

# 2019-2020 Graduate Calendar

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The information published in this Graduate Calendar outlines the rules, regulations, curricula, programs and fees for the 2019-2020 academic year, including the Summer Semester 2019, Fall Semester 2019 and the Winter Semester 2020.

For your convenience the Graduate Calendar is available in PDF format.

If you wish to link to the Graduate Calendar please refer to the Linking Guidelines.

The University is a full member of:

- Universities of Canada

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The logo of the University of Guelph, featuring the words "UNIVERSITY of GUELPH" in a stylized, serif font. The "of" is smaller and positioned between "UNIVERSITY" and "GUELPH".The tagline "CHANGING LIVES IMPROVING LIFE" in a bold, sans-serif font, with "CHANGING LIVES" on the top line and "IMPROVING LIFE" on the bottom line.

## Disclaimer

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The Office of Graduate and Postdoctoral Studies has attempted to ensure the accuracy of this on-line Graduate Calendar. However, the publication of information in this document does not bind the university to the provision of courses, programs, schedules of studies, fees, or facilities as listed herein.

## Limitations

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The University of Guelph reserves the right to change without notice any information contained in this calendar, including any rule or regulation pertaining to the standards for admission to, the requirements for the continuation of study in, and the requirements for the granting of degrees or diplomas in any or all of its programs.

The university will not be liable for any interruption in, or cancellation of, any academic activities as set forth in this calendar and related information where such interruption is caused by fire, strike, lock-out, inability to procure materials or trades, restrictive laws or governmental regulations, actions taken by the faculty, staff or students of the university or by others, civil unrest or disobedience, Public Health Emergencies, or any other cause of any kind beyond the reasonable control of the university.

The University of Guelph reaffirms section 1 of the Ontario Human Rights Code, 1981, which prohibits discrimination on the grounds of race, ancestry, place of origin, colour, ethnic origin, citizenship, creed, sex, sexual orientation, handicap, age, marital status or family status.

The university encourages applications from women, aboriginal peoples, visible minorities, persons with disabilities, and members of other under-represented groups.

# Introduction

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## Collection, Use and Disclosure of Personal Information

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Personal information is collected under the authority of the University of Guelph Act (1964), and in accordance with Ontario's Freedom of Information and Protection of Privacy Act (FIPPA) [http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/90f31\\_e.htm](http://www.e-laws.gov.on.ca/DBLaws/Statutes/English/90f31_e.htm). This information is used by University officials in order to carry out their authorized academic and administrative responsibilities and also to establish a relationship for alumni and development purposes. Certain personal information is disclosed to external agencies, including the Ontario Universities Application Centre, the Ministry of Advanced Education and Skills Development, and Statistics Canada, for statistical and planning purposes, and is disclosed to other individuals or organizations in accordance with the Office of Registrarial Services Departmental Policy on the Release of Student Information. For details on the use and disclosure of this information call the Office of Registrarial Services at the University at (519) 824-4120 or see <https://www.uoguelph.ca/registrar/>

## Statistics Canada - Notification of Disclosure

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For further information, please see Statistics Canada's web site at <http://www.statcan.gc.ca> and Section XIV Statistics Canada.

## Address for University Communication

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Depending on the nature and timing of the communication, the University may use one of these addresses to communicate with students. Students are, therefore, responsible for checking all of the following on a regular basis:

### Email Address

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The University issued email address is considered an official means of communication with the student and will be used for correspondence from the University. Students are responsible for monitoring their University-issued email account regularly.

### Home Address

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Students are responsible for maintaining a current mailing address with the University. Address changes can be made, in writing, through Registrarial Services.

## Name Changes

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The University of Guelph is committed to the integrity of its student records, therefore, each student is required to provide either on application for admission or on personal data forms required for registration, their complete, legal name. Any requests to change a name, by means of alteration, deletion, substitution or addition, must be accompanied by appropriate supporting documentation.

## Student Confidentiality and Release of Student Information Policy Excerpt

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The University undertakes to protect the privacy of each student and the confidentiality of their record. To this end the University shall refuse to disclose personal information to any person other than the individual to whom the information relates where disclosure would constitute an unjustified invasion of the personal privacy of that person or of any other individual. All members of the University community must respect the confidential nature of the student information which they acquire in the course of their work.

Complete policy at <https://www.uoguelph.ca/secretariat/office-services/university-secretariat/university-policies>.

# Learning Outcomes

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## Graduate Degree Learning Outcomes

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On May 27, 2013, the University of Guelph Senate approved the following five University-wide Learning Outcomes as the basis from which to guide the development of graduate degree programs, specializations and courses:

1. Critical and Creative Thinking
2. Literacy
3. Global Understanding
4. Communication
5. Professional and Ethical Behaviour

These learning outcomes are also intended to serve as a framework through which our educational expectations are clear to students and the broader public; and to inform the process of outcomes assessment through the quality assurance process (regular reviews) of programs and departments.

An on-line guide to the learning outcomes, links to the associated skills, and detailed rubrics designed to support the development and assessment of additional program and discipline-specific outcomes, are available for reference on the [Learning Outcomes website](#)

### Critical and Creative Thinking

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Critical and creative thinking is a concept in which one applies logical principles, after much inquiry and analysis, to solve problems with a high degree of innovation, divergent thinking and risk taking. Those mastering this outcome show evidence of integrating knowledge and applying this knowledge across disciplinary boundaries. Depth and breadth of understanding of disciplines is essential to this outcome. At the graduate level, originality in the application of knowledge (master's) and undertaking of research (doctoral) is expected.

In addition, Critical and Creative Thinking includes, but is not limited to, the following outcomes: Independent Inquiry and Analysis; Problem Solving; Creativity; and Depth and Breadth of Understanding.

### Literacy

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Literacy is the ability to extract information from a variety of resources, assess the quality and validity of the material, and use it to discover new knowledge. The comfort in using quantitative literacy also exists in this definition, as does using technology effectively and developing visual literacy.

In addition, Literacy includes, but is not limited to, the following outcomes: Information Literacy, Quantitative Literacy, Technological Literacy, and Visual Literacy.

### Global Understanding

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Global understanding encompasses the knowledge of cultural similarities and differences, the context (historical, geographical, political and environmental) from which these arise, and how they are manifest in modern society. Global understanding is exercised as civic engagement, intercultural competence and the ability to understand an academic discipline outside of the domestic context.

In addition, Global Understanding includes, but is not limited to, the following outcomes: Global Understanding, Sense of Historical Development, Civic Knowledge and Engagement, and Intercultural Competence.

### Communication

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Communication is the ability to interact effectively with a variety of individuals and groups, and convey information successfully in a variety of formats including oral and written communication. Communication also comprises attentiveness and listening, as well as reading comprehension. It includes the ability to communicate and synthesize information, arguments, and analyses accurately and reliably.

In addition, Communication includes, but is not limited to, the following outcomes: Oral Communication, Written Communication, Reading Comprehension, and Integrative Communication.

### Professional and Ethical Behaviour

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Professional and ethical behaviour requires the ability to accomplish the tasks at hand with proficient skills in teamwork and leadership, while remembering ethical reasoning behind all decisions. The ability for organizational and time management skills is essential in bringing together all aspects of managing self and others. Academic integrity is central to mastery in this outcome. At the graduate level, intellectual independence is needed for professional and academic development and engagement.

In addition, Professional and Ethical Behaviour includes, but is not limited to, the following outcomes: Teamwork, Ethical Reasoning, Leadership, Personal Organization and Time Management, and Intellectual Independence.

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## Appendix A - Courses

Courses are listed in the appendix in alphabetic order and may also be found listed under the program in which they are offered.

### Accounting

#### ACCT\*6100 Integrated Cases I S [0.50]

“Integrated Cases I” is a required course for students pursuing a Chartered Professional Accountant (CPA) designation and will provide students with an in-depth knowledge of financial reporting and auditing. The course will integrate topics from both the finance and taxation areas of the CPA competency map. The course will also assist students in developing their problem solving and decision making abilities and communication skills, which are part of the enabling competencies of the CPA competency map.

*Restriction(s):* Students in MA.MGMT and GDip.ACCT

*Department(s):* Department of Management

#### ACCT\*6200 Integrated Cases II S [0.50]

“Integrated Cases II” is a required course for students pursuing a Chartered Professional Accountant (CPA) designation and will provide students with an in-depth knowledge of management accounting. The course will integrate topics from both the strategy and governance and the finance areas of the CPA competency map. The course will also assist students in developing their problem solving and decision-making abilities and communication skills, which are part of the enabling competencies of the CPA competency map.

*Restriction(s):* Students in MA.MGMT and GDip.ACCT

*Department(s):* Department of Management

#### ACCT\*6300 Taxation S [0.50]

This course is intended to help students achieve the competencies related to Elective Module 4 (E4) – Taxation in the CPA Competency Map. It covers the competencies necessary to provide taxation services and guidance. Topics include: compliance and tax-planning issues for both individuals and corporate entities, as well as, partnerships and trusts, risk tolerance of all stakeholders involved, tax governance, controls, and risk management, and the importance of taking taxes into account when making business and investment decisions..

*Prerequisite(s):* ACCT\* 6100 and ACCT\*6200

*Restriction(s):* Students in MA.MGMT and GDip.ACCT

*Department(s):* Department of Management

#### ACCT\*6400 Performance Management U [0.50]

Performance Management is an elective course for students pursuing a Chartered Professional Accountant (CPA) designation and will build on student's management accounting knowledge from both their undergraduate courses as well as “Integrated Cases II”. The course will also assist students in further developing their problem solving and decision-making abilities and communication skills, which are part of the enabling competencies of the CPA competency map.

*Prerequisite(s):* ACCT\*6200

*Restriction(s):* Students in MA.MGMT and GDip.ACCT

*Department(s):* Department of Management

#### ACCT\*6500 Assurance S [0.50]

This course develops the competencies necessary to assess an entity's assurance needs and perform both internal audit projects and external assurance engagements. The CPA Competency Map describes in detail the two types of competencies - technical and enabling - that employers in public practice, industry, and government require of accounting professionals. As such, the CPA Competency Map will be utilized in this course to help ensure that students meet the course learning objectives.

