One copy of official or unofficial transcripts of all undergraduate and graduate work from all colleges or universities attended. If an offer of admission is extended on the basis of unofficial transcripts, final official transcripts must be submitted by the deadline on the offer of admission.

3. Completed Confidential Report forms as required.

4. Any additional program requirements, e.g., GMAT, GRE, writing sample, portfolio.

5. For applicants whose native language is not English, see the Senate Policy on Graduate English Language Proficiency Requirement.

The Senate on Graduate English Language Proficiency Requirement can be found online on the Central Policies website. www.uwindsor.ca/policies

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.

Master's Qualifying Admission (M1): An applicant who holds a three-year degree in the discipline to which s/he is applying, or a four-year degree in another discipline, may be admitted as a qualifying student, with a recommendation for advancement to the M2 level contingent upon completion of a prescribed set of qualifying courses, with a minimum grade as specified by the program. Since qualifying students are not candidates for a degree, a qualifying student is not considered a graduate student.

Regular Admission (M2): Applicants who hold a four-year degree or equivalent in the discipline to which they are seeking admission may be admitted to this level.

Transitional Admission (M2): An applicant who holds a four-year degree, but not one in the discipline to which s/he is applying, may be admitted to a Master's program as a transitional student. Transitional students are normally required to complete a program of no more than five (5) specified undergraduate courses in addition to the graduate courses required of regular students. Upon completion of these extra courses, with a minimum grade as specified by the program, the student may continue in the Master's program as a regular student.

Probationary Admission (M2): An applicant who does not meet the minimum departmental program admission requirements, but who can present evidence of leadership, and/or substantial related work experience, may be considered for probationary admission upon the recommendation of the program. Students who are accepted on probation will be required to satisfactorily complete two specified graduate courses in the first term, in addition to any other admission requirements, before conditions are waived. Graduate credit will be given for the graduate courses after the conditions are waived. The final decision on probationary admission rests with the Faculty of Graduate Studies

PhD Admission: Applicants who hold a Master's degree or, in exceptional cases, a four-year Bachelor's degree, may be admitted to this level.

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 based on the Registrar's Important Academic Dates.

CATEGORIES OF REGISTRATION

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

It is the expectation that all graduate students are admitted on a full-time basis, although some programs may offer part-time admission on an exceptional basis.

1. Full-Time Student: A student who is admitted to a program on a full-time basis is one who is geographically available and visits the campus regularly. Graduate students must be continuously present at the university for each term in which they are registered. It is understood that a graduate student may be absent from the University while still under supervision, e.g., visiting libraries, attending a graduate course at another institution, doing field work, etc. Any such absence from the University must be approved by the program.

2. Part-Time Student: Some graduate programs are available on a part-time basis, and students may be admitted to such programs as part-time registrants. Students must petition the Graduate Program and Faculty of Graduate Studies for permission to transfer to part-time status. Part-time registration in full-time programs may be granted in exceptional circumstances and only with the approval of both the Graduate Program and Faculty of Graduate Studies. Supporting documentation must be submitted with the request. Students interested in part-time studies should first consult the program.

Full-time employees of the University enrolled in graduate programs may only have part-time status.

Note: Part-time students may not take more than one course in any term. Concurrent registration in a course and in a thesis or dissertation (not major paper) will be permitted.

GRADUATE REGISTRATION REGULATIONS

Graduate registration regulations include information on leaves of absence, non-degree registration and auditing courses.

1. Graduate students must register before the appropriate deadline or they will not receive credit for academic work they may be doing during the term. Note: Registration is not complete until the appropriate fees have been paid.

Students completing all requirements for the degree within the first few weeks of a term may be eligible for a tuition refund for that term. (Consult the Faculty of Graduate Studies.)

2. Full-time students are required to maintain continuous registration through all terms of their graduate program. Failure to do so will require application for readmission to their program and payment may be required for terms missed, up to a maximum of three terms.

3. In accordance with the circumstances listed below, a student may apply to the Dean of Graduate Studies for, and may be granted, a leave of absence.

Maternity Leave: Graduate students may request a maternity leave for no more than three consecutive terms without prejudice to their academic standing. Time limit/funding eligibility will be extended by the duration of the leave.

Paternity Leave: In recognition of a father's role, a graduate student may request paternity leave for no more than one term without prejudice to their academic standing. Time limit/funding eligibility will be extended by the duration of the leave.

Parental Leave: Parental leave is intended to recognize that there may be a need for a pause in studies in order to provide full-time care in the first stages of parenting a child. Either or both parents may request one term of leave without prejudice to their academic standing. The request for leave must be completed within twelve months of the date of birth or custody. Time limit/funding eligibility will be extended by the duration of the leave.

Financial Leave: In the case of financial necessity, primarily as evidenced by the support awarded through the University, a student shall be granted a leave of no more than one term out of three upon application (not available to part-time students.) Time limit/funding eligibility will not be extended by the duration of the leave.

Medical Leave: Graduate students may apply for a leave of absence on medical grounds for up to three terms without prejudice to their academic standing. Students are required to provide documentation to support a medical leave of absence. Time limit/funding eligibility will be extended by the duration of the leave.

Personal Leave: Graduate students may apply for a leave of absence on grounds of serious personal circumstances for up to three terms Time limit/funding eligibility will be determined on a case-by-case basis.

A term is defined as a four-month period coinciding with the academic calendar (January to April; May to August; and September to December).

While on leave, a student will not have access to any university resources, including office space, computer access, library facilities, continuation of laboratory experiments, computer research applications, and guidance by faculty members.

Apart from the combination of maternity or paternity and parental leave, sequentially combining two leave of absence classifications is allowable only in special and extenuating circumstances.

Applications for a leave of absence must be submitted to the student's department for recommendation before the end of the second week of the term. A student on leave of absence will be assessed a fee per term. Appeals against any decisions shall be heard promptly by the Faculty of Graduate Studies.

4. Part-time students must register in every session in which the facilities of the University are to be utilized, whether in residence or off-campus. This includes those who are consulting with faculty members while

working on a major paper, thesis, or dissertation. Part-time students who have not registered for more than one terms will be required to apply for readmission, and their applications will be considered on their merits in the light of the then prevailing conditions and circumstances.

5. Students are reminded that they will not receive credit for courses for which they are not properly registered or for courses completed during terms in which the student has not paid fees.

Once a student has registered, course changes or withdrawal after the published deadlines require permission from the Dean of Graduate Studies. Subjects dropped without permission from the Dean will be regarded as failures.

Non-Degree Registration: A student who is not interested in admission as a degree student may be allowed to register for individual courses on a non-degree basis. The maximum number of courses taken overall on this basis is two. Only students who have been admitted to a graduate program may receive graduate credit at the University of Windsor for courses taken.

Audit Student: An audit student in any course is one who attends the course without credit toward a degree or program. Such a student will not be allowed to write examinations and cannot be graded in any way. The student will pay the regular fees for the course(s).

AWARDS AND FINANCIAL AID

ELIGABILTY 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 and the Department.

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 may be offered within the first two years (six terms) from the first term of registration at the Master’s level (M2). Support from the University of Windsor at the Doctoral level may be offered within the first four years (twelve terms) from the first term of registration at the Doctoral level (D2). While external awards are administered according to 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 at www.uwindsor.ca/graduate.

GRADUATE FACULTY DESIGNATION

The regulations for Graduate Faculty designation are outlined in the Senate Policy on Graduate Faculty Designation.

FACULTY OF GRADUATE STUDIES

GENERAL COURSES

The Theory and Practice of University Teaching
This is an introductory course designed for graduate students to enable participants to perform more effectively as university teachers, as seminar leaders, as in-service trainers, and as public speakers. Empirical principles of learning and teaching will be introduced that are appropriate to the university classroom. Educational research will guide the approach taken in the course and will be used as the theoretical basis for course content. This course is a non-credit course and, upon successful completion, will appear on the student's transcript.

CTLP-8100. Learning-Centred Teaching in Higher Education
This course offers the opportunity to explore and evaluate the principles and theories of learning-centred teaching in higher education. Through a diverse range of class activities, readings, reflection, and peer-reviewed class facilitation, students will develop skills in teaching critical thinking; mentorship; and active learning. Students will also use research findings and reflection on teaching practice to inform their own teaching development. This course is of particular interest to graduate students and instructors, but prior teaching experience in higher education is not a prerequisite. (Prerequisite: Admission into a graduate program or faculty status.)

CTLP-8200. Course Design
This six-week course introduces participants to the principles and practice of effective course design, including developing effective outcomes, devising methods and strategies to help students master difficult concepts and theories, and aligning assessments. Participants will have the opportunity to design (or redesign) a course of their choosing, receiving feedback at each step. (Prerequisites: Admission into a graduate program or faculty status.)

GART-9000. Current Issues in Argumentation Theory
This course will introduce students to the current leading theories and theoretical controversies in argumentation theory. It will do so from a variety of perspectives, including the logical, the dialectical and the rhetorical. It will cover such topics as rhetorical vs. epistemic uses of argument, the use of ideal models in argumentation analysis, the current state of fallacy theory, relations of argumentation theory to other fields, such as law, computer science, philosophy. Prerequisites: This graduate course requires that the student have completed an undergraduate degree. Normally, the student will have completed at least two undergraduate courses in such areas as logic (formal or informal), critical thinking, argumentation, theory of argument, rhetoric, or dialectic. (Prerequisites: permission of instructor.)

RESG-8990. Interdisciplinary Master's Seminar
This course will offer graduate students in English, History, Philosophy, Political Science, Psychology, Sociology, Visual Arts, and any other graduate program with a humanities component, the opportunity, in the course of their intensive, discipline-oriented training, to benefit from an interdisciplinary experience. Topics will vary from year to year (Offered over two terms.)

PROGRAMS ADMINISTERED BY THE OFFICE OF DEAN OF FACULTY OF ARTS, HUMANITIES AND SOCIAL SCIENCE (FAHSS)

PROGRAMS

Argumentation Studies (PhD)

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.

Degree Requirements

ARGU-9000. History and Theories of Argumentation
ARGU-9010. Advanced Studies in Argumentation
ARGU-9980. Dissertation

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 PhD 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.

COMMUNICATION, MEDIA AND FILM

PROGRAMS

Master's in Communication and Social Justice (MA)

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 CASJ-8500, CASJ-8501, and CASJ-8502. 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 CASJ-8500, CASJ-8501, and CASJ-8502. 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.

COMMUNICATION, MEDIA, AND FILM COURSES

CASJ-8500. 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.

CASJ-8501.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.

CASJ-8502. 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.

CASJ-8512.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.

CASJ-8513.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.

CASJ-8514.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).

CASJ-8515.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.

CASJ-8518. 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.)

CASJ-8520.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.

CASJ-8543. 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.)

CASJ-8590.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.)

CASJ-8960.Major Paper
(Credit Weight: 9.0)

CASJ-8970.Thesis

ENGLISH AND CREATIVE WRITING

PROGRAMS

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

Master's in English: Literature and Creative Writing (MA)

Four graduate seminar courses
ENGL-8910. Creative Writing Seminar A
ENGL-8920. Creative Writing Seminar B
ENGL-8940. Creative Writing Project (a novel, a play, a collection of poems or short stories)

Master's in English: Literature and Language (MA)

THESIS OPTION
Five graduate seminar courses
ENGL-8970. Thesis/Project (of at least 20,000 words)

COURSE WORK OPTION
Eight graduate seminar courses.

For both fields, students must include ENGL-8000, 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 BA.

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 MA 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 MA 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 MA 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 MA 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 AND CREATIVE WRITING 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.

ENGL-8000. Scholarship and the Profession

ENGL-8010. Tutorials

ENGL-8050. The English Language and Linguistics

ENGL-8100. Literature of the Old English Period

ENGL-8150. Literature of the Middle English Period

ENGL-8200. Literature of the Renaissance

ENGL-8250. Renaissance Drama

ENGL-8300. Literature of the Restoration Period

ENGL-8350. Literature of the Eighteenth Century

ENGL-8400. Literature of the Romantic Period

ENGL-8450. Literature of the Victorian Period

ENGL-8500. Literature of the Twentieth Century

ENGL-8550. Literature of the United States

ENGL-8600. Literature of Canada

ENGL-8650. Post-Colonial Literature

ENGL-8700. Literary Genres: Poetry

ENGL-8750. Literary Genres: Drama

ENGL-8800.Literary Genres: Fiction

ENGL-8850. Literary Genres: Criticism/Cultural Studies

ENGL-8910. 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.

ENGL-8920. 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. (Prerequisite: ENGL-8910 or portfolio approval).

ENGL-8930.Composition Pedagogy: Theory and Practice
(Required for Graduate Assistants assigned to teach ENGL-1001.)

ENGL-8940. Creative Writing Project
ENGL-8970. Thesis/Project

HISTORY

PROGRAMS

Master's in History (MA)

Admission Requirements
The normal requirement for admission to the MA 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 (Masters Qualifying -- see section titled Application Procedures – Admission Levels).

Program Requirements
Students must successfully complete six courses and a Major Paper. Students must take two required courses: HIST-8030 and HIST-8040 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

All of the following courses will not necessarily be offered in any one year.

HIST-8030.Modes of Historical Interpretation
This course introduces students to a variety of methods and theories currently used to advance historical explanation. Particular attention will be paid to the role of narrative, the place of the social sciences, and the complexities of race, gender, ethnicity, and class in historical writing. Readings will also address the problem of synthesis, post-modernism and the relationship between history and public policy. This course also stresses the development of skills in critical reading and analytical writing.

HIST-8040. Research Methods
This course introduces students to the range of methods and approaches to historical research, and to the problems associated with interpreting various kinds of sources. Students will identify and establish a research problem, in which they define the questions to be posed, and begin to move from broad to narrow approaches to their topic. They will discover and evaluate accessible sources of evidence, and at the same time develop an appropriate methodological and interpretive framework for a specific research project.

HIST-8060. Studies in the History of Sexuality
This course will provide a thematic approach to the foundations of Western attitudes towards sexuality, especially as they developed in premodern Europe. The complex interweaving of ancient ideas, medicine, Christian law and theology, and popular practices and beliefs will be explored. This course is problem oriented and will explore some of the theoretical issues pertaining to the historical study of human sexuality.

HIST-8070. Studies in the History of Women and Gender
This course examines the historiography and theory of these two interrelated fields since 1970. It explores the themes and approaches in early studies of women's organizations, labour, and sexuality; the later growth of attention to differences of culture and power among women; and the more recent emergence of poststructuralism and the study of the interrelation of gender, class, and race. Readings will range across time periods and national boundaries but with an emphasis on the U.S. literature.

HIST-8080. Studies in the History of the Book and the Culture of the Written Word
This course will provide an introduction to the historical problems encountered and interpretive possibilities revealed when books (both artefacts and texts) become the focus of inquiry. Ranging broadly through a variety of disciplinary approaches to manuscript and print cultures on both sides of the Atlantic, we will consider such questions as the complex uses of literacy, and the extent to which technological transformations such as the printing press or the computer have determined literary and cultural change. Studies of the book trades (printing, bookselling, journalism, publishing of all kinds) will be used to illuminate changes in religious, scientific, scholarly, literary and other aspects of the cultures (from medieval to postmodern) in which they flourish.

HIST-8090. Studies in Canadian Social History
The course discusses approaches, methods, and debates in the writing of social history in English Canada since 1970. Topics discussed include historiographical debates over the writing of a "national" history, the writing of labour and working-class history, women's history, ethnic and immigration history, the history of sexuality, regional history, and family history. How the categories of class, gender, race, ethnicity and sexuality have been incorporated into the writing of Canadian social history is a focus of consideration.

HIST-8100.Studies in Postcolonial History
This course evaluates important works of history and theory written from a postcolonial perspective. It focuses on novel approaches to studying people whose modern experience began as subordinate subjects of the West's colonizing projects. The course will also consider the influence of postcolonial scholarship on contemporary historiography in general. (2 lecture hours a week.)

HIST-8110. Modernity
This course address's themes in the history of modernity, the lived experience of the capitalist, scientific and technological revolutions over the last three hundred years. Focusing primarily on the years from 1800-1950s, this course will begin with literature on the contemporary ideas of “being modern” in North America and Europe and the critiques of modernity by social theorists such as Marx, Gramsci and Weber. It will then turn to the historical literature on modernity, ideas of the modern and their impact on areas such as politics, the state, the workplace, economic development, education, colonial relationships, the environment.

HIST-8130. Class in the Anglo Atlantic
This course addresses the ways in which the concept of class has influenced our understanding of the past, particularly in relation to the history of working people. It reviews the "new" labour history that emerged in British and North American history beginning in the 1960s, and documents the ways in which the history of identities (race, ethnicity and gender) and postmodernism have impacted the study of class. The course examines the rise of capital and labour from their roots on the farm and plantation and in the craft shop through to modern industrial society and the contemporary effects of deindustrialization and globalization. The course furthermore scrutinizes not only the history of that experience but also the theoretical and historiographical content of class studies. (2 lecture hours a week.)

HIST-8590. Selected Topics in History

HIST-8600. Selected Topics in History

HIST-8960. Major Paper

A sophisticated scholarly essay, normally amounting to some 40-60 pages, incorporating research on primary sources (in most cases), and written under the supervision of two members of the graduate faculty, a supervisor and a second reader. There will be a public oral examination. Students are advised that they may be required to have proficiency in a language other than English in order to do their research.

PHILOSOPHY

PROGRAMS

Master of Philosophy (MA)

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. One area is informal logic, the theory of argument, and the theory of critical thinking; the other area is twentieth-century continental philosophy and critical social theory. 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 MA 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 the admissions section of the Graduate Calendar for general requirements for admission into an MA program at the University of Windsor. The Philosophy program normally requires a BA honours in Philosophy or its equivalent for regular admission to the Master's program (M-2 admission level) and a general BA in Philosophy or its equivalent for admission to the qualifying stream of the Master's program (M-1 admission level). Students are admitted to either the coursework or the major paper stream

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 MA in Philosophy:

1. The student may proceed to the degree in any one of the following ways:

(a) The major paper stream
Students admitted to the major paper stream must successfully complete six graduate courses, including the Departmental Seminar (PHIL 8900), pass the MA examination, and write a major research paper (PHIL 8960). A maximum of two courses may be taken from a cognate field.

(b) The coursework stream
Students admitted to the coursework stream must successfully complete eight graduate courses, including the Departmental Seminar (PHIL 8900), and pass the MA examination. A maximum of two courses may be taken from a cognate field.

Students who wish to move from the coursework stream to the major paper stream must satisfy the following conditions: (i) complete at least six graduate courses (two of these courses may be in a cognate field), including the Departmental Seminar (PHIL 8900), with a minimum average of 80%; (ii) pass the MA examination; (iii) submit to the Graduate Coordinator a major research paper plan that was approved by the academic supervisor.

(c) The thesis stream
Students who wish to move from the coursework stream or the major paper stream to the thesis stream must satisfy the following conditions: (i) complete at least four graduate courses in philosophy, including the Departmental Seminar (PHIL 8900), with a minimum average of 85%; (ii) pass the MA examination; (iii) submit

to the Graduate Coordinator a thesis plan that was approved by the academic supervisor. In addition to satisfying these conditions, students in this stream must also write a thesis (PHIL 8970).

2. All students proceeding to the degree must pass the MA examination following the successful completion of the Departmental Seminar (PHIL 8900). In the event of a failing grade, students will be provided an opportunity to retake the exam before completing the first year of their program. Students who fail the MA examination for a second time will be asked to withdraw from the program.

3. MA Qualifying Year (M-1 admission): Students at the I Master's level are required to take PHIL-4910 (Honours Seminar) (see section titled, Philosophy Courses in the Undergraduate Calendar).

4. Program Approval: Each student must have his or her projected program approved by the Graduate Coordinator.

PHILOSOPHY COURSES

GROUP A
Note: Students may receive credit for more than one offering of a course in Group A provided that the emphasis is sufficiently different. Thus, for example, credit may be received for both PHIL-8700 Recent German Philosophy: Arendt and PHIL-8700 Recent German Philosophy: Habermas where these are entirely distinct course offerings.

PHIL-8200. Topics in Ethics and Value Theory

PHIL-8210. Topics in Social and Political Philosophy

PHIL-8220. Topics in Environmental Philosophy
The course will focus on the conceptual foundations of the human relationship to the natural and built environment. The course may adopt either an historical or contemporary emphasis depending on the decision of the instructor. (May be repeated for credit if content changes and with permission of the instructor.)

PHIL-8260. Philosophy of Law
The objective of this course is to introduce the student to contemporary issues concerning the philosophy of law, to include European and Indigenous law. Particular emphasis will be placed upon the presupposed relation of concepts to society. The course will examine such issues as the difference and relation of legitimacy to legality, the relation of legal analysis to social needs, the relation of morality and ethicality to the content of legal rules and legal reasoning (Prerequisite: MA Philosophy students or by instructor permission) (Cross-listed with PHIL-4260.)

PHIL-8300. Topics in Gender and Sexuality
The course will focus on the philosophical implications of the impact gender and sexuality have on major epistemological, scientific, normative, and political problems. The specific focus of each year's class will be determined by the instructor. (May be repeated for credit if content changes and with permission of the instructor.)

PHIL-8500. Topics in Mind or Knowledge

PHIL-8600. Movements and Figures in Argumentation Theory and Informal Logic
The course will focus on selected contemporary movements and figures in Argumentation Theory and Informal Logic. The movement and figure studied in any given year will be determined by the latest developments in the field.

PHIL-8610. Problems in Argumentation and Informal Logic

PHIL-8700. Recent German Philosophy
Significant developments in German philosophy in the twentieth century will be examined. Portions of the course may be devoted to Husserl (the founder of the phenomenological school), Heidegger (a seminal figure in existentialism), Gadamer (a key figure in the development of hermeneutics), Critical Theory (a Freudian and Marxist approach to social and economic issues), and second-generation critical theorists such as Habermas. (Prerequisite: PHIL-1120, and one 2000-level or above Philosophy course, and semester 5 or above standing, or permission of instructor.) (Cross-listed with PHIL-4700.)

PHIL-8710. Recent French Philosophy
A study of significant developments in recent French thought as found in Bergson, Sartre, Merleau-Ponty, Bataille, and Levi-Strauss, for example. (Prerequisite: PHIL-1100 or PHIL-1120, at least one 2000-level or above Philosophy course, and semester 5 or above standing, or consent of the instructor.) (Cross-listed with PHIL-4710.)

PHIL-8720. Analytic Philosophy
Advanced study of themes and trends in analytic philosophy, in which logic, language, and scientific evidence play central roles. (Cross-listed with PHIL-4720.)

PHIL-8730. Pragmatist Philosophy
Advanced study of some of the major themes or figures in pragmatist philosophy, which takes practice, in a broad sense of the term, to have a central role in most if not all philosophical issues. (Cross-listed with PHIL-4730.)

PHIL-8770. Topics in Continental Philosophy

PHIL-8800. to PHIL-8840. Special Topics

GROUP B
The following course must be taken by all MA students:

PHIL-8900. Departmental Seminar: The History of Philosophy in Perspective
The aim of the seminar is to deepen students' sensitivity to the history of philosophy and help prepare them for the Master's examination in Philosophy. Each year a specific philosophical theme is traced through a number of key figures in the history of thought.

GROUP C
PHIL-8960. Major Paper

PHIL-8970. Thesis

POLITICAL SCIENCE

PROGRAMS

Master of Arts in Political Science (MA)

Admission Requirements
The normal requirement for admission to the one-year MA 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
Completion of the MA degree will follow one of three routes:

A. **Major Paper**
1.Successful completion of POLS-8000 (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 POLS-8000
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 POLS-8000 (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 (POLS-8950), 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 POLS-8000 in order to complete the degree. Any student securing an failing grade will normally be asked to withdraw from the program.

Additional Information that pertains to all program streams:
All students must successfully complete POLS-8000 to complete the degree.
Any student securing a failing grade will normally be asked to withdraw from the program.

Articulation Agreement (University of Michigan)

Master of Arts in Political Science (MA) and Master of Public Policy Articulation Agreement with University of Michigan

The articulation agreement will enable students in the Political Science Master's 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.

POLITICAL SCIENCE COURSES

All courses listed will not necessarily be offered in any given year. Courses are normally two hours a week.

POLS-8000. Scope and Approaches to Political Science
A review of the state of the discipline and a survey of approaches to research. This course is mandatory, as students will focus on their major paper/thesis research design.

POLS-8010. Selected Topics in Contemporary Political Theory
This course explores one or more themes in political theory through discussions and seminar presentations. While the focus is on political themes, the readings might be drawn from other disciplines, e.g., literature, psychology, religion, history, or sociology.

POLS-8020. International Relations Theory
A survey of recent literature on theories and methods in the study of international politics.

POLS-8100. Quantitative Methods in Political Science
The course will give an overview of quantitative methods and techniques which are core to the analysis of empirical data analysis in Political Science. The aim is to provide an understanding of statistical methods to be able to (1) conduct statistical tests in a variety of applications, and (2) quantify dependencies between variables. The course requires that students have had some introduction to questions of research design and basic descriptive statistics at the undergraduate level. Along with this introduction to various methods, their application through the use of statistical computer packages (e.g., SPSS) will also be a core part of the course. This course is also designed to help students obtain and analyze data for their major paper/thesis (Prerequisite: POLS-8000).

POLS-8200. Federalism in Canada
Analysis of selected topics in Canadian federalism. Topics may include: federalism, federal/provincial relations, the social union, and the debate over the future of Quebec in Canada.

POLS-8210. Canadian Politics: Participation and Processes
Analysis of selected topics in Canadian politics. Topics may include: parties, elections, voting behaviour, pressure groups, representation, new social movements, Canadian political theories, ideologies, and public opinion as measured through survey research and communication surveys.

POLS-8220. Canadian Public Policy
A review of the applicability of contemporary theories of public policy-making, policy evaluation, and policy delivery within the context of the Canadian political system. May include a focus on specific areas of public policy.

POLS-8230. Canadian Foreign Policy
An examination of selected issues in Canadian foreign policy, chosen for the relevance in driving the contemporary research agenda. Topics may include human security, Canadian defence policy, peacekeeping, and/or Canadian aid and development policy.

POLS-8300. International Organizations
A theoretical overview of International Organizations; the course will examine why these organizations exist, how they operate, and their impact on international affairs. The course may also focus on specific organizations, for example, the UN, the EU, ASEAN and/or the OAS.

POLS-8320. The Third World in International Relations
An examination of the theoretical literature on such topics as the foreign policy of third world states, nonstate actors, structural dependence, North-South conflict, and regional integration.

POLS-8330. International Political Economy
Study of the major theoretical perspectives in international political economy as applied to such issues as multinational corporations, trade, and international development.

POLS-8340. International Security
An examination of selected topics in security. Examples of topics may include inter- and intra-state conflict, different approaches to conflict resolution, the utility of force, the causes of war, non-traditional approaches to security and/or detailed case studies of selected conflicts.

POLS-8350. Globalization, Poverty and Development
This course provides a foundation for understanding the fields of Globalization and Development Studies, with special emphasis on the problem of persistent poverty and inequality on a global scale, and the relation of this condition to global political economy, global justice, and global politics. With a focus on the role of the state and market, the course combines expertise and perspectives from the fields of Politics, International Political Economy, and Sociology of Development to provide an interdisciplinary learning environment. It covers a range of relevant topics including the definitions of globalization(s); the definition(s) and measurement of poverty; the analysis of the relationship between globalization, development and poverty; global politics and development, global justice and global ethics; and the 2007 global crisis and its relation to global poverty and development.

POLS-8360. Politics and Security in Russia and Eurasia
This course examines the politics of and security issues facing the Russian Federation, the five Central Asian Republics of Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan, and the Caucasian Republics of Georgia, Armenia and Azerbaijan. For the purposes of this course, the role and influence of Turkey, Iran, China and the United States on the politics and security of these Eurasian states will also be considered. The approach taken in this course is inter-disciplinary, drawing heavily from the fields of political science, history,

and economics. The students will be introduced to political, economic and social issues affecting the region and taught how to research these issues through the lens of historical analysis and political economy.

POLS-8400. American Politics and Government
Analysis of selected topics in American politics and government. Topics may be selected from the institutional or behavioural areas of the discipline or may include a comparative analysis of Canadian and American politics.

POLS-8410. Political Economy, Mass Media and Democracy
This course examines the linkages between media, democracy and the larger political economy. Students will research a media conglomerate; identify media roles in how governments and publics interact. Hegemony, ideology and institutional/organization analyses will bring students an integrated understanding of the role of media in a democracy.

POLS-8420. Politics in the Developed World
An examination of the political systems of economically developed countries. Topics may include comparative government, managing ethnic conflict, new social movements, democratic development, and the development of international political and economic institutions.

POLS 8430. Collective Action and Contentious Politics
This course explores the conditions and processes shaping protests, riots, revolutions, and other forms of contentious politics. The course examines major theories about revolutions and social movements and considers competing explanations for the emergence of collective action. Particular attention is paid to the conditions under which people do or do not rebel and various aspects of the strategic interaction between social movements and states, and the determinants of movement outcomes. The students will read theoretical works and review several cases of revolutions and social movements in both democratic and nondemocratic state settings, thinking through parallels and differences among them.

POLS-8679. Islamic Political Thought
This course examines the rise and development of Islamic political thought from the formative period of Islam (622-661 CE) down to the contemporary era described here as the 'age of fundamentalism' (1920s – present). The focus of the course will revolve around ideas of significant Muslim thinkers, and, where appropriate, look into the political, legal and cultural traditions that provided the contextual milieu of these intellectual contributions. Preference would be given to those with a background in Political Theory and/or Islamic or Middle Eastern Politics.

POLS-8910. Selected Topics in Political Science
Topics of current interest selected by the Political Science faculty which may vary from year to year. (May be repeated for credit if offered as a different topic with the permission of the program coordinator.)

POLS-8920. Readings in an Approved Special Field
Intended for students with a special interest in and knowledge of areas not covered in sufficient depth by other courses. (To be taken only with the permission of the program coordinator.)

POLS-8950. Political Science MA Internship
The Political Science MA Internship places students in a full-time work placement relating to public policy and political science generally. Students will be placed with an organization for approximately six months in the summer and fall semesters. During this period, they will have the opportunity to continue their study of politics at a practical level, synthesizing the theory to practice. Interns will meet periodically during the internship in a class setting to evaluate the progress of their internships. At the conclusion of the work

placement, students will prepare a research paper relating to their work experience. This paper will be publicly presented at a conference in December.

POLS-8960. Major Paper

POLS-8970. Thesis

PSYCHOLOGY

PROGRAMS

Clinal Psychology (MA and PhD)

Applied Social Psychology (MA and PhD)

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.

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. Applied Social students may be admitted to the PhD program with a Master's degree from an outside institution. In the case that their previous Master's degree is not from the field of Applied Social Psychology, the Area will determine what courses are needed to supplement their missing background preparation (as specified at admission).

Psychology Fields Include:
MA and PhD in Psychology (Adult Clinical, Child Clinical, Clinical Neuropsychology)
MA and PhD in Psychology (Applied Social Psychology)

In addition to the general requirements, the following requirements must be met by all students proceeding to the PhD 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, Writing) are required of all students seeking admission to the Department of Psychology. In the event that an applicant does not have the required number of undergraduate courses, the GRE Advanced Test in Psychology may be required. Possession of the minimum academic requirements does not ensure acceptance. Applications for admission must be completed by December 1.

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. This would not apply to students entering the Applied Social Psychology PhD program with a prior Master's degree.

2) Course Work: Requirements vary according to areas of specialization, however, there is a core curriculum involving two general statistical methodology courses, 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 must demonstrate competence in the four core areas of biological bases of behaviour, cognitive bases of behaviour, social bases of behaviour, and the historical and philosophical foundations of psychology. Up to six courses may be accepted for credit from another university. 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, her, or their 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. 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. 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 PhD. 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 PhD. 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.

(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.

PSYCHOLOGY COURSES

All courses listed will not necessarily be offered in any given year. Some courses are restricted to students in the Clinical Program.

PSYC-8070. Survey Data
Student will work in teams to develop questionnaires, gather data, and prepare them for analysis. Extensive reading will be required on sample design, questionnaire design, and survey administration. (2 lecture, 1 laboratory hour each week.) (Cross listed with SACR-8070)

PSYC-8080. Data Analysis
Students will explore their data and test hypotheses, drawing on methods from other graduate data analytic courses. Students will be required to write a final report which emphasizes communicating findings to non-specialists. (2 lecture, 1 laboratory hour each week.) (Cross listed with SACR-8080)

PSYC-8501. Historical and Philosophical Foundations of Psychology
The origin of modern psychology as a science and profession and the philosophy of science underlying psychology.

PSYC-8503. Human Neuropsychology and Biological Bases of Behaviour
Basic brain/behaviour relationships are introduced in the context of neuro-anatomical and neurotransmitter systems. Traditional theories of on brain function are reviewed, and include coverage of major neuropsychological domains (e.g., attention, memory, language, perception, sensory-motor, processing speed, executive function, emotion) and clinically-relevant methods that evaluate central nervous system integrity (e.g., imaging, EEG, and neuropsychological evaluation). (3 hours a week.)

PSYC-8505. Cognitive Bases of Behaviour
Systems and methodologies in areas such as attention, perception, learning, memory and thinking. (3 hours a week.)

PSYC-8511. Statistics for Graduate Study in Psychology I
Overview of the general linear model (univariate case) covering statistical analyses used to analyze data from experiments as well as to analyze observational data. Topics will include analysis of variance including between subjects and repeated measures factorial designs, random effects, and various mixed designs. Both linear and logistic regression techniques will be covered including vector coding and continuous variable interactions, as well as other extensions. (3 lecture hours, 1 laboratory hour a week.)

PSYC-8512. Statistics for Graduate Study in Psychology II
Overview of the general linear model (multivariate case) including classical methods such as canonical correlation analysis, discriminant analysis, multivariate analysis of variance, and exploratory factor analysis. Other topics may include methods of addressing missing data, loglinear modeling, and confirmatory factor analysis. (Prerequisite: PSYC-8511.) (3 lecture hours, 1 laboratory hour a week.)

PSYC-8513. Advanced Multivariate Analysis
Topics covered: path analysis; structural equation modeling, including confirmatory analysis; and, clustering methods. Other topics may include hierarchical linear modeling and latent growth modeling; multidimensional scaling, latent partition analysis and other related nonparametric techniques. (Prerequisite: PSYC-8512 or consent of instructor.) (3 hours a week.)

PSYC-8514. Research Methods in Clinical Psychology
Review of research values and issues in clinical psychology; survey and evaluation of common research designs and strategies in psychopathology, personality, and psychotherapy. (Prerequisite: PSYC-8511.) (3 hours a week.)

PSYC-8516. Applied Psychological Measurement
The basic principles of measurement and how they are applied in the construction and evaluation of surveys, tests, and scales will be covered. Also examined will be special problems characteristic of various approaches to measurement, such as the role of sampling in survey work. (3 hours a week.)

PSYC-8517. Qualitative Methods
This course examines the theory, methods, and inference of qualitative inquiry and includes practical application. Topics to be covered include the historical and theoretical roots of qualitative inquiry, ethics and a range of specific methods which may include interviewing, biography and case study, ethnography, grounded theory, archival and historical methods, and Q-Methodology. (3 seminar hours a week.)

PSYC-8519. Advanced Developmental Theory and Research Methods
Provides an overview of research designs and methodological issues in the context of contemporary child psychology research and developmental theories. Students conduct a literature review and design a research project in preparation for fulfilling the program's thesis and dissertation requirements.

PSYC-8529. Structure and Function of the Brain
A comprehensive introduction to the neuroanatomical basis of normal and abnormal human functioning, with coverage of the basic neuroanatomic structures and neurotransmitter systems of the central and peripheral nervous systems, including the sensory modalities, and proprioception), motor system, and autonomic nervous system, as well as the cortex, cranial nerves, cerebellum, basal ganglia, limbic structures, ventricles, meninges, and the vascular supply of the brain. The material covered in lectures will be reinforced by "hand-on" lab activities that will include the use of multimedia resources (e.g., videos) as well as analysis of real clinical case data and an introduction to the neurological examination and imaging procedures. (2 seminar hours and 2 laboratory hours per week; Prerequisite: 46-503).

PSYC-8540. Developmental Psychopathology
Review and analysis of developmental theories and research describing normal and abnormal development across the life course.

PSYC-8541. Cognitive Development
Review and comparison of major theoretical positions in cognitive development and a consideration of research generated from these theories.

PSYC-8542. Emotional Development
An examination of emotional development from infancy through the adult years. Topics include an overview of cognitive-affective theories and research on developmental change in emotions and self-regulation strategies, and cultural variations in displays of emotional expression and control in families.

PSYC-8550. Applied Social Psychology
An in-depth exploration of the field of applied social psychology, its development and progress. The course will situate applied social psychological research within the broader field of social psychology. Students are also guided through the process of developing research proposals.

PSYC-8560. Theory and Research in Social Psychology
A review of research design and methodology in social psychology, in the context of social psychology theory. Students will develop proposals for research projects.

PSYC-8566. Program Evaluation and Organizational Development
An examination of theory, research, and analytical methods appropriate to the planning, design, implementation, and utilization of program evaluation in education, social, business, and other organizational settings. These issues will be combined with those of organizational development and workplace design, which encourage the engagement of workers/stakeholders, development of leaders, and promotion of a creative and inspiring workplace.

PSYC-8570. 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: PSYC-3530, PSYC-3580 or PSYC-3350.) (Also offered as BIOL-8470; Cross-listed with PSYC-4570.)

PSYC-8575. Feminist Psychology and the Psychology of Women and Gender
This course uses the scholarship and careers of early and recent feminist psychologists to explore a selection of topics in feminist psychology and the psychology of women and gender. The impact of social and personal circumstances on women's career trajectories and research contributions is also explored within a feminist intersectional framework. (3 hours a week.)

PSYC-8577. Ethical Issues in Applied Psychology
This course will provide an overview of ethics and standards in psychological practice and research. Ethical issues in academic, clinical, community and organizational settings will be examined, and feminist and cross-cultural approaches to ethical issues will be considered. (Antirequisite: PSYC-8581.)

PSYC-8578. Foundations of Positive Psychology: Flourishing in Interpersonal Contexts
This course will provide students with foundational knowledge of positive psychology principles and interventions with an emphasis on applying this knowledge to interpersonal relationships in the two places where we spend the most time: at home and in the workplace. Some of the topics covered in this course include character strengths and virtues, positive emotions, social capital, high-quality connections, and being an agent of positive change, among others. The study of positive psychology in this context embraces the knowledge and practices that arise when research focuses on what enables people to flourish, as measured by thriving, engagement, health, growth, and creativity, all of which are essential for creating an optimal state of functioning.

PSYC-8580. Psychopathology
Seminar on issues, diagnostic categories, etiological perspectives, and research in psychopathology in adults, adolescents, and children; includes focus on risk assessment, cultural diversity, diagnostic interviewing and report-writing, and case presentations.

PSYC-8581. Ethical and Professional Issues in Clinical Psychology
Ethics and standards of psychological practice and research are reviewed. Legislation, privileged communication, confidentiality, informed consent, private practice, patient rights and sexism are among the topics discussed.

PSYC-8582. Clinical Assessment I
An introduction to clinical psychological assessment. Emphasis is on the cognitive, achievement, and adaptive functioning of children, adolescents, and adults. Topics and activities include basic psychometrics; interviewing; the construction, selection, evaluation, and use of ability tests; behavioural observations; case formulation; report writing; and an introduction to neuropsychological assessment. Attention is given to the assessment of individuals from cultural and linguistic minority backgrounds and to the assessment of those with disabilities. Students practice the administration, scoring, and interpretation of tests; practice interviewing; develop basic report writing skills; and conduct at least one cognitive assessment of an adult and a child.

PSYC-8583. Clinical Assessment II
Development of knowledge and skills in the assessment of psychopathology and personality in children, adolescents, and adults; evaluation of the clinical utility and psychometric properties of major personality instruments. The focus is on objective personality assessment, with an introduction to projective techniques. Students build on the skills developed in PSYC-8582; practice the administration, scoring, and interpretation of tests, case formulation, and report writing; and conduct at least one clinical evaluation. Attention is given to non-normative aspects of personality and psychopathology assessment of individuals from cultural and linguistic minority backgrounds and to assessment of those with disabilities. (Prerequisite: PSYC-8582.) (3 seminar, 3 laboratory/practicum hours a week.)

PSYC-8588. Multicultural Issues in Clinical Practice
An overview of the field of multicultural counseling and psychotherapy and, to a lesser extent, the field of cross-cultural psychology. The course surveys multicultural research, theories, practices, ethical issues, and assessment, and aims to facilitate students' multicultural competency in terms of cultural awareness, knowledge, and skills. A strong emphasis is placed on students' self-examination of personal cultural values and identities, and the impact these variables might have on their clinical work with clients or patients.

PSYC-8589. Advanced Adult Assessment
Students work with one or two adult clients to apply basic assessment skills acquired in preceding courses, to evaluate a wide range of cognitive, emotional, personality and interpersonal functions. The goal is to arrive at a comprehensive description of the person being assessed that results in meaningful clinical recommendations. Assessment strategies frequently employed in the field of clinical psychology will be practiced, and students will acquire skill with additional assessment instruments as determined by client needs. Students with further their skills in interviewing, report writing, clinical formulation, diagnosis, and making recommendations and referrals appropriate to the needs of clients. Client cultural and linguistic differences are considered. This course includes a peer supervision training component whereby students learn to provide constructive feedback to their peers. (Prerequisite: PSYC-8583)

PSYC-8590. Adult Assessment Practicum
In this practicum, graduate students in the adult clinical track of the clinical program complete psychoeducational and psychodiagnostic assessments of community members who seek assessment services at the Psychological Services and Research Centre on-campus under the supervision of a Registered Clinical Psychologist. This is a continuation of learning from PSYC-8589 as well as PSYC-8582 and PSYC-8583. (Prerequisite PSYC-8589).

PSYC-8604. Special Projects in Psychological Research
Provides the opportunity for a student to work on an independent research project under the supervision of a faculty member. Requires consent of instructor and Graduate Program Chair. May be taken for a maximum of two terms.

PSYC-8606. Special Topics in Psychology

Seminar format provides an opportunity to study in an area not covered in sufficient depth by other courses. May be taken more than once if offered by a different instructor. (3 seminar hours a week.)

PSYC-8610 Special Topics in Applied Social Psychology
Seminar format provides an opportunity to study in an area of Applied Social Psychology not covered in sufficient depth by other courses. May be taken more than once if offered by a different instructor. (3 seminar hours a week.)

PSYC-8630. Professional and Practice Issues in Clinical Psychology
A series of seminars/workshops covering various topics, which may include but are not limited to, professional development (e.g., self-assessment of competencies, communicating a diagnosis, risk assessment, the mental health system in Ontario, strategies for providing tactful assessment feedback), career planning (e.g., professional registration, post-doctoral training opportunities, private practice), and provision of services in special settings/groups (child custody, forensic, medical/health, geriatric, LGBTQ, indigenous, immigrant/refugee). (3 hours a week.)

PSYC-8640. Child Clinical Neuropsychology: Theory Methods and Research
This course includes a survey of the literature on brain-behaviour relationships, including the effect of brain dysfunction on perception, learning, memory, language and thinking as present in children/adolescents receiving clinical neuropsychology services. Students will receive training in the administration, scoring, and interpretation of neuropsychological tests currently used in practice with children and adolescents. This course includes seminars and required lab sessions. (Prerequisite PSYC-8503; non-clinical neuropsychology students must have instructor permission to enrol.)

PSYC-8642. Adult Clinical Neuropsychology: Theory Methods and Research
This course includes a survey of the literature on brain-behaviour relationships in adults. Topics emphasized include: the effect of brain dysfunction on perception, learning, and thinking, memory disorders, and personality disorders associated with cerebral dysfunction in adulthood. Students will receive training in the administration, scoring, and interpretation of neuropsychological tests, including strategies and techniques of assessment, rationales underlying the use of various measures, modes of interpretation, and approaches to intervention. This course includes seminars and required lab sessions. (Prerequisite: PSYC-8503; non-clinical neuropsychology students must have instructor permission to enrol.)

PSYC-8644. Neurodevelopmental Disorders
An examination of the theories, research, and practice related to the neuropsychological and biological correlates of neurodevelopmental disorders. Each semester a particular disorder (e.g., ADHD) will selected as a prototype to consider assessment, diagnosis, and treatment of neurodevelopmental disorders. (Prerequisites: PSYC-8503 and PSYC-8583, or consent of instructor.) (3 seminar hours per week.

PSYC-8645. Neuropsychological Aspects of Rehabilitation
A study of the literature and the methods currently employed in the treatment of brain-injured adults. Topics to be stressed include epidemiology and societal impact, pathophysiology, clinical presentation and both the theories and practices of rehabilitation. (3 hours a week.)

PSYC-8648. Neuropsychology of Older Adults
A survey of the literature dealing with brain-behaviour relationships across the older adult life span. Emphasis is given to the understanding and assessment of normal and dysfunctional aspects of cognitive and affective development in older adults. (Consent of instructor.) (3 hours a week.)

PSYC-8651. Survey of Child Psychotherapies

Introduction to psychotherapy with children with an emphasis on fundamental principles and empirical foundations of effective psychotherapy. Several treatment approaches are studied.

PSYC-8652. Child Clinical Assessment
Advanced training in selection, evaluation, and use of tests designed for the assessment of children's abilities, personality, and behaviour. Practicum in administration, interpretation, and communication of results of comprehensive test batteries.

PSYC-8653. Child and Adolescent Assessment Practicum
In this practicum, graduate students in the child clinical track of the clinical program complete psychoeducational and psychodiagnostic assessments of children and adolescents from the surrounding community. Typically parents are seeking assessment services on behalf of the child. The practicum is housed at the Psychological Services and Research Centre on-campus under the supervision of a Registered Clinical Psychologist. This is a continuation of learning from PSYC 8652 as well as PSYC 8582 and 8583. (Prerequisite: PSYC 8652).

PSYC-8657. Issues in Cultural Diversity
An examination of issues associated with the negotiation of individual and intergroup relations in a culturally pluralist society, from an explicitly intercultural psychological perspective that focuses primarily upon the social processes occurring when members of different cultural groups interact with one another. Groups considered include, but are not restricted to, those based on ethnicity, gender, and class. Issues to be covered include the search for universals of social behaviour, the determinants, characteristics, and consequences of acculturative stress, and cultural value differences in the definition of self, inter-personal, and inter-group relations.

PSYC-8660. Community Psychology
An overview of the field of community psychology, with emphasis on societal and cultural approaches to community well-being, social problems, and effecting social change. Issues in theory, research, and practice in community psychology will be presented and discussed.

PSYC-8662. Health Psychology
An overview of health psychology, with emphasis on contributions made by psychology to the areas of health promotion, prevention and treatment of illness, modification of unhealthy behaviours, and improvement of health delivery. Application of the biopsychosocial model to health-related research and practice will be examined.

PSYC-8665. Industrial/Organizational Psychology
An examination of theory, research, and practice in the area of Industrial/Organizational Psychology. Industrial topics include measurement theory, job analysis, criterion development and other areas of personnel decision making. Organizational topics cover leadership, work motivation, team development, organizational development, and other areas of organizational functioning.

PSYC-8674. Introduction to Psychotherapy
An overview of historical and contemporary models of psychotherapy, common therapeutic factors, and therapy outcome research. Development of basic therapeutic relationship skills and empathic responding through role-playing and other class activities.

PSYC -8710. Practicum in Peer Supervision
In this practicum, advanced graduate students will engage in clinical supervision of more junior peers while receiving supervision from a registered psychologist. These practicum experiences will be embedded in

established assessment and intervention courses as well as internal practica within the Department of Psychology.

THERAPY COURSES

Therapy course sequences consist of courses numbered PSYC-8675 through PSYC-8697 as listed below. General prerequisites for ALL two-term therapy course sequences are enrollment in the Clinical Psychology Program; PSYC-8674, and the consent of the instructor and Director of Clinical Training. PSYC 8581 is a prerequisite or co-requisite for all therapy courses. Additional prerequisites for individual therapy courses are indicated in the course description.

Therapy course sequences are taught over two terms. Seminars involve readings, discussion, and presentations on the theory, relevant research, techniques, and processes that are specific to the therapeutic approach under consideration. Practica involve supervised experience appropriate to the therapeutic modality. Students include practicum hours obtained through therapy courses in the total number of practicum hours reported on internship applications.

At least three different therapy course sequences will be offered in each academic year, but offerings will vary from year to year depending upon demand and the availability of qualified instructors.

PSYC-8675. Child/Adolescent Clinical Interventions I
Examination of the theory, research, and practice of clinical interventions with children, adolescents and families with an emphasis on fundamental principles and empirical foundations of effective psychotherapy. Issues relevant to the practice of psychotherapy with different groups will be discussed. (Space is limited; preference will be given to students in the Child Clinical Track and more advanced students in the Clinical Neuropsychology track who have previously indicated that they intend to apply to child-focused internship sites (3 seminar hours a week, plus practicum.)

PSYC-8676. Child/Adolescent Clinical Interventions II
Seminar and supervised practice in clinical interventions with children, adolescents and families. (Prerequisite: PSYC-8675.) (3 seminar hours a week, plus practicum.)

PSYC-8677. Advanced Child/Adolescent Clinical Interventions I
This advanced course focuses on training in theory and practice of clinical interventions with children, adolescents and families. Emphasis is placed on advanced intervention skills applied to child and adolescent populations and problems. Primary focus of training will be in individual and co-therapy with child and adolescent groups. Students may also be trained in parent-child interventions and co-therapy in group interventions with parents. Students explore their own psychological functioning as well as the therapeutic process and thus have the opportunity for personal as well as professional growth. Space is limited; preference will be given to students in the Child Clinical Track. (Prerequisites: completion of MA requirements; PSYC-8675 and PSYC-8676) (3 seminar hours a week, plus practicum.)

PSYC-8678. Advanced Child/Adolescent Clinical Interventions II
Advanced seminar and supervised practice in clinical interventions with children, adolescents and families. (Prerequisite: PSYC-8677.) (3 seminar hours a week, plus practicum.)

PSYC-8683. Special Topics in Therapy I
This course provides an introduction to theory, research and therapeutic techniques related to a specific approach to intervention not covered by other therapy course offered in the Clinical Psychology Program (e.g., marital/couples, group, systemic, crisis intervention, interpersonal, existential, dialectical behaviour

therapy). Topics will vary from year to year. (Prerequisite or co-requisite: PSYC-8581.) (3 seminar hours a week, plus practicum.) (May be repeated for credit if therapy modality is different.)

PSYC-8684. Special Topics in Therapy II
Supervised practical experience in applying the specific therapeutic theory and techniques introduced in the linked PSYC-8683 offering. (Prerequisite: PSYC-8683.) (3 seminar hours a week, plus practicum.) (May be repeated for credit if therapy modality is different.)

PSYC-8685 Brief Psychodynamic Psychotherapy I
This course focuses on the acquisition of knowledge and skills necessary to practice brief psychodynamic therapy. Students will be instructed in a brief psychodynamic psychotherapy (BPP) method through readings, didactic training, and role playing. The chosen relational approach is to be specified by the instructor at the time of course selection by students. After this didactic training period, students will engage in the practicum portion of this course with at least one client with whom they will practice the BPP method taught in this course. Weekly supervision will be provided to guide students in the application of BPP to their therapeutic work. (Prerequisites: PSYC-8674; PSYC-8581; consent of instructor and Director of Clinical Training.) (3 seminar hours a week; seminar and supervision plus practicum).

PSYC-8686. Brief Psychodynamic Psychotherapy II
Students continue supervised practice with at least one client according to the BPP approach selected for PSYC-8685. Concurrently, students learn to conduct interpretive work through readings, didactic instruction, and role playing. In the practicum portion of this course, students learn to conduct interpretive work with their clients within BPP.(3 seminar hours a week, plus practicum.)

PSYC-8702. Introductory Practicum in Clinical Neuropsychology
Students will work with mock clients as they develop their neuropsychological assessment skills; and observe more advanced students conducting neuropsychological assessments. After demonstrating basic mastery of test administration and clinical interpersonal skills, students will administer, score, and interpret neuropsychological measures under supervision. This course will be largely practice-based with group supervision as well as limited didactic instruction and will be co-taught with PSYC-8703 (Intensive practicum in clinical neuropsychology). Students register for this course for three full terms (Inter/Summer, Fall, Winter). (Prerequisite: PSYC-8583 and consent of instructor). (Graded on a pass/fail basis.)

PSYC-8703. Advanced Practicum in Neuropsychology
Students will continue to work with clinical supervisors to design test batteries, conduct interviews and assessments, provide diagnoses, and communicate results of assessment and recommendations for intervention to clients in this year-long course. In this second year of clinical practice, students will also serve as lead assessors with assistance from more junior students. This course will be largely practice-based with group and individual supervision as well as limited didactic instruction and will be co-taught with PSYC-8702 (Introductory Practicum in Clinical Neuropsychology). Students register for this course for three full terms (Inter/Summer, Fall, Winter). (Prerequisites: PSYC-8702.) (Graded on a Pass/Fail basis.)

PSYC-8690. Family Therapy I
This course covers the background theory, research, and therapeutic techniques of the major approaches to family therapy. Issues relevant to the practice of psychotherapy with different groups will be discussed.
Preference will be given to students in the Child Clinical track. Prerequisite: One previous therapy course sequence and one or more of the following: PSYC-8540, 8651 and/or 8675/8676.

PSYC-8691. Family Therapy II
Seminar and supervised practice in family therapy. (Prerequisite: PSYC-8690). (3 seminar hours a week, plus practicum).

PSYC-8692. Cognitive Behaviour Therapy I
This is the first course in a two-course series that is designed to provide a reasonably comprehensive and practical overview of Cognitive-Behavioural Therapy (CBT). The focus in this course is on understanding the basic premises of CBT and on developing assessment, case conceptualization, and basic intervention skills. During the associated practicum, student therapists provide therapy to two clients and attend weekly supervision meetings during which videotaped sessions are reviewed and discussed. (3 seminar hours a week, plus practicum.)

PSYC-8693. Cognitive Behaviour Therapy II
This course focuses on how CBT is applied to a range of common clinical problems, on how CBT may be adapted and modified to meet the needs of diverse populations (e.g., clients from different ethnic and cultural groups), and on reviewing empirical support for the use of CBT. Issues related to therapist training and supervision are addressed. (Prerequisite: PSYC 8692.) (3 seminar hours a week, plus practicum.)

PSYC-8694. Integrative Psychotherapy I
This course is designed to facilitate the student therapist's development of a personal framework for integrating theoretical concepts and therapeutic interventions across two or more psychotherapy approaches (e.g., CBT, EFT, Psychodynamic, Humanistic/Experiential) in the service of providing more individualized treatments to enhance client outcomes. Students will continue to explore personal development relevant to professional practice. Students see at least one therapy client under individual supervision. Priority is given to students in the Adult Clinical Track. (Co-requisite: PSYC-8715.) (6 hours a week, combined seminar and practicum.)

PSYC-8695. Integrative Psychotherapy II
Further development of an integrative psychotherapy framework with an emphasis on case conceptualization as applied to diverse syndromes, situations, and populations. The focus is on the therapist's ability to understand the client's situation and symptoms and to select appropriate interventions based on the therapist's own articulation of integrative psychotherapy. Students will continue to explore personal development relevant to professional practice. Students see at least one therapy client under individual supervision. Priority is given to students in the Adult Clinical Track. (Co-requisite: PSYC-8715.) (6 hours a week, combined seminar and practicum.)

PSYC-8696. Emotion Focused Therapy I
EFT is based on current emotion theory and experiential therapy theory and research emphasizing the central role of emotion in functioning and therapeutic change. This course covers the theory, research, and therapeutic techniques used in this treatment model. Students will participate in class discussions, role play exercises, and view videotapes of expert therapists. Supervised practica will begin the end of the first semester. (3 seminar hours a week, plus practicum.)

PSYC-8697 Emotion Focused Therapy II
EFT is based on current emotion theory and experiential therapy theory and research emphasizing the central role of emotion in functioning and therapeutic change. This course covers the theory, research, and therapeutic techniques used in this treatment model. Students will participate in class discussions, role play exercises, and view videotapes of expert therapists. (Prerequisite PSYC-8696.) (3 seminar hours a week, plus practicum.)

PSYC-8701. Clinical Practicum: MA Level
Supervised experience in an approved clinical setting with a focus on the development of basic clinical skills in preparation for practice and/or research, including skills related to interviewing, use of clinical assessment

instruments, case formulation, report writing, and intervention. Prior to completion of MA requirements, students register for this course for each semester in which they attend a practicum placement.

PSYC-8707. Supervision, Consultation, and Interdisciplinary Relationships
This course explores models, ethics, and issues related to supervision and consultation in the practice of clinical psychology, and the benefits and challenges of working with professionals in other disciplines. It includes didactic, discussion, and experiential components. (Prerequisites: completion of MA requirements; consent of instructor and Director of Clinical Training.) (3 hours a week.) (Graded on a Pass/Fail basis.)

PSYC-8715. Psychological Services and Research Center Advanced Psychotherapy Practicum
This practicum focuses on training in psychotherapy theory and practice. Emphasis is placed on advanced psychotherapeutic skills applied to various client populations and problems. Training in individual psychotherapy is the primary focus. Students may also be trained in crisis intervention and in co-therapy with families, groups, or couples. Students will continue to explore personal development relevant to professional practice. Priority is given to students in the Adult Clinical Track. (Prerequisites: completion of MA requirements; completion of two psychotherapy course sequences; enrolment in Clinical Psychology Program and consent of Director of Clinical Training.) (Co-requisites: PSYC-8694 and PSYC-8695.) (14 practicum hours a week.)

PSYC-8721. Applied Social Psychology Practicum
Problem solving in work settings, applying methods of community psychology, organizational psychology, and other fields of applied psychology. Students consult and work directly with a group or organization on a project selected for value to the organization and to the student.

PSYC-8794. Directed Study Major Project I
Under the guidance of the instructor, the candidate will engage in research on a discipline relevant issue, using existing data set(s), leading to the production of a final project which entails empirically grounded policy suggestions. Students will select a Project Committee, review literature, and develop research question and identify data set(s). (Cross listed with SACR-8794)

PSYC-8795. Directed Study Major Project II
In the Summer Semester, operationalize concepts, recode variables, analyze data, write report and suggest policies. The final project will show evidence of methodological skills, knowledge of the relevant substantive area, and ability to define policy implications based on analyzed data. (Cross listed with SACR-8795)

PSYC-8970. MA Thesis Research

PSYC-9020. Clinical Practicum: PhD Level
Supervised experience in an approved clinical setting with a focus on the development of basic clinical skills in preparation for practice and/or research. Students register for this course for each semester in which they attend a practicum placement. (Prerequisite: completion of MA requirements and consent of the Director of Clinical Training.)

PSYC-9050. Preparing for Clinical Internships
This one-term course is intended to assist students with their development and submission of written applications and preparation for the interviews that occur in the process of obtaining required one-year pre-doctoral internships in CPA- or APA-accredited clinical settings. (Prerequisites: completion of all required courses and practica, acceptance of dissertation proposal by the preceding June 15, consent of Director of Clinical Training.) (1.5 hours per week, graded P/F)

PSYC-9060. Predoctoral Clinical Internship

A one-year, full-time (or two-year, half-time) internship/residency in a CPA- or APA-accredited clinical setting. (Prerequisites: completion of all doctoral requirements except for PSYC-9980; acceptance of dissertation proposal at time of application for internship; consent of Director of Clinical Training.)

PSYC-9310. Applied Social Doctoral Internship I
(500 hours of supervised internship.)

PSYC-9320. Applied Social Doctoral Internship II
(500 hours of supervised internship.)

PSYC-9410. Comprehensive Examination
Independent study for and completion of the written Comprehensive Examination. Students may register in PSYC-9410 for a maximum of three consecutive terms. (Prerequisite: completion of MA requirements.)

SCHOOL OF CREATIVE ARTS

PROGRAMS

Master of Fine Arts in Film and Media Arts (MFA)

Admission Requirements
Student admission will be determined by GPA, portfolio submission, letters of reference, and a clear statement of interest describing their intended film or media arts thesis production. A Media Arts thesis could be any of the following: audio/sound art, audio responsive installation, experimental video, animation, video installation, interactive art, multimedia performance, and any fusion thereof.

1) For admission to the Film and Media Arts Master of Fine Arts program, applicants must satisfy the following requirements:

(a) portfolio submission: submit a pdf with links for web or digital download of 3 video/audio/image samples (minimum 5 minutes in total) for evaluation by the departmental graduate acceptance committee;
(b) have attained at least a 75% cumulative average;
(c) present transcripts of all university and/or college-level work;
(d) clear statement of interest;
(e) three letters of recommendation;
(f) minimum language scores for international students: TOEFL 100; IELTS 7.0; Pearson 68.

Normally, successful applicants will have an Honours BA in Media Arts or Film production, or a cognate discipline. Students who do not meet this requirement may be admitted to the Faculty of Graduate Studies in a qualifying (M1) program.

Degree Requirements
Total Courses: Seven Courses plus Thesis

(a) One theory course: MACS-8600 Seminar on Contemporary Issues
(b) Two studio production courses: VSAR-8650 Studio Production and VSAR-8660 Studio Production II
(c) One Writing Methods Course: MACS-8000 Directed Individual Studies
(d) Three courses in Studio Practice: VSAR-8620 Studio Practice II, VSAR-8630 Studio Practice III, VSAR-8640 Studio Practice IV
(e) Thesis Film/Media Arts

Course work will culminate in the defense of the thesis. For Film, the thesis proposal includes a preliminary 5-page draft of the thesis support document, 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.

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

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.

Master of Fine Arts in Visual Arts (MFA)

The program provides two years of advanced education and creative development in the student's chosen areas of research. The program emphasizes studio production and the exploration of ideas and technical skills within a critical framework. Areas of research within the MFA program are Painting/Drawing, Sculpture and Installation, Printmaking, and Integrated Media (Video, Sound, Photography and Digital Arts).

Admission Requirements

1) For admission to the Visual Arts Master of Fine Arts program, applicants must satisfy the following requirements:
(a)portfolio submission: submit a pdf with links for web or digital download to twenty images/video/audio pieces of recent work for evaluation by the departmental graduate acceptance committee;
(b)have attained at least a 75% cumulative average;
(c) have six courses in art history/visual culture;
(d) present transcripts of all university and/or college-level work;
(e) three letters of recommendation;
(f) provide a clear statement of interest;
(g) minimum language scores for international students: TOEFL - 100; IELTS – 7.0; Pearson – 68

2) Normally, successful applicants will have an Honours B.F.A. in Visual Arts, or or a cognate discipline. Students who do not meet this requirement may be admitted to the Faculty of Graduate Studies in a qualifying (M1) program.

Degree Requirements

1) Ten courses are required:
(a) four courses in Studio Practice (VSAR-8610, VSAR-8620, VSAR-8630, VSAR-8640);
(b) MACS-8600: Contemporary Issues;
(c) MACS-8000: Directed Individual Studies;
(d) Graduate Seminars (VSAR-8596, VSAR-8597, VSAR-8598, VSAR-8599);
(e) During their first year, students must participate in a first year MFA. group exhibition. Additionally, students will participate in three end of semester reviews to evaluate studio production in semesters 1, 2, and 3.

2) Thesis (VSAR-8970): The thesis will consist of an exhibition of a body of original creative works within the candidate's area of research, and an accompanying written support document. The thesis will be planned with and executed under the direction of the candidate's principal faculty advisor. This final exhibition will be regarded as the equivalent of the scholarly thesis of an academic discipline.

SCHOOL OF CREATIVE ARTS COURSES

STUDIO

All graduate studio courses are directed individual studies courses. Projects will be planned and carried out in conjunction with a faculty supervisor.

VSAR-8610.Studio Practice 1
Directed individual studio projects within the areas of research in; Painting/Drawing, Printmaking, Sculpture and Integrated Media (Video, Sound, Photography, Digital Arts). (This course is supervised by the Guidance Committee composed of two professors and the principal advisor.) (Open to MFA. students only.)

VSAR-8620.Studio Practice 2
Directed individual studio projects within the areas of research of; Painting/Drawing, Printmaking, Sculpture and Integrated Media (Video, Sound, Photography, Digital Arts). This course is supervised by the Guidance Committee composed of two professors and the principal advisor. (Prerequisite: VSAR-8610) (Open to MFA. students only.)

VSAR-8630.Studio Practice 3
Directed individual studio projects within the areas of research of; Painting/Drawing, Printmaking, Sculpture and Integrated Media (Video, Sound, Photography, Digital Arts). (This course is supervised by the Guidance Committee composed of two professors and the principal advisor.) (Prerequisite: VSAR-8620) (Open to MFA. students only.)

VSAR-8640.Studio Practice 4
Directed individual studio projects within the areas of research of; Painting/Drawing, Printmaking, Sculpture and Integrated Media (Video, Sound, Photography, Digital Arts). This course is supervised by the Guidance Committee composed of two professors and the principal advisor. (Prerequisite: VSAR-8630.) (Open to MFA. students only.)

VSAR-8650. Studio Production I
Through discussion, exercises and hands-on work, students explore the concepts, technologies, theories and production techniques of film and video creation and cinematic storytelling. (Lab fees may apply.)

VSAR-8660. Studio Production II
This course explores experimental and innovative approaches to media arts. The focus of the course is on experimental video, animation, video installation art, interactive art, audio/sound art, audio responsive installation, multimedia performance, and any fusion thereof. Time-based media arts environments may include sound, video, images, text and/or alternate physical feedback as triggered through interaction. (Lab fees may apply.)

VSAR-8596.Graduate Seminar 1
The seminar addresses art methodologies in the creative research, the development of critical vocabulary and interpretations in the context of contemporary art making as well as some pedagogical concepts through lectures, group discussions, studio visits, visiting scholars and artists. The seminar provides a forum for peer critique and critical discussion on contemporary concepts related to the students' artistic research. (Open to MFA. students only.)

VSAR-8597.Graduate Seminar 2
The seminar addresses art methodologies in the creative research, the development of critical vocabulary and interpretations in the context of contemporary art making as well as some pedagogical concepts through

lectures, group discussions, studio visits, visiting scholars and artists. The seminar provides a forum for peer critique and critical discussion on contemporary concepts related to the students' artistic research. (Prerequisite: VSAR-8596.) (Open to MFA. students only.)

VSAR-8598.Graduate Seminar 3
The seminar addresses art methodologies in the creative research, the development of critical vocabulary and interpretations in the context of contemporary art making as well as some pedagogical concepts through lectures, group discussions, studio visits, visiting scholars and artists. The seminar provides a forum for peer critique and critical discussion on contemporary concepts related to the students' artistic research. (Prerequisite: VSAR-8597.) (Open to MFA students only.)

VSAR-8599.Graduate Seminar 4
The seminar addresses art methodologies in the creative research, the development of critical vocabulary and interpretations in the context of contemporary art making as well as some pedagogical concepts through lectures, group discussions, studio visits, visiting scholars and artists. The seminar provides a forum for peer critique and critical discussion on contemporary concepts related to the students' artistic research. (Prerequisite: VSAR-8598.) (Open to MFA. students only.)

VSAR-8000. Special Project
Directed individual artist project outside the Student's area of research. (May be repeated for credit.) (Has to be approved by the Graduate Committee and the Program Coordinator.)

VSAR-8970. Thesis

ART HISTORY COURSES

The specific topics in the Directed Individual Studies in Art History and the Art History Seminar will vary from year to year, depending upon the interests and needs of professors and students. All courses are three hours a week unless otherwise indicated.

MACS-8000. Directed Individual Studies
This course involves examination of a particular problem in a specific area of interest in which a paper will be required. (May be repeated for credit with permission of the MFA. Program Coordinator.)

MACS-8600. Seminar on Contemporary Issues
Current issues in art criticism and theory will be considered through reading, discussions, museum trips, guest lectures and research papers culminating in a seminar presentation by individual students on specific issues.

SOCIAL WORK

PROGRAMS

PhD in Social Work

Admission Requirements
Admission criteria include the following:
1. Completed a Social Work degree from an accredited university
2. A minimum 80% (A- average) in the most recent graduate degree
3. A statement of interest
4. Research proposal
5. Practice and educational experience.
6. Curriculum vitae
7. Sole or co-authored sample of professional or academic writing.
8. Three letters of reference.
9. Transcripts

Program Requirements
The proposed program is designed as a full-time doctoral program. All students complete a minimum of 7 three (3) credit courses during the two-year residency period, the courses are designed to give a full breadth of advanced research and practice knowledge. Students must complete all 6 courses (SWRK 9720, SWRK 9730, SWRK 9740, SWRK 9741, SWRK 9743, SWRK 9744) before they proceed to the comprehensive proposal stage. Full time students must maintain continuous registration; students register in SWRK-9980 when not registered in another course.

Courses
SWRK-9720, SWRK-9730, SWRK-9740, SWRK-9741, SWRK-9743, SWRK-9744, SWRK-9795, SWRK-9980

Comprehensive Proposal and Paper
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 doctoral dissertation committee.

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, two department readers, one outside department reader who is within the University of Windsor. The dissertation supervisor, program reader 1 and program reader 2 must have Graduate Faculty designation status.

Progress reports
All students are 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.

Dissertation 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 examiner outside the University of Windsor; and a representative of the Dean as approved by the Faculty of Graduate Studies.

For more information, contact the School of Social Work (http://www.uwindsor.ca/socialwork/403/phd-program).

Master of Social Work (MSW)

Admission Requirements
To be considered for admission to any MSW programs, the School of Social Work requires applicants to have a minimum average of 73% or equivalent. 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 MSW.
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): SWRK-8503, SWRK-8504, SWRK-8523, SWRK-8531, SWRK-8532, SWRK-8533, SWRK-8534, SWRK-8547, SWRK-8550, SWRK-8570, and, SWRK-8571 (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: SWRK-8610, SWRK-8611, SWRK-8621, SWRK-8622, SWRK-8640, SWRK-8680, and SWRK-8681 (Advanced Practice Internship 6.0 credit hours).

Advanced Standing Master of Social Work *
*This program is available to students with a Bachelor of Social Work (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: SWRK-8523, SWRK-8547, SWRK-8610, SWRK-8611, SWRK-8621, SWRK-8622, SWRK-8640, SWRK-8680, and SWRK-8681 (Advanced Practice Internship 6.0 credit hours).

Master of Social Work for Working Professionals (MSW)

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: SWRK-8503, SWRK-8504, SWRK-8523, SWRK-8531, SWRK-8532, SWRK-8533, SWRK-8534, SWRK-8547, SWRK-8550, SWRK-8570, and SWRK-8571 (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: SWRK-8610, SWRK-8611, SWRK-8621, SWRK-8622, SWRK-8640, SWRK-8680, and SWRK-8681 (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: SWRK-8523, SWRK-8547, SWRK-8610, SWRK-8611, SWRK-8621, SWRK-8622, SWRK-8640, SWRK-8680, and SWRK-8681 (Advanced Practice Internship – 6.0 credit hours).

SOCIAL WORK COURSES

SWRK-8503. Comprehensive Social Policy Analysis
This course introduces students to the history of policy and how policies are created. Students will critically analyze the economic forces, political forces, cultural forces, social forces, and professional issues that impact social policy. Students will explore their understanding of the impact social policies have on individuals, families, organizational infrastructures, service delivery systems, and network linkages. The formulation of policy recommendations will also be addressed.

SWRK-8504. Communication Skills in Social Work Practice
This course introduces students to the various types of communication skills utilized in advanced social work practice. Through in-depth examination of intentional interviewing and counselling skills, students will explore core social work values in relation to practice situations. Content focuses on the critical analysis of particular verbal and non-verbal forms of communication. A laboratory format will be employed to build student competencies in the effective use of interactional skills with clients and client systems.

SWRK-8523. Challenges in Human Behaviour
This course examines how principle biological, psychological, and social theoretical perspectives differentially explain the etiology, occurrence, and response to common life challenges including physical illness and disability, mental illness and substance abuse, economic adversity, family and community violence, and minority status related to culture, ethnicity, or sexuality. An ecological perspective will be used to understand the individual, family, community, and societal issues related to these challenges. Both the impact of these challenges and strategies responding to these challenges will be appraised and critically analyzed.

SWRK-8531. Social Work Practice with Individuals
Students will develops a theoretical and applied understanding of foundational knowledge for advanced social work practice with individuals. Using a historical and ecological systems perspective, an emphasis is placed on multidimensional assessment and the differential application of therapeutic, supportive, educational, and resource management strategies for individuals. Specific attention is given to the needs of diverse populations in the context of social justice.

SWRK-8532. Social Work Practice with Groups
Students will critically examine the theoretical frameworks used in advanced social work practice with groups. Using an ecological systems perspective, students will use selected practice theories for social work with groups to develop knowledge, values, and skills in critical analysis, differential assessment, planning and intervention, and evaluation and termination with client groups. The challenges faced by diverse populations that affect group composition, development and processes are explored within the context of social justice. Assessment skills are used to identify group strengths, weaknesses, and challenges in formulating effective social work practice with groups.

SWRK-8533. Social Work Practice with Families
Students will analyze assessment and intervention with families. Using an ecological systems perspective, students will analyze the impact of diverse family structure and dynamics, cultural and social contexts, and the life cycle on family functioning. They will develop an understanding of their own family of origin issues as they impact self and work with families, critically analyze and differentially apply selected family therapy approaches, and appropriately apply social work values and skills when working with families.

SWRK-8534. Social Work Practice with Organizations and Communities
In this course, students will critically describe the political forces, cultural forces, social forces, and professional issues that impact working with organizations and communities. They will critically describe human diversity, human oppression, and social justice in the context of social work interventions with organizations and communities with particular attention to removing barriers to change and mobilizing or facilitating change with diverse populations. After evaluating procedures applicable to assessing organizational and community factors, students will design the implementation and facilitation of groups from an ecological perspective to advance change with clients and client systems.

SWRK-8547. Social Work Research: Practice Evaluation
This course prepares students to understand and critically evaluate use applied research in evaluating social work practice. The ideological assumptions underlying qualitative and quantitative research methods will be examined. Students will consider ethical issues as they conduct a literature review, identify a research problem relevant for interventions for diverse populations, formulate a research question and hypotheses, develop an appropriate design and methodology considering quantitative and qualitative options, and indicate appropriate analytical methods (statistical and/or qualitative).

SWRK-8550. Social Work Values, Ethics and Anti-Oppressive Practice
In this course, students will use an anti-oppressive focus to critically examine the nature, history, traditions, and issues of the social work profession as they relate to the development of a distinct theoretical knowledge-base, set of values, code of ethics, and approaches to direct and indirect practice. During the course, students will examine ethical questions and value dilemmas encountered by social workers in various fields of practice. Through value analysis and the application of ethical principles, the meaning of professionalism and its expression in social work are considered using contemporary practice case studies.

SWRK-8570. Field Integration Seminar
This seminar course focuses on the integration of academic and field work experience to advance knowledge, values, and skills as they relate to the development of advanced practice competence. Students will use structured reflection and self-evaluation to understand their own practice in terms of values, ethics, policies, theoretical models, and agency expectations. Students will reflect upon personal values and beliefs and explore solutions to actual issues during their field placements. (This course is evaluated on a pass/fail basis.)

SWRK-8571. Master of Social Work Foundation Year Practicum
This course is offered in a field education setting and is designed to assure the practice of advanced social work from the ecological perspective. The foundation practicum comprises 450 hours of supervised social

work practice (Prerequisites: SWRK-8503, SWRK-8504, SWRK-8523, SWRK-8531, SWRK-8532, SWRK-8533, SWRK-8534, SWRK-8547, SWRK-8550.)

SWRK-8610. Advanced Direct Social Work Practice
This course will focus on the critical analysis of the theoretical basis for the application of a range of advanced professional social work theories and models to direct practice with diverse populations. Using ecological systems and strengths perspectives, students will analyze client empowerment and constructive transactions with the environment. Aimed at enhancing social justice, an analysis and critique of evidence-based practices with clients will be explored as vehicles to bringing about change.

SWRK-8611. Advanced Indirect Social Work Practice
Students will critically assess indirect social work practice with regards to community practice and human service organizations. Using an ecological perspective, students will examine community practice and human service organizations within the context of professional social work practice and by highlighting key indirect social work functions with a focus on community and organizational development.

SWRK-8621. Social Justice and Social Change
This seminar focuses on the critical analysis of systemic injustice. It will consider the history, meaning, consequences and dynamics of barriers that threaten, preclude or compromise the normal participation of selected vulnerable groups in social, economic and political institutions. It will critically examine concepts such as deviance, dependence, need, social control, and oppression. This critical analysis will form the underpinnings for leadership in the development and implementation of strategies for change.