*Restriction(s):* Students in MA.MGMT and GDip.ACCT

*Department(s):* Department of Management

#### ACCT\*6600 Financial Management U [0.50]

The course will build upon the conceptual foundation developed in undergraduate introductory finance courses. The focus of the course is on the development of competencies in identifying, analyzing, evaluating and making appropriate recommendations for investing and financing decisions in a variety of professional contexts, particularly in the areas of treasury management, valuation, and risk management. There will be a strong emphasis on applying the body of knowledge in integrated case problems.

*Restriction(s):* Students in MA.MGMT and GDip.ACCT

*Department(s):* Department of Management

## Animal Science

#### ANSC\*6010 Topics in Comparative Animal Nutrition F [0.50]

Current topics in the feeding and nutrition of agricultural, companion and captive animal species. Emphasis is placed on the influence of nutrients on metabolic integration at tissue, organ and whole-animal levels. A nutritional case study will be conducted to allow students to solve practical feeding problems by applying basic nutritional principles. The course is offered annually.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6030 Modelling Metabolic Processes F [0.50]

Building and testing of mathematical models of metabolic processes using continuous simulation software to assist in weekly assignments. Choice of model based on students' research interests (e.g. protein synthesis, nutrient uptake, rumen fermentation). Term project to reproduce model from scientific knowledge.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6050 Biometry for Animal Sciences W [0.50]

For students involved in animal research. The course will provide outlines of appropriate presentation and analysis of experimental data with emphasis on different analytical techniques.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6100 Special Project F,W,S [0.50]

Supervised program of study in some aspect of animal and poultry science that can involve an experimental project and/or detailed analysis of the literature.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6210 Principles of Selection in Animal Breeding W [0.50]

Definition of selection goals, prediction of genetic progress and breeding values, and the comparison of selection programs.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6240 Topics in Animal Genetics and Genomics W [0.50]

Current literature and classical papers pertaining to quantitative genetics, animal breeding and animal genomics are reviewed in detail through presentation, discussion and critical analysis.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6250 Growth and Metabolism W [0.50]

Animal growth and metabolism are considered at the cellular level in a manner that extends beyond the basic disciplines of biometrics and biochemistry with attention focused on the main carcass components — muscle, fat and bone.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6330 Topics in Computational Biology and Bioinformatics F,W [0.50]

Major topics and methods in bioinformatics and computational biology for animal sciences will be covered. Topics include alignments, phylogenetics, genomics, data mining, databases, DNA, RNA and protein structures, DNA sequence analysis, data curation, pipeline construction and data visualization.

*Offering(s):* Offered annually

*Department(s):* Department of Animal Biosciences

#### ANSC\*6360 Techniques in Animal Nutrition Research W [0.50]

Theory and/or practices of techniques to evaluate feedstuffs and determine nutrient utilization in poultry, swine and ruminants is covered through lectures, short laboratories and a major project.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6370 Quantitative Genetics and Animal Models F [0.50]

The course covers quantitative genetics theory associated with animal models; linear models applied to genetic evaluation of animals; estimation of genetic parameters for animal models; and computing algorithms for large datasets.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6390 QTL and Markers W [0.50]

Advanced training in QTL mapping and selection assisted by genetic markers.

*Department(s):* Department of Animal Biosciences

#### ANSC\*6400 Mammalian Reproduction W [0.50]

Discussions and applications of methodology for collection and examination of gametes and embryos and for measurements of hormones in biological fluids.

*Offering(s):* Offered in odd-numbered years.

*Department(s):* Department of Animal Biosciences

**ANSC\*6440 Advanced Critical Analysis in Applied Ethology F [0.50]**

Students explore the process of scientific inquiry and experimental design within the context of applied ethology research. Discussions include the peer review process, critical analyses and applications of methods for applied animal behaviour research.

*Department(s):* Department of Animal Biosciences

**ANSC\*6450 Topics in Animal Biotechnology F [0.50]**

The course will explore current methods and recent advances of biotechnology, innovation, and emerging translational products of significance to animal production and human health.

*Prerequisite(s):* MCB\*2050 / MBG\*2040 / ANSC\*4050 or equivalent

*Department(s):* Department of Animal Biosciences

**ANSC\*6460 Lactation Biology F [0.50]**

An in-depth systems analysis of lactation, comparing the cow, pig, rat, human and seal. Mammary development from conception through to lactogenesis, lactation and involution will be covered. Hypotheses of regulation of the biochemical pathways of milk synthesis will be tested in relation to experimental observations.

*Department(s):* Department of Animal Biosciences

**ANSC\*6470 Advanced Animal Nutrition and Metabolism I F [0.50]**

A systematic review of key aspects of energy, protein, amino acid and carbohydrate utilization and metabolism in farm animals.

*Department(s):* Department of Animal Biosciences

**ANSC\*6480 Advanced Animal Nutrition and Metabolism II W [0.50]**

A systematic review of key aspects of lipid, vitamin and mineral utilization and metabolism in farm animals.

*Department(s):* Department of Animal Biosciences

**ANSC\*6490 Advanced Dairy Management W [0.50]**

A comprehensive systems science and integrative capstone course that encompasses the “closing of the loop” education of dairy production systems. Students will be exposed to real-time issues relating to dairy production from, environment, economics, nutrition, housing, health, welfare, society and agrology. This course will allow the student to practice their training from the courses they have been exposed to as undergraduates into many case study evaluations on farms provincially, nationally and internationally.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Animal Biosciences

**ANSC\*6600 Scientific Communication I F,W [0.25]**

This course is required for completion of a thesis-based MSc degree. Via, reading, guest lectures, online modules and in-class discussion, students will learn about the principles of effective communication, and with training and feedback create a departmental webpage and oral presentation outlining their research plans.

*Restriction(s):* Restricted to Animal Biosciences students.

*Department(s):* Department of Animal Biosciences

**ANSC\*6610 Thesis Proposal and Professional Development I F,W [0.25]**

This course is required for successful completion of an MSc thesis degree. With guidance and instruction, students complete a research proposal, or a literature review for their thesis. Students will also spend 8 hours on professional development (e.g. via mygradskills.ca, MITAC Step workshops).

*Restriction(s):* Restricted to Animal Biosciences students.

*Department(s):* Department of Animal Biosciences

**ANSC\*6620 Scientific Communication II F,W [0.00]**

This course is required for successful completion of a PhD degree. Via reading, guest lectures, online modules and in-class discussion, students will learn about the principles of effective communication, and with training and feedback, create a departmental webpage and oral presentation outlining their research plans.

*Prerequisite(s):* ANSC\*6600

*Restriction(s):* Restricted to Animal Biosciences PhD students.

*Department(s):* Department of Animal Biosciences

**ANSC\*6630 Thesis Proposal and Professional Development II F,W [0.00]**

This course is required for successful completion of a PhD degree. With guidance and instruction, students will complete a research proposal, or a literature review for their thesis. Students will also spend 8 hours on professional development (e.g. via mygradskills.ca, MITAC Step workshops).

*Prerequisite(s):* ANSC\*6610

*Restriction(s):* Restricted to Animal Biosciences PhD students.

*Department(s):* Department of Animal Biosciences

**ANSC\*6700 Animals in Society: Historical and Global Perspectives on Animal Welfare F [0.50]**

A seminar course covering society's duties to animals. Students will learn about the major ethical theories that deal with society's duties towards animals, the main scientific approaches to animal welfare, and the relationship of science to ethics. A brief history of human-animal relationships will be covered and cultural differences described. Students will use this to analyze some current issues.

*Department(s):* Department of Animal Biosciences

**ANSC\*6710 Assessing Animal Welfare in Practice W [0.50]**

A lecture/seminar course covering the principles of applied animal welfare assessment. Students will learn what influences an animal welfare assessment and will understand the components necessary to create an effective and targeted animal welfare program for industry or regulatory application.

*Offering(s):* Winter offering on-campus, Summer offering Distance Education.

*Prerequisite(s):* ANSC\*6700

*Department(s):* Department of Animal Biosciences

**ANSC\*6720 Scientific Assessment of Affective States in Animals W [0.50]**

Graduate students will explore the biology and validity of behavioural and physiological techniques used in animal welfare assessment such as: sympathetic activation, HPA functioning, stereotypic behaviour and preference responses. A combination of lecture, instructor-led discussion and student-led discussion will explore these methods of animal welfare assessment.

*Department(s):* Department of Animal Biosciences

**ANSC\*6730 Applied Environmental Physiology and Animal Housing W [0.50]**

A lecture/seminar course covering the principles of applied environmental physiology including temperature regulation, space requirements, animal responses to light and other aspects of the physical environment. Students pursue a topic in depth to develop or update recommended codes of practice and resource-based standards.

*Department(s):* Department of Animal Biosciences

**ANSC\*6740 Special Topics in Applied Animal Welfare Science S [0.50]**

A lecture/seminar course covering in depth topics in applied animal welfare science. The course will review the scientific research into the welfare of a specific animal species or a specific animal welfare problem common across species, focusing on the main threats to welfare, relevant indicators of welfare, and possible solutions to improve welfare.

*Department(s):* Department of Animal Biosciences

**ANSC\*6900 Major Paper in Animal and Poultry Science F,W,S [1.00]**

A detailed, critical review of an area of study related to the specialization of students in the MSc by course work and major paper option that includes analysis and interpretation of relevant data.

*Department(s):* Department of Animal Biosciences

**Anthropology****ANTH\*6000 Public Issues Anthropology F [0.50]**

This course will examine the interface between anthropological and public understandings of public issues, with sensitivity to the presence or absence of anthropological insights. The course will assure that students become well versed in how to synthesize the resources of various branches of the discipline.