SWRK-8622. Advanced Social Policy Analysis and Development
Building on the Comprehensive Social Policy Analysis course, this course focuses on the processes involved in policy formulation, implementation, and social change. Students will further refine their capacity to critically analyze social policies and generate recommendations that emanate from a global context.

SWRK-8625. Law and Social Work: Advanced Practice Research Methods and Policy Analysis
This course prepares students to use the practitioner-researcher model in the analysis of social policy, as it relates to law, in Canada. This model includes problem formation, qualitative and quantitative research design, data analysis and interpretation, and the dissemination of findings. Students will learn to apply specific analytic frameworks and theories, drawn from law and social work, to issues of Canadian social policy. In addition, students will learn essential elements of program evaluation including needs assessment, program logic models, implementation and process evaluations, and impact evaluations. Particular attention will be given to the implications of social policy for vulnerable and oppressed populations. Credit Weight 4.0. (Cross-listed with LAWG-5930.).

SWRK-8626. Advanced Seminar in the Theory and Practice of Social Work and the Law
This seminar focuses on the intersection of law and social work in theory and practice. It will prepare students to think critically about the interrelationship between law and social work, both as disciplines and professions, and to identify and analyze theoretical and substantive areas of compatibility and tension. The challenges of interdisciplinary practice will be considered, with a particular emphasis on ethical norms and the advancement of social justice. (Open to MSW/JD students only, or with the permission of both program areas.) (Credit Weight 4.0. Cross-listed with Law LAWG-5931.).

SWRK-8640. Program Design and Evaluation
This course prepares students to use the evidence-based practitioner-researcher model to critically evaluate social work practice with organizations and communities. Student will learn essential elements of program evaluation including needs assessments, program logic models, implementation and process evaluations,

outcome evaluations, and impact efficiency evaluations. Students will design programs and develop evaluation proposals and will learn how to disseminate the results of program evaluations.

SWRK-8680. Advanced Internship Seminar
This capstone course must be taken concurrently with students' advanced practice internship SWRK-8681. This course provides a structured forum for students to discuss, synthesize and integrate the knowledge they have acquired throughout the program including practice theories, professional ethics, policy development, research and program evaluation.

SWRK-8681. Advanced Practice Internship
This course is offered in a field education setting. Students develop skills which will equip them for leadership in advanced social work practice. The internship comprises 450 hours of supervised social work practice. (Prerequisites: SWRK-8610, SWRK-8611, SWRK-8621, SWRK-8622, SWRK-8640.)

SWRK-8970.Thesis
The thesis will integrate knowledge of research and evaluation methods to promote the acquisition of evidence-based practice to specific vulnerable populations. The thesis is supervised by the student's thesis committee. (3 lecture hours)

SWRK-9720. Epistemology and Philosophy of Science in Social Work
This course examines the epistemological foundations of social work research. The nature of knowledge, the different ways we come to know, and the social process in the distribution of knowledge are discussed. Critical analysis of the historical context, philosophical assumptions, and current debates related to each paradigm--positivist/postpositivist, interpretative, critical and postmodernism are explored. Students identify their own standpoint with respect to their dissertation research. The process by which social work researchers can advance evidence for practice within social justice principles for each of the available paradigms is emphasized.

SWRK-9730. History and Theory in Social Work
This course provides an in-depth examination of the development of the social work profession over the last one hundred years. An exploration of the impact of changing social, political, economic, moral, and historical contexts on the practice, theoretical and scholarly orientations of the profession will be highlighted. Key debates regarding the mission and development of professions in general and social work in particular; the relationship between practice, scholarship, and social policy; and tensions between disciplinary (and inter-disciplinary) approaches to social work knowledge development will be discussed within its national and international contexts. This seminar will also provide an examination of selected issues facing the profession today.

SWRK-9740. Qualitative Methods in Social Work Research
This course provides an overview of qualitative research design and application. It is intended to facilitate students' understanding in both designing, and in implementing their doctoral dissertation research or a sample of research involving qualitative methods. A number of designs are discussed as well as debates related to the position of the researcher, interviewing, ethics and diversity. The contribution of qualitative research to current models/issues of evidence-based social work practices, knowledge, truth and representation is also discussed. (3 lecture hours)

SWRK-9741. Qualitative Data Analysis
This course examines various approaches to qualitative data analysis and their grounding in various theoretical foundations. Students learn and practice multi-level approaches to data analysis, using software applications as data organization tools. Building on the qualitative methods course, students articulate the reasons for choosing certain approaches to analysis, referring to their consistency with various

methodologies and theoretical foundations. The course applies the standards for rigour in qualitative analysis as a tool for evaluating various approaches. (3 lecture hours)

SWRK-9743. Quantitative Methods in Social Work Research
This course introduces students to quantitative research methods, including research designs, sampling methods, standardized measures, questionnaire design, meta-analysis and ethical consideration in conducting research. The course also covers the operationalization of social science concepts and scale construction, validity and reliability, and measurement error. Students gain knowledge about the current trends in evidence-based practice.(3 lecture hours)

SWRK-9744. Quantitative Data Analysis
This course provides an examination of the principles of quantitative data analysis with a focus on conducting and interpreting common bivariate and multivariate statistical procedures used in social science research. Parametric and non-parametric approaches are examined. Students gain competency in the assumptions underlying statistical tests, the criterion for test selection, and the utilization of computer software analysis for analyzing small and large datasets.(3 lecture hours)

SWRK-9795. Dissertation Seminar
This course guides students through the process of developing a dissertation proposal. It covers each step of the research development process, from examining current knowledge to a description of how the data analysis will be conducted. It encourages students to consider the most appropriate methodology for their purposes (i.e., mixed, qualitative, and quantitative approaches). Students will also be supported through the process of obtaining approval for their project from the University of Windsor Research Ethics Board.(3 lecture hours)

SWRK-9980. Dissertation Research
Students work with a supervisor and committee to develop and implement an original research investigation. The results will be embodied in a professionally organized and written dissertation conforming to the requirements outlined in the School of Social Work PhD. Manual and by the Faculty of Graduate Studies. The dissertation is expected to be of the highest quality and suitable for publication (graded pass/fail).

SOCIOLOGY, ANTHROPOLOGY AND CRIMINOLOGY

PROGRAMS

Master of Arts in Criminology (MA)

Admission Requirements
The requirement for admission to the MA candidate year of the program is an Honours degree in Criminology or a related field from an accredited university. Applicants without an Honours degree in Criminology or a related discipline may be required to take additional courses. 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.

Applicants will be considered on the basis of:
Obtaining a 77% minimum cumulative average in the final two years of study (full- time equivalent) of the 4-year undergraduate degree.
Strong recommendations based on faculty observation of student's performance, work experience, or community involvement demonstrating clear commitment to and understanding of criminological concerns.
Background preparation and graduate faculty resources that are available in the area of specialization indicated on the application

Program Requirements

COURSE STREAM
Successful completion of seven graduate courses within 12 months (3 consecutive semesters):
SACR-8640
SACR-8050 OR SACR-8060
Three graduate courses which must be selected from SACR-8610, SACR-8620, SACR-8650, SACR-8670, SACR-8680, and/or SACR-8710
Two graduate courses from any SACR-8xxx course*

THESIS STREAM
Successful completion of five graduate courses and a Thesis within 24 months (6 consecutive semesters):
SACR-8640
SACR-8050 OR SACR-8160
One graduate course which must be selected from SACR-8610, SACR-8620, SACR-8650, SACR-8670, SACR-8680 OR SACR-8710
One graduate course from any SACR-8xxx course*
SACR-8900 and SACR-8970 Thesis Proposal and Thesis Oral Defenses

Thesis Stream Progress Requirements:
Students are required to complete all five courses in two consecutive semesters; 02-SACR-8900 should be taken during the second semester.

MA thesis students must complete their thesis proposals by the end of Term 3. Proposals must be defended by September 30th of their second year in the program. Students who have not set the date for their thesis proposals by July 1st will automatically be moved into the course stream so they can register for courses in the Fall term.

*One of which may be replaced by a graduate course from another department, subject to the department's approval

Important Program Requirement Details

1. Students may not take more than three (3) courses in a single term.
2. Students will proceed towards completing the degree by achieving at least a 77% cumulative average in all courses.
3. The minimum passing grade in a graduate course is 70%.
4. Seminar courses require active class participation. Instructors may therefore take into account class participation in grading students, in accordance with Senate regulations.

Master of Arts in Sociology (MA)

Admission Requirements

The requirement for admission to the MA candidate year of the program is an Honours degree in Sociology or a related field from an accredited university. Applicants without an Honours degree in Sociology or a related discipline may be required to take additional courses. Students transferring into Sociology from a non-related discipline and those with insufficient preparatory background may be required to take additional courses before proceeding into the candidate year.

Applicants will be considered on the basis of:

Obtaining a 77% minimum cumulative average in the final two years of study (full- time equivalent) of the 4-year undergraduate degree.

Strong recommendations based on faculty observation of student's performance, work experience, or community involvement demonstrating clear commitment to and understanding of sociological concerns.

Background preparation and graduate faculty resources that are available in the area of specialization indicated on the application

Program Requirements

COURSE STREAM

Successful completion of seven graduate courses within 12 months (3 consecutive semesters):

SACR-8000 OR SACR-8010

SACR-8050 OR SACR-8060

Three graduate courses which must be selected from SACR-8020, SACR-8200, SACR-8210, SACR-8250, SACR-8270, SACR-8300, SACR-8400, SACR-8500, SACR-8550, SACR-8690, SACR-8710 and/ or SACR-8800

Two graduate level courses from any SACR-8xxx course *

THESIS STREAM

Successful completion of five graduate courses and a Thesis within 24 months (6 consecutive semesters):

SACR-8000 OR SACR-8010

SACR-8050 OR SACR-8160

Two graduate level courses from any SACR-8xxx course *

SACR-8900 and SACR-8970 Thesis Proposal and Thesis Oral Defenses

Thesis Stream Progress Requirements:

Students are required to complete all five courses in two consecutive semesters; SACR-8900 should be taken during the second semester.

MA thesis students must complete their thesis proposals by the end of Term 3. Proposals must be defended by September 30th of their second year in the program. Students who have not set the date for their thesis

proposals by July 1st will automatically be moved into the course stream so they can register for courses in the Fall term.

*One of which may be replaced by a graduate course from another department, subject to the department's approval

Important Program Requirement Details
Students may not take more than three (3) courses in a single term.
Students will proceed towards completing the degree by achieving at least a 77% cumulative average in all courses.
The minimum passing grade in a graduate course is 70%.
Seminar courses require active class participation. Instructors may therefore take into account class participation in grading students, in accordance with Senate regulations.

Social Data Analysis (MA) (Joint Program with Psychology)

(Note: as of Fall 2014, there are no new admissions to this program.)

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.
5. Three reference letters

Degree Requirements
PSYC-8511, SACR-8050, SACR-8070/SACR-8080 (cross listed as PSYC-8070/PSYC-8080), SACR-8794/SACR-8795 (cross listed as PSYC-8794/PSYC-8795), and two of PSYC-8512, PSYC-8513 or SACR-8050. Students may substitute PSYC-8513 for SACR-8050.

Program Sequencing
Students will complete their 6 courses in term 1 and 2 and complete their Final Project (SACR-8794/SACR-8795 cross-listed as PSYC-8794/PSYC-8795) during the Spring/Summer semesters.

Fall: PSYC-8511, SACR-8050, SACR-8070 (cross listed as PSYC-8070)
Winter: SACR-8080 (cross listed as PSYC-8080), and two of PSYC-8512, PSYC-8513 or SACR-8050
IS: SACR-8794/SACR-8795(cross listed as PSYC-8794/PSYC-8795)

PhD in Sociology with Specialization in Social Justice

Admission Requirements
In addition to the general requirements set out by the Faculty of Graduate Studies, the requirement for admission to the PhD. program in Sociology with Specialization in Social Justice is a Master's degree in Sociology (or equivalent) from an accredited university. Possession of the minimum academic requirements does not ensure acceptance.

Applications will be considered on the basis of the following:
1. Application documents submitted;

2. The availability of faculty to advise, supervise, and provide funding and research training in conjunction with their own research project;
3. The diversity of subject areas represented in the applicant pool; and,
4. Obtaining a 77% minimum cumulative average in the final two years of study (full- time equivalent)/MA degree

Degree Requirements
Successful completion of five graduate courses plus the Dissertation:
SACR-8020 or SACR-8010 or SACR-8000;
SACR-8150 or SACR-8160
Three graduate courses from any SACR-8xxx course*
SACR-9980 Dissertation
Two comprehensive examinations:
1. A dissertation proposal, which includes an oral defence
2. A dissertation, which includes an oral defence

*One of which may be replaced by a graduate course from another department, subject to the department's approval

NOTE: A PhD. student who has previously completed a MA 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.

Comprehensive Examinations
After successful completion of all course requirements, the student must demonstrate mastery of two established and distinct fields of sociological inquiry through satisfactory completion of two comprehensive examinations. Students will not be able to move on to the second comprehensive exam until the first comprehensive exam has been successfully completed. Students failing a comprehensive examination after a second attempt will be required to withdraw from the program. The required PhD comprehensive examinations consist of exams in two distinct fields in the discipline of Sociology. The student will complete one thematic area based comprehensive and one dissertation lead substantive area comprehensive.

Dissertation Proposal with Oral Defence
After successful completion of the comprehensive examination requirements, the student moves on to the 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 dissertation; the feasibility of the research project; and ethical issues raised by the research.

After successful completion of the dissertation proposal requirements, the student continues on with the dissertation. 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.
Important Program Requirement Details

Important Program Requirement Detail
Students may not take more than three (3) courses in a single term. Students will proceed towards completing the degree by achieving at least a 77% cumulative average in all courses. The minimum passing grade in a graduate course is 70%. Seminar courses require active class participation. Instructors may therefore consider class participation in grading students, in accordance with Senate regulations.

SOCIOLOGY, ANTHROPOLOGY AND CRIMINOLOGY COURSES

All courses listed will not necessarily be offered in any given year. All courses are taught as seminars.

SACR-8000. Sociological Theory
A seminar on current and emerging trends in social theory from social constructionism to world systems theory, including contemporary debates on impacts of globalization, modernity and postmodernity, and the recovery of neglected voices in sociological theory.

SACR-8010. Classical Social Theories and Beyond
A seminar on creative, critical, and reflexive modes of theoretical development and appropriation grounded in sections of classical social theory. Topics covered may include causality, power, justice, love, sexuality, the family, class, solidarity, religion, science, ideology, culture, state formation, and cosmopolitanism. Attention will be given to the discursive formation of the social sciences and epistemological, ontological, and normative debates.

SACR-8020. Social Theory and Social Justice
A seminar to develop the theoretical foundations of doctoral research by critically examining the location of research and researchers in the global system, presumptions concerning human subjectivity and empowerment, and the conceptualization and practice of social justice. (Prerequisite: permission of instructor.)

SACR-8050. Quantitative Statistics and Analysis
Construction and testing of regression and logit models, sampling, and questionnaire construction. Additional topics may be selected in view of the needs and interests of students.

SACR-8060. Qualitative Methodology
Examination and practice of qualitative methods used in social research. An examination of Students will critically examine the ethics and politics of research. The course is primarily designed to provide MA course-stream students with an opportunity to engage in various research methods and debates in the field.

SACR-8070. Survey Data
Student will work in teams to develop questionnaires, gather data, and prepare them for analysis. Extensive reading will be required on sample design, questionnaire design, and survey administration. (2 lecture, 1 laboratory hour each week.) (Cross-listed with PSYC-8070)

SACR-8080. Data Analysis
Students will explore their data and test hypotheses, drawing on methods from other graduate data analytic courses. Students will be required to write a final report which emphasizes communicating findings to non-specialists. (2 lecture, 1 laboratory hour each week.) (Cross-listed with PSYC-8080)

SACR-8150. Statistics and Quantitative Methods
Sociological applications of structural equation modeling, hierarchical modeling, log-linear models, multinomial and ordinal logits, consideration of the strengths and limitations of quantitative sociology and political issues in its exercise. (Prerequisite: SACR-8050 or permission of instructor.)

SACR-8160. Qualitative Research Design
An exploration of the epistemological assumptions and analytical tools that underpin the design of students' qualitative research projects. Students will be exposed to a variety of research issues in areas such as of sociological field work, select ethnographic techniques, the analysis of documents, and participatory action research. The course is designed to assist students in examining and employing specific qualitative methods to assist in the development of developing the methodological component of their thesis or PhD proposal.

SACR-8200. Social Movements and Popular Mobilization
Seminar on the theory and research of large-scale transformations through historical and cross-cultural examinations of such topics as the development and impact of social movements, states and social revolutions, and the mobilization of people around issues concerning human rights, working conditions, racism, gender, sexuality, environment, peace, poverty, and globalization.

SACR-8210. Social Inequality and the State
Seminar on the theory and research of structured inequality in the national and international context. The focus will be on the role of the state in creating, sustaining, and altering different aspects of inequality in terms of resource attainment, political ideology and behaviour. Policy related issues may include globalization, family, sexuality, multiculturalism, immigration, employment, crime, education, health and welfare.

SACR-8250. International Development and its Discontents
Seminar on the central theoretical and empirical issues raised in understanding the ways in which national and global processes of socio-economic development are experienced locally.

SACR-8270. The Unruly City: Urban Analysis and Ethnography
The aim of this course is to consider the work of anthropologists, sociologists and others who have explored and attempted to conceptualise cities and urban spaces, urban cultures and social relations, and the intersections between cultural phenomena and urban transformation all within the context of political economic formations. The course further aims to familiarize students with the variable theoretical perspectives that have been brought to bear on urban life, and the way in which ethnographic research may be undertaken in cities. Students develop the skills to analyse and debate social issues and aspects of cities and urban life.

SACR-8300. Work and Social Change
This course examines current research and theoretical approaches in the sociology of work with an emphasis on understanding the relationship between the transformation of work and broader social change in class, gender and ethnic relations. Areas of concentration may include the organization of production, worker control and resistance, state labour policies and legislation, unemployment, labour market segregation, and globalization.

SACR-8400. Race and Ethnic Relations
A comparative analysis of race and ethnic relations focusing on such issues as ethnic stratification and mobility patterns, assimilation and cultural pluralism, and policies and legislation governing multiculturalism, employment equity and collective rights.

SACR-8500. Family Relations and Gender Politics
An examination of historical and contemporary debates on gender politics within the context of family formation and social change in Canada. Special attention will be given to the gender division of labour, sexuality, economy and class, and to related social justice issues such as state regulation of marriage, divorce, childcare and procreation, reproductive engineering and rights, and ideological power structures and practices that construct family members in particular social and cultural contexts.

SACR-8550. Sexualities and Social Justice
This course will investigate the relationship between sexuality, power inequalities and social change. This may include an examination of the impact of globalization processes on sexualities, the development of lesbian, gay, bisexual, transgender and queer identities and movements, the racialization and gendering of sexual identity (and the sexualization of racial, ethnic and gender relations), the criminalization of sexualities, and the construction of sexual 'health'.

SACR-8610. Crime and Exclusion
An exploration of research and theory on the conception, construction, and production of crime and other exclusionary processes. Substantive topics may include violence, victimization and the impact of culture, borders, inequalities, and regulatory agencies on crime and deviance.

SACR-8620. Security and Regulation
An examination of research and theory on the regulatory agencies of criminal law and social policy (e.g. courts, police, corrections, social service agencies), modes of regulation (e.g. discipline, surveillance, detention) and their application (e.g. to bodies, spaces, borders and subjectivities).

SACR-8640. Contemporary Criminological Theory
An advanced analysis of social theories in Criminology. Various perspectives will be covered including feminist, Marxist, cultural, postmodern, and constructionist theories.

SACR-8650. Law and Governance
This course examines perspectives on moral regulation, the social construction of law and law as governance. The focus will be the analysis of various forms of law, policy, and regulation. Substantive issues to be covered may include sexuality, immigration and exclusion, labour and economic policies, drug policies and communication, or cultural policies.

SACR-8670. Current Issues in Criminology
An examination of contemporary research in criminology, deviance, and/or social justice. Students will critically engage with the results of recent research central to these areas of investigations

SACR-8680. Critical Perspectives on Policy Development
This course provides an in-depth study of the process of policy formation, development, and implementation in the area of crime and criminal justice broadly defined.

SACR-8690. Culture and Globalization
This seminar course uses cultural perspectives to explore processes of globalization. Topics may include migration, mass mediated practices, transnational organizations, work and employment, and human rights.

SACR-8710. Critical Cultural Studies
A critical examination of popular culture within contemporary social and cultural contexts. Topics may include: media representations of crime/criminality/criminal justice, gender, sexuality, race/ethnicity; the role of power and inequality in cultural production; myth; ideology; and how media and popular culture inform and impact various forms of social policy.

SACR-8740. Health and Social Justice
Examines the social construction, production, and subjectivities of health and illness with reference to a variety of social justice developments and policy issues.

SACR-8800. Subordination, Identity and Empowerment
A micro level examination of the effects of subordination on everyday life in the generation of acquiescence and resistance, including the use of discourse in identity formation and popular ideologies.

SACR-8870. Selected Topics in Sociology
This course involves an examination of a selected topic within Sociology based on new developments in particular areas, special faculty interests, and opportunities afforded by the availability of visiting professors. Topics covered will vary from semester to semester.

SACR-8900. Directed Readings: Development of the Thesis Proposal
Students will register for this course with a faculty advisor in their declared area of specialization with the purpose of developing a thesis proposal. (Available for credit only in the MA program by thesis.)

SACR-8794. Directed Study Major Project I
Under the guidance of the instructor, the candidate will engage in research on a discipline relevant issue, using existing data set(s), leading to the production of a final project which entails empirically grounded policy suggestions. Students will select a Project Committee, review literature, and develop research question and identify data set(s). (Cross listed with PSYC-8794)

SACR-8795. Directed Study Major Project II
In the Summer Semester, operationalize concepts, recode variables, analyze data, write report and suggest policies. The final project will show evidence of methodological skills, knowledge of the relevant substantive area, and ability to define policy implications based on analyzed data. (Cross-listed with PSYC-8795)

SACR-8970. MA Thesis

SACR-9980.Doctoral Dissertation

ODETTE SCHOOL OF BUSINESS

PROGRAMS

Master of Business Administration (MBA)

Program Curriculum Structure
Total courses: 17:

The Odette MBA is a 16-month program that is challenging, intensive and exciting. This full-time program is divided into four semesters that combine core business fundamentals and theory with practical experience.

Degree Requirements
Admissions to the Odette MBA program are highly selective and seek students who can understand complex issues, manage multiple projects, and communicate effectively.

Applicants must have:
An undergraduate degree with a minimum grade point average of 70% or above in their last two years.
A completed Graduate Management Admission Test (GMAT) with an average score of 550 for accepted applicants.
Applicants must also upload one letter of reference, a resume, a letter of intent and will be subject to a qualifying personal interview.

All Fields
Fall
BUSI-8010 Leadership and Interpersonal
BUSI-8020 Core Concepts of Accounting I
BUSI-8030 Introduction to Financial Management
BUSI-8050 Marketing Management
BUSI-8140 Digital Business Systems

Winter
BUSI-8100 Core Concepts of Accounting II
BUSI-8120 Financial Management.
BUSI-8130 Human Resources Management.
STEN-8900 Entrepreneurship: New Venture Formation and Management
STEN-8110 Project Management I

Summer
MGMT-8600 Business Ethics and Sustainability
MGMT-8460 Dynamics of Business Negotiations
STEN-8120 Project Management II
STEN-8980 Strategic Management
BUSI-8150 Business Analytics

Fall
One of the following:
Two 8000-level business courses

BUSI 8960 Major Paper
Two 8000 level business courses taken as part of the international exchange program

Master of Business Administration with Professional Accounting Specialization (MBA) Fast Track

The Fast Track MBA with Professional Accounting Specialization is specifically designed for students pursuing their CPA Designation who have met the requirements for entry into PEP/CPA Accredited Program.

Degree Requirements
Total Courses: 11 (or 33 credit hours)

a) 7 Required Courses:
BUSI-8010. Interpersonal Dynamics
STEN-8980. Strategic Management
ACCT-8010. Advanced Topics in Financial ReportingACCT-8020. Advanced Topics in Management Accounting
ACCT-8070. Integration and Team Building ACCT-8080. Integrative Case AnalysisBUSI-8673-01. Special Topics: Business Management

b) Plus 4 of 6 electives:
ACCT-8030. Performance Management
ACCT-8040. Advanced Topics in Finance
ACCT-8050. Advanced Audit and Assurance
ACCT-8060. Advanced Topics in Taxation
BUSI-8610. Business Law
BUSI-8673-02. Special Topics: Business Management

NOTES
1. ACCT-8010 and ACCT-8020 are prerequisites for ACCT-8030, ACCT-8040, ACCT-8050, ACCT-8060 or BUSI-8610.
2. ACCT-8070 and ACCT-8080 are co-requisite courses that are restricted to MBA-PAS students who have completed ACCT-8010, ACCT-8020, BUSI-8010, STEN-8980, BUSI-8673 (01), ACCT-8030, ACCT-8040, ACCT-8050, ACCT-8060 or BUSI-8610.

Graduation Requirements
Must have a cumulative average of 70%.
Must not have more than one course under 70%
Must obtain a minimum grade of 70% in ACCT-8070
Must obtain a minimum grade of 70% in ACCT-8080

Master of Business Administration (MBA) (For Managers and Professionals)

Program Curriculum Structure
Total Courses: 17:

Targeted at mid-career professionals, the MBA for Managers and Professionals (MandP) is optimized for students to maintain their current career while building the skills and knowledge necessary for leadership positions in the 21st century business environment.

Admission Requirements
Admissions to the Odette MBA program are highly selective and seek students who can understand complex issues, manage multiple projects and communicate effectively.
Applicants must have:
An undergraduate degree with a minimum grade point average of 70% or above in their last two years.
A completed Graduate Management Admission Test (GMAT) with an average score of 550 for accepted applicants.
Applicants must also upload one letter of reference, a resume, a letter of intent and will be subject to a qualifying personal interview.
Odette MBA for Managers and Professionals – Requires a minimum of 5 years professionals work experience.

All Fields
YEAR 1
BUSI-8010. Leadership and Interpersonal Dynamics
BUSI-8030. Introduction to Financial Management
BUSI-8050. Marketing Management
BUSI-8070 Financial and Managerial Accounting
BUSI-8120. Financial Management II
BUSI-8150. Business Analytics
BUSI-8140. Digital Business Systems
STEN-8900 Entrepreneurship: New Venture Formation and Management

YEAR 2
BUSI-8130. Human Resources Management
MGMT-8460. Dynamics of Business Negotiations
MGMT-8600. Business Ethics and Sustainability
STEN-8990 Capstone Project (2 course equivalent)
MKTG-8310 Consumer Behaviour
STEN-8920-01 and BUSI-8673-01 (Option 1)
STEN-8920-02 and BUSI-8673-02 (Option 2)
STEN-8980. Strategic Management

The MBA for Managers and Professionals offers specializations in two fields:
Management, and Strategy/Entrepreneurship.

Students who choose to obtain a specialization must complete the requirements as follows:

STATEGY/ENTREPRENEURSHIP FIELD
For the Strategy/Entrepreneurship Field, students must complete:
STEN-8900. Entrepreneurship: New Venture Formation and Management
STEN-8980. Strategic Management
STEN-8990. Capstone Project
STEN-8920-01 and STEN-8920-02. Special Topics in Strategic Management

MANAGEMENT FIELD
For the Management Field, students must complete:
BUSI-8010. Leadership and Interpersonal Dynamics
BUSI-8130. Human Resource Management
MGMT-8460. Dynamics of Business Negotiations
MGMT-8600. Business Ethics and Sustainability

BUSI-8673-01 and BUSI-8673-02. Special Topics in Business Management
Integrated MBA/JD Program

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

This special program provides students interested in a career combining management and legal skills with an opportunity to complete the MBA and JD. 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 MBA and JD 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 MBA. To facilitate academic and career planning, it is strongly suggested that these applications be made simultaneously. Students who are accepted to both the MBA and JD 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 JD or MBA. programs. They must meet the admissions requirements and application deadline for the program for which they are seeking entry.

For information on Application to the integrated MBA/JD visit the Faculty of Law at:
http://www.uwindsor.ca/law/344/how-apply-mbajd.

TERM PLANNING
The MBA/JD Program offers students the opportunity to experience two enriching education experiences, two degrees, in an accelerated, integrated manner.

MBA/JD students can enter into the program in one of two ways:
i) Defer law studies for one year, complete 15 course credits toward the MBA (with only the Major Paper (BUSI-8960), 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 15 course credits toward the MBA (again, with only the Major Paper (BUSI-8960) 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 one exception. With earning the 15 MBA. course credits, only the major paper (again, worth the equivalent of two courses) would remain to complete the program. The sequence is presented below:

Fall
BUSI-8010 Leadership and Interpersonal Dynamics
BUSI-8020 Core Concepts of Accounting I
BUSI-8030 Introduction to Financial Management

BUSI-8050 Marketing Management
BUSI-8140 Digital Business Systems

Winter
BUSI-8100 Core Concepts of Accounting II
BUSI-8120 Financial Management.
BUSI-8130 Human Resources Management.
STEN-8900 Entrepreneurship: New Venture Formation and Management
STEN-8110 Project Management I

Summer
MGMT-8600 Business Ethics and Sustainability
MGMT-8460 Dynamics of Business Negotiations
STEN-8120 Project Management II
STEN-8980 Strategic Management
BUSI-8150 Business Analytics
+ BUSI-8960 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 17 course credits required for the MBA are fulfilled.

The registration of students is straightforward. While studying for the core 15 course credits of the MBA., 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 (BUSI-8960) under that status, using the MBA/JD program status in UwinSite. Once completed, the Major Paper (BUSI-8960) will have its "IP" status converted to the grade that was earned.

Master of Management (MOM)

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; 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.

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.

Degree Requirements
Total courses: 13

As with the regular MBA 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.

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

All Fields
BSMM-8110. Accounting concepts and techniques
BSMM-8120. Finance in a global perspective
BSMM-8130. Managing employees
BSMM-8140. Marketing
BSMM-8000. Business Communications, Parts 1 and 2 (delivered over two consecutive terms)
BSMM-8310. International Business
BSMM-8320. Quantitative Studies
BSMM-8510. Business Strategy (capstone course)

Manufacturing Field
BSMM-8330. Introduction to Business Logistics Management
BSMM-8340. Leadership and Organizational Change
BSMM-8520. Marketing Strategy and Planning
BSMM-8530. Manufacturing Strategy
BSMM-8540. Manufacturing and Globalization (Stream capstone)

Logistics and Supply Chain Management Field
BSMM-8330. Introduction to Business Logistics Management
BSMM-8350. Purchasing and Procurement
BSMM-8550. Domestic Transportation and International Shipping
BSMM-8560. Quantitative Analysis for Logistics and Supply Chain Management
BSMM-8570. Supply Chain Management (Stream capstone)

International Accounting and Finance Field
BSMM-8360. International Financial Reporting
BSMM-8370. International Financial Management
BSMM-8610. Consolidated financial statements
BSMM-8620. Accounting Systems Control and Auditing
BSMM-8630. Corporate Governance (Stream capstone)

Human Resources Management Field
BSMM-8380. Human Resources Management
BSMM-8340. Leadership and Organizational Change
BSMM-8650. International Management
BSMM-8660. Managing for High Performance
BSMM-8670. Current HR Trends (Stream capstone)

Business Data Analytics Field
BSMM-8710. Introduction to Data Analytics
BSMM-8720. Data Analytics and Project Management
BSMM-8730. Data Acquisition and Management
BSMM-8740. Data Analytic Methods and Algorithms
BSMM-8750. Predictive Modeling and Decision-Making (Capstone)

The fields will be included on the Diploma parchment:

Master of Management, International Accounting and Finance
Master of Management, Logistic and Supply Chain Management
Master of Management, Manufacturing Management
Master of Management, Human Resources Management
Master of Management, Business Data Analytics

Master of Business Administration Degree Program Information
The purpose of the Master of Business Administration program is to provide broad graduate study in the general field of business administration. It provides students with three important components to prepare them for management positions, academic knowledge, job skills and work experience. Graduate students have the opportunity of expanding their accounting, administrative, finance, marketing, management science and strategy expertise. The program emphasizes knowledge that prepares students for careers in private industry and business, for the public service, and for doctoral studies.

Admission Requirements
1. Applicants who have secured satisfactory standing (at least a B- average) in their undergraduate work may be admitted. Major consideration is given to the performance during the last two years of the undergraduate program. Applicants without an undergraduate degree who possess at least ten years of significant and senior professional, managerial, or entrepreneurial experience may be considered for admission to the MBA program. Possession of the minimum requirements for admission does not ensure acceptance.

Students must write the GMAT before applying for admission to the Faculty. Applicants who hold an M.B.A or a PhD. from a foreign University (or equivalent degree) in any discipline may not be required to write the GMAT. (Details of the Test may be obtained from The Educational Testing Service, Princeton, New Jersey, 08540.) The order form for the Bulletin of Information for the GMAT is available in the Office of the Registrar and in the MBA Office.

2. Students in the candidate year who maintain a 70% average or better will qualify for the M.B.A. degree.

Professional Accounting Designation
Students who are interested in pursuing both a professional accounting designation (i.e. CPA) and a MBA degree are advised to complete their accounting prerequisite course requirements while being registered in the Bachelor of Commerce for University Graduates program or the Post-Graduate Certificate in Accounting program. After successfully completing all the accounting prerequisite courses, students are encouraged to apply for admission to the MBA-Professional Accounting Designation.

Deans Honour Roll for Graduate Students
Students who have met the criteria for Dean's Honour Roll in their Faculty will have a notation included on their transcript to this effect.
1.Students must have been enrolled in a graduate program within the Odette School of Business on a full-time basis during at least two of the three semesters during the academic year. (i.e., Summer/Fall, Summer/Winter, or Fall/Winter).
2.Students will be ranked within each graduate program based on their annual average. The top 10% of students within each graduate program will be recognized as Dean's Honour Roll students, with the caveat that they must also have a minimum annual GPA of 80%.

Master of Engineering Management (MEM) (Joint Program with Engineering)

The Master of Engineering Management program is offered jointly between the Odette School of Business and the Faculty of Engineering. For the regular Master of Engineering Management (MEM) Program: Fall semester intake only.

Admission Requirements
Admission will be granted, within the limits of program availability to students with the following credentials:
1. 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
2. Proof of English language proficiency IELTS: 7.0 / IBT TOEFL: 100
3. Two reference letters
4. CV/Resume
5. Statement of purpose letter
6. Preference will be given to candidates who have at least two years of relevant work experience in engineering or a related field

Degree Requirements
Total courses:
Students are required to complete nine (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)
C) Capstone Project Course (two semester course for a total of 6 credits)

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

A. Core Business Courses:
BUSI-8310. Financial and Managerial Accounting
BUSI-8300. Applied Finance
STEN-8980. Strategic Management

B. Core Engineering Courses
INDE-8430. Product Innovation and Design Management
INDE-8340. Engineering Design, Methodology and Applications
GENG-8020. Engineering Project Management

Non-core Courses
Students select 1 non-core course from each of the following course groups:
C. Non-core Engineering Courses
Choose One:
INDE-8390. Work Organization: Analysis and Design
INDE-8420. Supply Chain Management and Logistics
ENVE-8500. Sustainability: Principles and Practice
ELEC-8900 (2). Electronic Commerce
GENG-8060. Strategic Entrepreneurial Management

D. Non-core Business Courses
Choose One:
MSCI-8040. Operations Management
BUSI-8050. Marketing Management
STEN-8820. Manufacturing Strategy
BSMM-8130. Managing Employees
STEN-8920. Special Topics (depending on semester)

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, BUSI-8400/MECH-8040 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 (to be delivered on-campus during the first weekend in each term):
Students are required to complete all the following workshops before the end of the program:
1. Year 1 Winter Term: Team building and development
2. Year 1 Summer Term: Intellectual property with focus on engineering/technology
3. Year 1 Fall Term: Negotiation skills and practices
4. Year 2 Winter Term: Pre-capstone camp
All courses are used to calculate the major average.

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.

ACCOUNTING

ACCT-8010. Advanced Topics in Financial Reporting
This course will advance the students' knowledge in a number of topic areas of accounting including: Financial Statement Reporting, Accounting Policies and Transactions Analysis, Financial Report Preparation, Financial Statement Analysis, Audit and Assurance, Treasury and Risk Management, Financial Analysis/Corporate Finance, Corporate and Personal Tax. (Prerequisites: ACCT-4570, ACCT-4580, ACCT-4590).

ACCT-8020. Advanced topics in Management Accounting
This course will advance the student's knowledge of how to apply forecasting and evaluation techniques and recommend improvements to operations, strategy, policy, and assurance. Recommendations based on analysis of facts will also comply with existing regulatory and legal frameworks. (Prerequisites are ACCT-4570 and ACCT-4590)

ACCT-8030. Performance Management
This course develops students' ability to mobilize knowledge from various subject areas such as strategy, governance, risk management, management accounting and control to analyze, evaluate and improve overall organizational performance. This course will facilitate the development of technical and enabling skills required to prepare students for the changing role of professional accountants in organizations who are both

strategic and financial leaders. (Corequisite: ACCT-8040 and is mandatory for those seeking a CPA for non-public accounting.

ACCT-8040. Advanced Corporate Finance
This course develops students' ability to mobilize knowledge from various subject areas such as strategy, governance, risk management, management accounting and control to analyze, evaluate and improve overall organizational performance. This course will facilitate the development of technical and enabling skills required to prepare students for the changing role of professional accountants in organizations who are both strategic and financial leaders. (Co-requisite: ACCT-8030 and is mandatory for those seeking a Chartered Professional Accountant (CPA) for non-public accounting.

ACCT-8050. Advanced Audit and Assurance
This course equips Chartered Professional Accountant (CPA) candidates with the competencies necessary to perform both internal audit projects and external assurance engagements. (Co-requisite: ACCT-3600.)

ACCT-8060. Taxation III
The course concentrates on advanced income tax topics, including income tax planning for individuals and corporations and income tax research. The use of partnerships and trusts in tax planning and the corporate reorganization provisions of the Income Tax Act are studied. Tax research is conducted using the Income Tax Act, tax treaties and court cases. (Co-requisite: ACCT-4610 and mandatory for those seeking a Chartered Professional Accountant (CPA) for non-public accounting.

ACCT-8070. Integration and Team Building
This course further develops students' strategic leadership capabilities, problem solving, written and oral communication skills, ethical and professional behaviours, self-management and teamwork capabilities. Students are required to work in teams to analyze a complex business case and to present their findings to a panel of faculty members acting as senior executive managers / Board members. This course will prepare Chartered Professional Accountant (CPA) candidates for the Common Final Exam (CFE).

ACCT-8080. Integrative Case Analysis
This course prepares students for the final examination, the Common Final Exam (CFE). The complex and highly integrative cases, simulating real-life business issues will train students to draw on technical and enabling competencies acquired in previous courses to formulate a well-structured response within the allotted time.

ACCT-8500. 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.

ACCT-8510. 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.

ACCT-8590. Special 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.

FINANCE

FINA-8700. 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.

FINA-8710. 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.

FINA-8720. 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.

FINA-8730. 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.

FINA-8740.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

MSCI-8020. Special 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.

MSCI-8030. 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.

MSCI-8040. 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.

MSCI-8060. 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

MKTG-8310. 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.

MKTG-8320. 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.

MKTG-8350. 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.

MKTG-8380. Special 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.

MKTG-8390. 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

STEN-8110. Project Management I
Students will examine approaches to project management and apply project management principles to projects with industry partners. Project planning strategies for project implementation will be discussed relative to industry sectors. Problem solving, market research, critical thinking skills based on scientific inquiry in business will provide students with an understanding of project management competencies. Students will develop project management skills in their project teams with industry partners.

STEN-8120. Project Management II
The course provides students with experience solving project management issues for industry partners in real time. Students complete project management tasks for projects focused on the mature stages of the

industry/product life cycle, such as management of legacy products and services. The team will construct detailed project plans, including a critical appraisal of relevant literature on the issues which arise in the industry projects. The students will construct viable solutions to address issues arising in the project plan. The students will present their findings to the industry partner and the class.

STEN-8696. 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).

STEN-8800. 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.

STEN-8820. 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.

STEN-8900. Entrepreneurship Formation and Management
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.

STEN-8920. Special Topics in Strategy and Entrepreneurship
This course involves 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.

STEN-8980. Strategic Management for MBA Program
This capstone course integrates the knowledge gained in prior courses and focuses it on the functions of top management of an organization. Working in teams and individually, at the conclusion of the course students will have synthesized comprehensive analyses of relevant information including ethical considerations regarding strategic issues; applied the rational decision-making model to develop, recommend solutions to strategic issues; and communicated orally and in writing, feasible recommendations to resolve issues. (Prerequisites: candidate-year standing and all other required courses.)

STEN-8981. Strategic Management for MBA-PAS Program

This capstone course integrates the knowledge gained in prior courses and focuses it on the functions of top management of an organization. Working in teams and individually, at the conclusion of the course students will have synthesized comprehensive analyses of relevant information (e.g. MDandA, Budgets, financial statements, CPA codes of ethics, professional behaviour) to assess control of strategic processes; applied the rational decision-making model to develop, recommend solutions to strategic issues; and communicated in compliance with professional standards both orally and in writing, feasible recommendations to resolve issues. (Prerequisites: registration in the MBA-PAS program.)

STEN-8982. Strategic Management for MEM Program
This capstone course integrates the knowledge gained in prior courses and focuses it on the functions of top management of an organization. Working in teams and individually, at the conclusion of the course students will have synthesized comprehensive analyses of relevant information including ethical considerations, regarding strategic issues specific to innovation and commercialization of applied technology; applied the rational decision-making model to develop, recommend solutions to strategic issues; and communicated orally and in writing using appropriate professional format, feasible recommendations to resolve issues. (Prerequisites: registration, enrolment in, and candidate year standing in the Master of Engineering Management Program.)

STEN-8990. Capstone Project
This final Capstone Project is the culmination of the MBA for Masters and Professionals (MandP) and is an opportunity for students to demonstrate and apply what they have learned in the program. The project can be undertaken with a current employer or a different organization. Students will be required to complete a final presentation and final written project.

BUSINESS

BUSI-8010.Leadership and Interpersonal Dynamics
This course provides students with the behavioural skills to be effective in organizations. Active listening, conflict resolution and running effective meetings, 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.

BUSI-8020. 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.

BUSI-8030. Introduction to Financial Management
This course introduces 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.

BUSI-8040. 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.

BUSI-8050. Marketing Management
This course 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.

BUSI-8060. Managing Employees
Familiarise 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 organising resources to set and accomplish organizational goals will be emphasized.

BUSI-8070 Financial and Managerial Accounting
This course concentrates on financial reporting and interpretation to internal and external stakeholders of the organization. It emphasizes the use of accounting information as part of the planning, decision-making, and control processes. Issues of income determination, asset and liability recognition, measurement and reporting will be addressed. It also offers an introduction to management’s use of internal accounting information for planning, managing, controlling and evaluation of business operations. Topics include cost concepts (including activity based costing), budgeting, cost-volume-profit analysis, standard costing, performance evaluation and product pricing.

BUSI-8100. Core Concepts of Accounting II
This is a continuation of BUSI-8020. This course 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 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 BUSI-8020, the impact of ethical, regulatory, and environmental aspects on the interpretation and application of accounting information will be considered.

BUSI-8110. Research Methodology
This course 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 business discipline perspective through classroom lectures as well as a hands-on, practical research project. Both quantitative and qualitative methods of research will be discussed.

BUSI-8120. Financial Management
This course examines the firm's long-term financial decisions. It focuses on the sources and the mechanics of obtaining long-term financing, together with a 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.

BUSI-8130. Human Resources Management
The course introduces the role of human resources activities in facilitating the achievement of organizational effectiveness. Students will examine 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 human resources issues.

BUSI-8140. Digital Business Systems
Students will learn how to envision, design and evaluate computer-based solutions to typical business problems. The emphasis will be on the contemporary and emerging hardware/software tools, the managing of information, and information technology.

BUSI-8150. Business Analytics
This course introduces business analytics concepts, methods, and models that develop a student's ability to interpret, explain and analyze data. Students are provided with the background in quantitative techniques and probability theory that is necessary to understand and use analytics to solve business problems and make effective business decisions. Theoretical understanding is reinforced using practical business analytic tools such as Excel to construct effective data visualizations and to conduct descriptive, predictive, and prescriptive analytics.

BUSI-8300. Finance for Engineering Managers
The course covers the fundamental principles of financial management of business enterprises within the global financial environment. It also includes introduction to financial analysis, planning and models with applications for new ventures and corporations. There will also be specific focus on the entrepreneurial process, start-up finance, venture math, business valuation methods and new venture fundraising techniques. (Antirequisites: BUSI-8030 and BUSI-8120

BUSI-8310. Financial and Managerial Accounting for Engineers
It is designed to provide engineers with a robust understanding of the core concepts and procedures of financial and management accounting which engineers need to enhance their capabilities as informed future managers and decision makers. It concentrates on financial reporting and interpretation to internal and external stakeholders of the organization. Issues of income determination, asset and liability recognition, measurement and reporting will be addressed. It also offers an introduction to management's use of internal accounting information for planning, managing, controlling and evaluation of business operations. Topics include cost concepts (including activity-based costing), budgeting, cost-volume-profit analysis, standard costing, performance evaluation and product pricing. (Antirequisites: BUSI-8120)

BUSI-8400. 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 GENG-8040)

BUSI-8514. 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.

BUSI-8606. 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.

BUSI-8610. Business Law
This course examines common law principles and statutes affecting the business administrator's decision-making process.

BUSI-8613.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.

BUSI-8646. Dynamics of Business Negotiations
The course examines 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.

BUSI-8647.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

BUSI-8651.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.

BUSI-8660. 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)

BUSI-8661. 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.

BUSI-8662. Advanced Business Agreements
This intensive seminar course provides learning experiences at the intersection of law and business. Through readings, mini lectures, and analysis of business agreements, students prepare for participation in class discussions to engage in active and collaborative learning. Discussions focus on real business agreements used as case studies to enhance experiential, interdisciplinary learning, where the diversity of the course learning community provides multiple perspectives to unpack different agreements.

BUSI-8672.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.

BUSI-8673. Special Topics in Business
This course explores and applies theory to contemporary business issues. (Prerequisite: A minimum required grade of 80% and a minimum cumulative average of 75%.)

BUSI-8680.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.

BUSI-8690.Entrepreneurship: New Venture Formation and Management
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.

BUSI-8698.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.

BUSI-8701. MBA Co-op Work Term I

BUSI-8702. MBA Co-op Work Term II

BUSI-8711.Fast-Track M.B.A Co-op Work Term

BUSI-8960. Major Paper (weight: 2 courses)

BUSI-8970. Thesis (weight: 4 courses)

MASTER OF MANAGEMENT

BSMM-8000. Business Communications
Building on an understanding of the communication process and barriers to communication, students will develop, through this course, the sensitivity and flexibility required to address the needs of different audiences. Throughout the course, practical skill building for leaders is stressed, and time is devoted to communication concepts and techniques, case studies outlining issues faced by communicators in organizations, and planning and organizing ideas for business writing and presenting. Through lectures, interactive class discussions, role play, individual and group presentations, as well as two written cases and a self-reflective paper, students emerge with the realization that becoming a highly effective communicator is a learned, active process, as well as a necessary and powerful skill base of any leader. (Co-requisites: BSMM-8110 and BSMM-8380.)

BSMM-8110. 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.

BSMM-8120. 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.

BSMM-8130. 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.

BSMM-8140. 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.

BSMM-8310. 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.

BSMM-8320. 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.

BSMM-8330. 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.

BSMM-8340. 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.

BSMM-8350. 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.

BSMM-8360. 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.

BSMM-8370. 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.

BSMM-8380. 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.

BSMM-8510. 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.

BSMM-8520. 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.

BSMM-8530. 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.

BSMM-8540. Manufacturing Globalization (Manufacturing 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.

BSMM-8550. 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.

BSMM-8560. 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.

BSMM-8570. 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.

BSMM-8610. 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.

BSMM-8620. 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.

BSMM-8630. 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.

BSMM-8650. 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.

BSMM-8660. 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.

BSMM-8670. Current Human Resource 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.

BSMM-8710. Introduction to Data Analytics
An introductory course on the fundamentals in the area of data analytics, with the focus on preparing future analytics professionals with a profound understanding on data acquisition and data communication, programming and coding for data preparation. Basic knowledge on big data, analytic frameworks, machine learning, artificial intelligence, data visualization and reporting, and databases will introduce students to the emerging challenges facing today's business managers.

BSMM-8720. Data Analytics and Project Management
The focus of this course is placed on the problems and issues that confront project managers in the area of data analytics, including the introduction of organizational, managerial, and technical constructs and principles as well as a variety of coding tools and techniques that project managers employ in data analytics. A major objective is to develop professional capabilities on business problem identification and framing, analytics problem identification and framing, and the deployment of appropriate IT and analytical tools to solve identified problems in order to enhance the students' ability to manage analytical projects in a more effective manner

BSMM-8730. Data Acquisition and Management
An examination of the analytical tools needed to manage data in a time of organizational turbulence. This course focuses on preparing managers on how to turn data into decisions and turn organizational data into added value with an array of coding tools and techniques, including data acquisition, data inspection, data cleansing, data transforming, and data modeling with the objective of discovering meaningful information to inform managers and support the decision-making process. The course also explores methods of assessing and mitigating risk/uncertainty based on data analytics.

BSMM-8740. Data Analytic Methods and Algorithms
This course is the exploration of an analytical framework for method selection and model building to help students develop professional capability in data-based techniques of data analytics. A focus will be placed on comparing and selecting appropriate methodology to conduct advanced statistical analysis and on building predictive modeling in order to create a competitive advantage in business operations with efficient analytical methods and data modeling.

BSMM-8750. Predictive Modeling and Decision-Making (Capstone)
This is a project-based capstone course for the Business Data Analytics field. It is a research seminar that adopts an integrative perspective to examine major concepts and important contemporary problems in data management and analytics. Students will use a software/modelling method chosen for data management (e.g., R or Python) to practice skills learned in class on data preparation, analysis, and predictive modeling to improve decision- making quality in a turbulent business environment, with a focus on portfolio and asset management, e.g. FinTech, financial assets pricing and management. Projects also include working with faculty on existing problems facing various industries

MANAGEMENT AND LABOUR STUDIES

MGMT-8130.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.

MGMT-8430.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.

MGMT-8460.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.

MGMT-8470. 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.

MGMT-8480.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.

MGMT-8600. Business Ethics and Sustainability
Students will critically examine existing structures, organizations, society, and perhaps, most importantly, themselves to see if these represent a means to freedom or domination, liberation or oppression, or some combination of both. Students will study the connection between our dominant paradigm of wealth maximization, social inequality, and environmental degradation. Through the use of experiential learning the course provides an opportunity for students to plan and implement informed and responsible action to improve current global systems within which business is conducted.

FACULTY OF EDUCATION

PROGRAMS

Master of Education (MEd)

An online MEd is available for candidates wishing to pursue the course-based Curriculum Studies or Education Administration Concentrations. Candidates in the online MEd may switch between these two concentrations, complete up to two courses in a face-to-face manner, participate on a part-time or full-time basis, and change to the face-to-face program at any point prior to the start of the associated research projects if they wish to switch from the course-based completion stream to a major research paper or thesis stream.

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.

Degree Requirements:

Candidates for the Master of Education degree will pursue studies in on of the following areas of concentration:
1) Curriculum Studies;
2) Educational Administration and Leadership; and
3) Second Language Acquisition, Culture, and Society

Candidates in the thesis and major paper streams are required to successfully complete the following courses;
(a) Three compulsory courses: EDUC-8100, EDUC-8270, and (EDUC-8240 or EDUC-8290 or EDUC-8390) , 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: EDUC-8400, EDUC-8420, EDUC-8430, and EDUC-8910,
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 additional courses for this concentration.

(b) A research project resulting in either a major paper (EDUC-8960), with the value of two term courses, or a thesis (EDUC-8970), with the value of four term courses;.

(c) For Curriculum Studies and Educational Administration and Leadership candidates proceeding to the degree by major paper, five additional courses, at least three of which must be chosen from the courses listed for the area of concentration.
For Second Language Acquisition, Culture, and Society candidates proceeding to the degree by major paper, three additional courses, at least two of which must be chosen from the courses listed for the area of concentration.

(d) For Curriculum Studies and Educational Administration and Leadership candidates proceeding to the degree by thesis, three additional courses, two of which must be selected from the 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 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 (EDUC-8940), students must have completed all required courses in their program. The Thesis Proposal may be completed concurrently with one course in the final semester of coursework. Thesis stream students must enrol in EDUC-8940 (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 (EDUC-8940) and the Thesis (EDUC-8970) if all course work is complete. If students register for the Thesis Proposal (EDUC-8940) and the Thesis (EDUC-8970) concurrently, then only upon completion of the thesis proposal may thesis stream students begin their Thesis. They must enrol in EDUC-8970 (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: EDUC-8270 (Research in Education), EDUC-8795 (Final Project Seminar), and EDUC-8240 (Fundamentals of Curriculum Theory and Development) or EDUC-8290 (Theories of Educational

Administration) or EDUC-8390 (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: EDUC-8400 (Language Culture and Society), EDUC-8420 (Language Systems Analysis), EDUC-8430 (Special Education and Language Acquisition), and EDUC-8910 (32) (Language Assessment). It is important to note that with regard to these four courses, Second Language Acquisition, Culture, and Society 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 EDUC-8100 (Statistics in Education) or EDUC-8300 (Qualitative Methods in Educational Research);

(c) For Curriculum Studies and Educational Administration and Leadership candidates six additional courses, at least four of which must be chosen from the courses listed for the area of concentration. For Second Language Acquisition, Culture, and Society candidates four additional courses, at least two of which must be chosen from the courses listed for the area of concentration.

STUDIES IN THE AREA OF CONCENTRATION

Compulsory Courses
EDUC-8100. Statistics in Education
EDUC-8240. Fundamentals of Curriculum Theory and Development*
EDUC-8270. Research in Education
EDUC-8290. Theories of Educational Administration and Leadership**
EDUC-8390. Theories and Approaches in Language Acquisition and Instruction****
Two of the following four courses: EDUC-8400 (Language Culture and Society), EDUC-8420 (Language Systems Analysis), EDUC-8430 (Special Education and Language Acquisition), and EDUC-8910 (32) (Language Assessment)****
EDUC-8940. Thesis Proposal***
EDUC-8795. Final Project Seminar***
EDUC-8960. Major Paper***
EDUC-8970. Thesis*** (Note: Students in the Thesis stream must have successfully completed the Thesis Proposal (EDUC-8940) before work may begin on the Thesis.)

* Compulsory for students in Curriculum Studies.
** Compulsory for students in Educational Administration and Leadership
*** 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
EDUC-8390. Theories and Approaches in Language Acquisition and Instruction
EDUC-8560. Approaches to Literacy Development
EDUC-8570. The English Language Arts
EDUC-8270. Research in Education
EDUC-8300. Qualitative Methods in Educational Research
EDUC-8240. Fundamentals of Curriculum Theories and Development
EDUC-8500. Issues in Education
EDUC-8510. Information and Communication Technologies (ICT) for Teaching and Learning
EDUC-8150. Comparative and International Education
EDUC-8330. Survey Design and Research
EDUC-8340. Individual Reading
EDUC-8650. Sociological Aspects of Education

EDUC-8400. Language Culture and Society
EDUC-8420. Language Systems Analysis
EDUC-8430. Special Education and Language Acquisition
EDUC-8910 (32). Language Assessment

Educational Administration and Leadership
EDUC-8150. Comparative and International Education
EDUC-8290. Theories of Educational Administration and Leadership
EDUC-8300. Qualitative Methods in Educational Research
EDUC-8310. Supervision of the Instructional Process
EDUC-8320. Administration and Leadership of the School
EDUC-8330. Survey Design and Research
EDUC-8340. Individual Reading
EDUC-8350. Organizational Behaviour in Educational Institutions
EDUC-8360. Introduction to Educational Policy Analysis
EDUC-8380. The Arts and Education
EDUC-8500. Issues in Education
EDUC-8510. Information and Communication Technologies (ICT) for Teaching and Learning
EDUC-8450. Teaching for Sustainability: An Introduction to Environmental Education
EDUC-8550 Strategies for the implementation of Change
EDUC-8560. Approaches to Literacy Development
EDUC-8580. Psychology of Learning Problems
EDUC-8590. The Recent History of Education in Ontario
EDUC-8600. Politics of Education
EDUC-8610. Legal Aspects of Education
EDUC-8620. Educational Finance
EDUC-8650. Sociological Aspects of Education
EDUC-8660. Interpersonal Relationships in Education
EDUC-8910. Special Topics in Education

Curriculum Studies
EDUC-8030. The Psychology of Learning and Teaching
EDUC-8150. Comparative and International Education
EDUC-8240. Fundamentals of Curriculum Theory and Development
EDUC-8300. Qualitative Methods in Educational Research
EDUC-8330. Survey Design and Research
EDUC-8340. Individual Reading
EDUC-8370. Language Arts in the Elementary School
EDUC-8380. The Arts and Education
EDUC-8390. Theories and Approaches in Language Acquisition and Instruction
EDUC-8410. The Social Sciences Curriculum
EDUC-8450. Teaching for Sustainability: An Introduction to Environmental Education
EDUC-8470. Learning in Science
EDUC-8500. Issues in Education
EDUC-8510. Information and Communication Technologies (ICT) for Teaching and Learning
EDUC-8520. Curriculum Developments in Mathematics Education
EDUC-8530. The Teaching and Learning of Mathematics
EDUC-8540. Fundamentals of Instructional Design
EDUC-8550 Strategies for the implementation of Change
EDUC-8560. Approaches to Literacy Development
EDUC-8570. The English Language Arts

EDUC-8580. Psychology of Learning Problems
EDUC-8650. Sociological Aspects of Education
EDUC-8720. Theory and Practice in Early Childhood Education
EDUC-8910. Special Topics in Education

PhD in Educational Studies (PhD) (Joint Program with Brock, Lakehead and Windsor)

The Joint PhD 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 PhD. 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 PhD 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 and Advanced Standing
Students may receive advance credit for a maximum of one-half course specialization 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 course 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.

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 caried 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.

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

(a) Doctoral Seminar I (EDUC-9020) and Doctoral Seminar II (EDUC-9040)
(b)The Specialized course (EDUC-9510). Candidates may meet this requirement through a graduate level course offered at any of the participating institutions
(c) One Joint PhD. Specialization course (one of EDUC-9210, EDUC-9310, EDUC-9410)
(d) Research Proposal Colloquium (EDUC-9690) (via distance education) (Prerequisite: must have completed two terms of full-time residency or equivalent.)

Comprehensive Portfolio
The Comprehensive Portfolio (EDUC-9800) 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 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
EDUC-9020. Doctoral Seminar I: Research, Theories, and Issues
EDUC-9040. Doctoral Seminar II: Research, Theories, and Issues

Specialization Courses

Policy and Leadership
EDUC-9210. Educational Leadership and Policy Studies:
Sociocultural Contexts of Education
EDUC-9310. Social/Cultural/Political Contexts of Education:
Cognition and Learning:
EDUC-9410. Conceptual Bases for Cognition and Learning

Other Required Courses
EDUC-9510. The Specialized course
EDUC-9690. Research Proposal Colloquium
EDUC-9800. Comprehensive Portfolio
EDUC-9980. Doctoral Dissertation

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.

EDUC-8020. 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.

EDUC-8030. 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.

EDUC-8100. 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.

EDUC-8150. Comparative and International Education
The course is designed to introduce students, who are registered in both the Educational Administration and Leadership and Curriculum stream of the MEd 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.

EDUC-8240. 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.

EDUC-8270. 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.

EDUC-8290. Theories of Educational Administration and Leadership
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.

EDUC-8300. 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.

EDUC-8310. 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.

EDUC-8320. Administration and Leadership 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.

EDUC-8330. 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.

EDUC-8340. 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.)

EDUC-8350. 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.

EDUC-8360. 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.

EDUC-8370. 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.

EDUC-8380. 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.

EDUC-8390. 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.

EDUC-8400. 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.

EDUC-8410. 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.

EDUC-8420. 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.

EDUC-8430. 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 disproportionally 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.

EDUC-8450. 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.

EDUC-8470. 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.

EDUC-8500. Issues in Education
This course will examine current issues affecting contemporary Canadian education. Specific course content and instructors will be published in advance.

EDUC-8510. 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.

EDUC-8520. 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.

EDUC-8530. 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.

EDUC-8540. 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.

EDUC-8550. 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.

EDUC-8560. 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.

EDUC-8570. 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.

EDUC-8580. 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.

EDUC-8590. 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.

EDUC-8600. 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.

EDUC-8610. 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.

EDUC-8620. 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.

EDUC-8650. 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.

EDUC-8660. 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.

EDUC-8720. 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.

EDUC-8795. Final Project Seminar
Candidates pursing 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.

EDUC-8910. 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.

EDUC-8910. Special Topics in Education - Topic: 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.

EDUC-8930. 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 coursework. (Prerequisites: EDUC-8150; EDUC-8510;

EDUC-8290 OR EDUC-8240; EDUC-8270; EDUC-8100 OR EDUC-8300; EDUC-8650; EDUC-8350; EDUC-8360; EDUC-8660.)

EDUC-8940. Thesis Proposal
Candidates pursuing a Master's 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 (EDUC-8940), 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 EDUC-8940 (Thesis Proposal) and do so for each subsequent term until the thesis proposal has successfully been defended.

EDUC-8960. 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.)

EDUC-8970. Thesis
Students may enrol concurrently in the Thesis Proposal (EDUC-8940) and the Thesis (EDUC-8970) if all course work is complete. If students register for the Thesis Proposal (EDUC-8940) and the Thesis (EDUC-8970) concurrently, then only upon completion of the thesis proposal may thesis stream students begin their Thesis. They must enrol in EDUC-8970 (Thesis) for each subsequent term until the successful completion and deposition of the thesis.

EDUC-9020. 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.

EDUC-9040. 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.

EDUC-9210. 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.

EDUC-9310. 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).

EDUC-9410. 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.

EDUC-9510. The Specialized Elective
The content for this course must relate to the student's 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.

EDUC-9690. 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.

EDUC-9800. Comprehensive Portfolio
(3 course equivalencies.)

EDUC-9980. 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.)

FACULTY OF ENGINEERING

PROGRAMS

Doctor of Philosophy (PhD)
PhD program requirements are common for the following Engineering programs: Civil Engineering, Electrical Engineering, Environmental Engineering, Engineering Materials, Mechanical Engineering. The areas of specialization are listed by Department.

Admission Requirements
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 PhD. 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 PhD. 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 PhD. 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 PhD. program. Other students must take it within twenty-four months of registration for the PhD. 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 PhD or MASc 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.

Industrial and Manufacturing Systems Engineering (Multi-Disciplinary PhD)

Program Overview

The objective of the multi-disciplinary PhD. 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 PhD. 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)
W. Abdul-Kader, Ph.D.,P.Eng., Mechanical, Automotive and Materials Engineering (MAME)
F. Baki, Ph.D., Business. Cross-appointed to MAME
R. Caron, Ph.D., Mathematics and Statistics, Cross-appointed to MAME
X. Chen, Ph.D., P.Eng., Electrical and Computer Engineering.
H. ElMaraghy, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME), [Tier 1 Canada Research Chair (CRC) Manufacturing Systems]. Chair of the Program.
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)
L. Oriet, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)
Z. Pasek., Ph.D., Mechanical, Automotive and Materials Engineering (MAME)
J. Urbanic, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)
M. Wang, Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)
G. Zhang, .Ph.D., P.Eng., Mechanical, Automotive and Materials Engineering (MAME)
X. Yuan, Ph.D., Computer Science

Areas of Specialization

Research within the Industrial and Manufacturing Systems PhD. 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.

Admission Requirements
The PhD. program in Industrial and Manufacturing Systems Engineering will be governed by the general regulations regarding the PhD. degree of the Faculty of Graduate Studies.

Degree Requirements
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.

The specific minimum program requirements for the PhD. degree include the successful completion of:
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. 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 PhD. Program is 4; at least 2 from the INDE-8XXX courses listed in Category A and a minimum of one from Category B would be selected. This is in addition to the Graduate Seminar course (INDE-8595).

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 Category B courses are:
ECON-8030. Microeconomic Theory II
ECON-8310. Industrial Organization
ECON-8800. Models of Strategic Behaviour
POLS-8910. Selected Topics in Political Science
COMP-8490. Virtual Reality
COMP-8700. Introduction to Artificial Intelligence
COMP-8510. Visual Processing
COMP-8540. Advanced Algorithms
COMP-8700. Introduction to Artificial Intelligence
COMP-8760. Advanced Search Methods
MATH-8820. Portfolio Optimization
STAT-8460. Statistical Data Analysis

STAT-8520. Experimental Design
MSCI-8020. Special topics in Management Science
STEN-8820. Manufacturing Strategy
STEN-8980. Strategic Management
BUSI-8040. Quantitative Techniques in Management
BUSI-8140. Management Information Systems
CIVL-8900. Special Topics In Civil Engineering (Urban Transportation Planning)
ELEC-8230. System Theory
INDE-8310. Stochastic Processes
ELEC-8330. Computational Intelligence
ELEC-8350. Nonlinear Systems
MECH-8245. Automotive Control Systems
MECH-8240. Applied Finite Element Analysis
MECH-8293. Introduction to Finite Element Analysis
ENVE-8500. Sustainability: Principles and Practices
KINE-8220.Instrumentation and Modeling in Kinesiology
KINE-8230. Applied Biomechanics of Human Performance
KINE-8240. Biomechanics in the Workplace

(b) A comprehensive examination.

(c) 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, PhD. students will be required to review their research progress and results. The PhD. Supervisory Committee will complete the evaluation.

(d) 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 PhD. 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 PhD. 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 PhD. Program. Other students must take it within twenty-four months of registration for the PhD. 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 takes 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.

Master of Applied Science (MASc)

MASc program requirements are common for the following Engineering programs: Civil Engineering, Electrical Engineering, Engineering Materials, Environmental Engineering, and Mechanical Engineering. Industrial Engineering has slight variation. 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.

Possession of the minimum requirements does not automatically ensure acceptance.

Degree Requirements
The specific minimum program requirements for the MASc 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 in the MASc program must take MECH-8295 (MASc Graduate Seminar) and Mechanical Engineering students in the PhD program must take MECH 9295 (PhD Graduate Seminar).

Note: 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; or 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."

4. Industrial Engineering students must additionally take INDE-8595 (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 MASc. 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 BASc/MASc

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 BASc and MASc degree in a time period as short as five years. This program treats the educational process through the BASc to the MASc 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 BASc/MASc 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 BASc. study may be granted admission to the integrated program which confers conditional admission status to the MASc. program.

Contact the appropriate Engineering Department for more information.

Research in Outside Institutions
Research for the PhD or MASc 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.

Master of Engineering (MEng)

Program requirements are common for: Civil Engineering, Electrical and Computer Engineering, Engineering Materials, Environmental Engineering, Industrial Engineering, Mechanical Engineering,

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 eight semesters and the maximum allowable time is fifteen consecutive semesters. Practical work-experience placements are available for full-time students only, but cannot be guaranteed.

Degree Requirements
Students in MEng Electrical Engineering, Computer Engineering, Mechanical Engineering, Engineering Materials and Industrial Engineering must take Eight (8) courses, equivalent to 24 credits, including:

(a) four (4) mandatory courses, equivalent to 12 credits, including GENG-8000 (Engineering Technical Communications),* GENG-8010 (Engineering Mathematics) and GENG-8020 (Engineering Project Management) and GENG-8030 (Computational Methods and Modeling for Engineering Applications) equivalent to 12 credits.
(b) four (4) major courses, equivalent to 12 credits, one of which may be taken from the 4000-level courses related to the major

*Engineering Technical Communications can be waived (i.e., replaced by another graduate course of equal or greater credit value approved by the program coordinator,) at the discretion of the department pending an evaluation of the student's communication ability by the department.

Full time MEng students in Electrical Engineering, Computer Engineering, Mechanical Engineering, Engineering Materials and Industrial Engineering can only register in a major course under one of the following conditions:
1- Successfully completed four mandatory courses (GENG-8000, GENG-8010, GENG-8020 GENG-8030),
2-Successfully completed three mandatory courses (GENG-8000, GENG-8010 GENG-8020) and simultaneously registered in the fourth mandatory course (GENG-8030) and a major course.

Full-time Co-op MEng Students in Electrical Engineering, Computer Engineering, Mechanical Engineering, Engineering Materials and Industrial Engineering can enroll in a maximum of two courses in their first semester and three courses in their second semester.

Full-time non-Coop MEng students in Electrical Engineering, Computer Engineering, Mechanical Engineering, Engineering Materials and Industrial Engineering should take maximum of two mandatory courses in their first two semesters, while in the second semester they can add an extra graduate course from their host program.

Part time MEng students should complete all four mandatory courses (GENG-8000, GENG-8010, GENG-8020, GENG-8030 before registering in a major course.

Students in MEng Civil Engineering and MEng Environmental Engineering must take eight (8) courses, equivalent to 24 credits, including:
(a) three (3) mandatory courses, equivalent to 9 credits:
GENG-8000. Engineering Technical Communications*,
GENG-8010. Engineering Mathematics
GENG-8020. Engineering Project Management
(b) five (5) major courses, equivalent to 15 credits, one of which may be taken from the 400-level courses related to the major.

*Engineering Technical Communications can be waived (i.e., replaced by another graduate course of equal or greater credit value approved by the program coordinator,) at the discretion of the department pending an evaluation of the student's communication ability by the department.

Full-time MEng students in Civil Engineering and Environmental Engineering can only register in a major course under one of the following conditions: they have successfully completed three mandatory courses (GENG-8000, GENG-8010, and GENG-8020); or they have successfully completed two mandatory courses (selected from GENG-8000, GENG-8010, and GENG-8020) and are registered in a third mandatory course.

Full-time MEng Students in Civil Engineering and Environmental Engineering can take a maximum of two courses in their first semester.

Part-time MEng students in Civil Engineering and Environmental Engineering should complete all three mandatory courses (GENG-8000, GENG-8010, GENG-8020) before registering in a major course.

2.1 A candidate, with the permission of the host Department, may register for at most one senior undergraduate course (4000-level) in the MEng Program. All courses must be for credit only.

2.2 The candidate must obtain a pass in all courses credited to her or his program, with a minimum overall average of 70%. A grade of less than 60% in any course counts as a failure.

2.3 Co-op/Internship – Work Term Option

MECH-8071. 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 their first study term (Prerequisite: Departmental permission). Students can complete a four (4) 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. All Co-op/Internship students must, in the first and second semester of their program, register and pass three (3) graduate courses for their program.

Withdrawal from the Co-op/Internship program will be granted only under exceptional circumstances. For example, 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 a graduate 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.

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 in later rounds (either verbally or in writing) 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 in a work term course for the 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 the -month work term

1. Receive a satisfactory mid work term assessment from supervisor
2. Submit and receive a passing grade on a work term report (guidelines prepared by faculty and report evaluated by faculty)
3. Complete and receive a satisfactory post-work term presentation (evaluated by Co-op Coordinator and Faculty)
4. 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. 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 one course 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
MEng applicants shall be recommended for admission by the Faculty of Engineering's Associate Dean for Research and Graduate Studies. 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 /BSc. in Engineering/B.Eng. degree or equivalent*) with at least 70% average over the last four 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. Students whose undergraduate degree programs do not provide them with sufficient GPA/overall average, background in Design and Applied Science and Professional/Technical communications are required to enter a qualifying program of courses (Honour Certificate Program) at the undergraduate level before admission to candidature for the MEng degree. Students entering and successfully completing the MEng qualifying program in any Civil, Environmental, Industrial Manufacturing System Engineering as well as Electrical and Computer Engineering with the minimum overall average of 77% can gain admission to the MEng in the respective program.

4.2. The language of instruction for the MEng courses is English. Applicants will be required to provide certification of English language proficiency, if they have:

4.2.1 not completed three or more years of post-secondary work at a Canadian institution or in a country where the official language is English.

4.3 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 on the Faculty of Graduate Studies website. The Faculty of Engineering and the Faculty of Graduate Studies reserve the right to require further demonstration of English Language proficiency.

4.4 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) Level 3 with the minimum score of 75% will be considered as a means to gain admission to the Department for such students.

4.5 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 A full-time MEng student may apply for admission into the MASc research degree track after successfully completing 4 MEng courses with an overall average of at least 77%. A maximum of two courses from their major (excluding GENG-8XXX courses) may be granted advanced standing 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. MEng students, once admitted to the MASc Program cannot transfer back to the MEng Program. They will be required to re-apply to the MEng Program. If admitted to the MEng Program a student may receive advanced standing for a maximum of 4 (four) graduate level courses.

5.3 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.

5.4 MASc students transferring to the MEng must relinquish their research student office and will be required to return any computer equipment provided for their use as an MASc research student.

^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 may 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 77%, may reapply for admission into an Engineering Graduate program but will not be given credit for any courses they previously transferred to the HCP.

Policy on Grades between 60-69%: Students who obtain grades between 60% and 69% can retain a maximum of two courses with these grades if their overall average is above 70% in the semester in which they received these marks. If the overall average is below 70% in the semester in which they received these grades, the student may be required to repeat the course, take an equivalent course, or may be required to withdraw.

Policy on Failing Grades: Students who obtain a grade below 60% (failed grade) may be required to repeat this course or replace it with an equivalent course. Students receiving a failing grade (below 60%) in more than one course may be required to withdraw from the program.

Master's of Engineering (MEng) Automotive Option Program Sequencing

TERM 1
Requirements: 8 courses
Two mandatory courses:
MECH-8008. Fundamentals of Clean Engine Technology

MECH-8010. Vehicle Dynamics
plus,
Two additional courses from the following list as determined by the Faculty of Engineering and the Centre for Executive Education, and made available for the term:
85-501. Design and Analysis of Engineering Experiments
85-502. Sustainability: Principles and Practices
85-503. Advanced Operations Research 1
85-504. Engineering Design, Methodology and Applications
85-505. Product Innovation and Design Management
85-506. Tribology: Materials and Manufacturing Aspects
85-507. Turbulent Reacting Flows
85-509. Introduction to Finite Element Analysis
MECH-8011. Bluff Body Aerodynamics
85-512. Managing Employees

TERM 2
Three mandatory courses:
MECH-8025. Automotive Applications for Noise, Vibration and Harshness Evaluation
MECH-8026. Aftertreatment and IC Engine Modeling
MECH-8029. Automotive Paint and Industrial Coatings

One additional course from the following list as determined by the Faculty of Engineering and the Centre for Executive Education, and made available for the term:
85-521. Air Pollution from Mobile Sources
85-522. Advanced Topics in MEMS
85-523. Manufacturing Systems Simulation
85-524. Corrosion Principles and Prevention
MECH-8027. Automotive Heat Exchange Design
85-528. Heat Transfer and Fluid Flow in Microchannels
MECH-8014. Management Information Systems

TERM 3
One mandatory course:
MECH-8033. Automotive Sensor Systems
plus,
Two additional courses from the following list as determined by the Faculty of Engineering and the Centre for Executive Education, and made available for the term:
85-531. Introduction to Micro Fuel Cells
85-532. Active Vision Systems
85-534. Flexible Manufacturing Systems
85-519. Linear Systems in Mechanics
85-536. Casting: Modeling and Simulation
85-537. Metal Casting Technology
85-538. Finite Element Methods for Crash-worthiness and Impact Analysis
MECH-8000. Special Topics in Automotive Engineering
MECH-8091. Engineering Venture Formation

MECHANICAL, AUTOMOTIVE, MATERIALS ENGINEERING AREAS OF SPECIALIZATION

ENGINEERING MATERIALS

PhD, MASc and MEng 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

PhD, MASc. and MEng. graduate programs in Industrial Engineering are administered by Mechanical, Automotive and Materials Engineering.

MECHANICAL ENGINEERING

PhD, MASc and MEng graduate programs in Mechanical Engineering are administered by Mechanical, Automotive and Materials Engineering upon the advice of its Graduate Studies Committee for Mechanical Engineering. PhD, MASc and MEng programs are offered in the fields of Automotive, Machine Dynamics and Design, Thermo-Fluids. Prospective students should note that the M.Eng. in Mechanical Engineering (Automotive Field) (with or without co-op/internship) is specifically designed for a cohort of international students, particularly foreign-trained engineers.