*Restriction(s):* Restricted to incoming students in the program.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6080 Anthropological Theory F [0.50]**

An examination of classical and contemporary anthropological theory, including an emphasis on the most recent directions in the discipline.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6140 Qualitative Research Methods W [0.50]**

An examination of the methods of qualitative research, including participant observation and unstructured interviews, as well as the ethical considerations of fieldwork. Other topics, such as comparative and historical methods, may be included.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6270 Diversity and Social Equality U [0.50]**

This course will examine a range of approaches used in the study of intergroup relations, with special emphasis on struggles over influence and power. Students will acquire a deeper understanding of the complex intersection, as well as the overlap among forms of identity and group mobilization based on ethnic, linguistic, regional, class, gender, racial and other forms of social division. The course may also cover native issues and policies related to multiculturalism, equity and local or regional autonomy.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6420 Global Agro-Food Systems, Communities and Rural Change U [0.50]**

This course will reflect recent sociological interests in food studies and global agro-food systems, resources and the environment, community sustainability, rural-urban linkages, the transnationalization of labour regimes, and social movements in the rural context. The course will encourage students to take a comparative and historical approach, focussing on cross-national and inter-regional studies where possible, and to examine how class, gender, race and ethnicity play out in each particular substantive topic comprising the rural field.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6460 Gender and Development F [0.50]**

Cross-cultural and historical changes in gender relations and the roles/positions of women brought about by industrialization and the development of the world system. Critical examination of the predominant theories of gender relations, in so far as these inform development research and action in societies with different socio-economic systems. Introduction to the latest theories and research in the area of women and development, as well as with social and political actions undertaken by women themselves. This is one of the two alternative core courses for the International Development Studies collaborative specialization.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6480 Work, Gender and Change in a Global Context U [0.50]**

This course will consider some of the theoretical frameworks available for examining work, workers and work places in the context of globalization, economic restructuring, and shifts in public policy. Using case studies of particular work worlds, the course may include topics such as changing patterns of work and employment in comparative contexts, labour regimes, industrial and organizational change, organizations and protest, education for work, and the regulation of work. The course will focus on the dialectical relationship between the configurations of gender, class, race and ethnicity and the transformation of work.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6550 Selected Topics in Theory and Research U [0.50]**

This course will be offered with varying content focusing on theory or research.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6600 Reading Course U [0.50]**

A program of directed reading, complemented with the writing of papers or participation in research. Reading courses are arranged by students through their advisors or advisory committees and must be approved by the chair of the department. This course may be repeated provided different content is involved.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6660 Major Paper U [1.00]**

The major paper is an extensive research paper for those who do not elect to complete a thesis. It may be taken over two semesters.

*Department(s):* Department of Sociology and Anthropology

**ANTH\*6700 Pro-seminar F-W [0.00]**

The pro-seminar concerns matters involved in graduate studies and later work as a professional anthropologist, including how to form a graduate advisory committee, assistantship responsibilities, presentation skills, exploration of careers in anthropology, writing grant proposals, reports and articles, and teaching.

*Department(s):* Department of Sociology and Anthropology

## Art History and Visual Culture

**AVC\*6100 Proseminar: Critical Methods I F [0.50]**

This proseminar explores the histories, theories, and methodologies of the fields of art history, visual culture, and material culture.

*Department(s):* School of Fine Art and Music

**AVC\*6200 Proseminar: Critical Methods II W [0.50]**

This seminar is a multi-disciplinary survey of critical theory. The aim is to consider which bodies of theory have been—and continue to be—lively options for the practice of critical thought in relation to visual culture, especially post-1968. The course explores issues which also possess cultural, social and political relevance, theories which affected all the humanities and social sciences, and themes that are also deeply relevant outside the academy. These include: the institutions and networks of knowledge, identity politics, race, sexuality, gender and class, amongst others.

*Prerequisite(s):* AVC\*6100

*Department(s):* School of Fine Art and Music

**AVC\*6300 Special Topics in Art History and Visual Culture F [0.50]**

This seminar explores issues of historical and critical method by focusing them through the lens of a particular area of concern within the fields of art history, visual culture, and/or material culture.

*Department(s):* School of Fine Art and Music

**AVC\*6310 Topics in Art & Visual Culture I W [0.50]**

This seminar course is designed to explore one or more issues in Art and Visual Culture depending on the expertise of the instructor. Offered in conjunction with ARTH\*4310. Extra work is required of graduate students. Students should consult the department for specific offerings.

*Restriction(s):* Credit may be obtained for only one of AVC 6310 or ARTH 4310.

*Department(s):* School of Fine Art and Music

**AVC\*6320 Topics in Art & Visual Culture II F [0.50]**

This seminar course is designed to explore one or more issues in Art and Visual Culture depending on the expertise of the instructor. Offered in conjunction with ARTH\*4320. Extra work is required of graduate students. Students should consult the department for specific offerings.

*Restriction(s):* Credit may be obtained for only one of AVC 6320 or ARTH 4320.

*Department(s):* School of Fine Art and Music

**AVC\*6330 Topics in Art & Visual Culture III W [0.50]**

This seminar course is designed to explore one or more issues in Art and Visual Culture depending on the expertise of the instructor. Offered in conjunction with ARTH\*4330. Extra work is required of graduate students. Students should consult the department for specific offerings.

*Restriction(s):* Credit may be obtained for only one of AVC 6330 or ARTH 4330

*Department(s):* School of Fine Art and Music

**AVC\*6340 Topics in Art & Visual Culture IV F [0.50]**

This seminar course is designed to explore one or more issues in Art and Visual Culture depending on the expertise of the instructor. Offered in conjunction with ARTH\*4340. Extra work is required of graduate students. Students should consult the department for specific offerings.

*Restriction(s):* Credit may be obtained for only one of AVC 6340 or ARTH 4340.

*Department(s):* School of Fine Art and Music

**AVC\*6350 Topics in Art & Visual Culture V F [0.50]**

This seminar course is designed to explore one or more issues in Art and Visual Culture depending on the expertise of the instructor. Offered in conjunction with ARTH\*4350. Extra work is required of graduate students. Students should consult the department for specific offerings.

*Restriction(s):* Credit may be obtained for only one of AVC 6350 or ARTH 4350.

*Department(s):* School of Fine Art and Music

**AVC\*6370 Practicum I: Art Institutions F [0.50]**

The practicum provides students with an opportunity to gain practical experience through work with a curator, or other museum or arts professional. This experience may be based in a museum department, gallery or arts publication office. The course should result in a substantial piece of work - for example, preparatory work for an exhibition, an analysis of a segment of a permanent collection, or a survey or catalogue of an artist's archives. The student is required to submit a written report upon completion of the course.

*Restriction(s):* Admission to the Graduate Program in Art History and Visual Culture  
Instructor consent required.

*Department(s):* School of Fine Art and Music

**AVC\*6400 Practicum II: Art Institutions W [0.50]**

The practicum provides students with an opportunity to gain practical experience through work with an artist, curator, or other museum or arts professional. This experience may be based in a museum department, gallery, artist's studio, or arts publication office. The course should result in a substantial piece of work - for example, preparatory work for an exhibition, an analysis of a segment of a permanent collection, or a survey or catalogue of an artist's archives. The student is required to submit a written report upon completion of the course.

*Restriction(s):* Admission to the Graduate Program in Art History and Visual Culture  
Instructor consent required.

*Department(s):* School of Fine Art and Music

**AVC\*6500 Directed Reading U [0.50]**

Each student establishes, in consultation with the faculty member chosen, the content of this special study within the instructor's area of expertise. Faculty varies.

*Department(s):* School of Fine Art and Music

**AVC\*6800 Art History and Visual Culture Major Research Paper F,W,S [1.00]**

The Master's Research Project is a 10,000-15,000 word paper that requires original research and argumentation.

*Restriction(s):* Admission to the Graduate Program in Art History and Visual Culture,  
course-work students only

*Department(s):* School of Fine Art and Music



## Bioinformatics

<b>BINF*6110 Genomic Methods for Bioinformatics W [0.50]</b>
This course provides an introduction to current and emerging methods used to generate genomic data analyzed in bioinformatics. This may include techniques for DNA sequencing as well as transcriptome, proteome and metabolome analysis. The objective is to develop an appreciation for the challenges of producing data.
<i>Restriction(s):</i> Restricted to students in Bioinformatics programs. Students in other programs may consult with course instructor.
<i>Department(s):</i> Dean's Office, College of Biological Science
<b>BINF*6210 Software Tools for Biological Data Analysis and Organization F [0.50]</b>
This course will familiarize students with tools for the computational acquisition and analysis of molecular biological data. Key software for gene expression analyses, biological sequence analysis, and data acquisition and management will be presented. Laboratory exercises will guide students through application of relevant tools.
<i>Restriction(s):</i> Restricted to students in Bioinformatics programs. Students in other programs may consult with course instructor.
<i>Department(s):</i> Dean's Office, College of Biological Science
<b>BINF*6410 Bioinformatics Programming F [0.50]</b>
This course will introduce bioinformatics students to programming languages. Languages such as C and Perl will be introduced with a focus on bioinformatics applications. The topics covered will serve to aid students when existing software does not satisfy their needs.
<i>Restriction(s):</i> Restricted to students in Bioinformatics programs. Students in other programs may consult with course instructor.
<i>Department(s):</i> Dean's Office, College of Biological Science
<b>BINF*6420 Biosequence Pattern Analysis W [0.50]</b>
This course is an overview course on different approaches to analyze biological sequences. Basic concepts are introduced, as well as related algorithms.
<i>Restriction(s):</i> Restricted to students in Bioinformatics programs. Students in other programs may consult with course instructor.
<i>Department(s):</i> Dean's Office, College of Biological Science
<b>BINF*6500 PhD Research Writing in Bioinformatics F,W,S [1.00]</b>
Background literature pertinent to the student's initial research direction will be studied. Starting with a reading list provided by the advisor and the instructor, the student will build on this list and construct a major literature review over two semesters. As the student begins to generate initial ideas for their own research direction, their ideas are written and explained. The emphasis will be on a sub-field or sub-fields of bioinformatics and the depth of study will be appropriate to the doctoral level.
<i>Restriction(s):</i> PhD students in Bioinformatics program
<i>Department(s):</i> Dean's Office, College of Biological Science
<b>BINF*6890 Topics in Bioinformatics F [0.50]</b>
Selected topics in bioinformatics will be covered. The course might focus on biological or informatics topics, or upon a mixture of both.
<i>Restriction(s):</i> Restricted to students in Bioinformatics programs. Students in other programs may consult with course instructor.
<i>Department(s):</i> Dean's Office, College of Biological Science
<b>BINF*6970 Statistical Bioinformatics W [0.50]</b>
This course presents a selection of advanced approaches for the statistical analysis of data that arise in bioinformatics, especially genomic data. A central theme to this course is the modelling of complex, often high-dimensional, data structures.
<i>Prerequisite(s):</i> Introductory courses in statistics, mathematics and programming
<i>Restriction(s):</i> Restricted to students in Bioinformatics programs. Students in other programs may consult with course instructor.
<i>Department(s):</i> Dean's Office, College of Biological Science
<b>BINF*6999 Bioinformatics Master's Project F,W,S [1.00]</b>
A major research paper is completed and presented by students in the Master of Bioinformatics program.
<i>Prerequisite(s):</i> BINF*6110, BINF*6210
<i>Restriction(s):</i> Restricted to MBNF students only
<i>Department(s):</i> Dean's Office, College of Biological Science

## Biomedical Science

<b>BIOM*6070 Pregnancy, Birth and Perinatal Adaptations S [0.50]</b>
This course promotes understanding of the physiology of the placenta, and its role in fetal, perinatal and adult health. It is offered through videoconference involving University of Guelph, Queen's University and University of Waterloo. Parts are customized to student's interests within pregnancy physiology.
<i>Department(s):</i> Department of Biomedical Sciences

<b>BIOM*6100 Research Proposal in Biomedical Sciences F-W [0.50]</b>
This is a 2 semester course (students must register for the course in each semester) focused on preparing students for their MSc defense while improving their critical thinking, oral communication skills and written communication skills. Students will submit a research proposal and present a seminar on their research proposal. Students will also write lay summaries on other student's seminars.
<i>Restriction(s):</i> Instructor consent required.
<i>Restriction(s):</i> Restricted to MSc students (thesis-based) registered in their first year in the Department of Biomed Sci.
<i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6110 Research Methods in Biomedical Sciences F-W [0.50]</b>
To provide a theoretical and practical introduction to basic and advanced laboratory techniques for graduate students in Biomedical. Sciences. Routine and specialized procedures for light microscopy and various lab techniques, including but not limited to qPCR, protein assays, HPLC, Histology, cell culture and flow cytometry, are examined. Each technique is extensively examined through lectures, discussions and practical exercises. (This is a two semester course that begins in the Fall semester.)
<i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6130 Vertebrate Developmental Biology U [0.50]</b>
The principles of vertebrate development are examined through lectures, discussions and practical exercises. Topics include aspects of gametogenesis, fertilization, implantation, embryonic and fetal development and experimental manipulation of embryos. Emphasis is on mammalian development and topics may vary depending on student needs and interests.
<i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6160 Cellular Biology U [0.50]</b>
An integrative course that examines aspects of cell biology in the context of recent research advancements. Topics are chosen based on student interest and faculty expertise and are explored through a combination of lectures, student seminars and group discussions.
<i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6300 Cancer Biology W [0.50]</b>
Directed to students pursuing cancer research and based on two 1.5-hour lectures and a 2-hour tutorial per week, the general aim of this course is to familiarize students with general concepts in cancer biology and the most commonly used methodologies in cancer research. Apart from improving students' general understanding of cancer biology, the course seeks to enhance critical thinking, writing and oral presentation skills by means of a seminar presentation, weekly tutorial discussions and the preparation of two literature reviews. Offered in conjunction with BIOM*4150. Extra work is required for graduate students.
<i>Restriction(s):</i> Credit may be obtained for only one of BIOM*4150 or BIOM*6300.
<i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6310 Advanced Cancer Biology F [0.50]</b>
This course explores advanced topics in cancer biology including cancer etiology, detection and screening and therapeutic strategies. Students will also critically evaluate the scientific literature as well as cancer related articles disseminated to the general public.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6400 Critical Thinking in Medical Research F [0.50]</b>
This course will explore a variety of issues related to the scientific ideals and practical realities of research in the health sciences. Topics include critical thinking, critical appraisal of the medical literature (with emphasis on clinical trials), the principles of evidence-based medicine, and selected issues related to scientific integrity.
<i>Prerequisite(s):</i> Undergraduate or graduate course in statistics.
<i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6490 Introduction to Drug Development W [0.50]</b>
Drug development is the process of integrating scientific data from several disciplines in order to demonstrate efficacy and safety of the new chemical entity for regulatory approval. This course will provide an overview of the drug development process including preclinical and clinical aspects of drug development.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6570 Biochemical Regulation of Physiological Processes U [0.50]</b>
This course focuses on the regulation of vertebrate physiological processes, such as electrolyte and water balance, temperature regulation, growth and energy metabolism, by hormones and other biological regulators that act through cellular receptors and intracellular biochemical-control pathways.
<i>Department(s):</i> Department of Biomedical Sciences

<b>BIOM*6601 Special Topics in Reproductive Biology and Biotechnology U [0.25]</b>
Permits in-depth exploration of interdisciplinary aspects of biomedical research. Topics such as inflammation, reproductive immunology and neoplasia have been offered. <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6602 Applied Reproductive Biotechnologies F-W [0.50]</b>
The production of embryos in the laboratory requires considerable manual dexterity and expertise as well as theoretical knowledge and problem-solving skills. This is a 2-semester course consisting of laboratory training in bovine in vitro embryo production, seminars, field trips, group discussions and the placement in IVF clinics. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6610 Vascular Biology U [0.50]</b>
An interdisciplinary course in which the interrelationships between vascular proteins, cellular elements and the maintenance of vascular integrity are examined. Structural-functional relationships in vascular biology are explored through seminar presentations, group discussions and small group participation in problem based examples of vascular dysfunction. <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6701 Special Topics in Development, Cell and Tissue Morphology U [0.25]</b>
Permits further in depth study of developmental and morphological sciences. <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6702 Special Topics in Development, Cell and Tissue Morphology U [0.50]</b>
See BIOM*6701 <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6712 Special Topics in Physiology &amp; Biochemistry U [0.50]</b>
This course involves an appropriate combination of an experimental procedure (or project), seminars, selected reading or a literature review outside the thesis subject, developed according to the student's requirements. <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6721 Special Topics in Pharmacology-Toxicology U [0.25]</b>
This course will comprise a combination of an experimental procedure (or project), seminars, selected reading or a literature review outside the thesis subject, developed based on the student's requirements. Topics could include clinical pharmacology/toxicology, pharmaco-epidemiology/economics, gerontological or perinatal pharmacology and toxicokinetics. <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6722 Special Topics in Biomedical Pharmacology-Toxicology U [0.50]</b>
See BIOM*6721 <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6800 Gene Expression in Health and Disease W [0.50]</b>
This course presents the molecular concepts of gene expression and the functional consequences of abnormal expression in pathological conditions. The conceptual, methodological and applied aspects of gene expression will be illustrated through student and faculty seminars, written reports, group discussions, and debates. <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6900 Research Project in Biomedical Sciences W,S,F [1.00]</b>
This course is a lab-based, one-semester research project course for students in the course-based Master of Biomedical Sciences (MBS). As part of this course, students will complete a research paper and grant proposal pertaining to the research topic as well as a poster presentation of the project. <i>Restriction(s):</i> Course restricted to students registered in the course-based MBS. Instructor consent required. <i>Department(s):</i> Department of Biomedical Sciences
<b>BIOM*6910 Practicum in Biomedical Sciences S [1.00]</b>
This is a one-semester practicum project course for students in the Master of Biomedical Sciences (MBS) program. Students receive applied training by working in a host organization or agency for a 12- to 14-week period, focusing on a major project of significance to the host. <i>Restriction(s):</i> Course restricted to students registered in the course-based MBS. Instructor consent required. <i>Department(s):</i> Department of Biomedical Sciences

## Biotechnology

<b>BIOT*6500 Molecular Biotechnology F [0.50]</b>
This course will provide an overview of molecular approaches relevant to a broad range of biotechnology industries including those found in medical, microbial, protein, pharmaceutical, environmental and agricultural fields. <i>Department(s):</i> Department of Molecular and Cellular Biology
<b>BIOT*6550 Biodiversity and Biotechnology W [0.50]</b>
Biological diversity includes the variability among living organisms spanning genetic, species, habitat and geographic scales, thereby encompassing all living things and associated systems. This course will provide an overview of DNA-based approaches used to analyze and characterize the main principles of biodiversity followed by discussions of the impact of biologically diverse communities within the biotechnology sector. <i>Department(s):</i> Department of Molecular and Cellular Biology
<b>BIOT*6600 Innovation Management F [0.50]</b>
This course will focus on the integration of science and business from initial discovery through to commercialization. This integration involves resolving issues related to technical, market and financial feasibility. Topics will include the innovation process, assessment of markets, development of business models and managing projects under high uncertainty. <i>Department(s):</i> Department of Management
<b>BIOT*6610 Cases in Biotechnology Management W [0.50]</b>
This course will examine contemporary issues in biotechnology / science-based business through a case-based approach. Topics from across the spectrum of business disciplines (marketing, management, strategy, intellectual property, etc.) will be examined. Time permitting, a live case with an industry partner will be used. <i>Prerequisite(s):</i> BIOT*6600 <i>Department(s):</i> Department of Management
<b>BIOT*6700 Communication in Science and Business W [0.50]</b>
The goal of this course is to develop written, and oral presentation skills to effectively communicate ideas and experiments in both scientific and business contexts. Students will be asked to write and orally communicate a research proposal. <i>Department(s):</i> Department of Molecular and Cellular Biology
<b>BIOT*6800 Research Project S [1.00]</b>
The students will be matched with a research advisor in their first semester and write a research proposal on their project in the second semester communication course. During the time they do their research project, they will be expected to do the research work that they propose and then to prepare a written report of their results and conclusions as well as to give a poster presentation on this. The research project can be undertaken with any appropriate faculty member, or with an approved off-campus institution. <i>Restriction(s):</i> Students registered in Master of Biotechnology program <i>Department(s):</i> Department of Molecular and Cellular Biology
<b>Biophysics</b>
<b>BIOP*6000 Concepts in Biophysics W [0.50]</b>
This course will emphasize basic concepts in molecular, cellular and structural biophysics arising from key journal publications and their impact on present day research trends. <i>Department(s):</i> Dean's Office, College of Engineering and Physical Sciences
<b>BIOP*6010 Biophysics Seminar U [0.00]</b>
This public research seminar is based on presentations by all PhD students in the Biophysics program in yearly intervals after passing the qualifying exam and by all MSc students in their second year of studies. Students are required to attend all seminars presented during the semester in which they are registered for the course. <i>Department(s):</i> Dean's Office, College of Engineering and Physical Sciences
<b>BIOP*6100 Scientific Communication and Research Methods in Biophysics U [0.50]</b>
The development and refinement of the skills of scientific communication, emphasizing oral presentation and writing skills, in the context of developing a literature review or thesis proposal. All Biophysics students will normally take this within 4 semesters of entering the program. <i>Department(s):</i> Dean's Office, College of Engineering and Physical Sciences
<b>BIOP*6950 Advanced Topics in Biophysics U [0.50]</b>
This course provides opportunities for graduate students to study special topics in contemporary biophysical research under the guidance of graduate faculty members with pertinent expertise. Proposed course descriptions are considered by the Director of the Biophysics program on an ad hoc basis, and the course will be offered according to demand. <i>Department(s):</i> Dean's Office, College of Engineering and Physical Sciences