International MASc In Automotive Engineering/Laurea Magistrale in Automotive Engineering

This is a Dual degree program with Politecnico di Torino, Italy

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.

Degree Requirements

(a) 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.

(b) 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 Master of Applied Science thesis as is customary in the University of Windsor MASc program.

(c) 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 Corporation in the US for certain projects.

Program Layout

University of Windsor Students
Year 1 (University of Windsor)
Term 1: 1-2 courses
Term 2: 1-2 courses
Term 3: 1-2 courses
3 courses and planning of thesis.
60 European Credit Transfer (ECTS)

Year 2 (Politecnico di Toronino)
Semester 1: 30 ECTS courses 30 ECTS thesis
Semester 2: 30 ECTS courses 30 ECTS thesis
Industry-Academic Research Thesis
60 European Credit Transfer (ECTS)

Total Credits:
Total courses/credits = 3 courses in Windsor + 30 ECTS of courses and 30 ECTS for Thesis in Torino

Politecnico di Toronino Students
Year 1
Semester 1: 60 ECTS courses
Semester 2: 60 ECTS courses
3 courses + Major Industry-Academic Project Report (equivalent to Thesis)
60 European Credit Transfer (ECTS)

Year 2
Term 1: 1-2 courses
Term 2: 1-2 courses
Term 3: Project
3 courses + Major Industry-Academic Project Report (equivalent to Thesis)
Total courses/credits = 60 ECTS of courses in Torino + 3 courses in Windsor
60 European Credit Transfer (ECTS)

TOTAL European Credit Transfer (ECTS) : 120

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 Master’s of Applied Science degree.

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

International Master of Applied Science (MASc) In Civil Engineering

Graduates of the dual degree program will receive two degrees:
1) Laurea Magistrale in Civil Engineering (issued by the University of Udine in Italy)
2) International Master of Applied Science in Civil Engineering (issued by the University of Windsor).

Areas of Study: The suggested course choices at each university will be streamed into five key areas: Structural Engineering, Water Resources, and Transportation Engineering, Geotechnical Engineering, and

Building and Construction Management. Each student will be required to take courses in at least two key areas. In this way, all the graduates of the proposed program will receive a well-rounded education in civil engineering and an opportunity to build a significant level of specialized expertise in an area that is of particular interest to them.

Admission Requirements

Admission will be granted, within the limits of program availability (initially 3 students/year) to University of Windsor students possessing a Bachelor of Applied Science degree in Civil Engineering (or equivalent engineering degree) from an accredited Canadian university. Standard admission requirements for entry in the Civil Engineering MASc program will be met. This includes acceptance by a thesis advisor, who must have a plan for the research and coursework approved by the Department Head and the Graduate Coordinator at Windsor, as well as the Udine Head of the Department. The regular admissions process in each of the partner schools will be supplemented by an interview by a panel made up of representatives from the home institution of the student. As is normal practice, applications will be reviewed by the Graduate Coordinator of the Civil 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 Graduate Coordinator. Accepted students will be enrolled at the University of Windsor with M2 status (Master candidate) in the International Masters in Civil Engineering. For University of Udine students, admission will be granted, within the limits of program availability (initially 3 students/year) to students possessing a Laurea [Bachelor's degree] in Civil Engineering (or equivalent engineering degree) from an accredited European university. Student files will be reviewed by the Course of Studies Coordinator; similar to the University of Windsor process. Accepted students will begin the first year in the Laurea Magistrale in Civil Engineering at the University of Udine.

Degree Requirements

(a) For Windsor students: 3 Windsor graduate courses and 30 ECTS credits in courses in Italy. The total course requirements are equivalent to the weight of study done to complete a Windsor Master of Applied Science degree in Engineering with a thesis (thus making the students eligible to continue their studies at the doctoral level).

For Udine students: 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.

(b) Students from both institutions will be required to complete the graduate seminar course while at the University of Windsor.

(c) University of Windsor students must complete at least two of their courses in Term 1 of Year 1, and three no later than Term 2 of Year 1.

(c) Thesis:

Each student will complete a thesis with supervision and advisement by both Windsor faculty and Udine department members. The Windsor students will carry out 58% of their thesis work in Windsor and the remainder in Udine and the Udine students will work on their thesis primarily in Windsor.

For the purposes of the University of Windsor degree, the thesis committee will consist of the principal and co-advisor, an internal program reader, and an external program reader, as per Windsor's standard requirements for thesis committees. Additional Committee members may be added to meet the requirements of the Udine program. The principal advisor for the Windsor students will be a Windsor faculty member, with a department member from Udine acting as an advisor. Similarly, for Udine students the principal advisor will be a department member from Udine, with an advisor assigned from Windsor faculty. The thesis committee will be formed in the beginning of the first year when students plan their approach to the thesis. The coordination of supervision will be conducted through progress report meetings via tele- or

videoconference. Under supervision of the advisors, the thesis will be written and submitted to the committees at both universities in a format that is acceptable to both institutions. An oral defense of the thesis will be accomplished by an in-person examination at the University of Windsor with a video teleconference link to the University of Udine. The student must also give a presentation on the thesis at the University of Udine.

The thesis should be significant in its embodiment of an advance in the state of the art of the field. It must be delivered at a level commensurate with the Engineering Masters of Applied Science Degree.

ENGINEERING COURSES

CIVIL ENGINEERING COURSES

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.

CIVL-8006. Life Cycle Thinking for Engineering Projects
Practical and theoretical applications of life cycle thinking in engineering projects, products, and processes. Understand international standards and methods in Life Cycle Assessment (LCA), Life Cycle Costing (LCC), and Social Life Cycle Assessment (S-LCA). Analyze, interpret, provide critical feedback, and report on claims on sustainability. (Antirequisite: CIVL-8900-49.) (Cross-listed with ENVE-8006 and MECH-8006.)

CIVL-8020. Building Information Modeling
Practical and theoretical applications of building information modeling (BIM) in civil and environmental engineering projects. Understand BIM standards (e.g., ISO), use BIM software for buildings, and conduct BIM-based analysis (e.g., solar analysis, structural analysis, and energy analysis). Enhance the efficiency of project management with the aid of BIM. (Antirequisite: CIVL-8900-50.)

CIVL-8200. 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.)

CIVL-8210. 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.)

CIVL-8220. Analysis of Plate and Shell Structures
General theory of thin plates and shells. Analytical solutions of circular and rectangular plates. Membrane stresses in shells. Bending stresses in shells. Finite element methods for plates and shells. Buckling of cylindrical pressure vessels. (Prerequisite: CIVL-8200 or equivalent.) (3 lecture hours a week.)

CIVL-8250. 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.)

CIVL-8310. 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.)

CIVL-8330. 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.)

CIVL-8340. 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.)

CIVL 8350. Wood Design
Introduction to structural wood design based on CSA O86 Engineering Design in Wood. Topics include: wood as an engineering material; sawn lumber; structural panels; connections; lateral-load resisting systems; glulam; and cross laminated timber

CIVL-8360. Earthquake Engineering
Fundamental principles of earthquake engineering: seismology and strong ground motions, seismic hazard analysis, structural dynamics, methods of analysis and design, building code provisions for seismic design, and **base isolation.**

CIVL-8390. 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.)

CIVL-8410. 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.)

CIVL-8420. 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.)

CIVL-8430. 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.)

CIVL-8440. Advanced Hydromechanics
Properties of scalar and vector fields; gradiant, 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.)

CIVL-8460. 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.)

CIVL-8595. 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 their MASc program in Civil Engineering. Students who are not able to complete the MASc Graduate Seminar course have to take an additional 3-credit graduate course approved by their graduate coordinator to fulfill the overall credit requirement for the degree. This seminar course will be graded on a pass/fail basis. (1 lecture hour/week) (Also offered as ENVE-8595, CIVL-9595, and ENVE-9595).

CIVL-8620. Contaminants Fate and Transport in the Environment
Key environmental media and properties, persistent organic pollutants – chemical classes and properties, real and evaluative environments, partition coefficients and multimedia partitioning calculations, chemical loss processes, multimedia chemical fate and transport mass balance models of varying complexities, model application to contaminant fate and transport in natural and engineered environmental systems. (3 lecture hours a week.) (Cross-listed with ENVE-8620)

CIVL-8900. Special Topics In Civil Engineering
Selected advanced topics in the field of civil engineering. (3 lecture hours a week.)

CIVL-8960. Major Paper

CIVL-8970. Thesis

CIVL-8800. MEng Research Project
Masters of Engineering student will conduct an investigation, design, and/or analysis, present a progress seminar, and produce a technical report based on their work. Selection of students will be on a competitive basis. (Prerequisite: one CIVL-8XXX level course)

CIVL-9595. 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 their PhD program in Civil Engineering. Students who are not able to complete the PhD Graduate Seminar course have to take an additional 3-credit graduate course approved by their graduate coordinator to fulfill

the overall credit requirement for the degree. This seminar course will be graded on a pass/fail basis. (1 lecture hour/week) (Also offered as ENVE-9595, CIVL-8595, and ENVE-8595)

CIVL-9980. Dissertation

ENVIRONMENTAL ENGINEERING COURSES

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.

ENVE-8006. Life Cycle Thinking for Engineering Projects
Practical and theoretical applications of life cycle thinking in engineering projects, products, and processes. Understand international standards and methods in Life Cycle Assessment (LCA), Life Cycle Costing (LCC), and Social Life Cycle Assessment (S-LCA). Analyze, interpret, provide critical feedback, and report on claims on sustainability. (Antirequisite: CIVL-8900-49.) (Cross-listed with CIVL-8006 and MECH-8006.)

ENVE-8300. 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.)

ENVE-8310. 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: ENVE-8300 or equivalent.) (3 lecture hours a week.)

ENVE-8330. 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.)

ENVE-8340. 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.)

ENVE-8350. 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.)

ENVE-8370. 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.)

ENVE-8380. 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.)

ENVE-8390. Industrial Wastewater Treatment
Sources and characteristics of industrial wastewater; pre-treatment and primary treatment; physical and chemical treatment; biological treatment; waste minimization; treatment of wastes from various industries. (3 lecture hours a week.)

ENVE-8400. 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.)

ENVE-8420.Air Pollution Modelling
Air quality standards; emission inventory, source estimation; development of transport models; models with chemical reactions. (3 lecture hours a week.)

ENVE-8430. 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.)

ENVE-8500.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. (3 lecture hours per week.)

ENVE-8595 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 their MASc program in Environmental Engineering. Students who are not able to complete the MASc Graduate Seminar course have to take an additional 3-credit graduate course approved by their graduate coordinator to fulfill the overall credit requirement for the degree. This seminar course will be graded on a pass/fail basis. (1 lecture hour/week) (Also offered as CIVL-8595, CIVL-9595, and ENVE-9595).

ENVE-8620. Contaminants Fate and Transport in the Environment
Key environmental media and properties, persistent organic pollutants – chemical classes and properties, real and evaluative environments, partition coefficients and multimedia partitioning calculations, chemical loss processes, multimedia chemical fate and transport mass balance models of varying complexities, model application to contaminant fate and transport in natural and engineered environmental systems. (3 lecture hours a week.) (Cross-listed with CIVL-8620)

ENVE-8660. Solar Energy Engineering
Introduction (history, types, and parts of solar energy collection systems), the solar resource (solar time, angles, shadows, measuring and estimating irradiation), solar thermal collectors (construction, thermal analysis, testing, performance), applications of solar thermal systems (water heating, space heating, industrial applications), photovoltaic system components and sizing, economic analysis. (3 lecture hour/week) (Cross-listed with MECH-8660) (Anti-requisites: ENVE-8990 (27), MECH-8290 (14).

ENVE-8800. MEng Research Course
Masters of Engineering student will conduct an investigation, design, and/or analysis, present a progress seminar, and produce a technical report based on their work. Selection of students will be on a competitive basis. (Prerequisite: one ENVE-8XXX level course)

ENVE-8900. 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.

ENVE-8960. Major Paper

ENVE-8970. Thesis

ENVE-9595. 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 their PhD program in Environmental Engineering. Students who are not able to complete the PhD Graduate Seminar course have to take an additional 3-credit graduate course approved by their graduate coordinator to fulfill the overall credit requirement for the degree. This seminar course will be graded on a pass/fail basis. (1 lecture hour/week) (Also offered as CIVL-9595, CIVL-8595, and ENVE-8595)

ENVE-9980. Dissertation

ELECTRICAL AND COMPUTER ENGINEERING COURSES

The graduate course offerings in Electrical Engineering are designed to complement the areas of specialization. Course requirements for the PhD., MASc., 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.

ELEC-8210. 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.)

ELEC-8220. 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.)

ELEC-8230. System Theory
Continuous and discrete time systems, state formulation techniques, controlability and observability concepts, and system simulation. (3 lecture hours a week.)

ELEC-8240. 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.)

ELEC-8250. 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.)

ELEC-8270. 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.)

ELEC-8280. 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.)

ELEC-8290. 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.)

ELEC-8310. 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.)

ELEC-8330. 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.)

ELEC-8340. 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.)

ELEC-8350. 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.)

ELEC-8360. 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 MECH-8245.)(3 lecture hours a week.)

ELEC-8410. 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.)

ELEC-8500. 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.)

ELEC-8510. Advanced Digital Signal Processing
Review of discrete-time systems and digital filters. Multirate systems including decimatots, 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 word length effects including coefficient quantization, arithmetic round-off errors, dynamic range scaling, and low-sensitivity digital filter structures. (3 lecture hours a week.)

ELEC-8520. 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, micro packaging, 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.)

ELEC-8530. 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.)

ELEC-8540. Automotive Sensor Systems
This course describes topics on sensors, optics and 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.)

ELEC-8550. Computer Arithmetic
his 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.)

ELEC-8560. 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.)

ELEC-8570. 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.)

ELEC-8580. 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.)

ELEC-8590. 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.)

ELEC-8600. 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.)

ELEC-8610. 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.)

ELEC-8620. 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 word length effects in digital filters, pipelined and parallel filters and adaptive filters, and bit-level arithmetic architectures. (3 lecture hours a week.)

ELEC-8630. 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.)

ELEC-8640. 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 ELEC-8640 and it if offered under ELEC-8900 as a Special Topics course.)

ELEC-8650. Introduction to Nano electronic 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 ELEC-8650 and it if offered under ELEC-8900 as a Special Topics course.)

ELEC-8660. 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 ELEC-8660 and it if offered under ELEC-8900 as a Special Topics course.)

ELEC-8670. 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 ELEC-8670 and it if offered under ELEC-8900 as a Special Topics course.)

ELEC-8900. 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.)

ELEC-8960. Major Paper

ELEC-8970. Thesis

ELEC-9980. Dissertation

MECHANCIAL, AUTOMOTIVE AND MATERIALS ENGINEERING COURSES

Course requirements for the PhD and MASc. 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.

MATL-8801. 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.)

MATL-8802. 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.)

MATL-8805. 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.)

MATL-8806. Microscopy of Materials
The theoretical an 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.)

MATL-8807. 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 non-metallic materials. (3 lecture hours a week.)

MATL-8810.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.)

MATL-8811.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.)

MATL-8812.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.)

MATL-8813.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.)

MATL-8890. 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

MATL-8970. Thesis

MATL-9980. Dissertation

INDUSTRIAL AND MANUFACTURING ENGINEERING COURSES

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.

INDE-8200. 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: INDE-3120 or equivalent.) (3 lecture hours a week.)

INDE-8210. 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: INDE-3270 or equivalent.) (3 lecture hours a week.)

INDE-8220. 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.)

INDE-8230. 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: INDE-4130 or equivalent.) (3 lecture hours a week.)

INDE-8240. 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: INDE-3120 or equivalent.) (3 lecture hours a week.)

INDE-8250. 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 queuing models. Probabilistic dynamic programming. (Prerequisite: INDE-4120 or equivalent.) (3 lecture hours a week.)

INDE-8260. 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: INDE-3110 and INDE-3150, or equivalent.) (3.0 Lecture hours per week)

INDE-8270. 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.)

INDE-8280. 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-noon-parametric methods, censored testing and accelerated life-testing. Design for reliability-specification, reliability allocation, failure analysis, system safety. Maintainability and availability. (Prerequisite: INDE-3270) (3 lecture hours a week.)

INDE-8290.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.)

INDE-8300. 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: GENG-3130 or equivalent.) (3 lecture hours a week.)

INDE-8310. 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 INDE-4120 or equivalent.) (3 lecture hours a week.)

INDE-8320. Manufacturing Systems Paradigms
The evolution of manufacturing systems paradigms, their drivers, characteristics, prerequisites and operation principles. Variant-oriented systems including Flexible (FMS) and Reconfigurable (RMS) Manufacturing Systems. Industrial revolutions, including I4.0, and future manufacturing systems paradigms. (3 lecture hours a week). (Prerequisite INDE-4310 or equivalent with instructor permission).

INDE-8340.Engineering Design, Methodology and Applications
Engineering Design is a creative, iterative, and often open-ended process subject to constraints. Topics include: design creativity and problem solving, engineering conceptual design and 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.)

INDE-8350. 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.)

INDE-8360.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: INDE-3110 or equivalent.) (2 lecture hours a week and 2 laboratory hours a week.)

INDE-8370. 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 and product redesign proposals that support the lean enterprises balance scorecard. (3 lecture hours a week)

INDE-8380. 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. (Prerequisites: INDE-3120.) (3 lecture hours per week.)

INDE-8390. 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. (Prerequisite: Graduate Standing in Engineering or Business) (3 lecture hours per week.)

INDE-8400. 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).

INDE-8410. 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.)

INDE-8420. 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. (Prerequisite: INDE-3120 or INDE-3910, or equivalent) (3 lecture hours per week.)

INDE-8430. 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.)

INDE-8440. 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. (Prerequisite: INDE-3120 or equivalent.) (3 lecture hours per week.)

INDE-8450. Products Variety Management
Products variety types, sources and implications; design for variety (DFV); modularity; design structural matrices; products grouping, families and platforms; mass customization and personalization; and variety-oriented manufacturing systems. (3 lecture hours/week). (Pre-requisite: INDE-4310 or equivalent with instructor permission).

INDE-8595. MASc Graduate Seminar
The MASc Graduate Seminar is a series of presentations by graduate students, faculty and invited speakers on engineering and research related topics and technical communication. All full-time and part-time students are required to register in it throughout their program, attend no less than 75% of all seminars, and give a presentation (normally in the final year of their degree). This course will be graded on a Pass/Fail basis. (1 lecture hour a week.)

INDE-8900. Special Topics
Selected advanced topics in the field of Industrial Engineering. (3 lecture hours a week.)

INDE-8960. Major Paper

INDE-8970. Thesis

INDE-9695. PhD Graduate Seminar
The PhD Graduate Seminar is a series of presentations by graduate students, faculty and invited speakers on engineering and research related topics and technical communication. All full-time and part-time students are required to register in it throughout their program,and give 2 presentations. Students are required to attend no less than 75% of all seminars. This seminar course will be graded on a Pass/Fail basis. (1 lecture hour/week).

INDE-9980. Dissertation

MECHANICAL ENGINEERING COURSES

Course requirements for the PhD., MASc. 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 4490 only and related to the graduate field of study may be taken for graduate credit for students enrolled in the MASc and M.Eng. programs. Not more than one undergraduate course (numbered greater than 4490 only) shall count as credit towards the course requirements for the MASc or MEng. degree. These courses are not available for course credit towards the PhD. degree. In the case of MEng. students, the Chair of the Graduate Committee assumes the role of the advisor.

MECH-8006. Life Cycle Thinking for Engineering Projects
Practical and theoretical applications of life cycle thinking in engineering projects, products, and processes. Understand international standards and methods in Life Cycle Assessment (LCA), Life Cycle Costing (LCC), and Social Life Cycle Assessment (S-LCA). Analyze, interpret, provide critical feedback, and report on claims on sustainability. (Antirequisite: CIVL-8900-49.) (Cross-listed with CIVL-8006 and ENVE-8006.)

MECH-8203. Turbulent Flow
General turbulence theories, wall turbulence and free turbulence. (3 lecture hours a week.)

MECH-8206. Thermal Systems Design
Advanced systems design requiring the application of economics, heat transfer, simulation and optimization. (3 lecture hours a week.)

MECH-8207. 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.)

MECH-8209. 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.)

MECH-8216. 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.)

MECH-8217. 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.)

MECH-8230.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: MECH-8290, section 1.) (3 lecture hours a week.)

MECH-8231.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: MECH-8290, section 2.) (3 lecture hours a week.)

MECH-8232.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: MECH-8290, section 7.) (3 lecture hours a week.)

MECH-8233. 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: MECH-8290, section 8.) (3 lecture hours a week.)

MECH-8234. 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. (3 lecture hours a week.)

MECH-8235. Advanced Topics in Computational Fluid Dynamics

This course is a continuation of MECH-8234. 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: MECH-8234.) (3 lecture hours a week.)

MECH-8236. 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.

MECH-8240. 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: MECH-8290, section 3.) (3 lecture hours a week.)

MECH-8241.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: MECH-8290, section 4.) (3 lecture hours a week.)

MECH-8242.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: MECH-8290, section 5.) (3 lecture hours a week.)

MECH-8243.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: MECH-8290, section 6.) (3 lecture hours a week.)

MECH-8244.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: MECH-8290, section 12.) (3 lecture hours a week.)

MECH-8245.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: MECH-4212.) (Antirequisite: MECH-8290, section 22.) (Cross-listed with ELEC-8360.) (3 lecture hours a week.)

MECH-8290. 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.

MECH-8293.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. (3 lecture hours a week and 2 laboratory hours a week.)

MECH-8295. 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)

MECH-8960. Major Paper

MECH-8970. Thesis

MECH-9295. 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)

MECH-9980. Dissertation

MECHANICAL ENGINEERING COURSES (AUTOMOTIVE FIELD)

MECH-8000. Special Topics in Automotive Engineering
Selected advanced topics in the field of automotive engineering.

MECH-8011. 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. (Prerequisite: Undergraduate level Engineering Mechanics, Fluid Mechanics.)

MECH-8029. 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. (Antirequisite: ENVE-8900 Pollution Prevention in Manufacturing.)

MECH-8091. 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. (Antirequisites: STEN-4910.)

GENERAL ENGINEERING COURSES

GENG-8000. 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.)

GENG-8010. 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).

GENG-8020. 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 and Masters of Engineering Management 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.

GENG-8030. Computational Methods and Modeling for Engineering Applications
This course covers the basics of computational analysis for real-world engineering applications. Students will learn the fundamentals of programming and modeling with MATLAB. Topics include: Computational Methods, Model Building, for Engineering Projects, Hardware for Real-time Testing, Data Acquisition from Sensors. Students will complete a real-world project in the areas of their interests.

GENG-8040. 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 BUSI-8400)

GENG-8060. Strategic Entrepreneurial Management
This course introduces the basic principles and techniques of start-up creation. The focus of the course is on nurturing the skills required to develop a successful business model for a new venture. First, students learn to assess the commercial viability of a new product or service. Then, they learn techniques to identify and validate the key value propositions for a start-up. They also employ the lean startup methodologies to define and segment the market, identify adequate revenue streams, and assess distribution channels. Also, students learn how to design and develop a minimum viable product and identify risks associated with market entry. Finally, students explore the financial and legal aspects of a startup. Attention is also given to aspects of sustainability, diversity, and ethics. (Restricted to students in the Master of Engineering Management program.)

FACULTY OF HUMAN KINETICS

PROGRAMS

Master of Human Kinetics (MHK)

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.

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 (KINE-8100) 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 Stream
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 KINE-8040, KINE-8070, KINE-8100, KINE-8110, KINE-8210, KINE-8220, KINE-8230, KINE-8240, KINE-8250, KINE-8260, KINE-8270, KINE-8280, KINE-8290, KINE-8940
2) A Thesis (KINE-8970).
3) One other graduate course chosen in consultation with the thesis advisor.

Internship Option
1) Five courses from KINE-8040, KINE-8070, KINE-8100, KINE-8210, KINE-8110, KINE-8220, KINE-8230, KINE-8240, KINE-8250, KINE-8260, KINE-8270, KINE-8280, KINE-8290, KINE-8940
2) Internship (KINE-8950).
3) Two other graduate courses chosen in consultation with the internship advisor.

Sport Management Stream
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 KINE-8000, KINE-8010, KINE-8020, KINE-8030, KINE-8050, KINE-8060, KINE-8080, KINE-8100, KINE-8940
2) Research Methods (KINE-8620)
3) A Thesis (KINE-8970)
4) One other graduate course chosen in consultation with the thesis advisor

Internship Option
1) Four courses from KINE-8000, KINE-8010, KINE-8020, KINE-8030, KINE-8050, KINE-8060, KINE-8080, KINE-8100, KINE-8940
2) Research Methods (KINE-8620)
3) Internship (KINE-8950)
4) Two other graduate courses chosen in consultation with the internship advisor

PhD in Kinesiology

Degree Requirements
Total courses: A minimum of 4 courses

(a) All students must complete the following 3-credit courses and a dissertation for successful completion of the degree:
KINE-9920. Independent Study
KINE-9698. Community Internship
KINE-9950. Doctoral seminar (must register for 6 terms)
Minimum of one additional graduate level course

(b) Students must have graduate level competency in statistics and/or research design. Depending on graduate level courses taken at the Master's level, students may be asked to complete either KINE-8070 (Quantitative Analysis in Kinesiology) or KINE-8620 (Research Methods), or their equivalent.

(c) 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

All courses listed will not necessarily be offered in any given term. All courses are three hours a week unless otherwise noted.

KINE-8000. Sport Leadership
A survey course using the current research and literature relating to leadership in administrative environments. Several leadership theories will be reviewed and analyzed. Various models of leadership will be discussed relative to the sport administration environments.

KINE-8010. Legal and Human Rights Issues in Sport Management
An analysis of the research and professional practice related to the role of legislation and litigation as they relate to sport and physical activity programs and services and participation. Specific emphasis will be placed on the issue of human rights, covering topics including legislation and case study analyses from the sport management domain.

KINE-8020. Organizational Behaviour in Sport Organizations
An analysis of the interdependent nature of the social/psychological components of organizational behaviour. Special reference will be made to individual and group behaviour in terms of the organizational effectiveness of sport organizations.

KINE-8030. Sport Marketing
An analysis of the research and literature related to the marketing of sport and physical activity programs and services. Specific emphasis will be placed on the review and application of sport marketing research, an overview and application of the related marketing terms and the development of a marketing plan for a sport organization.

KINE-8040. Advanced Topics in the Psychology of Sport and Exercise
An analysis of the research and literature related to the psychological phenomena influencing the participants in the sport and exercise situation. Topics include specific sport/exercise intervention techniques, measurement issues and social psychological aspects of sport and exercise.

KINE-8050. Social Issues in Sport Management
Sport managers operate within a social world. This course examines current social issues and their implications for sport managers. Issues include the impact of various institutions on sport management (e.g., sport, government, economics, media, education), as well as the relationship between sport management and various power relations in society (e.g., race, gender, class, age, and physical ability).

KINE-8060. Crises, Politics and Commercialism in the Modern Olympic Movement
This course focuses on two dimensions: (1) the study of three persistent problems and issues surrounding the history of the Modern Olympic Movement (crises, politics, commercialism), and (2) individual independent research on a course-related topic for which the greater amount of evidence exists in primary documents housed in various regional archives.

KINE-8070. Quantitative Analysis in Kinesiology
The course introduces students to some of the most commonly employed statistical techniques in kinesiology. The content requires a basic background of elementary statistics and mathematical principles. Through classroom discussions, hands-on computer exercises and assignments, students are expected to develop essential understanding of quantitative data analysis techniques and provide interpretations and draw conclusions based on statistical findings drawn from those analyses. (Prerequisite: Kinesiology Master's Student)

KINE-8080. Strategic Management in the Sport Industry
This course integrates and applies academic work studied throughout the graduate Sport Management curriculum. More specifically, it is concerned with the work of the general manager who is responsible for the overall success of the organization. Emphasis will be placed on developing skills for diagnosing and critically analysing complex problems occurring at the organizational level, as well as proposing and implementing realistic solutions to such problems within sport organizations.

KINE-8100. Special Problems
Independent research study and/or directed reading conducted under the advisement of a graduate faculty member. Before enrolling in this course, the student with the help of the supervisor and/or co-supervisor(s) will include a rationale and assessments that ensure learning outcomes are achieved at course conclusion. This course cannot be used as a review of literature for a thesis or internship. Students should expect to commit between 6-9 hours/week in the completion of this course.

KINE-8110 Group Dynamics in Sport and Exercise
The course examines the psychological factors influencing sport and exercise behaviours from a group dynamics perspective. Emphasis is placed on understanding the theoretical constructs and empirical research underlying an individual's involvement in group settings and familiarizing the student with salient group measurement issues. Topics include the impact of cohesion, group leadership, collective efficacy, and group norms in the context of sport and exercise.

KINE-8210. Exercise Rehabilitation
This interactive graduate level course is designed to intentionally link theory and practice on topics related to exercise rehabilitation, including exercise prescription and adherence, coronary artery disease and associated risk factors, and other special populations.

KINE-8220.Instrumentation and Modeling in Kinesiology
This course will be designed to expose students to methods and instruments used to collect and process data in Kinesiology research. In addition, the course will expose students to examples of modelling approaches used to represent the nervous system, muscle force generation, musculoskeletal structure and the cardiopulmonary system.

KINE-8230. Applied Biomechanics of Human Performance
This course will focus on the application of biomechanics concepts in the study of human performance. Specific topics will reflect the interests of students and may include areas such as sports, locomotion, activities of daily living, and equipment testing and design.

KINE-8240. Biomechanics in the Work Place
This seminar-based course will focus on the application of biomechanical principles and tools to occupational activities. Special emphasis will be placed on evaluating foundational and contemporary research supporting and/or refuting the use of specific methods for assessing the physical demands and musculoskeletal injury risk associated with work. Other factors that affect worker health and performance in the workplace will also be discussed.

KINE-8250. Motor Skill Acquisition
This seminar/lecture course will examine the learning processes involved in skill acquisition by novice and experienced learners in a variety of contexts. In lab/field settings students will carry out task analysis and acquire movement observation/analysis skills.

KINE-8260. Motor Control of Human Performance
This seminar/lecture course will examine the perceptual, cognitive, and neurophysiological aspects of human motor control. Different theoretical and methodological approaches will be examined and applied to the understanding of functional movements in the home, workplace, and sporting environment. Changes in the control of movement in special populations will also be examined.

KINE-8270. Physiological Responses to Human Movement Demands
This seminar/lecture course will examine the acute response and chronic adaptive nature of selected physiological systems directly related to human movement. Specific topics will reflect the interests of students and may include areas such as temperature regulation and fatigue as well as current topics of interest in human movement.

KINE-8280.Neuromuscular Physiology
This seminar/lecture course will examine fundamental concepts of the neuromuscular system as they relate to movement, exercise and sport. Special emphasis is placed on physiologocal adaptations of the neuromuscular system as a result of acute (exercise, fatigue, training) and chronic (age, disease) perturbations.

KINE-8290. The Physiology of Sex Differences in Sport, Exercise and Health
The intent of this course is to examine the innate physiological differences that may or may not be responsible for the sex based differences in athletic and exercise performance and health. Specific attention will be given

to the role of endogenous sex hormones, their changes across the lifespan and the physiological systems relevant to exercise that they may or may not modify.

KINE-8620. Research Methods
A review and appraisal of qualitative and quantitative research methods with special reference to design, data collection, analysis and generalization.

KINE-8900. External Graduate Course
Must be a course approved by the Faculty of Graduate Studies and Research.

KINE-8940. Selected Topics
Topics developed by individual faculty members, based on new developments in a particular area of study.

KINE-8950. Internship
See Graduate Internship Handbook.

KINE-8970. Thesis

KINE-9698. Community Internship
The purpose of the PhD. in Kinesiology Internship is to fully complement the program's focus on community, which is used as broadly as possible. The goal is to increase awareness of the impact that this program can make on the global and local communities. The expectation is that this would occur in either year 2 or 3 of the program and would consist of 120-160 hours of work within any community-based organization. The product of the internship can take many forms (e.g.) a review paper, a seminar, a conference presentation, an organizational efficiency analysis, or a combination of more than one of these items. The specific product that the student is responsible for will be established in writing within the first 30 hours of the internship experience. This course will be graded on a PASS/FAIL basis.

KINE-9920. Independent Study
An independent study conducted under the guidance of a graduate faculty member. The student will engage in research on a discipline relevant issue, using relevant data set(s), leading to the production of a final project. This course cannot be used as a review of literature for dissertation. (Prerequisite: consent of the instructor)

KINE-9950. Doctoral Seminar
Using an inter-disciplinary modular approach, this seminar will provide doctoral students with a background in a variety of theoretical and methodological frameworks that are relevant to the practice of Kinesiology research. Topics presented will reflect students' research backgrounds and interests. The seminar will emphasize the connections between theory and method, and prepare students to develop methodological and theoretical frameworks for their own doctoral research. Through the seminar, we aim to prepare students to become reflexive members of a scholarly community through focused, intellectual discussion and inquiry, as well as through the development of specific skills such as preparing conference proposals, submitting research grants and submitting writing for publication. This course will be graded on a PASS/FAIL basis. (Doctoral students must register in this course a total of six semesters during the Fall and Winter terms of full-time registration.)

KINE-9980. Dissertation Research
Students work with a supervisor and committee to develop and implement an original research investigation. The results will be embodied in a professionally organized and written dissertation conforming to the requirements outlined in the Department's PhD. Program Details Manual and by the Faculty of Graduate

Studies. The dissertation is expected to be of the highest quality and suitable for publication (graded pass/fail).

FACULTY OF LAW

PROGRAMS

Master of Laws (LLC)

Windsor Law's Master's program (LLM) will stress rigorous scholarship, centred on our institutional themes of Access to Justice and Transnational Law. A key feature of the Windsor LLM will be that our students, while enrolled, will make concrete contributions to legal scholarship. Moreover, students in our unique and innovative LLM with Certificate in University Teaching and Learning stream will be offered the chance to complete the University of Windsor's internationally recognized University Teaching Certificate program as part of their course of study, as well as the opportunity to engage in law teaching. In addition to students contemplating an academic career, the program will be suitable for legal practitioners interested in developing expertise in a specialized area of law. Wherever possible, students will be integrated into our Law Faculty's existing Centres, and interdisciplinary and multi-disciplinary collaborations will be promoted.

The experiential learning component of the program consists of the law teaching practicum that students in the LLM with Certificate in University Teaching and Learning stream will complete. The law teaching practicum will, in most cases, extend for a maximum of four weeks (or twelve hours) of teaching. The practicum may be completed in a variety of ways including as part of a team of professors/instructors teaching a course, as a series of guest lectures in a faculty member's course and, for students who show exceptional promise or who have exceptional background in teaching, the teaching of a one-semester course.

Admission Requirements
Students who are accepted to the program will be academically inclined, motivated, and committed to continuous learning. Outside of exceptional circumstances, students applying to the LL.M program will be required to have an undergraduate law degree. In rare cases, a student may be admitted without a law degree. For students without law degrees to gain entry, they must have outstanding grades or experience and superior ability to complete the LL.M program. Admission to the program will be based on four categories which evaluate the student's: a) aptitudes, b) academic achievements, c) research proposal and, d) additional requirements such as reference letters and language proficiency. Details of these four broad categories are as follows:

Aptitudes
Generally, successful students admitted to our LL.M program will demonstrate the following aptitudes in terms of their ability to apply themselves, their knowledge, and their reasoning and communication skills. Specifically, the student accepted into the program will have shown evidence of:

Application: exceptional academic motivation; capacity for sustained and intense work; developed ability to organize time and set own agenda for study; academic curiosity for investigation and learning.

Knowledge: a broad, deep, advanced, and integrated understanding of the main branches of law and / or a related discipline.

Reasoning ability: outstanding analytical abilities, including the ability to draw and maintain fine distinctions, the ability to separate the relevant from the irrelevant, and the ability to develop and sustain complex arguments; capacities for accurate observation and insightful criticism, including willingness and ability to

engage with disciplines other than law and to bring their insights to bear on legal problems; originality and creativity of thought, open-mindedness, and capacity for lateral thinking; excellent powers of synthesis.

Communication: willingness and ability to express highly complex ideas clearly and effectively; ability to conduct a mature debate leaving room for the contributions of others; aspiration to professional standards of style and organization in legal and scholarly writing.

Academic Achievements
First and foremost, applicants will be able to demonstrate their exceptional abilities through their academic achievements. Generally, this will mean high academic standing – normally at least a 70% average in an undergraduate law program (although this alone will not necessarily guarantee admission), and evidence of interest in academic pursuits (for example, pursuing independent/supervised research studies, publications, editing of academic work, etc.). For applicants applying from the workforce, noteworthy achievements may also be taken into account for what they reveal about the applicant's ability to succeed academically within a Master's program in Law. All applicants will also be required to submit their undergraduate transcripts.

Research Proposal
A significant element of each student's application package will be the statement of proposed research. The research proposal should provide evidence of the candidate's ability and potential to engage with the relevant scholarly literature, doctrinal and/or empirical material and to formulate pertinent research questions. An academic writing sample will also be required.

Additional Requirements
Applicants will be asked to submit at least two letters of reference that show support for their scholarly endeavour. Admission will be contingent upon availability of a suitable supervisor and suitable reference materials for the applicant to pursue their research project.

Finally, all students must meet an English language proficiency standard of 250 (600) IBT-100 minimum on the TOEFL or 7.0 IELTS

Degree Requirements

One Year Stream (LLM)
Total courses:
(a) Research Methods (6 credits)
(b) Graduate Seminar (1 credit)
(c) Legal Theory (3 credits)
(d) Thesis (12 credits)
(e) 0-2, 3-credit courses, depending on student's background

Two Year Teaching Stream (LLM)

Total courses:
(a) LAWM-8100.Research Methods (6 credits)
(b) LAWM-8300. Graduate Seminar (1 credit)
(c) LAWM-8200. Legal Theory (3 credits)
(d) LAWM-8970. Thesis (12 credits)
(e) 0-2, 3-credit courses, depending on student's background
(f) Complete and obtain the Centre for Teaching and Learning (CTL)University Teaching Certificate
(g) LAWM-8400. Law Teaching in the Diverse Classroom (1.5 credits)
(h) Students in this stream must also complete the Law Teaching Practicum (non-credit)

Additional requirements:
Presentation of research at scholarly conferences or other academic venues outside of Windsor Law's graduate program.

In order to obtain wider academic feedback, students will be required to present their research as an academic talk. During the write-up phase of their thesis, students will be a) required to present their work in progress in an open faculty/graduate student seminar (outside of the graduate seminar) and b) encouraged to present their work at subject-relevant conferences which foster graduate student networking, such as the Canadian Law and Society Association annual conference.

Subject-relevant conferences should be academic in nature for example, a graduate students' conference, faculty seminars, or conferences/workshops set up by learned associations such as the Canadian Law and Society Association. Students may also organize their own talks. In this connection, the Graduate Studies Committee has begun to make connections with other universities and research institutes which may be interested in hosting presentations by our graduate students.

Standing Required for Continuation in the Experiential Learning Option of the Program
Students will need to pass the teaching practicum and otherwise meet the normal regulations for continuation in the program as set by the University's regulations.

LAW COURSES

MASTER OF LAW COURSES

LAWM-8100. Research Methods
Through this required course, and in view of writing the LLM thesis, students will focus on developing research questions, elaborating appropriate methodological approaches for their graduate research (i.e. the Master's thesis), preparing a research agenda, creating a literature review, and on creating a written report of their research findings. The central part of the course will place emphasis on learning contemporary methodological approaches to legal scholarship. Although the research methods discussed may vary from year to year, doctrinal (case-based), qualitative, and historical research methods will be examined. Students will also develop ethical and interdisciplinary approaches to academic legal research and advanced library research skills. (6 credits, 2-term course.) (Open only to LLM students.)

LAWM-8200. Legal Theory
Drawing from continental and analytic writings manifesting social contextual, historical, anthropological, and philosophical perspectives, this course will, in particular, examine issues surrounding the relation of legal orders to outsiders, the social-cultural context of the nature of a law, the nature of legal obligation and the boundary of law as a discourse.

LAWM-8300. Graduate Seminar
An adjunct to the LL.M Research Methods course, the Graduate Seminar will provide a forum in which students can discuss their ongoing research and present portions of their work for feedback from the course director and their peers. The seminar will convene for the equivalent of 1hour/week, every other week, over the course of the fall and winter semesters (12 hours total).

LAWM-8400. Law Teaching in the Diverse Classroom
This course will examine theory and techniques for engaging with controversial topics in the law school class setting. Through this course, students will focus on learning, and evaluating critically, different approaches to teaching in classroom settings that require cultural competence and other diversity competencies. This

course will focus on understanding how student learning is influenced by individual experiences, gender, language, culture, family and community. Students will also work on developing their own approaches to teaching in such settings. This course serves to complement the LL.M student's learning experience in the University Teaching Certificate Program (or equivalent) by offering exposure to issues related specifically to law teaching. (Prerequisite for students in the teaching stream: completion of UTC lesson plan exercise in the UTC course "Learning Centred Teaching in Higher Education") (1.5 credit)

LAWM-8970. Thesis
The central component of the program's requirements is the completion of original publishable research. A major written piece of original research, the thesis may be submitted as one single document or as a set of publishable articles totalling approximately 100-125 pages in length.

MASTER OF SOCIAL WORK/JURIS DOCTOR COURSES

LAWG-5930. Law and Social Work: Advanced Practice Research Methods and Policy Analysis
This course prepares students to use the practitioner-researcher model in the analysis of social policy, as it relates to law, in Canada. This model includes problem formation, qualitative and quantitative research design, data analysis and interpretation, and the dissemination of findings. Students will learn to apply specific analytic frameworks and theories, drawn from law and social work, to issues of Canadian social policy. In addition, students will learn essential elements of program evaluation including needs assessment, program logic models, implementation and process evaluations, and impact evaluations. Particular attention will be given to the implications of social policy for vulnerable and oppressed populations. Credit Weight 4.0. (Cross-listed with Social Work SWRK-8625).

LAWG-5931. Advanced Seminar in the Theory and Practice of Social Work and the Law
This seminar focuses on the intersection of law and social work in theory and practice. It will prepare students to think critically about the interrelationship between law and social work, both as disciplines and professions, and to identify and analyze theoretical and substantive areas of compatibility and tension. The challenges of interdisciplinary practice will be considered, with a particular emphasis on ethical norms and the advancement of social justice. (Open to MSW/JD students only, or with the permission of both program areas.) (Credit Weight 4.0. Cross listed with Social Work SWRK-8626).

FACULTY OF NURSING

PROGRAMS

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 baccalaureate degree in nursing from a recognized university
Have a completed Master's degree in nursing or other relevant discipline from a recognized university
Applicants must have current registration in a Canadian jurisdiction with no practice restrictions. Must be registered with the College of Nurses of Ontario prior to registration for thesis credits.
Have a minimum 77% (B+) average in their Master's program

Applicants must submit the following documents:
Curriculum vitae (CV)
Three professional letters of reference.
A statement of research interest and a career plan
Provide two examples of independent scholarly work (e.g., publications, research reports, course assignments)
For international students, successful completion of an English Language Proficiency Exam may be required. Refer to Application Information in Graduate Calendar for requirements

Other: Interview may be required

Degree Requirements
NURS-9100. Philosophy of Science in Nursing
NURS-9200. Advanced Perspectives in Quantitative Research Methods and Analysis
NURS-9300. Advanced Perspectives in Qualitative Research
One graduate level course
NURS-9410. Comprehensive Exam
NURS-9980. Dissertation

In addition to the degree requirements, all students in the PhD Program must complete a series of professional development activities prior to enrolling in NURS-9410 Comprehensive Examinations.

Master of Science in Nursing (MScN)

The mission of the University of Windsor Master of Science degree program in Nursing is to prepare graduates for advanced nursing practice. Graduates will address societal health needs relating to health promotion and illness prevention, or human responses and adaptations to alterations in health. Through the integration of theory, research, and practice students will advance their scientific base for practice. In addition, the program supports development of leadership and advocacy skills for contributions to health care, education and research. Through faculty guidance and self-directed learning activities, students from diverse backgrounds will develop advanced professional knowledge through critical thinking, decision making, and scholarly inquiry in a multicultural society. This program is especially designed to meet the needs of employed baccalaureate prepared nurses.

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 have current registration with the College of Nurses of Ontario with no practice restrictions.
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.

Degree 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 for a MScN may be satisfied by pursuing a program of studies consisting of six prescribed courses and a thesis.

Additional information concerning the procedure for theses and major papers may be obtained from the coordinator of graduate studies.

3. Prescribed courses:
NURS-8810. Theoretical Foundations of Nursing
NURS-8820. Advanced Statistics
NURS-8830. Research Methods in Nursing
NURS-8910 Advanced Professional Nursing Practicum
and either NURS-8850 and NURS-8860, or NURS-8880 and NURS-8890, 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.

8. 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.

Nursing (MN) Advanced Clinical Practice and Leadership in Nursing Fields

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 have current registration with the College of Nurses of Ontario with no practice restrictions.

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.
An "Applicant Profile" must be completed which includes a section addressing goals in seeking graduate education (narrative statement).
Applicants whose native language is not English must submit certification of English proficiency (official TOEFL score or equivalent MELAB).
Applications for admission must be completed by February 15 (or until seats have been filled).
An interview may be required.

Degree Requirements
It should be noted that two areas of concentration: 1) Advanced Clinical Practice, and 2) Leadership in Nursing - are the same as the MSc. program. There is also a third area of concentration available through the Master of Nursing: 3) Primary Health Care Nurse Practitioner Field.

Total courses: Ten (10) courses

(a) 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):
NURS-8810. Theoretical Foundations of Nursing
NURS-8820. Advanced Statistics
NURS-8830. Research Methods in Nursing
NURS-8910 Advanced Professional Nursing Practicum

(b) NURS-8850 (Health of Individuals Families and Groups) and NURS-8860 (Community and Population Health) OR NURS-8880 (Theoretical Foundation of Nursing Leadership) and NURS-8890 (Innovations in Nursing Leadership)

(c) Four additional graduate level courses, two of which must be Nursing courses. Students can use the courses in the other field to fulfill this requirement.

Course Sequencing

YEAR I
Fall Semester
NURS-8810. Theoretical Foundations of Nursing
NURS-8830. Research Methods in Nursing

Winter Semester
NURS-8820. Advanced Statistics
NURS-8850.Health of Individuals, Families and Groups
or
NURS-8880. Theoretical Foundations of Nursing Leadership

Summer Semester
Nursing/Other graduate course(s)

YEAR II
Fall Semester
Nursing/Other graduate course
NURS-8860. Community and Population Health
or
NURS-8890. Innovations in Nursing Leadership

Winter Semester
NURS-8910Advanced Professional Nursing Practicum

Summer Semester
Nursing/Other graduate course(s)

Nursing (MN) 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 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 current registration with the College of Nurses of Ontario with no practice restrictions.
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
NURS-8810. Theoretical Foundations of Nursing
NURS-8500. Pathophysiology for the Nurse Practitioner (3 credit hours, 2 terms)
NURS-8570. Advanced Health Assessment and Diagnosis I (4.5 credit hours)

Winter
NURS-8500. Pathophysiology for the Nurse Practitioner (3 credit hours, 2 terms)
NURS-8580. Advanced Health Assessment and Diagnosis II (4.5 credit hours)

YEAR II
Fall
NURS-8830. Research Methods in Nursing
NURS-8520. Roles and Responsibilities of the Nurse Practitioner in Primary Health Care (3 credit hours, 2 terms)
NURS-8610. Therapeutics in Primary Health Care I (4.5 credit hours)

Winter
NURS-8820. Advanced Statistics
NURS-8520. Roles of the Nurse Practitioner in Primary Health Care (cont'd)
NURS-8620.Therapeutics in Primary Health Care II (4.5 credit hours)

Summer
NURS-8870. Integrative Practicum (12 credit hours)

Primary Health Care Nurse Practitioner - Graduate Diploma

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 current registration with the College of Nurses of Ontario with no practice restrictions.
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 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
NURS-8500. Pathophysiology for the Nurse Practitioner (3 credit hours, 2 terms)
NURS-8520. Roles and Responsibilities of the Nurse Practitioner in Primary Health Care. (3 credit hours, 2 terms)
NURS-8570. Advanced Health Assessment and Diagnosis I (4.5 credit hours)
NURS-8610. Therapeutics in Primary Health Care I (4.5 credit hours)

Winter
NURS-8500. Pathophysiology for the Nurse Practitioner (cont'd, 3 credit hours, 2 terms)
NURS-8520. Roles of the Nurse Practitioner in Primary Health Care (cont'd, 3 credit hours, 2 terms)
NURS-8580. Advanced Health Assessment and Diagnosis II (4.5 credit hours)
NURS-8620. Therapeutics in Primary Health Care II (4.5 credit hours)

Summer
NURS-8870. Integrative Practicum (12 credit hours)

NURSING COURSES

Not all of the courses listed below will necessarily be offered in any one year.

NURS-8300. Advanced Health Assessment, Diagnostics, and Therapeutics of the Oncology/Palliative Patient I
This course prepares students with advanced skills in health assessment, diagnostics and therapeutics in preparation to provide holistic care to individuals who have experienced alterations in their physical health from cancer treatment and/or may also to individuals who are palliative. Students will learn through lectures, readings, and simulation in the laboratory, learn and practice performing a holistic health history and the techniques of inspection, percussion, palpation and auscultation for systematic health assessment of individuals

NURS-8310. Leadership and Management in Oncology/Palliative Care Settings
This course prepares students who work across the continuum of cancer care for advanced practice and leadership roles. Course content will focus on the examination and critical appraisal of concepts and theories of leadership, research, management, and education within the context of oncology and palliative nursing environments. Emphasis will be placed on organizational and change theories, professional practice, decision-making and governance models, power and social justice concepts. Strategies for knowledge transmission and information system development will be appraised. Note: This course is equivalent to NURS-8880; thus, students who take NURS-8880 will not be eligible to take this course for credit.

NURS-8320. Advanced Health Assessment, Diagnostics, and Therapeutics of the Oncology/Palliative Patient II
This course is the second of two advanced health assessment, diagnostics and therapeutics courses of the Oncology/Palliative diploma that are designed to prepare students with advanced skills to provide holistic

care to individuals who have experienced alterations in their physical health from cancer treatment and/or may also be in need of palliative care. Students will learn through lectures, readings, and simulations, learn and practice performing a holistic health history along with advanced techniques in inspection, percussion, palpation and auscultation for systematic health assessment of individuals.

NURS-8330. Interprofessional Psychosocial Oncology: Introduction to Theory and Practice
This course is required for the graduate diploma in Advanced Practice Oncology/Palliative Care. It is also open to other students from any discipline enrolled in Masters of PhD program to take as an unspecified graduate course. It provides graduate students with an introduction to the field of psychosocial oncology. Emphasis is placed on understanding and interpreting the experience of cancer informed by theory, evidence and illness narratives. This course also emphasises an understanding of the illness experience and assists the student to assess distress and coping from a family centred perspective. This course draws on a case-based, narrative format and provides opportunities to learn in small groups of interprofessional learners drawn from across Canada.

NURS-8340. Advanced End of Life Care
This course teaches the specialized assessment, diagnostics and therapeutics needed to care for patients at the end of life. This class will focus on, but is not limited to, disease management; psychological and physical support: loss, grief, social, and practical end of life care management along with spiritual support for caregivers and the patient. Students will learn through lectures, readings, case studies and assignments how to more effectively care for these patients and their family members. They will learn the basics of the theories used in palliative care and the fundamentals of how to care for a dying patient and their family members.

NURS-8350. Oncology/Palliative Capstone Project
This course will provide learners with the opportunity to synthesize concepts from prior coursework and to undertake an in-depth exploration of an area of oncology/ palliative care nursing practice. Students will systematically search, analyze, and synthesize relevant research literature and make recommendations for practice, education and research. The student will write an evidence-based scholarly article that is suitable for publication in a journal. (Prerequisites: NURS-8300, NURS-8310, NURS-8320, NURS-8330, NURS-8340)

NURS-8360. Relational Practices with Families in Oncology and Palliative Care
This is the second psychosocial oncology course offered through the Canadian Association of Psychosocial Oncology (CAPO) Interprofessional Psychosocial Oncology Distance Education (IPODE) project. It provides graduate students in health care disciplines (e.g., medicine, nursing, psychology, social work, and spiritual care) with an opportunity to explore the interprofessional care of families experiencing cancer along the illness trajectory from diagnosis through to bereavement or long-term survivorship.

NURS-8370. Sexual Health and Counselling in Cancer
This is the third psychosocial oncology course offered through the Canadian Association of Psychosocial Oncology (CAPO) Interprofessional Psychosocial Oncology Distance Education (IPODE) project. It provides graduate students in health care disciplines (e.g., medicine, nursing, psychology, social work, and spiritual care) with an opportunity to explore the interprofessional care, knowledge, and skills to intervene with the sexual issues that arise in cancer patients from a psycho-educational perspective.

NURS-8500. Pathophysiology for Nurse Practitioners
Examine theoretical and practice related concepts in pathophysiology as a basis for advanced nursing practice. Explore alterations in physiological function with an emphasis on age-related, acute, episodic, and chronic conditions found in primary health care practice. (Prerequisite or co-requisite: NURS-8810.) (3 hours per week.)

NURS-8520. Primary Health Care Nurse Practitioner Roles and Responsibilities

Compare and contrast advanced practice nursing and related frameworks to develop, integrate, sustain, and evaluate the role of the nurse practitioner within primary health care. Critically analyze and develop strategies to implement advanced practice nursing competencies (research, leadership, collaboration, and health and social policy). (Prerequisites or Co-requisites: NURS-8810 and NURS-8830.) (3 hours per week.)

NURS-8540.Evidence-Based Practice (EBP) for Advanced Practice Nursing (APN)
This course provides students with the knowledge and skills required to identify and use best evidence in advanced practice roles. The course focuses on developing a relevant evidence-based practice question, and searching appropriate evidence resources. Frameworks for the critical appraisal of quantitative and qualitative studies will be critiqued. Issues related to influencing practice and health outcomes through evidence, at the level of the individual practitioner and the health care organization, are addressed. This course will explore paradigms and theories that inform knowledge development and knowledge transfer. The foci of the course are the exploration, critical analysis, and application of concepts. Challenges and strategies related to addressing complex health care system issues through evidence, at the level of the individual practitioner and the health care organization, are addressed. (Prerequisites: NURS-8810 and NURS-8830.)

NURS-8560. Research Utilization Project: Evidence Based Decision Making in Health Care: Integrating Knowledge into Advanced Practice
This course provides students with the knowledge and skills required to identify and use best evidence in advanced practice roles. The course focuses on developing a relevant evidence based practice question, and searching appropriate evidence resources. Frameworks for the critical appraisal of quantitative and qualitative studies will be critiqued. Learning is facilitated through seminars, and workshops to address a question emerging from their own practice. Issues related to influencing practice, and health outcomes through evidence, at the level of the individual practitioner and the health care organization are addressed. (Prerequisite: COUPN Primary Health Care Nurse Practitioner Certificate)

NURS-8570. Advanced Health Assessment and Diagnosis I
Differentiate concepts and frameworks essential to advanced health assessment, clinical reasoning, and diagnosis in advanced nursing practice. Apply clinical, theoretical, and scientific knowledge in comprehensive and focused health assessment, including history taking, physical examination, diagnostic reasoning, and interpretation for the individual client's diagnostic plan of care. (Prerequisites or co-requisites: NURS-8500 and NURS-8810.) (3 hours seminar per week; 6 hours clinical per week.)

NURS-8580. Advanced Health Assessment and Diagnosis II
Integrate conceptual frameworks integral to advanced health assessment, clinical reasoning, and diagnosis in advanced nursing practice. Demonstrate substantive initiative, responsibility, and accountability in complex decision making for individual clients, groups, and/or communities within the nurse practitioner scope of practice. (Prerequisites or co-requisites: NURS-8570 and NURS-8810.) (3 hours seminar per week; 6 hours clinical per week.)

NURS-8610.Therapeutics in Primary Health Care I
Critically appraise and interpret concepts and frameworks integral to pharmacotherapy, advanced counseling, and complementary therapies for common conditions across the lifespan. Develop, initiate, manage, and evaluate therapeutic plans of care that incorporate client values and acceptability, goals of therapy, analysis of different approaches, pharmacotherapeutic principles. (Prerequisites or co-requisites: NURS-8570, NURS-8810 and NURS-8830.) (3 hours seminar per week; 6 hours clinical per week.)

NURS-8620.Therapeutics in Primary Health Care II
Integrate conceptual frameworks and evidence underlying the study of pharmacotherapy, advanced counseling, and complementary therapies for complex client situations. Demonstrate substantive initiative,

responsibility, and accountability in complex decision making. (Prerequisites or co-requisites: NURS-8580, NURS-8610, NURS-8810, NURS-8820 and NURS-8830.) (3 hours seminar per week; 6 hours clinical per week.)

NURS-8700.Counselling Process in Nursing
Development and refinement of counselling skills with an emphasis on human relationships and nursing strategies that facilitate health. Experiential learning will be implemented to bring a balance between counselling theory/research and applied counselling knowledge.

NURS-8710 Nutrition, Lifestyle, and Chronic Disease
Nutrition is the science that studies food and how the food nourishes the body and affects our health. This course will introduce the basic concepts of nutrition and present techniques and tools that can be used to encourage better eating habits in individuals. The course will introduce how nutrition can be incorporated into the clinical practice of health professionals. The topics that the course will cover include the processes of digestion, absorption and elimination as well as review basic nutrition therapy for some of the most common gastrointestinal conditions and disorders. There will be a brief overview of vitamins and minerals, discussion of key nutrition components that change throughout the life cycle and how diet plays a role in the development and treatment of chronic disease.

NURS-8720.Women and Health
An analysis of health issues of Canadian women from a holistic woman-centered perspective to include geographical, sociocultural and political variables that impact women's health.

NURS-8760. Management of Human Resources in Nursing
A study of concepts, theories, and practices that will assist nurse leaders to develop effective approaches to human resource management in nursing education and service settings.

NURS-8780. Seminar in Current Nursing Issues
An historical and futuristic examination of the critical issues facing the nursing profession and discipline. Considering the practice orientation of nursing, students will explore issues related to education, practice, discipline, and professionalism.

NURS-8800. Selected Readings in Nursing
Intended for students with a special interest in and knowledge of a specialty area in nursing. To explore theory and research related to an area of interest in nursing. (To be taken only with permission of the School.)

NURS-8810. Theoretical Foundations of Nursing
The focus of this course is theory exploration in nursing. Beginning with the theoretical evolution of the discipline of nursing, students' progress to issues related to development of theory in a practice discipline. Analysis, evaluation, and comparison are made of selected nursing conceptual models/theories and their major concepts. The contributions of the conceptual models to practice and research are investigated.

NURS-8820. Advanced Statistics
An advanced course with a focus on multi-variate analysis. Topics include ANOVA, MANOVA, regression analyses, critique of statistical analyses of research articles, and computer data analysis.

NURS-8830. Research Methods in Nursing
Students will examine diverse approaches to scientific inquiry in nursing. Within selected research paradigms, students will explore design, process, and evaluation techniques. Models for research analysis will be explored. Opportunities will be provided for students to develop a research proposal to gain solutions to nursing problems.

NURS-8840. Summer Institute of Clinical Health Research
This intensive one-week Summer Institute will provide participants (i.e. graduate students, clinicians, and academics from various health related fields) with 35 hours of in-depth exploration and discussion of the principles and applications of clinical health research. Participants will be engaged by a team of experts in discussions pertaining to the understanding and applications of topics such as qualitative research and evidence-based practice, the use of mixed methods in clinical health research, epidemiologic research designs, clinical trials, and statistical modeling techniques in clinical health research. Other topics will include successful grant writing, running a successful research program, and ethical issues in clinical health research.(Prerequisites: Basic Research and biostatistics course(s); Permission of instructor)

NURS-8850. Health of Individuals, Families and Groups
The focus of this course is excellence in health care delivery for individuals, families, and groups across the lifespan. Students will critically appraise conceptual frameworks and the empirical research underlying health promotion, health adaptation and risk reduction for individuals, families, and groups. Students will be prepared to influence client care and participate in research, education and policy activities related to advanced practice nursing and health care for diverse populations.

NURS-8910. Advanced Professional Nursing Practicum
Students, working in diverse areas of non-clinical advanced nursing practice, will engage in projects focused on complex system-related issues at the unit and/or organizational level. The goal is to integrate and apply in-depth knowledge across the domains of professional autonomy, leadership, research, practice, communication, intra/inter-professional teamwork and collaboration. (Prerequisites: NURS-8810; NURS-8820; NURS-8830 and either NURS-8880 and NURS-8890 or NURS-8850 and NURS-8860) (3 lecture hours per week plus approximately 20 hours per week related to community placement project work.)

NURS-8860. Community and Population Health
This course will examine the conceptual frameworks and empirical research underlying health promotion, health adaptation and risk reduction for communities and populations. The course engages the student in using advanced problem-solving , critical thought, and research to develop a comprehensive understanding of the determinants of the health of populations and their complex interaction. Students will have the opportunity to appraise the relationships among the determinants of health, decision making, policy, and legislation at local, provincial, national and international levels.

NURS-8870. Integrative Practicum in Primary Health Care
Synthesize competencies essential to advanced practice nursing to provide primary health care for clients across the life span. Demonstrate autonomy in decision-making, and critical analysis of organizational and system issues that influence scope of practice, professional accountability, and outcomes. (Prerequisites: All PHCNP courses; NURS-8810, NURS-8820 and NURS-8830.) (3 hours seminar per week; 32 hours clinical per week.)

NURS-8880. Theoretical Foundations of Leadership
This course will focus on the examination and critical appraisal of concepts and theories of leadership, research, management, and education within the context of nursing and dynamic health care systems. Emphasis will be placed on organizational and change theories, professional practice, decision making and governance models, power and social justice concepts. Strategies for knowledge transmission and information system development will be appraised.

NURS-8890. Innovations in Nursing Leadership
This course focuses on the application of leadership and organizational theories and research that support excellence and innovation in professional nursing practice, education, and workplace environments. Emphasis will be placed on the planning, implementation, and evaluation of health systems, and human

resource management. Students will examine issues pertaining to operations management, including finance, quality and risk management, information systems development and policy development. Students will be prepared to formulate innovative strategies to influence current policy and legislation that impact nursing practice, education, health care systems, and the health of Canadians.

NURS-8970. Thesis Option

Before writing the thesis, the student must meet with the Master's committee to obtain approval of the thesis investigation. Permission will only be granted when the student has shown sufficient preparation and competence to carry out the thesis proposal. Upon completion, each candidate will be required to make a satisfactory oral presentation and defense of the thesis.

NURS-9100. Philosophy of Science in Nursing
This course introduces students to the philosophical assumptions concerning knowledge and knowledge development that inform the conduct of research in the discipline of nursing. Students will explore key concepts in relation to a variety of paradigm/perspectives within the philosophy of science, ranging from positivism to post-modernism and critical theory. Major topics to be debated will include the notion of nursing as a science and what constitutes nursing knowledge. Individual seminars will enable in-depth analysis of selected philosophers (as representative of such paradigms) in their respective socio-political and historical contexts. This course will enable students to articulate and defend their own philosophical assumptions of the paradigm that informs their dissertation topic.

NURS-9200. Advanced Perspectives in Quantitative Research Methods and Analyses
This advanced course is designed to enhance students' knowledge of the design and analysis of selected observational (prevalence, ecologic, cohort, and case-control) and experimental (controlled trials) quantitative research designs. The course will also address principles and issues pertaining to the development, evaluation, and use of psychometric measures. Emphasis will be focused on the understanding and decision-making pertaining to (a) the selection of the right research design, (b) the identification of issues associated with various research methodologies, (c) the use of psychometric measurement, and (d) multivariate statistical procedure such as linear regression analysis, Binary and multinomial logistic regression analysis, and survival analysis. Approaches to evaluation of the quality of evidence in published research will also be addressed. (Prerequisite: NURS-9100; NURS-9300; Graduate level course)

NURS-9300. Advanced Perspectives in Qualitative Research
This course provides advanced philosophical and theoretical knowledge required to conduct qualitative research. Students are challenged to critically appraise the scholarship of published studies and to explore arising issues with qualitative inquiry. Issues may include, but are not limited to the importance and integration of philosophical underpinnings, researcher positioning, methodological congruence/consistency, ethical issues (anonymity, confidentiality of participation, privacy), challenges inherent in data collection and analysis, metasynthesis, rigour, and the usefulness of qualitative health research for nursing practice and healthcare policy. The relationship between qualitative and mixed methods health research will be examined. Students will defend their application of knowledge about these issues in relation to their own dissertation research interests. (Prerequisite: NURS-9100, Fall semester)

NURS-9410. Comprehensive Exam
This course allows students to demonstrate, in writing and orally, their ability to complete an extensive review and critical analysis of the literature to synthesize current knowledge and theoretical underpinnings pertaining to their research area. The critical review will also examine potential methodological and analytical approaches that are relevant to their research. The examination includes a written paper and an oral defense of the work.(Prerequisites: (NURS-9100, NURS-9200, NURS-9300, one Graduate Level course).

NURS-9980. Dissertation

PROGRAMS ADMISTERED BY THE OFFICE OF THE DEAN OF SCIENCE

Environmental Science (MSc)

Admission Requirements
Initial Application Procedure: The initial application procedure for students who wish to enrol in the MSc. Program includes:
1) Completion of the “Application for Admission to the Faculty of Graduate Studies” form;
2) one official transcript of all undergraduate studies from all colleges and universities attended;
3) two confidential letters of reference;
4) Graduate Record Examination, if required; and TOEFL results, as required;
5) letter of intent that clearly outlines 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 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 M.Sc. program.

Program Requirements
(a) Compliance with regulations outlined in University of Windsor Graduate Calendar.
(b) Successful completion of the Multi-disciplinary 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 Environmental Research Proposal course (MSc. 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 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 (PhD)

Admission Requirements
Initial Application Procedure: The initial application procedure for students who wish to enrol in the PhD. program includes:

1) Completion of the "Application for Admission to the Faculty of Graduate Studies " form;
2) one official transcript of all undergraduate and graduate studies from all colleges and universities attended;
3) three confidential letters of reference;
4) Graduate Record Examination, if required; and TOEFL results, as required;
5) letter of intent by the student 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 graduate programs. If a suitable supervisor cannot be identified, the student will be dissuaded from applying for admission.

Two streams of PhD. 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 PhD. program. Alternatively, students enrolled in the MSc 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 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.

Program Requirements
(1) Students entering the program with an M.Sc. degree must fulfill all requirements listed below:
(a) Compliance with regulations outlined in University of Windsor Graduate Calendar;
(b) Successful completion during the first year of enrolment in the program of an oral comprehensive 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;
(c) Successful completion of the Multiple Stressors and Environmental Modelling course (one credit). The course will be graded in accordance with university standards;
(d) Successful completion of the GLIER Multi-disciplinary 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 PhD. students who have successfully completed this course will be required to audit the course each year following their first year of residency.
(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.
(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.
(g) Completion of an original research project reported in a dissertation.
(h) Defence of the dissertation in a public lecture and before the Doctoral Committee; and
(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.

(2) Students transferring to the PhD. program must have received no grade less than 80% or satisfactory for all course work taken in the 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 approved for transfer into the PhD. program must comply with regulations (a) through (j) above.

In addition to courses offered in the 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 School of the Environment, Biological Sciences, and Chemistry and Biochemistry and involve various combinations of theory and lab work. All graduate students must complete the Multidisciplinary Graduate Seminar course and must complete the Environmental Research Proposal course. The Multiple Stressors and Environmental Modelling Course is required for all PhD. students. Other courses will supplement core courses, be offered on a rotating basis, and be mandated by Doctoral Committees, depending on students' perceived deficiencies in background preparation.

ENVIRONMENTAL SCIENCE COURSES

GLIE-8500. 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.)

GLIE-8700. 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.)

GLIE-9800. 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 PhD. students) (2 hours per week) (3.0 credit course).

GLIE-8970.Thesis

GLIE-9980.Dissertation

FACULTY OF SCIENCE

GENERAL COURSES

SCIE-8000. Theory and Practice of University Teaching and Learning in STEM
In this course, students will explore and critically evaluate current educational theory and practice relating to university teaching and learning in STEM (science, technology, engineering and mathematics). Students will be asked to critically evaluate their teaching beliefs and broaden their knowledge and skills by participating in classroom discussions and microteaching opportunities. (Prerequisites: Admission to a thesis-based master's or PhD program in the Faculty of Science and consent of the instructor.) (3 credits.)

SCIE-8001. STEM Teaching Development
In this course, students will be asked to select an undergraduate or graduate course in their discipline and work with a faculty mentor to redesign, teach and assess one unit in that course. A "unit" is defined as the equivalent of three 50-minute lectures, or one 3-hour laboratory session or tutorial. Through the practicum, students will explore course and curriculum design elements by producing a detailed lesson plan, and a strategy for assessment and evaluation of the success of teaching the unit. Students will be asked to critically reflect on their experience in this course by submitting reflective essays and participating in group discussions. Final experiences will be shared through a symposium poster presentation. (Prerequisites: SCIE-8000 and admission to a thesis-based master's or PhD program in the Faculty of Science and consent of the instructor.) (3 credits)

BIOMEDICAL SCIENCES AND INTEGRATIVE BIOLOGY (JOINT DEPARTMENT OFFERING)

PROGRAMS

PhD in Biological Science (PhD)

This is a joint offering between the Department of Biomedical Science and the Department of Integrative Biology.

Admission Requirements
Applicants with an honour's degree in Biological Sciences or related field and who have been judged to be outstanding students may be admitted directly into the PhD. 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 PhD. program with advanced standing in course work as described below.

Degree 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) Behaviour and Neuroscience.

Course Work: Students proceeding toward the PhD degree will follow one of the programs given below:

1) Students proceeding directly to the PhD. 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;
(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 PhD. 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 PhD. level for a total of three (3) courses.

2) Students entering into a PhD. 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;
(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).

Master’s in Biological Sciences (MSc)

This is a joint offering between the Department of Biomedical Science and the Department of Integrative Biology.

Admission Requirements
1. Applicants with an honours degree in Biological Sciences or a related field may be admitted to the Master's Candidacy (M2) program.
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.
3. For the Behaviour and Neuroscience field, agreement with a research supervisor for supervision will also be required.

Degree Requirements

Students may pursue one of the following fields within the MSc in Biological Sciences:
Molecular/Cellular Biology
Ecology, Evolution, Environment, and Behaviour
Behaviour and Neuroscience

1) Students admitted to the Master's Candidacy program 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 thesis defense may count as one of these);
(d) successfully complete a minimum of two graduate courses with approval of the Master's Committee, courses may be in a cognate area;
(e) complete an original research project and embody it in a thesis;
(f) defend the thesis orally at a public lecture or seminar.

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.

3) Grading: 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.

4) Master's Committee: 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.

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) review and approve course work and the research proposal no later than six months into the program.
(b) discuss the student's research and thesis at least six months before the anticipated time of the final oral examination.
(c) participate in 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 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.

Research Thesis
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.

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) Behaviour and Neuroscience.

BIOMEDICAL SCIENCES /INTEGRATIVE BIOLOGY COURSES (Joint Departmental Offering)

Note: These courses are a joint offering between the Department of Biomedical Science and the Department of Integrative Biology.

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.

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.

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.

BIOL-8004. 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.)

BIOL-8014. 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.)

BIOL-8018. 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.)

BIOL-8208. 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.)

BIOL-8270. 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: consent of instructor.) (3 lecture/discussion hours a week.) (Offered in alternate years.)

BIOL-8280. 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: BIOL-3250, or consent of instructor.) (3 lecture/discussion hours a week.) (Offered in alternate years.)

BIOL-8508. 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.)

BIOL-8520. 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.)

BIOL-8530. 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.)

BIOL-8900.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: BIOL-3022, or consent of instructor.) (2 discussion hours a week.)

BIOL-8008. 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.

BIOL-8018. 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.

BIOL-8970. 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.

BIOL-9980. 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 PhD. program.

BEHAVIOR, COGNITION AND NEUROSCIENCE FIELD

BIOL-8410. 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.

BIOL-8450. 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 Principal Neuroscience (55-258) or equivalent.)

BIOL-8400. 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.)

BIOL-8470. 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: PSYC-3530, PSYC-3580 or PSYC-3350.) (Also offered as PSYC-8570; Cross-listed with PSYC-4570.)

BIOL-8408. Advanced Behvioural 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: BIOL-4508) (Note: It is recommended that students taking this course have completed Principle Neuroscience 55-258 or equivalent.)

BIOL-8418. 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.)

CHEMISTRY AND BIOCHEMISTRY

PROGRAMS

Chemistry and Biochemistry (MSc)

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 MSc degree.

1) Course Work: Students must successfully complete at least three courses. Two courses must be taken from Chemistry and/or Biochemistry, and the third from a cognate area. Cognate courses must be approved by the Graduate Program Committee of the Department of Chemistry and Biochemistry. 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 (CHEM-8900) 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 (CHEM-8970). 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.

Medical Biotechnology (MMB)

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 with not more than one band (reading, writing, speaking, listening) at or below 6.0. For TOEFL-Internet Based Test, this would correspond to 83 overall with a minimum score of 21 in no more than one band. If an applicant receives an IELTS score of less than 6.5 (or TOFEL- Internet Based Test less than 83) 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.

Degree Requirements

Total courses: 10 courses

(a) six core MMB courses:
BIOC-8700. Human Physiology and Mechanisms of Diseases
BIOC-8730. Drugs: From Discovery to Market
BIOC-8740. Protein Structure and Function
BIOC-8760. Clinical Biochemistry
BIOC-8780. Biotechnology Entrepreneurship
BIOC-8790. Biotechnology Laboratory

(b) two Science electives chosen from:
BIOC-8020. Structural Proteomics and Its Applications
BIOC-8030. Integrative Biological Mass Spectrometry
BIOC-8203. Scattering Techniques in Biochemistry
BIOC-8408. Computational Enzymology
BIOC-8580. Non-Animal Methods in Biomedical Research and Toxicology
BIOC-8640. Advanced DNA Science
BIOC-8684. Cell Death, diseases, and Natural Health Products
CHEM-8520. Free Radical in Chemistry and Biology
CHEM-8641. Bio- and Sustainable Materials
CHEM-8650. Membrane Biochemistry

(c) two Business courses:
BSMM-8140. Marketing
and one of
BSMM-8310. International Business
BSMM-8340. Leadership and Organizational Change

RECOMMENDED COURSE SEQUENCE

First semester: three courses,
BIOC-8700. Human Physiology and Mechanisms of Diseases
BIOC-8740. Protein Structure and Function
BSMM-8140. Marketing

Second semester: three courses,
BIOC-8730 Drugs. From Discovery to Market
BIOC-8760. Clinical Biochemistry
and one Science elective course. Seek academic advising for assistance with course selection.

Third semester: two courses,
BIOC-8790. Biotechnology Laboratory

and one Business course. Seek academic advising for assistance with course selection.

Fourth semester: two courses,
BIOC-8780. Biotechnology Entrepreneurship
and one Science elective course. Seek academic advising for assistance with course selection.

Standing Required for Continuation in the Program and for Graduation
Students must have a cumulative average of not less than 70% to remain in good standing, and continue in the program.

Master of Materials Chemistry and Engineering (MMCE) (Joint Program with Engineering)

Students entering the MMCE program:
(a) must have a four (4) year B.Sc (Honours) in Chemistry or B.ASc (Honours) degree in Materials Engineering, or accepted equivalent from an academic institution approved by the University of Windsor. They must have the equivalent of a B (73%) average or higher in their undergraduate studies when converted to Ontario standards.
(b) demonstrated English proficiency by meeting or exceeding an IELTS score of 6.5 (or equivalent, i.e, 83 TOEFL Internet Based Test). If an application 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.
(c) 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.

MMCE is a premium program and enrollment is limited. Preference will be given to candidates who exceed the minimum requirements and those who have demonstrated work experience in the field of Materials Chemistry or Materials Engineering.

Total courses:
Course-based stream (10 courses + 2 laboratory courses)
Project-based stream (8 courses + 2 laboratory courses plus one major project course which is equivalent to 2 course credits or 6 credit hours. worth 2 term course credits (i.e., 6 instead of 3))

Degree requirements:
Students are required to take compulsory introductory courses and lab courses in both Materials Chemistry and Materials Engineering, which will give them both academic and practical experience in both disciplines. This is followed by an additional 6 courses for the course-based stream (or 4 courses for the project-based stream). These courses may be chosen from Materials Chemistry or Materials Engineering, with at least one course chosen from each discipline. Two additional business courses are also required.