## Business

### **BUS\*6050 Business Fundamentals U [0.50]**

Examination of theory, function, application, and practice of business with a particular emphasis on important skills, including strategy, communications, content, stakeholders, and decision-making. Course also includes critical business concepts such as ethics/ethical decision making; sustainable business development; ethical management; diversity and cross cultural management.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6100 Food and Agribusiness Economics and Policy U [0.50]**

An analysis of economic and policy issues relevant for food and agribusiness managers in affluent economies, with emphasis on the economic and policy environment that exists within North America.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6110 Foundations of Leadership U [0.50]**

The course will enhance students' interpersonal skills, expand their knowledge and understanding of the theory and research behind leadership and leader development. Leadership issues such as ethical decision-making, engagement, toxic leadership and the impact of team management and collaboration in the organization are explored.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6120 Food and Agribusiness Marketing U [0.50]**

A study of marketing decision-making in food and agribusiness firms, with emphasis on the formulation of strategic marketing plans.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6140 Foundations of Human Resource Management U [0.50]**

This course examines the essential strategic and operational human resource management functions. Topics covered include the legal context, attracting, acquiring and building human capital, employee empowerment, engagement, and rights, globalization of HR, health and safety, labour relations, and legal compliance, in a variety of organizational settings.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6150 Research Methods for Managers U [0.50]**

Students learn to formulate a research problem and to select and use appropriate quantitative and qualitative techniques for the collection and analysis of relevant data. The course also covers ethical issues and responsibilities in research.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6180 Financial and Managerial Accounting U [0.50]**

This course emphasizes the gathering and use of financial information to facilitate effective financial and management decisions by managers to contribute towards overall corporate vision and exercise fiscal responsibility towards overall corporate results and governance. This course takes an accounting information user rather than supplier perspective.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6200 Financial Management U [0.50]**

This course takes the viewpoint of a senior financial officer, focusing on cash management, accounts receivable, inventories and capital assets, and sourcing of funds through debt and equity. Business decision impacts on employees and customers, society and community, government relations, and the environment are considered.

*Prerequisite(s):* BUS\*6180

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6220 Special Topics in Management Issues U [0.50]**

An advanced course for those specializing in management, marketing or organizational behaviour. Deals with current and future topics, trends and problems in the industry, strategic planning, and the integration of management, marketing, and organizational behaviour.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6230 Special Topics in Business U [0.50]**

Advanced course for those specializing in organizational behaviour. Deals with in-depth analysis of industry organizational behaviour, management of current and future problems, reorganizations, corporate cultures, multi-cultural organizations, and ethics.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6300 Business Practices for Sustainability U [0.50]**

This course focuses on critical strategic and managerial issues related to sustainability and introduces students to concepts linking organizational strategies and sustainability principles. It explores how managers can integrate consideration of the environment and society into business strategies and business practices to improve competitive advantage and create environmental, social and economic value.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6320 Hospitality and Tourism Marketing U [0.50]**

Analysis and application of marketing foundations through integration of marketing variables with real-world situations and in-depth analysis of strategic marketing issues.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6400 Canadian Business Law: Addressing Legal Issues in Organizations F,W [0.50]**

This course will introduce you to Canadian business law and give you an understanding of legal principals as they apply to business organizations. After reviewing basic foundational concepts and sources of law in Canada, we will undertake a more in-depth review of practical legal issues and solutions that arise in various business environments. Topics include contracts, torts, employment law, class action and conflict resolution.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6450 Global Business Today U [0.50]**

This course will survey the key issues related to doing business internationally including the cultural context for global business, cross border trade and investment, ethics, the global monetary system, foreign exchange challenges and effectively competing in the global environment.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6500 Governance for Sustainability U [0.50]**

This course introduces MBA students to the rise of environmentalism and state-led environmental management, and the evolving world of environmental governance. Coupled with this review is coverage of some key contemporary environmental issues of relevance to business executives such as climate change and fisheries decline.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6510 Hospitality and Tourism Revenue Management U [0.50]**

This course discusses revenue maximization strategies and tactics that improve the profitability of businesses that work in fixed capacity environments, face time-varied demand, their product is homogeneous and their cost structure reflects a high proportion of fixed and a low proportion of variable cost items.

*Prerequisite(s):* HTM\*6300

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6520 Managing Price Risk U [0.50]**

The course deals with the use of futures, options and other instruments for marketing, risk management and investment purposes. Emphasis is placed on the development and implementation of trading strategies and on the policy and corporate governance framework necessary to support effective management.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

### **BUS\*6550 Managing Service Quality U [0.50]**

A holistic and interdisciplinary approach is used to explore the principles of service management. The course will enhance participants' understanding of what actually constitutes quality, the nature of service, and strategies for improving it.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

<b>BUS*6590 Organizational Theory and Design U [0.50]</b>
Core concepts in organizational theory and their interrelationships as well as concepts such as group decision making and intragroup and intergroup dynamics are explored. <i>Restriction(s):</i> Lang Executive Programs students only <i>Department(s):</i> Executive Programs
<b>BUS*6600 Sustainable Value Creation S [0.50]</b>
Many organizations have redefined their business strategies in line with principles of sustainability in order to maximize value creation for the organization and its stakeholders. In this course students will critically examine these sustainability drivers and strategic approaches to value creation. <i>Restriction(s):</i> Lang Executive Programs students only <i>Department(s):</i> Executive Programs
<b>BUS*6700 Strategic Management &amp; Business Game U [0.50]</b>
This course examines the study of business in a global context through a “live case study,” with specific emphasis on the strategic implications of food, hospitality, agribusiness, and sustainable commerce. This integrative course draws together the conceptual theories and models of the graduate program core. <i>Restriction(s):</i> Lang Executive Programs students only <i>Department(s):</i> Executive Programs
<b>BUS*6790 Operations Management U [0.50]</b>
This course delves into key decisions and techniques used to provide a good or service and deliver customer value in today’s global. The focus is on modelling service and product delivery systems with emphasis on managerial problems in hospitality, tourism, food and agribusiness organizations. <i>Restriction(s):</i> Lang Executive Programs students only <i>Department(s):</i> Executive Programs
<b>BUS*6800 Readings in Leadership I U [0.50]</b>
This course is available to individuals or groups of graduate students. Students will complete a set of readings and an associated paper as approved by designated faculty. Specific learning objectives consistent with the University’s will be developed each time the course is offered. <i>Restriction(s):</i> Lang Executive Programs students only <i>Department(s):</i> Executive Programs
<b>BUS*6810 Readings in Leadership II U [0.50]</b>
This course is available to individuals or groups of graduate students. Students will complete a set of readings and an associated paper as approved by designated faculty. Specific learning objectives consistent with the University’s will be developed each time the course is offered. <i>Prerequisite(s):</i> BUS*6800 (or may be taken concurrently) <i>Department(s):</i> Department of Management
<b>BUS*6820 Readings in Management U [0.50]</b>
This course is available to individuals or groups of graduate students. Students will complete a set of readings and an associated paper as approved by designated faculty. Specific learning objectives consistent with the University’s will be developed each time the course is offered. <i>Department(s):</i> Department of Management
<b>BUS*6830 Foundational Theories of Leadership F [0.50]</b>
This doctoral seminar introduces students to the underlying philosophical assumptions that support empirical research methods within management studies. The challenge facing future researchers, leaders and managers is to distill vast amounts of information into meaningful and action oriented knowledge. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of Management
<b>BUS*6840 Foundational Theories of Management W [0.50]</b>
This doctoral seminar provides a survey of classic and contemporary management thought. The objective of this course is to explore foundational and emerging areas of inquiry that are influential in the realm of management theory and practice. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of Management
<b>BUS*6850 Marketing Strategy U [0.50]</b>
An advanced course for those specializing in marketing. Deals with marketing theories, models, and specific subsets of marketing such as pricing, consumer and industrial-buyer behaviour, distribution, services, and service-delivery concepts. <i>Restriction(s):</i> Lang Executive Programs students only <i>Department(s):</i> Department of Management

<b>BUS*6900 Major Research Project U [1.00]</b>
A detailed critical review of an area of study specific to the specialization of students in the MBA by course work and major paper option. <i>Restriction(s):</i> Lang Executive Programs students only <i>Department(s):</i> Department of Management