Courses used to calculate the major average are:
Course-based stream: Both compulsory introductory courses and labs in Materials Chemistry and Materials Engineering and 6 technical options.

Project-based stream: Both compulsory introductory courses and labs in Materials Chemistry and Materials Engineering and4 technical options and the research project.

Chemistry and Biochemistry (PhD)

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

1) Course Work: Candidates must complete successfully at least six courses, including CHEM-9900 (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 (CHEM-8900) throughout their PhD. studies and present at least one seminar on their research as a fulfilment of this requirement.

3) Dissertation: The principal requirement for the PhD. degree is the presentation of a dissertation which embodies the results of an original investigation (CHEM-9980). For general requirements of the dissertation, see PhD, 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 PhD. committee is chosen in the manner described under PhD 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 PhD. 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 PhD. 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 PhD. program will be required to complete an oral comprehensive examination within the first twelve months following admission into the PhD. 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.

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.

CHEMISTRY AND BIOCHEMISTRY COURSES

BIOCHEMISTRY

BIOC-8000. Protein Chemistry I
Protein chemistry; chemical modification, protein folding, post-translational modification, lipoproteins, and glycoproteins. (Prerequisite: BIOC-3130 or equivalent.) (2 lecture hours a week.)

BIOC-8008. Special Topics in Biochemistry
(Prerequisites: BIOC-3100 and BIOC-3110, or equivalent.) (2 lecture hours a week.)

BIOC-8010. 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: BIOC-8000.) (2 lecture hours a week.)

BIOC-8020. Structural Proteomics and Its Applications
This course provides an introductory overview of the technologies and practices in structural proteomics and its applications. It will cover the history, current status, and the workflow of high-throughput approaches to structural biology. It will introduce the concepts of drugability, target selection and validation, chemical probes, chemogenomics in modern drug discovery and the critical role of structural proteomics in these applications. Also, progress in several important protein families, such as kinase, methyltransferase, deubiquitinase, will be discussed. This course is intended for graduate students in life science major who have interests in protein structural biology, want to interface with structural biologists or utilize the knowledge in their study and research. (2 lecture hours/week.)

BIOC-8030. Integrative Biological Mass Spectrometry
This course will focus on the theory and applications of biological mass spectrometry. The most common types of ionization methods and mass analyzers will be thoroughly presented including data interpretation. A major part of the course will be to discuss the applications of this technique in identifying multiprotein complexes, mapping post-translational modifications, structural biology, and quantitative proteomics. 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 common biological research fields. (2 lecture hours/week.)

BIOC-8203. Scattering Techniques in Biochemistry
In order to understand the biological role of different bio-molecules, it is necessary to determine the mesoscopic structure of well-defined systems. Neutron and X-ray scattering are non-invasive, probe-free techniques that have been used extensively in such systems to probe length scales ranging from angstroms to microns, and dynamics occurring over picosecond to millisecond time scales. Recent developments in the area of biology and biomaterials will be presented, and the underlying concepts of the different scattering techniques used to study them will be discussed in detail. (Prerequisite: BIOC-3581 or CHEM-2310 or equivalent.) (2 lecture hours a week.)

BIOC-8208. Advanced Bioanalytical Topics
(Prerequisite: BIOC-3100, or equivalent.) (2 lecture hours a week.)

BIOC-8404. Computational Enzymology
Computational enzymology is the study of all enzyme-related aspects using computers. It is a powerful and insightful approach for investigating and elucidating the properties, behaviours, and mechanisms of enzymes as well as related aspects such as protein-protein and protein-drug interactions. For instance, it includes mining databases to identify potential ligands (drugs), molecular dynamics (MD) simulations to examine the dynamic behaviour of enzymes including ligand binding, and quantum mechanics/molecular mechanics (QM/MM) methods to elucidate their catalytic mechanisms. In this course we will discuss and learn about these and other approaches of computational enzymology. In particular, we will examine and learn how such methods and approaches can be applied, often complementarily, to understand a desired aspect of the biological chemistry, role(s), and/or properties of enzymes (3 lecture hours a week).

BIOC-8260. 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: BIOC-3100 and BIOC-3110, or consent of instructor.) (2 lecture hours a week.)

BIOC-8408. 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.)

BIOC-8640. 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: consent of instructor.) (2 lecture hours a week.)

BIOC-8684: Cell death, diseases, and Natural Health Products
This course will cover a detailed biochemical study of physiological (apoptosis and autophagy) and pathological (necrotic) cell death in mammalian systems, and how these cellular processes play important role during the development of various diseases, including viral infection, cardiovascular diseases, neurodegenerative disorders and cancers. It will also present and discuss various preventative and therapeutic developments and practices using natural health products and purified natural compounds that specifically target biochemical pathways of cell death.3 lecture hours per week).

CHEMISTRY

CHEM-8008. 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 CHEM-8970 or CHEM-9980. (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; PhD. students may register under (b) above for two terms of this industrial experience.)

CHEM-8208. Special Topics in Analytical Chemistry
(Prerequisite: CHEM-3210.) (2 lecture hours a week.)

CHEM-8308. Special Topics in Organic Chemistry
Topics may include polymer chemistry, natural product chemistry, physical organic chemistry, or design and execution of organic syntheses. (Prerequisite: CHEM-3310 or consent of instructor.) (2 lecture hours a week.)

CHEM-8318. 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: CHEM-3310 or consent of instructor.) (2 lecture hours a week.)

CHEM-8320. Dyes and Pigments - Design, Synthesis, and Properties
This course describes essential design criteria for organic dyes and pigments and common synthetic strategies for their preparation. Also covered are basic structure-property relations regarding their absorption and emission properties. This is an advanced organic chemistry course and requires a good understanding of intermediate organic chemistry and spectroscopic techniques. Prerequisite: Consent of instructor. (Cross-listed with CHEM-4320)

CHEM-8328. 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.)

CHEM-8330. Synthetic Methods in Organic Chemistry
A study of some important organic reactions with emphasis on their practical application in synthesis. (Prerequisites: CHEM-3300 and CHEM-3310, or consent of instructor.) (2 lecture hours a week.)

CHEM-8338. 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: CHEM-3300 and CHEM-3310, or consent of instructor.) (2 lecture hours a week.)

CHEM-8350. Advanced Organic Chemistry
Physical organic chemistry. Includes molecular orbital theory, stereochemistry, thermodynamics, and reaction mechanisms. (Prerequisite: consent of instructor.) (2 lecture hours a week.)

CHEM-8410. 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.)

CHEM-8420. Nuclear Magnetic Resonance Spectroscopy
Theory and applications of Nuclear Magnetic Resonance (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).

CHEM-8458. Special Topics in Physical Chemistry
(2 lecture hours a week.)

CHEM-8468. 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.)

CHEM-8470. Advanced Quantum Chemistry
Perturbation and variation theories. Theories of many electron atoms and general theories of chemical bonds in diatomic and polyatomic molecules. (Prerequisite: consent of instructor.) (3 lecture hours a week.)

CHEM-8500. 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.)

CHEM-8508. 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.)

CHEM-8518. 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.)

CHEM-8520. Free Radicals in Chemistry and Biology
This is an advanced level course that covers the principle of radical generation and stabilization, and the foundations of Electron Paramagnetic Resonance (EPR) spectroscopy for studying and characterizing free radicals. Experimental data, such as EPR spectra, will be used to probe the electronic structure of free radicals as well as provide local information on the coordination geometry for metal complexes including metallo-enzymes. A range of free radical reaction mechanisms will be surveyed, incorporating radical recombination reactions, radical abstraction reactions, radical addition reactions and radical rearrangements. These will be exemplified by important chemical processes as well as examples drawn from biology including lipid peroxidation, lignin synthesis and metallo-enzyme chemistry. (Prerequisite: CHEM-2510 and either CHEM-2310 or CHEM-2320.) (3 lecture hours per week.)

CHEM-8528. Supramolecular Chemistry
Supramolecular chemistry can be defined as the study of chemical systems involving aggregates of molecules or ions held together by non-covalent interactions. This course will survey the concepts, major research areas and applications of modern supramolecular chemistry including intermolecular interactions, molecular recognition, supramolecular devices, self-assembly, supramolecular materials, molecular topology, biomimetic systems and molecular machines. (2 lecture hours a week.) (Cross listed with CHEM-4528)

CHEM-8530. 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.)

CHEM-8535. Organometallics for Clean Energy Conversion
This course exposes students to the use of organometallic chemistry for clean energy conversion. The content will be broken up into four major sub-sections regarding Earth's hydrogen, carbon, nitrogen, and oxygen cycles. Topics of interest will include (but are not limited to): i) assessing the energy challenge; ii) nuclear energy; iii) hydrogen as an energy carrier in fuel cells; iv) recent developments in CO_2 hydrogenation; v) assessing global need for ammonia formation and utilization; and vi) homogeneous water oxidation. In each of these areas, students are expected to develop an understanding of the factors that govern chemical reactivity in an effort to propose new catalysts from scratch. Emphasis will be placed on honing students' writing skills, mastering careful literature evaluation, and providing strong oral presentations. (3 lecture hours/week.) (Cross-listed with CHEM-4535)

CHEM-8538. 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.)

CHEM-8600. Surface Chemistry and Analysis
This course covers the formation, characterization and applications of self-assembled monolayers. It introduces students to the process of molecular self-assembly, the preparation of self-assembled monolayers, and the experimental techniques used for their characterization. The first half of the course focuses on these fundamentals. The second half of the course addresses the numerous applications of self-assembled monolayers. (3 lecture hours/week). (Prerequisite: CHEM-8820 Introduction to Materials Chemistry, or CHEM-3710 Introduction to Materials Chemistry) (Cross-listed with CHEM-4600.)

CHEM-8608. 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.

CHEM-8630. Self-Organization by Molecular Design
Self-organization is a ubiquitous phenomenon in nature (e.g., cell membranes, vesicles, and iridescent surfaces) and technology (e.g., block-copolymers, liquid crystals, and surfactants). This course will provide a basic understanding of the driving forces for self-organization and how the formation of specific self-organized structures (e.g., layers, micelles, tubes, columns, and cubic arrangements) can be programmed into molecules by rational design. The course will also provide an introduction to variable temperature polarized optical microscopy, thermal analysis (DSC and TGA), and variable temperature powder X-ray diffraction as important characterization techniques for these materials. (2 lecture hours/week and 1 lab/tutorial hour/week).

CHEM-8640. Organic Nanomaterials

This course examines the fundamental concepts, preparation strategies and properties of organic/carbon-rich nanomaterials at the nanoscale, and their applications in various areas of modern chemistry (materials, electronics, pharmaceutical, medicine, etc.). A special emphasis is also put on methods and techniques utilized in materials science to characterize organic nanostructures. (Prerequisite for students in graduate course: CHEM-3310 and CHEM-3700) (Crosslisted with CHEM-4740)

CHEM-8641. Bio- and Sustainable Materials
As technology makes increasing inroads into the chemical sciences, the development of new functional sustainable and biomaterials becomes increasingly important. This course focuses on the chemistry, characterization and applications of renewable and degradable polymers as well as on the chemistry of carbohydrates and amino acids, and the properties of their polymers. (3 lecture hours/week.)

CHEM-8650. 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: BIOC-3100 and BIOC-3110, or equivalent.) (2 lecture hours a week.)

CHEM-8660. Analytical Spectroscopy of Surfaces
Surface spectroscopic techniques and their application to the analysis of chemisorbed and physisorbed species and monomolecular layers. (Prerequisite: CHEM-3210 or equivalent.) (2 lecture hours a week.)

CHEM-8820. Introduction to Materials Chemistry
An introduction to topics in materials science and solid-state chemistry are discussed with an emphasis on the relationship between the material structure and its physical, optical, and electrical properties. The topics covered include solid-state materials, crystalline materials, amorphous materials, metals, magnetic materials, polymers, semiconductors, microelectronics, and nanomaterials. The use of these materials in applications is discussed (3 lecture hours/week.)

CHEM-8821. Materials Chemistry Laboratory
This course is a laboratory course designed to provide hands-on skills for the synthesis and characterization of materials, and for their processing to fabricate different types of electronic devices. Experiments cover the synthesis of conductive, surface active, and carbon-rich materials and their characterization by spectroscopic and microscopy methods. The experiments also include basic film processing by physical and solution-based techniques, electric characterization of conductive materials and the fabrication of different organic electronic devices such as transistors and sensors. (3 laboratory hours/week.) (Enrolment restricted to MMCE students.) (Prerequisite: MATL-8821)

CHEM-8831. Research Project
Original laboratory research under the direction of one faculty member from Chemistry and Biochemistry and one faculty member from Mechanical, Automotive, and Materials Engineering. Student must present three seminars discussing their research project. (1 lecture, 12 laboratory hours per week over two terms; 6 credit hours.) (Only open to students in Master of Materials Chemistry and Engineering, whose grade average above 80%, and with agreement of faculty members). (Prerequisites: MATL-8820, MATL-8821, CHEM-8820, CHEM-8821).

CHEM-8832. Magnetochemistry
This course covers the requisite theory underpinning the field of magnetic materials. It provides the necessary skills set for students to interact effectively in this sub-discipline with researchers in the fields of physics, materials science and engineering. Knowledge gained from this course provides current state-of-the-art knowledge in conventional magnetic materials (‘hard’ and ‘soft’ magnets and their applications) as well as emerging fields such as low dimensional magnetic materials and single molecule magnets with applications

in next-generation quantum computing. (3 lecture hours/week or 2 lecture hours and 1 lab hour per week.) (Cross-listed with CHEM-4832.)

CHEM-9900. 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 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 PhD. 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 PhD. program. The oral presentation and proposal defense will take place during the term of registration.)

CHEM-8900. Seminar

CHEM-8970. Master's Thesis

CHEM-9980. Doctoral Dissertation

MASTER OF MEDICAL BIOTECHNOLOGY (MMB) COURSES

BIOC-8700. 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.)

BIOC-8720. 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.)

BIOC-8730. 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.)

BIOC-8740. 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 including mass spectrometry and its applications will also be highlighted. The laboratory section of the course will focus on web based computational programs as they apply to protein structure and function. (Enrolment restricted to MMB students.)

BIOC-8750. Strategic Management of Biotech Innovations
The course will provide an overview of the principles underlying the strategic management of innovation with a focus on the biotechnology sector. Topics will include: (i) Sources, types and patterns of innovation (ii) Timing of entry and approaches to improve timing options, (iii) Budget allocation for sustainable RandD projects, (iv) Collaboration strategies, (v) Ways to protect innovations, (vi) Managing new product development teams and (vii) Strategic launching of new products. The course will emphasize concepts and strategies necessary to the development of managerial skills and the appropriate knowledge to identify, evaluate, and manage new biotechnology-based innovations. (Enrolment restricted to MMB students.)

BIOC-8760. 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, reroduction, 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.)

BIOC-8780. 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.)

BIOC-8790. 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.)

COMPUTER SCIENCE

PROGRAMS

Master of Applied Computing (MAC)

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's 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).

International applicants to graduate programs in Computer Science must demonstrate English proficiency by meeting or exceeding an IELTS overall score of 6.5 (or equivalent), with no more than one band scores of 6.0, and no band score below 6.0 (or TOEFL of 92).

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.

Degree Requirements

Total courses: 30 credit hours (10 courses - 3.0 credit hours each)

(a) Take the following 8 courses:
COMP-8117. Advanced Software Engineering Topics
COMP-8157. Advanced Database Topics
COMP-8347. Internet Applications and Distributed Systems
COMP-8547. Advanced Computing Concepts
COMP-8567. Advanced Systems Programming
COMP-8677. Networking and Data Security
COMP-8967. Internship/Project I
COMP-8977. Internship/Project II

NOTE: The above courses, except COMP-8967 and COMP-8977, may be offered in an accelerated 4 or 6 week format.

(b) Two of the following:

BSMM-8120. Finance in a Global Perspective
BSMM-8140. Marketing
BSMM-8130. Managing Employees
COMP-8xxx. Any graduate level lecture course offered by the School of Computer Science, excluding COMP-8100 (Literature Review and Survey) and COMP-8900 (Directed Special Studies).
ESCI-8818. Special Topics

Stream: students may specialize in Artificial Intelligence, if they successfully complete two courses from the following list:

COMP-8790 Topics in Applied Artificial Intelligence
COMP-8590 Statistical Learning
COMP-8610 Neural Networks and Deep Learning
COMP-8700 Introduction to Artificial Intelligence
COMP-8740 Machine Learning and Pattern Recognition
COMP-8720 Topics in Artificial Intelligence
COMP-8730 Natural Language Processing and Understanding
COMP-8750 Knowledge Representation and Reasoning
COMP-8760 Advanced Search Methods

And, (2) they successfully complete their COMP-8977 project/internship course to be on an approved topic in Artificial Intelligence. For these students, a special annotation will be made on their transcripts, stating that they were in the Artificial Intelligence stream

Suggested Program Sequencing

Term 1:
COMP-8117. Advanced Software Engineering Topics
COMP-8547. Advanced Computing Concepts

One of the following four:
BSMM-8120. Finance in a Global Perspective,
BSMM-8130. Managing Employees
BSMM-8140. Marketing,
ESCI-8818. Special Topics
COMP-8xxx. Any graduate level lecture course offered by the School of Computer Science, excluding COMP-8100 Literature Review and Survey, COMP-8900 Directed Special Studies.

Term 2:
COMP-8157. Advanced Database Topics
COMP-8567. Advanced Systems Programming

One of the following four:
BSMM-8130. Managing Employees
BSMM-8140. Marketing
BSMM-8120. Finance in a Global Perspective,
ESCI-8818. Special Topics
COMP-8xxx. Any graduate level lecture course offered by the School of Computer Science, excluding COMP-8100 Literature Review and Survey and COMP-8900 Directed Special Studies.

Term 3

COMP-8347. Internet Application and Distributed Systems
COMP-8677. Networking and Data Security
COMP-8967. Internship/Project I

Term 4
COMP-8977. Internship/Project II

NOTE: Course sequencing may change (except COMP-8967), particularly for Term 2 and Term 3.

Internship Requirements
Students will be required to complete an approved work-placement internship as part of their COMP 8977 course. Exceptionally, if a student is unable to secure a work-placement with an industry partner, he/she will be assigned an on-campus supervised project. Students will receive credit for the course COMP 8977 (worth 3 credit hours) upon successful completion of their internship. In exceptional circumstances and on a case-by-case basis, the internship could be extended for up to an additional 4-month term, with the permission of the School of Computer Science. In this case, an additional fee will be paid by students to cover the cost of the internship extension.

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.

Master of Science in Computer Science (MSc)

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 honour 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.

International applicants to graduate programs in Computer Science must demonstrate English proficiency by meeting or exceeding an IELTS overall score of 6.5 (or equivalent), with no more than one band scores of 6.0, and no band score below 6.0 (or TOEFL of 92).

Degree 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 are expected to attend regular departmental seminars throughout their MSc. 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 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.

Master of Science in Computer Science (MSc) Artificial Intelligence Stream

In addition to the Program Requirements for the Master of Science Degree programs above (ie, both the MSc-CS-AI and the MSc-CS-AI-Coop), students participating in the AI Stream must satisfy the following conditions:

Degree Requirements

1. Five (5) courses:

(a) One of the Following:
COMP-8590 Statistical Learning
COMP-8610 Neural Network and Deep Learning
COMP-8740 Machine Learning and Pattern Recognition

(b) Two of the Following:
COMP-8590 Statistical Learning
COMP-8610 Neural Network and Deep Learning
COMP-8700 Introduction to Artificial Intelligence
COMP-8720 Topics in Artificial Intelligence
COMP-8730 Natural Language Processing and Understanding
COMP-8740 Machine Learning and Pattern Recognition
COMP-8750 Knowledge Representation and Reasoning
COMP-8760 Advanced Search Methods

(c) Two of the Following: COMP-8XX0: Any graduate level course offered by the School of Computer Science, excluding COMP-8010 (Work Term), COMP-8970 (MSc. Thesis) and COMP-9980 (Doctoral Dissertation Research).

2. Research Thesis:
COMP-8970: A research thesis in an approved Artificial Intelligence topic. A thesis is a major research project which must involve substantial innovative work in Artificial Intelligence, generally, culminating in original results.

Additional Requirements:
3. Students are expected to attend regular departmental seminars in Artificial Intelligence-related topics throughout their M.Sc. studies, as a fulfilment of this requirement.
4. With prior approval of the graduate coordinator, candidates may be permitted to include graduate courses in Artificial Intelligence or Artificial Intelligence-related topics offered by other departments in their program.

Students who complete the Artificial Intelligence Stream will have a special annotation on their transcript, stating their Artificial Intelligence specialization.

PhD in Computer Science (PhD)

The general regulations for the Degree of the Doctor of Philosophy (PhD.) 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 PhD. 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.

International applicants to graduate programs in Computer Science must demonstrate English proficiency by meeting or exceeding an IELTS overall score of 6.5 (or equivalent), with no more than one band scores of 6.0, and no band score below 6.0 (or TOEFL of 92).

Outline of Degree Requirements
All PhD. 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 PhD. dissertation defense (COMP-9980).

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.

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.

COMP-8010. 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).

COMP-8100. 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.

COMP-8110. 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.

COMP-8117. 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.)

COMP-8120. 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.

COMP-8130. 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.

COMP-8150. 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.

COMP-8157. 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).

COMP-8207. Emerging Paradigms in Computing Technologies
This course explores the new trending and emerging technologies in the area of Computer Science and Information Technology. Students are required to investigate, through research, reading and use, a number of trending technologies, which reflect the breadth of the computing science discipline. Examples of such

trending technologies, which might change over the years, include and is not limited to, cloud computing, cyber security, artificial intelligence and deep learning. For each trending technology, students are required to compare, test and contrast the major available products representing the technology. Each group of students (2 or more students), will be assigned one trending/emerging technology on which they are required to write a critical review report. Students will use a team project management tool for their assigned work and will also present it as seminars to their class, to enhance their communication skills.

COMP-8347. 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.)

COMP-8350. 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.

COMP-8360. 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.

COMP-8370. 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.

COMP-8380. Information Retrieval Systems
Fundamental principles and advanced topics in the design of information retrieval systems. Theoretical as well as practical aspects will be discussed.

COMP-8390. 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.

COMP-8400. 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.

COMP-8490. 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.)

COMP-8500. 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.

COMP-8510. 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.

COMP-8520. Computer Graphics
Current developments in computer graphics. Topics covered will include hardware, software, interfaces, graphics standards, data structures, rendering algorithms, and visualization.

COMP-8540. Advanced Algorithms
Methodology for developing efficient algorithms. Advanced data structures. Intractable computational problems and approximation algorithms.

COMP-8547. 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.)

COMP-8550. 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.

COMP-8560.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: BSc Honours Computer Science or permission of instructor.)

COMP-8567. 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.

COMP-8570. Computational Geometry and Its Applications
The focus of this course is the design and analysis of algorithms and data structures to solve geometric problems. These problems arise from applied fields such as computer graphics, robotics, pattern recognition, wireless networks, geographic information systems (GIS), and surface modeling. Topics will include: convex hull algorithms, Voronoi diagrams, triangulations, point location, polygons, range searching, line arrangements, and matchings. (Prerequisite: B.Sc. [Hons, Computer Science] or with the permission of the instructor.)

COMP-8580. 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. Students will be required to investigate selected problems/methods in computational biology and bioinformatics. (Prerequisite: BSc Honours Computer Science or permission of instructor.)

COMP-8590. Statistical Learning

This course introduces the important elements of statistical learning. Statistical learning refers to a set of tools for modelling and understanding complex datasets. It blends Statistics with methods in machine learning, and its main goal is to "learn from the data"; that is: to extract important patterns and trends from the data, and understand "what the data says". Topics include: linear methods for regression, linear methods for classification; resampling methods, model assessment and selection, regularization; non-linear models, basis expansions; tree-based methods; support vector machines, kernel methods; unsupervised learning. Additional topics may include: matrix factorization methods; network-based machine learning; kernel smoothing methods; model inference and averaging; boosting methods; neural networks; prototype methods; ensemble learning; graphical models; high-dimensional problems. The legal, societal and ethical implications of artificial intelligence and machine learning are also discussed. (Prerequisite: BSc Honours Computer Science or permission of instructor.)

COMP-8600. 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.

COMP-8610. Neural Networks and Deep Learning

This course introduces the fundamentals of neural Networks and deep learning. Neural network architectures are discussed along with their associated set of learning algorithms. Topics include: supervised and unsupervised learning, associative learning, competitive learning, probably approximately correct learning, adaptive learning, gradient-descent and optimization. Students will be required to investigate selected shallow and deep learning models of neural networks, including autoencoders; and convolutional, recurrent, recursive, adversarial and probabilistic networks. Applications of deep learning to computer vision, speech recognition, natural language processing, and others. The legal, societal and ethical implications of artificial intelligence and machine learning are also discussed. (Prerequisite: BSc Honours Computer Science or permission of instructor.)

COMP-8620.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: BSc Honours Computer Science or permission of instructor.)

COMP-8640.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.

COMP-8670. 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.

COMP-8677. 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.)

COMP-8680. 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: BSc Honours Computer Science or permission of instructor.)

COMP-8690. 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.

COMP-8700. 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: BSc Honours Computer Science or permission of instructor.)

COMP-8720. 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: COMP-8700 or permission of the instructor.)

COMP-8730. 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 common-sense 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: COMP-8700 or permission of the instructor.)

COMP-8740. Machine Learning and Pattern Recognition

This course is a general introduction to machine learning and Pattern Recognition. Topics may include: Bayesian learning, estimation, distance-based models, linear methods, support vector machines, kernels, dimensionality reduction, feature extraction and selection, clustering, performance evaluation, regression, representation learning, regularization, decision trees, random forest, neural networks and deep learning models. Topics also include the legal, societal and ethical implications of machine learning and pattern recognition. Applications in bioinformatics, genomics, networks, computer vision, speech, and natural language may be discussed. (Prerequisite: BSc Honours Computer Science or permission of instructor.)

COMP-8750. 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: BSc Honours Computer Science or permission of instructor.)

COMP-8760. 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: BSc Honours Computer Science or permission of instructor.)

COMP-8790. 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: COMP-8700 or permission of the instructor.)

COMP-8880. Advanced Programming Languages
Current developments in the design, application, and implementation of pure lazy functional programming languages.

COMP-8900. 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 COMP-8970 (M.Sc. Thesis).

COMP-8920. Selected Topics
Selected advanced topics in computer science.

COMP 8967. Internship/Project I
This is the first part of a sequence of two courses, that is, Project 1 and Project 2, to provide supervised experience in completing an approved software project. This course introduces students to project management and prepares them for developing software systems. Students are required to participate in workshops on campus, to work on applied projects under the guidance of a faculty member to improve their technical skills and, are also required to present their projects when completed.

COMP-8970. MSc. Thesis

COMP 8977. Internship/Project II

This is the second part of a sequence of two courses, that is, Project 1 and Project 2, to provide supervised experience in completing an approved software project. The focus of this course 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. (May be repeated for credit with the permission of the Department Head.)

COMP-8997. 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.)

COMP-9980.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 PhD. program.

ECONOMICS

PROGRAMS

Master of Economics (MA)

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.

Degree Requirements
1) Students in the two-year program are required to take a make-up or qualifying year in their first year of the MA program. Selection of courses is to be made in consultation with a graduate advisor.

2) Students in the one-year MA 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 PhD. program are advised to take ECON-8010, ECON-8020, ECON-8030, ECON-8040, ECON-8410, and ECON-8420.

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.

Degree Requirements

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

(a) ECON-8210: Applied Microeconomics
ECON-8220: Applied Macroeconomics
ECON-8230: Mathematics for Applied Economics
ECON-8240: Applied Econometrics 1
ECON-8250: Applied Econometrics 2
ECON-8260: Business Communication
ECON-8270: Research Project in Economic Policy and Seminar

(b) Two of the following:
ECON-3730: International Economics: Trade
ECON-3740: International Economics: Finance
ECON-4160: Urban and Regional Economics
ECON-4300: Economics Analysis of Law
ECON-4600: Cost-Benefit Analysis
ECON-4860: Public Sector Economics: Finance
ECON-3350: Money and Banking

(c) Two of the following:
ECON-8100: International Economics
ECON-8500: Monetary Theory and Policy
ECON-8800: Models of Strategic Behavior
ECON-8940: Special Studies in Economics
ECON-8160: Labor Economics I
ECON-8910: Urban Economics

(d) Two of the following (offered by the Master of Management program):
BSMM-8110: Accounting Concepts and Techniques

BSMM-8120: Finance in a Global Perspective
BSMM-8310: International Business
BSMM-8360: International Financial Reporting
BSMM-8370. International Financial Management
BSMM-8550: 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.

ECONOMICS COURSES

All courses listed will not necessarily be offered in every term. Courses are normally three hours a week.

ECON-8010. Microeconomic Theory I
An intensive review of the theory of the firm and consumer theory.

ECON-8020. Macroeconomics Theory I
An intensive review of theories of the determination of aggregate output, employment and price level.

ECON-8030. Microeconomic Theory II
Additional topics in microeconomic theory.

ECON-8040. Macroeconomic Theory II
Additional topics in macroeconomic theory.

ECON-8100. 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.

ECON-8160. Labour Economics I
The demand and supply analysis; human capital; trade unions and collective bargaining; wage structures; labour mobility.

ECON-8310. Industrial Organization
A theoretical and empirical analysis of firms and markets.

ECON-8410. Econometric Theory I
The general linear model, selected single equation problems, and an introduction to simultaneous equations methods.

ECON-8420. Econometric Theory II
Additional topics in econometric theory (Prerequisite: ECON-8410.)

ECON-8430. 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 ECON-8410.)

ECON-8500. Monetary Theory
A survey of recent developments in the theory of money and monetary control of an economy, in addition to selected topics.

ECON-8800. 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.

ECON-8810. Mathematical Economics
The formal properties of selected economic models. Includes an examination of the problems of existence, uniqueness and stability of solutions.

ECON-8820. Selected Topics in Economic Theory
An examination of the most recent literature on one or two selected topics in theory.

ECON-8900. Regional Economics
Theoretical and policy issues relating to large regions, including, for example, distribution of wealth, distribution of productive resources, and migration.

ECON-8910. Urban Economics
Theoretical and policy issues relating to urban areas, including, for example, urban growth and land use.

ECON-8940. Special Studies in Economics
Research and reading course in a selected field approved by the Department.

ECON-8960. Major Paper

APPLIED ECONOMICS AND POLICY COURSES

ECON-8210. 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 labour and capital, income distribution, and the minimum wage.

ECON-8220. 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.

ECON-8230. 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. (Cross-listed with undergraduate course (ECON-3060), with more advanced expectations set for students enrolled under the graduate number.)

ECON-8240. 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

ECON-8250. Applied Econometrics 2
This is a continuation of ECON-8240. 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: ECON-8240.)

ECON-8260. 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.

ECON-8270. 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: ECON-8210, ECON-8220, ECON-8250.)

MATHEMATICS AND STATISTICS

PROGRAMS

Mathematics and Statistics (MSc)(Mathematics Field)

The candidate shall successfully complete one of the following courses of study:
(a) seven graduate courses, of which at least four must be numbered with the prefix MATH and the other three must be numbered with the prefix STAT or MATH or be approved by the Graduate Studies Committee upon the recommendation of the supervisor, and a major paper
(b) six graduate courses, of which at least three must be numbered with the prefix MATH, one numbered with prefix MATH or STAT and the other two must be numbered with the prefix STAT or MATH or be approved by the Graduate Studies Committee upon the recommendation of the supervisor, and a thesis. The originality of a Master's thesis may lie in the organization, presentation, and scholarly evaluation, rather than in the result.

The Department of Mathematics and Statistics requires that students maintain at least a 70% average at all times. Term courses in which a grade of at least 70% has been earned will be accepted for graduate credit. Term courses with a grade lower than 60% will not be accepted for graduate credit. At most two term courses with grades in the 60% - 69.9% range will be accepted for credit subject to the approval of the Faculty of Graduate Studies after a positive recommendation from the Graduate Studies Committee upon consultation with the supervisor. This recommendation will be given on a case-by-case basis.

All course selections require the approval of the student's master's committee, the supervisor, or the departmental graduate committee.
Mathematics Master's students must attend either 24 seminars or 75 percent of all seminars available during full-time registration, whichever is the smaller number. Seminars include the colloquium series, graduate major paper presentations and thesis presentations.

Master's Committee
If the Thesis option is taken for either the MSc Mathematics and Statistics (Mathematics) or the M.Sc. Mathematics and Statistics (Statistics), a Masters committee must be appointed within the student's first term of study at the Master's II (or M2) (Candidate) level. The Master's committee must be approved by the Executive Committee of the Faculty of Graduate Studies and Research. The Master's committee shall include the student's supervisor as chairperson, one other member of the Department, and one faculty member from outside the Department.

Mathematics and Statistics (MSc) (Statistic Field)

The candidate shall successfully complete one of the following courses of study:

(a) seven graduate courses, of which at least five must be numbered with the prefix STAT and the other two must be numbered with the prefix STAT or MATH or be approved by the Graduate Studies Committee upon the recommendation of the supervisor, and a major paper;
(b) six graduate courses, of which at least four must be numbered with the prefix STAT and the other two must be numbered with the prefix STAT or MATH or be approved by the Graduate Studies Committee upon the recommendation of the supervisor, and a thesis. The originality of a Master's thesis may lie in the organization, presentation, and scholarly evaluation, rather than in the result.

Up to two courses prefixed STAT may be replaced by MATH-8100 and/or MATH-8110.
Statistics Master's students must attend either 24 seminars or 75 percent of all seminars available during full-time registration, whichever is the smaller number. Seminars include the colloquium series, graduate major paper presentations and thesis presentations.

The Department of Mathematics and Statistics requires that students maintain at least a 70% average at all times. Term courses in which a grade of at least 70% has been earned will be accepted for graduate credit. Term courses with a grade lower than 60% will not be accepted for graduate credit. At most two term courses with grades in the 60% - 69.9% range will be accepted for credit subject to the approval of the Faculty of Graduate Studies after a positive recommendation from the Graduate Studies Committee upon consultation with the supervisor. This recommendation will be given on a case-by-case basis.

Master's Committee
If the Thesis option is taken for either the M.Sc. Mathematics and Statistics (Mathematics) or the M.Sc. Mathematics and Statistics (Statistics), a Masters committee must be appointed within the student's first term of study at the II Master's (Candidate) level. The Master's committee must be approved by the Executive Committee of the Faculty of Graduate Studies and Research. The Master's committee shall include the

student's supervisor as chairperson, one other member of the Department, and one faculty member from outside the Department.

Master of Actuarial Science (MActSc)

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. Knowledge of calculus and matrix algebra is essential. Admission is limited and competitive.

Degree Requirements
Total Courses: 12

ACSC-8010. Probability for Risk and Actuarial Science
ACSC-8020. Financial Mathematics, Theory of Interest
ACSC-8030. Derivatives Markets I
ACSC-8040. Derivatives markets II
ACSC-8050. Life Contingencies I
ACSC-8060. Life Contingencies II
ACSC-8070. Short Term Actuarial Models
ACSC-8100. Microeconomics
ACSC-8110. Macroeconomics
ACSC-8200. Regression and Time Series
ACSC-8300. Mathematical Statistics for Actuarial Science
ACSC-8400. Actuarial Science Capstone Project

The 12 required courses are scheduled over four semesters.

The Department of Mathematics and Statistics requires that students always maintain at least a 70% average. Term courses in which a grade of at least 70% has been earned will be accepted for graduate credit. Term courses with a grade lower than 60% will not be accepted for graduate credit. At most two term courses with grades in the 60% - 69.9% range will be accepted for credit subject to the approval of the Faculty of Graduate Studies after a positive recommendation from the Department's Graduate Studies Committee upon consultation with the Director of the Master of Actuarial Science program. This recommendation will be given on a case-by-case basis.

Mathematics and Statistics (PhD)

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.

Degree Requirements for the PhD (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 STAT; further graduate courses may be assigned by the Graduate Studies Committee in consultation with the supervisor. Transfer credits will not be allowed. (Up to two courses prefixed STAT may be replaced by MATH-8100 and/or MATH-8110.)

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 STAT and the other four must either be numbered STAT or MATH or be approved by the Graduate Studies Committee upon the recommendation of the supervisor; further graduate courses may be assigned by the Graduate Studies Committee in consultation with the supervisor. Transfer credits will not be allowed.
It is strongly recommended that all PhD. students in Statistics take a measure theoretic probability course.

The Department of Mathematics and Statistics requires that students maintain at least a 70% average at all times. Term courses with a grade lower than 70% will not be accepted for graduate credit.

PhD. students must give a fifty-minute presentation prior to the thesis 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. Refer to the calendar section “Faculty Regulations for the Doctor of Philosophy and the Master's Degrees”.

3) Dissertation: The dissertation shall be defended at an oral examination. Refer to the calendar section “Faculty Regulations for the Doctor of Philosophy and the Master's Degrees”.

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 supervisor 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. 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.

5) Statistics Doctoral students must attend either 72 seminars or 75 percent of all seminars available during full-time registration, whichever is the smaller number. Seminars include the colloquium series, graduate major paper presentations and thesis presentations.

Degree Requirements for the PhD (Mathematics Field)

1) Course Work: Students admitted with an M.Sc. or equivalent must successfully complete at least four graduate courses numbered with the prefix MATH; further graduate courses may be assigned by the Graduate Studies Committee in consultation with the supervisor. Transfer credits will not be allowed.

The Department of Mathematics and Statistics requires that students maintain at least a 70% average at all times. Term courses with a grade lower than 70% will not be accepted for graduate credit.

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 MATH and the other four must either be numbered STAT or MATH or be approved by the Graduate Studies Committee upon the recommendation of the supervisor; further graduate courses may be assigned by the Graduate Studies Committee in consultation with the supervisor. Transfer credits will not be allowed.

PhD. students must give a fifty-minute presentation prior to the thesis 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 Committer. Refer to the calendar section “Faculty Regulations for the Doctor of Philosophy and the Master's Degrees”.

3) Dissertation: The dissertation shall be defended at an oral examination. Refer to the calendar section “Faculty Regulations for the Doctor of Philosophy and the Master's Degrees”.