## Capacity Development and Extension

<b>CDE*6070 Foundations of Capacity Building and Extension U [0.50]</b>
Contemporary issues and changes in rural communities and the implications for building community capacity. Students will be introduced to and examine dominant paradigms of community capacity building for meeting rural needs. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>CDE*6260 Research Design U [0.50]</b>
Provides students with abilities and knowledge to undertake, formulate and implement research in their chosen area of development. Students are expected to acquire the ability to identify research question and the appropriate designs to answer such questions. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>CDE*6290 Special Topics in Capacity Building and Extension U [0.50]</b>
Selected study topics which may be pursued in accordance with the special needs of students in the program. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>CDE*6311 Community Engagement and Public Participation U [0.50]</b>
This course will explore the philosophy and principles of public participation. An emphasis will be placed on those practices and methods that can be used to engage communities and organizations within a participatory framework. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>CDE*6320 Capacity Building for Sustainable Development U [0.50]</b>
Learning processes enhancing human capital in civil society and the organizational and managerial capabilities that can empower communities to meet their economic, social, cultural and environmental needs. Examines development and underdevelopment and the role of non-formal education and administration in facilitation social change in peripheral regions from an interdisciplinary perspective. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>CDE*6330 Facilitation and Conflict Management U [0.50]</b>
Explore the theories of leadership, practice leadership skills and activities, and develop an understanding of the role facilitation and conflict management play in organizational success. Emphasizes personal individual development through practice, lecture and group discussion. Service learning through facilitation of community meetings will be part of the course. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>CDE*6410 Readings in Capacity Building and Extension U [0.50]</b>
A program of supervised independent study related to the student's area of concentration. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>CDE*6420 Communication for Social and Environmental Change U [0.50]</b>
Communication process for social change and development including participatory media. Students engage in community-based work involving multi-media projects. Course covers the history of development communication and current praxis in Canada and internationally. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>CDE*6690 Community Environmental Leadership U [0.50]</b>
This course explores the relationships between the environment and socio-economic issues at the community level and the resulting conflict. Using the social change model, this course examines the linages between advocacy, decision-making and conflict and the development of strategies to mitigate community conflict. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>CDE*6900 Major Research Paper U [1.00]</b>
Students select a topic and write a paper that does not necessarily include original data but is an analysis and synthesis of materials dealing with the topic selected. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> School of Environmental Design and Rural Development

## Chemistry

### CHEM\*7100 Selected Topics in Inorganic Chemistry U [0.50]

Discussion of specialized topics related to the research interests of members of the centre. Special topics could include, for example: bioinorganic chemistry; inorganic reaction mechanisms; synthetic methods in inorganic and organometallic chemistry; homogeneous and heterogeneous catalysis; chemistry of polynuclear compounds.

*Department(s):* Department of Chemistry

### CHEM\*7120 X-ray Crystallography U [0.50]

Introduction: crystals, basic concepts; space groups: the reciprocal lattice; x-ray diffraction; the phase problem; structure factors; electron density; small molecule structure solution, structure refinement, structure results, journals and databases, paper writing.

*Department(s):* Department of Chemistry

### CHEM\*7130 Chemistry of Inorganic Solid State Materials U [0.50]

Introduction to solid state chemistry, common crystal structures, principles of solid state synthesis, theory and experimental methods for characterizing solids, including thermal analysis techniques, powder x-ray and neutron diffraction methods; special topics to include one or more of the optical, electronic, magnetic, or conductive properties of inorganic materials. Prerequisites: one semester-long undergraduate course (at least third-year level) in inorganic chemistry, preferably with content in structural and/or solid state.

*Department(s):* Department of Chemistry

### CHEM\*7150 Structure and Bonding in Inorganic Chemistry U [0.50]

Free electron, Hückel and extended Hückel methods for molecules and clusters. Perturbation theory. Applications of group theory in inorganic chemistry; Jahn-Teller effects in molecules and solids. Energy bands in one, two and three dimensions. Prerequisites: three semester-long undergraduate courses in inorganic chemistry and one semester-long undergraduate course in quantum mechanics or group theory.

*Department(s):* Department of Chemistry

### CHEM\*7170 Advanced Transition Metal Chemistry U [0.50]

Magnetochemistry of transition metal compounds. Electronic spectra of complex ions including applications of molecular orbital and ligand field theories. Stabilization of unusual oxidation states and co-ordination numbers. Bonding, structure and reactivity of certain important classes of metal complexes, e.g., metal hydrides, metal-metal bonded species, biologically significant model systems such as macrocycles.

*Department(s):* Department of Chemistry

### CHEM\*7180 Advanced Organometallic Chemistry U [0.50]

Reactions, structure and bonding of organometallic compounds of transition and non-transition metals.

*Department(s):* Department of Chemistry

### CHEM\*7200 Selected Topics in Analytical Chemistry U [0.50]

Special topics could include, for example: trace analysis using modern instrumental and spectroscopic methods; advanced mass spectrometry (instrumentation and interpretation of spectra); analytical aspects of gas and liquid chromatography.

*Department(s):* Department of Chemistry

### CHEM\*7240 Chemical Instrumentation U [0.50]

Instrumental components and optimum application; rudiments of design; electrical, spectral, migrational and other methods.

*Department(s):* Department of Chemistry

### CHEM\*7260 Topics in Analytical Spectroscopy U [0.50]

Atomic emission and absorption spectroscopy; methods of excitation and detection; quantitative applications. Molecular electronic spectroscopy, UV, visible and Raman; instrumental characteristics; applications to quantitative determinations, speciation, measurements of equilibrium, etc. Sources and control of errors and interferences. Determination and description of colour.

*Department(s):* Department of Chemistry

### CHEM\*7270 Separations U [0.50]

Material to be covered is drawn from the following topics: diffusion; isolation of organic material from the matrix; chromatographic techniques - principles of chromatographic separation, gas (GLC, GSC), liquid (LLC, LSC, GPC, IEC), supercritical fluid (SFC) chromatographies; GC-MS, CG-FTIR; electrophoresis, flow field fractionation. Prerequisites: undergraduate level course in instrumental analysis.

*Department(s):* Department of Chemistry

### CHEM\*7280 Electroanalytical Chemistry U [0.50]

A study of electroanalytical techniques and their role in modern analytical chemistry. The underlying principles are developed. Techniques include chronamperometry, chronocoulometry, polarography, voltammetry, chronopotentiometry, coulometric titrations, flow techniques, electrochemical sensors and chemically modified electrodes.

*Department(s):* Department of Chemistry

### CHEM\*7290 Surface Analysis U [0.50]

*Department(s):* Department of Chemistry

### CHEM\*7300 Proteins and Nucleic Acids U [0.50]

Determination of protein sequence and 3-dimensional structure, protein anatomy; prediction of protein structure; intermolecular interactions and protein-protein association; effects of mutation. Nucleic acid structure and anatomy; DNA and chromatin structure; RNA structure; snRNPs and ribozymes; protein-nucleic acid interactions.

*Department(s):* Department of Chemistry

### CHEM\*7310 Selected Topics in Biochemistry U [0.50]

Discussion of specialized topics related to the research interests of members of the centre: for example, recent offerings have included peptide and protein chemistry, biochemical toxicology, medical aspects of biochemistry, glycolipids and glycoproteins, redox enzymes, biological applications of magnetic resonance, etc.

*Department(s):* Department of Chemistry

### CHEM\*7360 Regulation in Biological Systems U [0.50]

Mechanisms of regulation of metabolism - enzyme clusters; phosphorylation and protein kinases/phosphatases, repression and induction, protein turnover. Regulation of transcription, translation and mRNA processing. Cell cycle and control of cell division.

*Department(s):* Department of Chemistry

### CHEM\*7370 Enzymes U [0.50]

Mechanisms of rate enhancement. Enzyme kinetics - steady state; inhibitors; bisubstrate enzymes; fast reaction kinetics. Enzyme reaction mechanisms. Structural and genetic modification of enzymes. Catalytic antibodies. Binding processes. Multiple sites and co-operativity. Allosteric enzymes and metabolic control. Catalysis by RNA.

*Department(s):* Department of Chemistry

### CHEM\*7380 Cell Membranes and Cell Surfaces U [0.50]

Membrane proteins and lipids - structure and function; dynamics; techniques for their study; model membrane systems. Membrane transport. The cytoskeleton. Membrane protein biogenesis, sorting and targeting. Signal transduction across membranes. The cell surface in immune responses.

*Department(s):* Department of Chemistry

### CHEM\*7400 Selected Topics in Theoretical Chemistry U [0.50]

Discussion of specialized topics related to the research interests of the members of the centre. Special topics could include for example: theory of intermolecular forces; density matrices; configuration interaction; correlation energies of open and closed shell systems; kinetic theory and gas transport properties; theory of the chemical bond.

*Department(s):* Department of Chemistry

### CHEM\*7450 Statistical Mechanics U [0.50]

Review of classical and quantum mechanics; principles of statistical mechanics; applications to systems of interacting molecules; imperfect gases, liquids, solids, surfaces and solutions.

*Department(s):* Department of Chemistry

### CHEM\*7460 Quantum Chemistry U [0.50]

Approximate solutions of the Schrodinger equation and calculations of atomic and molecular properties.

*Department(s):* Department of Chemistry

### CHEM\*7500 Selected Topics in Physical Chemistry U [0.50]

Discussion of specialized topics related to the research interests of the members of the centre. Special topics could include for example: principles of magnetic resonance in biological systems; collisions, spectroscopy and intermolecular forces, surface chemistry; catalysis; electrolyte theory; non-electrolyte solution theory, thermodynamics of biological systems; thermodynamics.

*Department(s):* Department of Chemistry

### CHEM\*7550 Kinetics - Dynamics U [0.50]

Empirical analysis. Kinetic theory of gases. Potential energy surfaces. Unimolecular rates. Relaxation and steady state methods. Diffusion rates. Rates between polar molecules. Energy transfer.

*Department(s):* Department of Chemistry

### CHEM\*7560 Spectroscopy U [0.50]

Aspects of electronic vibrational and rotational spectroscopy of atoms, molecules, and the solid state. Relevant aspects of quantum mechanics, Dirac notation, and angular momentum will be discussed. Group Theory will be presented and its implications for spectroscopy introduced. Prerequisites: one semester-long undergraduate course in quantum mechanics or the approval of the instructor.

*Department(s):* Department of Chemistry

<b>CHEM*7600 Selected Topics in Organic Chemistry U [0.50]</b>
Two or three topics from a range including: bio-organic chemistry; environmental organic chemistry; free radicals; heterocyclic molecules; molecular rearrangements; organometallic chemistry; photochemistry; natural products.
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7640 Synthetic Organic Reactions U [0.50]</b>
Named organic reactions and other synthetically useful reactions are discussed. The mechanism, stereochemical implications and use in organic synthesis of these reactions will be presented. Examples from the organic literature will be used to illustrate these aspects.
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7650 Strategies in Organic Synthesis U [0.50]</b>
The synthesis of organic compounds is discussed and emphasis is placed on the design of synthetic routes. Examples drawn from the literature are used to illustrate this synthetic planning.
<i>Prerequisite(s):</i> CHEM*7640
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7660 Organic Spectroscopy U [0.50]</b>
Ultraviolet, infrared, resonance spectroscopy and mass spectrometry, with emphasis on applications to studies of organic molecules.
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7690 Physical Organic Chemistry U [0.50]</b>
Linear free energy relationships; substituent effects and reactive intermediates.
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7700 Principles of Polymer Science U [0.50]</b>
Introduction to the physical chemistry of high polymers, principles of polymer synthesis, mechanisms and kinetics of polymerization reactions, copolymerization theory, polymerization in homogeneous and heterogeneous systems, chemical reactions of polymers. Theory and experimental methods for the molecular characterization of polymers.
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7710 Physical Properties of Polymers U [0.50]</b>
The physical properties of polymers are considered in depth from a molecular viewpoint. Rubber elasticity, mechanical properties, rheology and solution behaviour are quantitatively treated.
<i>Prerequisite(s):</i> CHEM*7700 or equivalent
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7720 Polymerization and Polymer Reactions U [0.50]</b>
The reactions leading to the production of polymers are considered with emphasis on emulsion and suspension polymerization and polymerization reaction engineering. Polymer degradation, stabilization and modification reactions are also considered in depth.
<i>Prerequisite(s):</i> CHEM*7700 or equivalent.
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7730 Selected Topics in Polymer Chemistry U [0.50]</b>
Discussion of specialized topics of polymer chemistry related to the research interests of the faculty or prominent scientific visitors. Special topics could include, for example: polymer stabilization and degradation; mechanical properties; polymer principles in surface coatings; organic chemistry of synthetic high polymers; estimation of polymer properties; reactions of polymers; polymerization kinetics.
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7940 MSc Seminar U [0.50]</b>
A written literature review and research proposal on the research topic will be presented and defended in a 30-minute public seminar. This requirement is to be completed by all thesis-option MSc students within two semesters of entering the program.
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7950 PhD Seminar U [0.00]</b>
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7970 MSc Research Paper U [0.50]</b>
An experimental project normally based on the CHEM*7940 research proposal, supervised by the advisor, taking three to four months to complete. This project may be completed at any time during the student's program, but it must follow CHEM*7940. A written report is required, and a seminar based on the content of the report will be presented. The report must be completed as per the project/thesis guidelines of the University campus on which the student is registered. This course normally will follow the course CHEM*7940 MSc Seminar.
<i>Department(s):</i> Department of Chemistry

<b>CHEM*7980 MSc Thesis U [0.00]</b>
<i>Department(s):</i> Department of Chemistry
<b>CHEM*7990 PhD Thesis U [0.00]</b>
<i>Department(s):</i> Department of Chemistry
<b>Computing and Information Science</b>
<b>CIS*6000 Distributed Systems U [0.50]</b>
The evolution of distributed computer systems. Models for distributed processing. Taxonomy of multiprocessor systems. Interconnection networks. Memory and I/O for distributed architectures. Performance of distributed systems. Architectural issues of distributed systems
<i>Department(s):</i> School of Computer Science
<b>CIS*6020 Artificial Intelligence U [0.50]</b>
An examination of Artificial Intelligence principles and techniques such as: logic and rule based systems; forward and backward chaining; frames, scripts, semantic nets and the object-oriented approach; the evaluation of intelligent systems and knowledge acquisition. A sizeable project is required and applications in other areas are encouraged.
<i>Department(s):</i> School of Computer Science
<b>CIS*6030 Information Systems U [0.50]</b>
Relational and other database systems, web information concurrency protocols, data integrity, transaction management, distributed databases, remote access, data warehousing, data mining.
<i>Department(s):</i> School of Computer Science
<b>CIS*6050 Neural Networks U [0.50]</b>
Artificial neural networks, dynamical recurrent networks, dynamic input/output sequences, communications signal identification, syntactic pattern recognition.
<i>Department(s):</i> School of Computer Science
<b>CIS*6060 Bioinformatics U [0.50]</b>
Data mining and bioinformatics, molecular biology databases, taxonomic groupings, sequences, feature extraction, Bayesian inference, cluster analysis, information theory, machine learning, feature selection.
<i>Department(s):</i> School of Computer Science
<b>CIS*6070 Discrete Optimization U [0.50]</b>
This course will discuss problems where optimization is required and describes the most common techniques for discrete optimization such as the use of linear programming, constraint satisfaction methods, and genetic algorithms.
<i>Department(s):</i> School of Computer Science
<b>CIS*6080 Genetic Algorithms U [0.50]</b>
This course introduces the student to basic genetic algorithms, which are based on the process of natural evolution. It is explored in terms of its mathematical foundation and applications to optimization in various domains.
<i>Department(s):</i> School of Computer Science
<b>CIS*6090 Hardware/Software Co-design of Embedded Systems U [0.50]</b>
Specification and design of embedded systems, system-on-a-chip paradigm, specification languages, hardware/software co-design, performance estimation, co-simulation and validation, processes architectures and software synthesis, retargetable code generation and optimization.
<i>Department(s):</i> School of Computer Science
<b>CIS*6100 Parallel Processing Architectures U [0.50]</b>
Parallelism in uniprocessor systems, parallel architectures, memory structures, pipelined architectures, performance issues, multiprocessor architectures.
<i>Department(s):</i> School of Computer Science
<b>CIS*6120 Uncertainty Reasoning in Knowledge Representation U [0.50]</b>
Representation of uncertainty, Dempster-Schafer theory, fuzzy logic, Bayesian belief networks, decision networks, dynamic networks, probabilistic models, utility theory.
<i>Department(s):</i> School of Computer Science
<b>CIS*6130 Object-Oriented Modeling, Design and Programming U [0.50]</b>
Objects, modeling, program design, object-oriented methodology, UML, CORBA, database
<i>Department(s):</i> School of Computer Science
<b>CIS*6140 Software Engineering U [0.50]</b>
This course will discuss problems where optimization is required and describes the most common techniques for discrete optimization such as the use of linear programming, constraint satisfaction methods, and meta-heuristics.
<i>Department(s):</i> School of Computer Science

<b>CIS*6160 Multiagent Systems U [0.50]</b>
Intelligent systems consisting of multiple autonomous and interacting subsystems with emphasis on distributed reasoning and decision making. Deductive reasoning agents, practical reasoning agents, probabilistic reasoning agents, reactive and hybrid agents, negotiation and agreement, cooperation and coordination, multiagent search, distributed MDP, game theory, and modal logics. <i>Department(s):</i> School of Computer Science
<b>CIS*6200 Design Automation in Digital Systems U [0.50]</b>
Techniques and software tools for design of digital systems. Material covered includes high-level synthesis, design for testability, and FPGAs in design and prototyping. <i>Department(s):</i> School of Computer Science
<b>CIS*6320 Image Processing Algorithms and Applications U [0.50]</b>
Brightness transformation, image smoothing, image enhancement, thresholding, segmentation, morphology, texture analysis, shape analysis, applications in medicine and biology. <i>Department(s):</i> School of Computer Science
<b>CIS*6420 Soft Computing U [0.50]</b>
Neural networks, artificial intelligence, connectionist model, back propagation, resonance theory, sequence processing, software engineering concepts. <i>Department(s):</i> School of Computer Science
<b>CIS*6490 Analysis and Design of Computer Algorithms U [0.25]</b>
The design and analysis of efficient computer algorithms: standard methodologies, asymptotic behaviour, optimality, lower bounds, implementation considerations, graph algorithms, matrix computations (e.g. Strassen's method), NP-completeness. <i>Department(s):</i> School of Computer Science
<b>CIS*6510 Cybersecurity and Defense in Depth F [0.50]</b>
This course provides an overview of concepts and technical measures that are employed to enforce security policies and protect networks and systems from malicious activities. Students will learn how to engineer a secure system and how to secure networks in an ethical manner. <i>Restriction(s):</i> Student registered in the MCTI program. <i>Department(s):</i> School of Computer Science
<b>CIS*6520 Advanced Digital Forensics and Incident Response F [0.50]</b>
This course provides an in-depth understanding of theoretical concepts and practical issues in the field of digital forensics and incident response. Students will develop necessary skills, methodologies, and processes to detect cyber incidents and conduct in-depth computer and network investigation. <i>Restriction(s):</i> Student registered in the MCTI program. <i>Department(s):</i> School of Computer Science
<b>CIS*6530 Cyber Threat Intelligence and Adversarial Risk Analysis W [0.50]</b>
This course provides an in-depth understanding of techniques for detecting, responding to, and defeating Advanced Persistent Threats (APT) and malware campaigns using artificial intelligence and data mining techniques. Students will identify, extract, and leverage intelligence from different types of cyber threat actors. <i>Restriction(s):</i> Student registered in the MCTI program. <i>Department(s):</i> School of Computer Science
<b>CIS*6540 Advanced Penetration Testing and Exploit Development W [0.50]</b>
This course provides an in-depth understanding of techniques for detecting, responding to, and defeating Advanced Persistent Threats (APT) and malware campaigns using artificial intelligence and data mining techniques. Students will identify, extract, and leverage intelligence from different types of cyber threat actors. <i>Restriction(s):</i> Student registered in the MCTI program. <i>Department(s):</i> School of Computer Science
<b>CIS*6550 Privacy, Compliance, and Human Aspects of Cybersecurity U [0.50]</b>
This course provides an in-depth view of the privacy, regulatory, and ethical issues surrounding cybersecurity. It covers methods of mitigating/treating privacy risks associated with emerging technologies that collect, manage, and analyse data. This course also examines data protection regulations and compliance strategies. <i>Department(s):</i> School of Computer Science
<b>CIS*6560 Cybersecurity and Threat Intelligence Project W-S [1.00]</b>
Students plan, develop, and write an industry- or faculty-led report and produce required tools, services, and software. Projects should advance knowledge or practice, and address an emerging challenge in cybersecurity, cyber threat intelligence, digital forensics and incident response, cyber threat hunting, or a closely related field. <i>Restriction(s):</i> Student registered in the MCTI program. <i>Department(s):</i> School of Computer Science