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). 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.

5) Mathematics Doctoral students must attend either 72 seminars or 75 percent of all seminars available during fulltime registration, whichever is the smaller number. Seminars include the colloquium series and graduate major paper and thesis presentations.

MATHEMATICS AND STATISTICS COURSES

All courses listed will not necessarily be offered in any given year.

MATH

MATH-8100.Functions of a Real Variable I
Lebesgue measure, abstract measure, integration, monotone and dominated convergence theorems, Radon-Nikodym theorem, Hahn decomposition theorem, Fubini's theorem, Lp spaces.

MATH-8110. Functions of a Real Variable II
Metric spaces, topological spaces, compactness, Stone-Weierstrass and Ascoli theorems, Baire category theorem, classical Banach spaces.

MATH-8120. Functional Analysis I
Normed linear spaces and examples, Hahn-Banach theorem, open mapping theorem, principle of uniform boundedness, weak and weak topologies on Banach spaces, Hilbert spaces and bounded linear operators on Hilbert spaces.

MATH-8130. Functional Analysis II
Banach algebras and spectral theory, operator theory, C*-algebras and their representations, elementary von Neumann algebra theory.

MATH-8200. Abstract Algebra
Elements of group theory are explored including such topics as: the Sylow Theorems, classification of groups of low order, Jordan-Holder Theorem, solvable groups, nilpotent groups, groups in terms of generators and relation, representations of groups, basic operations on representations, orthogonality relations

MATH-8210.Ring Theory and Modules
This course is designed to introduce students to the structure theory of general rings and their modules. It will provide an appropriate foundation for more advanced graduate material in algebra at the doctoral level and will be an excellent preparation for doctoral comprehensive examinations. Topics covered will include: semi simple rings, Wedderburn-Artin Theorem, modules over a principal ideal domain, projective, injective and flat modules, introduction to homology theory.

MATH-8220. Introduction to Field Theory
This course will cover polynomial rings, splitting fields, the fundamental theorem of Galois theory, Galois' criterion for solvability by radicals, algebraically closed fields, and finite fields. (Prerequisites: MATH-2251 and MATH-3200) (Cross-listed with MATH-4230.)

MATH-8230. Lie Algebras
Engel's Theorem, Lie's Theorem, criterion for semi simplicity, root space decomposition, universal enveloping algebra, PBW basis, representation theory, finite dimensional modules, Harish-Chandra's Theorem.

MATH-8250. Matrix Algebra and Analysis
Aspects of measure theory and probability, convergence theorems for integrations and expectations, moments and inequalities, construction of Lebesgue-Stieltjes measure, Riemann-Stieltjes integral, comparison of Riemann and Lebesgue integrals, introduction to complex variable, contour integration, characteristics functions, elementary theorems on linear and matrix algebra, generalized and conditional inverses, distributions of quadratic forms. This course is designed for graduate students in Statistics.

MATH-8300. General Topology
Elementary concepts of topology, product and quotient spaces, continuity and homeomorphisms, nets and filters, separation and countability, compactness, connectedness.

MATH-8510. Advanced Linear Programming
By presenting results and their proofs, the student will acquire a solid understanding of the theory, algorithms and applications of linear programming. This course is a prerequisite for more advanced courses on integer programming, combinatorial optimization and networks flows. Topics emphasized include: formulations of linear programming problems, convex sets and convex functions, separation theorem, Farkas' lemma, duality theory, economic interpretation of duality, optimality conditions, primal and dual simplex algorithms, cycling, sensitivity analysis, interior-point methods and central path, primal-dual methods, convergence results.

MATH-8520.Nonlinear Programming
This course will provide an introduction to the field of nonlinear programming. By presenting results and their proofs, the student will acquire a solid understanding of the theory behind most algorithms for solving nonlinear optimization problems. He/she will also acquire the knowledge and skills needed to conduct research in this area. Topics covered will include: unconstrained optimization, necessary and sufficient conditions for optimality, convex sets and convex functions, steepest descent method, Newton's method, conjugate gradient methods, quasi-Newton's methods, separation theorem and Farkas' lemma, Karush-Kuhn-Tucker conditions, constraint qualification conditions, duality theory, Barrier methods, and quadratic programming.

MATH-8530. Integer Programming
This course will provide the student with a rigorous introduction to the field of integer programming. Topics covered will include: modelling with integer variables, elements of computational complexity theory, elements of polyhedral theory, total unimodularity, branch and bound methods, cutting plane methods, implicit enumeration, Bender decomposition, dynamic programming, lagrangian relaxation, knapsack problems, set covering/packing/partitioning problems, heuristic methods.

MATH-8540. Combinatorial Optimization
This course will provide a rigorous introduction to combinatorial optimization. The student will develop a solid understanding of the theory, algorithms and applications of these problems and their connections to integer programming, linear programming and complexity theory. Topics will include: formulation of combinatorial optimization problems, polytopes and polyhedra, elements of computational complexity theory, shortest paths, bipartite and non-bipartite matchings, max-flow min-cut theorem, multi-commodity flow problems, clique and coloring problems, perfect graphs, traveling salesman problem, spanning trees, matroids.

MATH-8610. Partial Differential Equations
First-order equations, classification of second-order equations, canonical forms and general solutions of second-order equations, diffusion equations, Laplace equations, the maximum principle and uniqueness for the Dirichlet problem, wave equations, Riemann's method for linear hyperbolic equation, Green's functions and transform methods.

MATH-8680. Numerical Analysis I
General error analysis, direct solution of linear algebraic equations, iterative solution of linear equations, algebraic eigenvalue problems, numerical solution of a system of nonlinear equations, error analysis.

MATH-8690. Numerical Analysis II
Interpolation and approximation, numerical integration and differentiation, finite differences. Numerical solution of ordinary and partial differential equations using finite differences.

MATH-8820. Portfolio Optimization
This is a first course on Markowitz mean-variance portfolio optimization. The course will cover quadratic programming, parametric quadratic programming, the efficient frontier, the capital asset pricing model, Sharpe ratios and implied risk-free returns, portfolio optimization with constraints, and quadratic programming solution algorithms; also covered are professional writing and presentation skills and the use of optimization software. (Prerequisite: MATH-2251.) (Cross-listed with MATH-4960.)

MATH-8980. Special Topics

MATH-8960. Major Paper

MATH-8970. Master's Thesis (MSc)

MATH-9980. Dissertation (PhD)
Graded as pass/fail.

STATISTIC COURSES

STAT-8400. Theory of Probability
Basic probability model, random variables and their distributions, expectation, convergence of random variables and their distributions, independence, and conditional dependence. Zero-one laws, characteristic functions, generating functions, Law of large numbers, Central Limit Theorem.

STAT-8410. Stochastic Processes
Discrete and continuous time Markov processes, renewal theory, branching processes, Brownian motion.

STAT-8420. Advanced Mathematical Statistics
A review of probability theory, transformations and expectations, common families of distributions, inequalities and identities, properties of a random sample, data reduction and best estimation strategies, asymptotic approximation.

STAT-8430. Statistical Inference
Measure of performance, pure significance test and formal hypothesis testing, interval estimation, asymptotic evaluations, analysis of variance and regression, analysis of categorical data.

STAT-8440. Multivariate Analysis
This course is aimed at giving theoretical and methodological background on inference procedure for the analysis of multivariate continuous data mainly under the assumption of normality.

STAT-8460. Statistical Data Analysis
This course takes a computer-oriented approach to equip students with the experience of data analysis, beginning with designing of experiment to presentation of results. Depending on the background of the students, different topics will be emphasized.

STAT-8470. Survival Analysis
Survivorship and hazard functions and their relationship to lifetime distributions and densities; types of censoring; the Kaplan-Meier and Nelson-Aalen estimators of the survivor and cumulative hazard functions; log rank tests; parametric survival time distributions and related regressions; semi-parametric regression models including the Cox's PH model; regression diagnostics; further topics may include: counting process approach, recurrent event analysis, time dependent covariates, frailty models, sequential and group sequential techniques and statistical learning algorithm.

STAT-8480. Non-parametric Statistics
Nonparametric tests including Wilcoxon, Mann-Whitney, Smirnov, Fisher's exact test, Cox and Stuart test for trend, runs test. Estimation. Theory and applications.

STAT-8490. Discrete Multivariate Analysis
This course is aimed at giving theoretical and methodological background for the analysis of discrete data mainly in the form of contingency tables. Other discrete models as part of the generalized linear models may be covered.

STAT-8500. Generalized Linear Models
This course is aimed at giving theoretical and methodological background for the analysis of discrete or continuous data using the generalized linear models and other semi-parametric models where full distributional assumptions cannot be justified.

STAT-8520. Experimental Design
Factorial designs with and without interactions, randomized block, Latin square, balanced incomplete block, nested design, confounding factorial and other designs. Fixed, random and mixed models.

STAT-8540. Theory of Sampling and Surveys
Sampling methods including simple random, stratified, cluster, PPS and multistage, ratio and regression estimates. Theory and applications.

STAT-8550. Regression Analysis
Simple and multiple linear regression, inference on regression parameters, residual analysis, stepwise regression, polynomial regression, diagnostics and remedial measures for multicollinearity and influential observations, weighted least squares, logistic regression, nonlinear regression.

STAT-8560. Statistical Consulting
This course is aimed at training students how to: (a) develop problem solving skills in applied statistics; (b) interact with clients from other scientific disciplines who seek statistical consultancy; and (c) improve skills for writing statistical data analysis reports.

STAT-8590.Topics in Statistics
Topics offered may include queueing theory, statistical quality control, statistical consulting, survival analysis, time series analysis, decision theory, and Bayesian analysis.

STAT-8960. Major Paper

STAT-8970. Thesis (MSc.)

STAT-9980. Dissertation (Phd)
Graded as pass/fail.

ACTUARIAL COURSES

ACSC-8010. Probability for Risk and Actuarial Science
Topics include discrete and continuous probability univariate and multivariate distributions, conditional and marginal distributions. Moments. Generating functions. Transformation of random variables. Order Statistics. Central Limit Theorem. Course is restricted to students in Master of Actuarial Science. (Prerequisite: Integral Calculus.)

ACSC-8020. Theory of Interest
Topics include interest rates, force of interest, equations of value, annuities, amortization, bonds, cash flows, yield, rate of return, term structure, forward interest rates, spot rates, duration, convexity, immunization. Course is restricted to students in the Master of Actuarial Science program.

ACSC-8030. Derivatives Markets I
Topics include financial derivatives, short selling, European and American options, hedging, arbitrage, forwards, futures, swaps, bond price models, binomial model, binomial model. Course is restricted to students in the Master of Actuarial Science program. Prerequisite: ACSC-8010, ACSC-8020.

ACSC-8040. Derivatives Markets II
Topics include Black Scholes option pricing, exotic options, Brownian motion, Ito integrals. Stochastic models. Course is restricted to students in the Master of Actuarial Science program. Prerequisite: ACSC-8030.

ACSC-8050. Life Contingencies I
Topics include life contingencies, survival distributions and life tables, life annuities, net premiums, premium reserves. Course is restricted to students in the Master of Actuarial Science program. Prerequisite: ACSC-8020.

ACSC-8060. Life Contingencies II
This course builds on the foundational life contingencies knowledge developed in ACSC-8050 and extends into advanced topics in the field. Topics include advanced life contingencies, risk theory, survival models, construction of mortality tables. Course is restricted to students in the Master of Actuarial Science program. Prerequisite: ACSC-8050.

ACSC-8070. Short Term Actuarial Models
This course allows students to select and explore in depth relevant topics of interest. Topics selected may include areas such as: loss models (severity models, frequency models, aggregate models, losses, risk measures, empirical models, parametric models, failure time, loss distributions), Bayesian analysis, simulation, etc. Course is restricted to students in the Master of Actuarial Science program. (Prerequisite: ACSC-8010.)

ACSC-8100. Microeconomics
This course provides an introduction to microeconomics, including the tools necessary to begin to understand and evaluate how resources are allocated in a market economy. Specific topics include how markets function, theories of the business firm, of consumer behaviour and of income distribution, supply and demand, the economic roles of labour unions and government. This course is restricted to students in the Master of Actuarial Science program.

ACSC-8110. Macroeconomics
This course provides an introduction to macroeconomics with an emphasis on measuring and explaining economic aggregates such as the GDP and the level of prices and employment. Topics include the role of money and financial institutions, the impact of international trade, the policy options available to governments for coping with inflation and unemployment. This course is restricted to students in the Master of Actuarial Science program. Prerequisite: ACSC-8100.

ACSC-8200. Regression and Time Series
This course introduces regression and time series analyses. Topics include multiple linear regression, least squares, model fitting, estimation, testing, matrix formulation, indicator variables, logistic regression, residual analysis, prediction intervals, times series, autoregressive models, moving average models, ARIMA models, fitting models, estimation and forecasting. Course is restricted to students in the Master of Actuarial Science program. Prerequisite: ACSC-8010.

ACSC-8300. Mathematical Statistics for Actuarial Science
This course will fulfill the requirements of the Validation by Educational Equivalent (VEE) for Mathematical Statistics of the Society of Actuaries. This calculus-based course will cover random sampling, statistical inference, sampling distributions, estimation, maximum likelihood, confidence intervals for unknown parameters, the Neyman-Pearson lemma, significance and power, likelihood ratio test, contingency tables, and goodness-of-fit. This course is restricted to students in the Master of Actuarial Science program. (Prerequisite: ACSC- 8010.) (3 lecture hours.)

ACSC-8400. Actuarial Science Capstone Project
This course will provide supervised experience in the solution of a realistic actuarial problem by making use of knowledge obtained in the first three terms of the Master of Actuarial Science program. The solution will

be effected using spreadsheet software and will be communicated orally using presentation software and in writing using word processing software. (Prerequisite: This course is restricted to students in Term 4 of the Master of Actuarial Science program.)

PHYSICS

PROGRAMS

Master of Science (MSc)

Admission Requirements
A four-year Bachelor's degree with adequate specialization in Physics with a minimum Cumulative Grade Point Average (CGPA) of 75% in the last 2 years of full-time study. Possession of minimum required CGPA does not ensure admission. The actual admitting average varies and is competitive.

International Applicants must submit evidence of English language proficiency with minimum scores as required by the Faculty of Graduate Studies. Some examples of minimum scores are TOEFL: IBT-83, or IELTS: 6.5, or Pearson: 65. A Graduate Record Examination (GRE) Advanced Physics Test score is helpful to the Admissions Committee to evaluate your application more completely.

Degree Requirements
Program M2. Master of Science (MSc)
Students may complete an MSc degree in the Department of Physics by enrolling in one of the following plans:

Thesis Plan
The MSc thesis program plan in Physics is intended for students with an honours B.Sc. degree in Physics or closely allied field who wish to pursue a career in scientific research and development. The program requirements may be completed by taking four graduate semester courses plus a thesis. The M.Sc. thesis is completed under the supervision of a faculty advisor and is evaluated by the M.Sc. thesis committee. The normal duration of the MSc thesis program plan is two years, however, students who wish to transfer into the PhD program may complete the course requirements within one year.

A typical course schedule for students in this program is:

YEAR 1
FALL
PHYS 8100 (required)
Optional one Physics course at the 8xxx level or above
PHYS 8970 (required)
PHYS 8000 (required)

WINTER
One or two Physics courses at the 8xxx level or above
PHYS 8970 (required)
PHYS 8000 (required)

SUMMER
PHYS 8970 (required)

YEAR 2
PHYS 8970 (required)
PHYS 8000 (required)

WINTER
PHYS 8970 (required)
PHYS 8000 (required)

SUMMER
PHYS 8970 (if needed)

Notes:
All new students must complete PHYS 8100 Advanced Quantum Theory I in their first semester, which will be the Fall semester.
Students must register for PHYS 8000 Seminar for MSc Students every Fall and Winter Semester.
Students are expected to finish their coursework in the first year of the MSc program
Students planning to pursue or transfer to a PhD program are advised to take PHYS 8110, and PHYS 8200 or PHYS 9130
Students planning to transfer into the PhD program should consult the 'Fast-Track Admission to the Degree of Doctor of Philosophy' section of the Graduate Calendar

Major Paper Plan
The one-year M.Sc. Major Paper program plan in Physics is intended for students with an honours BSc degree in Physics or closely allied field who wish to pursue a career in scientific research and development.

The program requirements may be completed by taking six graduate semester courses plus a Major Paper under the supervision of a faculty advisor.

Recommended Sequencing

Year 1
FALL
PHYS 8100 (required)
Plus one/two Physics courses at the 8xxx level or above
PHYS 8000 (required)
PHYS 8960 (required)

WINTER
Three/Two Physics courses at the 8xxx level or above
PHYS 8000 (required)

SUMMER
PHYS 8960 (required)

Notes:
All new students must complete PHYS 8100 Advanced Quantum Theory I in their first semester, which will be the Fall semester.
Students must register for PHYS 8000 Seminar for MSc Students every Fall and Winter Semester.
You may register in PHYS 8960 only if a faculty advisor agrees to supervise your Major Paper.
Three terms of registration are the minimum required for completing this degree plan.

Course Work Plan

The one-year MSc. course-work program plan in Physics is intended for students with an honours B.Sc. degree in Physics or closely allied field who wish to pursue a career outside research. The program requirements may be completed by taking eight graduate courses.

FALL
PHYS 8100 (required)
Plus two Physics courses at the 8xxx level or above
PHYS 8000 (required)

WINTER
Three Physics courses at the 8xxx level or above
PHYS 8000 (required)

SUMMER
One Physics course at the 8xxx level or above

Notes: All new students must complete PHYS 8100 Advanced Quantum Theory I in their first semester, which will be the Fall semester.

Students must register for PHYS 8000 Seminar for MSc Students every Fall and Winter Semester.
Students will not receive credit for PHYS 8970 or PHYS 8960.
Three terms of registration are the minimum required for completing this degree plan.

Course substitutions:

Students in the M2 MSc program may request to substitute optional courses with certain 4000-level courses in Physics or graduate courses from another Department (usually in the Faculty of Science or Faculty of Engineering) for some of the non-required Physics graduate courses in their program. Students in the Thesis plan may substitute up to one optional course, students in the Major Paper plan may substitute up to two optional courses, and students in the Coursework plan may substitute up to three optional courses, only two of which may be 4000-level courses. Requests for course substitution must be approved by the Research Supervisor (if applicable), Department and the Faculty of Graduate Studies within the first two weeks of the course.

Minimum Grade Required for Graduate Credit:

Courses in which a grade of 70% or higher is received will be accepted for graduate credit. Students MUST obtain a grade of 70% or higher in all required courses (PHYS 8100, PHYS 8960 Major Paper and PHYS 8970 Thesis).

Policy on Grades below 70%: In rare cases of extenuating circumstances, where in spite of the accommodation provided a grade of 60-69% was obtained, the Department may recommend to the Faculty of Graduate Studies to grant graduate credit for this course, as long as said course is not a required course, Major Paper or Thesis. Only one such course where a grade of 60-69% was earned can receive graduate credit.

Repeating a course: If a student fails to obtain credit in a course, the course may be repeated once only, at the discretion of the program coordinator 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.

Master's Thesis/Major Paper Committees:
An advisory committee consisting of the research advisor and at least one other faculty member in Physics will periodically review the student's progress. The Master's Thesis/Major Paper Committee must be requested by the student, and approved by the Faculty of Graduate Studies prior to the second term of registration in the MSc program.

Each MSc candidate in the Thesis plan will, on recommendation of the advisory committee, submit to a final oral examination in defense of the thesis. For the defense of the thesis, the committee will be supplemented by one faculty member from outside Physics who will be present at the final oral examination.

Program M1. Master of Science Qualifying Year
Students who have insufficient prerequisite coursework in Physics may be admitted to the M1 Master's qualifying year. The following undergraduate courses must be completed as part of the M1 year with a minimum mark of 70% in each course:

FALL
PHYS-3115. Atomic and Molecular Spectra
PHYS-3200. Electromagnetic Theory
PHYS-3500. Classical Mechanics

Winter
PHYS-4100. Quantum Mechanics I
PHYS-3210. Electromagnetic Waves
PHYS-4130. Introduction to Statistical Mechanics

Students who successfully complete these six courses with a minimum mark of 70% in each course will advance to the M2 MSc coursework year. If an advisor agrees to supervise the student, an M1 student may advance to the M2 MSc thesis or major paper plan. No graduate courses or undergraduate/graduate cross-listed courses may be taken in this year.

Doctor of Philosophy (PhD)

Admission Requirements
Students may apply to the PhD program either with a Master's degree, or request to transfer after a year of excellent performance in the M.Sc. thesis program.

An applicant with a Master's degree must have adequate specialization in Physics with a minimum Cumulative Grade Point Average (CGPA) of 75% in the last 2 years of full-time study including all graduate courses.

Exceptionally qualified undergraduates may be directly admitted into the PhD. program. A four-year Bachelor's degree with adequate specialization in Physics with a minimum Cumulative Grade Point Average (CGPA) of 77%, and a minimum Cumulative Grade Point Average (CGPA) of 80% in the last 2 years of full-time study is required.

Possession of minimum required CGPA does not ensure admission. The actual admitting average varies and is competitive.

International Applicants must submit evidence of English language proficiency with minimum scores as required by the Faculty of Graduate Studies. Some examples of minimum scores are TOEFL: IBT-83, or IELTS:

6.5, or Pearson: 65. A Graduate Record Examination (GRE) Advanced Physics Test score is helpful to the Admissions Committee to evaluate your application more completely.

Transferring to the PhD program:
Master of Science (MSc) thesis plan students may transfer to the PhD. program following a meeting with the MSc Thesis Committee (with participation of the Outside Reader optional) at which approval to transfer is recommended. To be eligible, the student must have completed all graduate courses for the Master's degree and must have obtained a minimum 80% average. Students wishing to transfer into the PhD program must apply to do so before the end of the 3rd semester in the MSc (Thesis) program.

Degree Requirements
Dissertation: The main requirement of a doctoral degree is the presentation and acceptance of a PhD. Dissertation that describes an original and significant contribution to a field made by the candidate.

Doctoral Committee: An advisory committee consisting of the research advisor and two other faculty members in Physics will periodically review the student's progress. The Doctoral Committee must be requested by the student, and approved by the Department, and Faculty of Graduate Studies prior to the second term of registration in the PhD program.

Each candidate will, on recommendation of the doctoral committee, submit to a final oral examination in defense of the dissertation. For the defense of dissertation (final oral examination) the doctoral 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.

Period of Study: Every student in a program leading to the degree of Doctor of Philosophy must be registered in a full-time program of study for a minimum of three calendar years, normally in succession. Credit for one of these years may be given for the time spent in proceeding to a Master's degree. Expected time to completion for a PhD program is four years of full-time study (five years for a direct-entry PhD).

Time Limit: A student admitted to a PhD. program must complete all requirements for the PhD. within six consecutive years of full-time registration. If an extension of the time limit becomes necessary, the student should address a petition to the Dean of Graduate Studies giving reasons for the request and plans for the completion of the work. A student who exceeds the time limit may be required to take additional qualifying examinations or additional course work, or both.

Course requirements:
Candidates with a Master's degree in Physics (or equivalent): a minimum of 4 graduate courses:
(1) PHYS-8100: Advanced Quantum Theory I, PHYS-8110: Advanced Quantum Theory II, PHYS-8200: Classical Electrodynamics, and PHYS-9130: Statistical Physics I must be taken, if previous equivalent credit has not been obtained.
(2) PHYS-9000 (Seminar for PhD Students) will be required of all candidates in the fall and winter terms.
(3) Candidates may request to substitute an optional course, with the permission of the Supervisor and Graduate Coordinator and with the approval of the Faculty of Graduate Studies, with up to one graduate-level course from another department (normally from the Faculty of Science or the Faculty of Engineering).
(4) The student may be required to take up to two additional courses, as stipulated by the Doctoral Committee.
(5) Students in the PhD program must register for PHYS-9980 PhD Dissertation in each term before graduation.

Candidates who do not have a Master's degree in Physics (or equivalent): a minimum of 7 courses:

(1) PHYS-8200: Classical Electrodynamics, PHYS-8100: Advanced Quantum Theory I, PHYS-9130: Statistical Physics I and PHYS-8110: Advanced Quantum Theory II, or equivalent, are required.
(2) PHYS-9000 (Seminar for PhD Students) is required of all candidates in the fall and winter terms. [Note: PHYS-8000 (Seminar for MSc Students) cannot be taken for credit.]
(3) Candidates may request to substitute optional courses, with the permission of the Supervisor and Graduate Coordinator and with the approval of the Faculty of Graduate Studies up to:

(i) one 4000-level undergraduate course in physics (pre-approved by the Department) or one graduate course from another department and
(ii) one graduate-level course from another department normally from the Faculty of Science or the Faculty of Engineering.

(4) The student may be required to take up to two additional courses, as stipulated by the Doctoral Committee.
(5) Students in the PhD program must register for PHYS-9980 PhD Dissertation in each term before graduation.

Minimum Grade Required for Graduate Credit:
Courses in which a grade of 70% or higher is received will be accepted for graduate credit. Students MUST obtain a grade of 70% or higher in all required courses (PHYS 8100, PHYS 8960 Major Paper and PHYS 8970 Thesis).

Policy on Grades below 70%: In rare cases, one grade below 70% may be allowed if the grade is on a non-required course, and the grade is between 65-69%.
Repeating a course: Please look at the Graduate Calendar for the Policy on Repeating a Course.

Qualifying Examination~~s~~: All candidates must pass a qualifying examination covering the general field of physics at the level of the honours program given at this university. The examination~~s~~ must be passed no later than one year after registration as a PhD. student. Other examinations (written or oral) may be set at the discretion of the program coordinator.

PHYSICS COURSES

Not all of the courses listed below will necessarily be offered in any one year.

PHYS-8000. Seminar for MSc Students
In order to receive credit for this course, a student should participate in the weekly departmental seminar throughout their M.Sc. studies, and annually present a seminar on a topic approved by the Seminar Coordinator. A Pass/Fail grade will be assigned.

PHYS-8100. Advanced Quantum Theory I
General principles, representations and transformation theory. Approximation methods. Many-body problems and identical particles.

PHYS-8110. Advanced Quantum Theory II
Number representations and second quantization. Dirac equation. An introduction into quantum electrodynamics and the electro-weak theory. (Prerequisite: PHYS-8100.

PHYS-8150. Atomic and Molecular Processes I
Atomic/molecular beam methods and techniques. Collision phenomena in atomic and molecular scattering, including elastic, inelastic and reactive scattering, excitation, ionization, and charge exchange. Detailed

discussion of the experimental results and their interpretation in terms of interatomic/ molecular forces and potentials.

PHYS-8151. Atomic and Molecular Processes II
A variety of topics in electron and photon collisions highlighting current advances in these fields and including total and differential elastic and inelastic scattering of electrons and positrons, resonances, polarization, coherence and correlation effects, post-collision interactions, photon-stimulation spectroscopy. (Prerequisite: PHYS-8150.

PHYS-8160. Condensed-Matter Physics
Elements of crystallography, crystal diffraction, reciprocal lattices, lattice dynamics and thermal properties of solids, phonons, solution of Schroedinger equation in periodic potential, band theory, Fermi surfaces of metals and semiconductors, optical properties of dielectrics

PHYS-8170. Theory of Atomic Structure and Atomic Spectra
Rotation matrices, 3n-j coefficients and graphical techniques for angular-momentum coupling, irreducible tensor operators, the Wigner-Eckart theorem and applications, the density matrix, interactions of atoms with external fields.

PHYS-8180. Molecular Spectroscopy
Diatomic molecules, Born-Oppenheimer approximation, adiabatic potentials, Hund's coupling cases, rotational, vibrational, and electronic states and associated spectra. Applications of group theory to the structure and spectra of polyatomic molecules.

PHYS-8200. Classical Electrodynamics
Radiation by moving charges, synchrotron radiation, bremsstrahlung, scattering of radiation, multipole fields, radiation reaction

PHYS-8250. Design and Application of Lasers
Stimulated emission, rate equation approach to amplification and output power calculations; Gaussian beams, stable and unstable resonators; Q-switching, mode-locking and cavity-dumping; ruby, Nd:YAG and other solid state lasers; semi-conductor, gas and dye lasers.

PHYS-8510. Theory of Particle Scattering
Classical theory of scattering. Formal quantum theory. The definitions of cross sections, transition probabilities and related concepts. The Born approximation, phase shifts.

PHYS-8600. Special Topics in Physics
Advanced topics in contemporary physics not normally covered in other courses. (May be repeated when the topic is different.) (Prerequisite: consent of instructor.)

PHYS-8630. General Theory of Relativity
The principle of equivalence, general co-variance. Riemann spacetime Einstein field equations.

PHYS-8650. Theory and Applications of Thin Films
Definition of thin films and their classification; methods of preparation; elements of high-vacuum technology; thin-film formation, structure and methods of investigation; mechanical, optical, electrical properties of thin films and their application in modern technology.

PHYS-8660. Atmospheric and Environmental Physics
Physics of the atmosphere, general description and layering, interactions of incoming and outgoing radiations, greenhouse effect, atmospheric thermodynamics and stability, cloud physics, atmospheric dynamics, gravity waves and turbulence, atmospheric photochemistry, ozone layer, upper atmosphere, plasma and hydromagnetic effects, ionospere, air glow and aurora.

PHYS-8670. Applications of Electron, Ion and Atomic Beams
Non-relativistic theory of charged particles in electric and magnetic fields. Review of matrix optics, electrostatic lenses, magnetic lenses, electrostatic and magnetic vector fields. Applications to energy and mass analysis. The Liouville Theorem and its consequences. Dense electron beams and applications.

PHYS-9000. Seminar for PhD Students
In order to receive credit for this course, a student should participate in the weekly departmental seminar throughout their PhD. studies, and annually present a seminar on a topics approved by the Seminar Coordinator. A Pass/Fail grade will be assigned.

PHYS-9610, PHYS-9620. Selected Topics in Theoretical and Experimental Physics
These courses consist of two survey lecture series to be selected from among several which will be offered each year. Each lecture series lasts for approximately half a term. Credit may not be obtained for any survey courses in subjects in which the student has taken another graduate course.

PHYS-9130. Statistical Physics I
Review of thermodynamics; information theory. The many-body problem in quantum mechanics, particle number representation. Statistical (density) matrix. The perfect gas, real gases, dense plasma, applications.

PHYS-9140. Statistical Physics II
The theory of macroscopic quantum phenomena. (Prerequisite: PHYS-9130.)

PHYS-9680. Elementary Particles and Their Symmetries
Symmetries and conservation laws, group representations, and particle muliplets; Lie groups and algebras; generators and weights of SU(n); the quark model; quantum chromodynamics; electro-weak interaction theory; supersymmetry; path integrals and Feynman diagrams.

PHYS-9120. Classical and Quantum Field Theory I
Variational principles and conservation laws and applications, field equations and their solutions. (Prerequisite: PHYS-8110.)

PHYS-9121. Classical and Quantum Field Theory II
Quantization of fields; scalar, vector, and spinor fields. Quantum electrodynamics and applications; renormalization and radiative corrections. (Prerequisite: PHYS-9120.)

PHYS-9630. Advanced Topics in Condensed Matter Physics
Crystal field theory in the weak and strong coupling schemes. Molecular orbitals; vibronic interactions. Electronic structure and spectra of molecular complexes. (Prerequisite: PHYS-8110.)

PHYS-8960. MSc Major Paper

PHYS-8970. MSc Thesis

PHYS-9980. PhD Dissertation

SCHOOL OF THE ENVIRONMENT

PROGRAMS

Earth Sciences (MSc)

Degree Requirements
1) Course Requirements: The candidate for a Master's degree will be required to take ESCI-8800 and ESCI-8900, 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 (ESCI-8818), and not more than two courses may be from the same instructor. Additional 8000-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.

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 PhD. degree.

Earth Sciences (PhD)

Admission Requirements
The normal requirement for entry into the PhD program shall be an MSc in Earth Sciences or an appropriate degree in a cognate discipline. Students who have enrolled in the MSc. 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.

Degree Requirements and Structure
Students entering the PhD. program with an MSc degree will be required to:
a) Take a minimum of four, one-semester courses, including the doctoral research proposal and graduate seminar courses.
b) 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 PhD degree.

Students transferring into the PhD program after having completed one year of the MSc 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.

SCHOOL OF THE ENVIRONMENT COURSES

All courses listed will not necessarily be offered in any one year.

ESCI-8100. 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.)

ESCI-8110. 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.)

ESCI-8120. Advanced Topics in Enviromental 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: ESCI-8100 or consent of instructor.)

ESCI-8300. 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.)

ESCI-8310. 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.)

ESCI-8400. Advanced Topics in Igneous Petrology and Global Techtonics
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: ESCI-8100 or consent of instructor.) (3 lecture and/or seminar hours a week.)

ESCI-8410. 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: ESCI-8100 or consent of instructor.) (3 lecture hours a week.)

ESCI-8420. 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: ESCI-8100 or consent of instructor.) (3 lecture and/or seminar hours a week.)

ESCI-8700. 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.)

ESCI-8710. 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.)

ESCI-8720. 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: ESCI-8710 or consent of instructor.) (3 lecture, seminar, and/or project hours a week.)

ESCI-8730. 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: ESCI-8710, or consent of instructor.) (3 seminar hours a week, plus project.)

ESCI-8800. 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 PhD program.) (1 hour a week.)

ESCI-8801. 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.)

ESCI-8802. 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.)

ESCI-8803. 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.)

ESCI-8804. 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.)

ESCI-8818. Special Topics
(May be taken for credit more than once provided that the topics are different.)

ESCI-8900. 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.

ESCI-8970. Master's Thesis

ESCI-9900. 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.)

ESCI-9980. Doctoral Dissertation

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.

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 studes 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.

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.

GLOSSARY

This glossary explains some terms which are used frequently throughout this Calendar. It is intended as a quick-reference guide and may not necessarily offer the complete, official definitions and explanations as they are applied to the University's programs and the administration of its regulations.

Antirequisite - A course or other level of attainment which, if already successfully completed, does not permit registration for credit in another course, and which cannot be taken for credit concurrently with that other course.

Attempt - Generally, any course for which a final grade has been assigned, including "WF" - Withdrew Failing. Failures which are repeated and for which credit is subsequently earned may or may not be considered as attempts, depending upon individual faculty regulations. If a student transfers from one program to another, not all previous attempts necessarily will be counted as attempts within the student's new program.

Bachelor's Degree (Baccalaureate) - The first university
degree, for which a student follows a specific undergraduate program (e.g., B.A.- Bachelor of Arts).

Certificate - At the undergraduate level, a program consisting of eight to twelve one-term course equivalents in a specialized area(s) of study.

Corequisite - A course which must be taken concurrently with another course which lists it as a corequisite.

Course - A unit of study identified by a course title and a unique course number. Unless otherwise specified, the term "course" refers to a one-term, 3.0 credit course offering.

Two-Term Course - A course taught over two terms, usually the Fall and Winter terms. A two-term course normally carries twice the credit value of a one-term course, or 6.0 credits.

Half Course - A course having a value of 1.5 credits. Half courses may be offered for fewer contact hours per week over an entire term, or may be concentrated in either the first or the second half of a term.

Credit - A unit of academic value earned within a particular program. A credit value of 3.0 normally is assigned to a one-term (13-week) course. A two-term course, therefore, would have a credit value of 6.0; a half-course 1.5.

Other credit values may be assigned. Some courses may be taken for varying amounts of credit within a specific range (e.g. 2.0 to 9.0 credits); other courses may be offered for alternate credit values (e.g., 3.0 or 6.0 credits).

Credit values are used in the calculation of averages for academic standing and in the determination of the student's year or level within a specific program. (See also "Weight").

Cross-Listed Courses - Courses which are listed under two different numbers in two different subject areas. Cross-listed courses may be taken in either subject area, but credit may be earned in only one course.

Cumulative Average - An average which is based upon all courses counted as attempts within a student's career.

Diploma - At the undergraduate level, a program of study less extensive than a degree program, but requiring more courses than a certificate program.

Full-Time Student - See "Categories of Registration".

Linked Courses - Credit may not be allocated to certain courses until a subsequent course is also successfully completed. Such "linking" of courses will be noted in the course descriptions.

Major - A formal, specific concentration of courses within a subject area as defined by its degree program(s).

Major Average - An average based upon courses attempted within the student's major as defined by the student's degree program.

Part-Time Student - See "Categories of Registration".

Prerequisite - A course for which credit must have been earned prior to registration in another course which lists it as a prerequisite. ("Consent of Instructor" may be listed as an alternative to, or in addition to a given course prerequisite.)

Program - A combination of courses in a subject area (or areas) which fulfills the requirements for a degree, certificate, or diploma.

Program Approval - For students in certain programs, consulting with and obtaining the signed approval of course selections by a faculty advisor may be required as part of the registration process.

Registration - The process of selecting courses, obtaining faculty approval for course selections where necessary, and making the appropriate arrangements with the University to pay the required fees.

Required Course - A course for which credit must be earned in a student's program.

Semester - Same as "Term"

Standing Required - Individual faculties and set out specific requirements which students must meet in order to continue in their programs. These requirements normally include the maintenance of specific minimum cumulative and major averages, and also place certain restrictions upon the number of courses a student is permitted to have failed. Progress is reviewed at the end of each term.

Term - An academic period of twelve or thirteen weeks' duration. The Fall term extends from September to December; the Winter term from January to April. Intersession, which extends for six weeks from mid-May through the end of June, and Summer Session, which extends from the beginning of July to mid-August are considered together as a single term.

Transcript - A document issued by the Office of the Registrar which records all aspects of a student's registrations and grades obtained at the University. An "official" transcript is one which bears the official seal of the University and which is sent directly to another institution or official of an organization. "Unofficial" transcripts also may be issued to the student.

Withdrawal - A formal procedure set out within the regulations of the University for withdrawing from an individual course(s), or from the University entirely.

Weight - For students registered in the Faculty of Engineering, the calculation of averages is based upon a weighting factor. The weight of an individual course is equal to the number of lecture hours per week, plus one-half of the number of laboratory and/or tutorial hours per week.

Year (or Semester) - Attaining a particular Year or Semester level depends upon earning credit for a specific number of courses. The number of courses normally taken in one term/semester determines the Semester level; the number of courses normally taken in a program over both the Fall and Winter terms of a "regular" academic year would determine the Year level. In some programs, the attainment of a specific level also may reflect the earning of credits in a particular group or sequence of courses.