<b>CIS*6570 Advanced Cryptography and Cryptanalysis U [0.50]</b>
This course provides an in-depth understanding of modern cryptography, with emphasis on practical applications. Topics covered include classical systems, information theory, symmetrical cryptosystems, block ciphers, stream ciphers, DES, AES, asymmetric cryptosystems, ECC, provable security, keyexchange and management, and authentication and digital signatures, among others. <i>Department(s):</i> School of Computer Science
<b>CIS*6580 Security Monitoring and Cyber Threat Hunting U [0.50]</b>
This course provides a comprehensive review of tools, techniques, and procedures for monitoring network events and assets to build a secure network architecture. It trains students in methods for hunting attackers that could bypass designed network defense mechanisms in an enterprise. <i>Restriction(s):</i> Student registered in the MCTI program. <i>Department(s):</i> School of Computer Science
<b>CIS*6650 Topics in Computer Science I U [0.50]</b>
This special topics course examines selected, advanced topics in computer science that are not covered by existing courses. The topic(s) will vary depending on the need and the instructor. <i>Department(s):</i> School of Computer Science
<b>CIS*6660 Topics in Computer Science II U [0.50]</b>
This is a reading course. Its aim is to provide background knowledge to students who need to get a head-start in their thesis research fields early during their program while no suitable regular graduate courses are offered. Admission is under the discretion of the instructor. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> School of Computer Science
<b>CIS*6890 Technical Communication and Research Methodology U [0.50]</b>
This course aims to develop students' ability in technical communication and general research methodology. Each student is expected to present a short talk, give a mini lecture, review a conference paper, write a literature survey and critique fellow students' talks and lectures. <i>Department(s):</i> School of Computer Science

## Clinical Studies

<b>CLIN*6010 Clinical Medicine F [0.50]</b>
These are in-service clinical training courses based on case material presented to the student in the Veterinary Teaching Hospital. Under supervision, the student is expected to take primary responsibility for case management including decisions related to diagnosis, therapy and client/referring veterinarian communications. Case material studied in each course reflects a different clinical subspecialty commonly occurring in the Fall (F), Winter (W), and Summer (S) semesters respectively. <i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6030 Clinical Medicine W [0.50]</b>
These are in-service clinical training courses based on case material presented to the student in the Veterinary Teaching Hospital. Under supervision, the student is expected to take primary responsibility for case management including decisions related to diagnosis, therapy and client/referring veterinarian communications. Case material studied in each course reflects a different clinical subspecialty commonly occurring in the Fall (F), Winter (W), and Summer (S) semesters respectively. <i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6031 Clinical Medicine S [0.50]</b>
These are in-service clinical training courses based on case material presented to the student in the Veterinary Teaching Hospital. Under supervision, the student is expected to take primary responsibility for case management including decisions related to diagnosis, therapy and client/referring veterinarian communications. Case material studied in each course reflects a different clinical subspecialty commonly occurring in the Fall (F), Winter (W), and Summer (S) semesters respectively. <i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6170 Clinical Surgery F [0.50]</b>
These are in-service clinical training courses based on case material presented to the student in the Veterinary Teaching Hospital. Under supervision, the student is expected to take primary responsibility for case management including decisions related to diagnosis, therapy and client/referring veterinarian communications. Case material studied in each course reflects a different clinical subspecialty occurring in Fall (F), Winter (W), and Summer (S) semesters respectively. The student is required to prepare a paper for publication in a recognized peer review journal based on clinical case material presented to the teaching hospital. As an alternative, the paper can be an in-depth review article on a clinically relevant topic. <i>Department(s):</i> Department of Clinical Studies

**CLIN\*6180 Clinical Surgery W [0.50]**

These are in-service clinical training courses based on case material presented to the student in the Veterinary Teaching Hospital. Under supervision, the student is expected to take primary responsibility for case management including decisions related to diagnosis, therapy and client/referring veterinarian communications. Case material studied in each course reflects a different clinical subspecialty occurring in Fall (F), Winter (W), and Summer (S) semesters respectively. The student is required to prepare a paper for publication in a recognized peer review journal based on clinical case material presented to the teaching hospital. As an alternative, the paper can be an in-depth review article on a clinically relevant topic.

*Department(s):* Department of Clinical Studies

**CLIN\*6181 Clinical Surgery S [0.50]**

These are in-service clinical training courses based on case material presented to the student in the Veterinary Teaching Hospital. Under supervision, the student is expected to take primary responsibility for case management including decisions related to diagnosis, therapy and client/referring veterinarian communications. Case material studied in each course reflects a different clinical subspecialty occurring in Fall (F), Winter (W), and Summer (S) semesters respectively. The student is required to prepare a paper for publication in a recognized peer review journal based on clinical case material presented to the teaching hospital. As an alternative, the paper can be an in-depth review article on a clinically relevant topic.

*Department(s):* Department of Clinical Studies

**CLIN\*6190 Neurology F [0.50]**

Basic principles of lesion localization in the domestic species with discussions of diagnostic problems in veterinary neurology. Offered alternate years.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Clinical Studies

**CLIN\*6200 Concepts and Application of Infection Control U [0.50]**

This course will involve principles of infection control in veterinary hospitals, drawing heavily from information from human medicine and evaluating human information in a veterinary context.

*Department(s):* Department of Clinical Studies

**CLIN\*6270 Applied Surgical Principles U [0.25]**

General surgical principles associated with surgical and related treatment of various body systems. This is an applied course with laboratory and written components. Prerequisite: must have prior surgical training.

*Department(s):* Department of Clinical Studies

**CLIN\*6310 Advanced Equine Veterinary Orthopaedics U [0.50]**

This course will provide the student with an in-depth understanding of orthopaedic practice and will facilitate revision of materials to prepare board certification.

*Prerequisite(s):* DVM or BSc

*Department(s):* Department of Clinical Studies

**CLIN\*6330 Advanced Principles of Diagnostic Imaging U [0.50]**

This course is intended for students pursuing a career in veterinary radiology. Using a lecture-discussion format, the science of x-ray production and the fundamentals of other diagnostic imaging modalities will be presented. The specific applications of these techniques to research and clinical situations will be investigated.

*Department(s):* Department of Clinical Studies

**CLIN\*6350 Advanced Radiology I F,W,S [0.50]**

Radiographic changes seen in diseases of the thorax and abdomen are demonstrated by using radiographs. Contrast and special studies are included where applicable.

*Department(s):* Department of Clinical Studies

**CLIN\*6370 Advanced Radiology II F [0.50]**

A continuation of CLIN\*6350, covering radiographic abnormalities of the neurological and skeletal systems.

*Department(s):* Department of Clinical Studies

**CLIN\*6380 Electrocardiography in Domestic Animals F,W,S [0.50]**

This course will deal with the study of the electrocardiography of the cat, dog, cow and horse. Students will review the mechanisms of arrhythmogenesis and the role of anti-arrhythmic agents in the control of arrhythmogenesis.

*Department(s):* Department of Clinical Studies

**CLIN\*6420 Anesthesiology I S [0.50]**

A course in advanced veterinary anesthesia and allied topics such as fluid, acid-base, and electrolyte balance, shock therapy, and cardio pulmonary resuscitation.

*Department(s):* Department of Clinical Studies

**CLIN\*6440 Anesthesiology II F,W,S [0.50]**

A discussion, reading and investigative course on research methods in comparative anesthesiology.

*Prerequisite(s):* CLIN\*6420 is normally a prerequisite

*Department(s):* Department of Clinical Studies

**CLIN\*6460 Anesthesiology III: Species Specific and Coexisting Disease Considerations F-W [0.50]**

A course in advanced veterinary anesthesia that focuses on the scientific literature related to the anesthesia of specific species and veterinary patients with varying underlying diseases.

*Prerequisite(s):* DVM; CLIN\*6420 and CLIN\*6440

*Department(s):* Department of Clinical Studies

**CLIN\*6550 Small Animal Internal Medicine I U [0.50]**

This is a graduate course designed for DVSc students and residents pursuing further study in the area. The basis of the course is the acquisition and application of knowledge of the pathophysiologic mechanisms of disease. The subject area(s) will be one or two organ systems, which will not be repeated in either CLIN\*6550 or CLIN\*6560 over a 3-year period.

*Department(s):* Department of Clinical Studies

**CLIN\*6560 Small Animal Internal Medicine II U [0.50]**

This is a graduate course designed for DVSc students and residents pursuing further study in the area. The basis of the course is the acquisition and application of knowledge of the pathophysiologic mechanisms of disease. The subject area(s) will be one or two organ systems, which will not be repeated in either CLIN\*6550 or CLIN\*6560 over a 3-year period.

*Department(s):* Department of Clinical Studies

**CLIN\*6570 Large Animal Internal Medicine I W [0.50]**

Advanced study in general medicine and pathophysiologic principles of disorders of the gastrointestinal and urinary systems in ruminants, swine and horses. Offered every third year.

*Department(s):* Department of Clinical Studies

**CLIN\*6580 Large Animal Internal Medicine II W [0.50]**

Advanced study in general medicine and the pathophysiologic principles of disorders of the cardiovascular, respiratory and musculo-skeletal systems of ruminants and horses. Offered every third year.

*Department(s):* Department of Clinical Studies

**CLIN\*6590 Large Animal Internal Medicine III W [0.50]**

Advanced study in general medicine and the pathophysiologic principles of neonatal disorders and disorders of the nervous system, skin and general systemic disorders. Offered every third year.

*Department(s):* Department of Clinical Studies

**CLIN\*6600 Equine Soft Tissue Surgery I F,W,S [0.50]**

Based on required reference reading, every other week discussion will cover advanced soft tissue procedures performed in equine surgery. Guest lectures on selected topics will be presented. Laboratory will be given.

*Department(s):* Department of Clinical Studies

**CLIN\*6610 Equine Soft Tissue Surgery II F,W,S [0.50]**

Based on required reference reading, every other week discussion will cover advanced soft tissue procedures performed in equine surgery. Guest lectures on selected topics will be presented. Laboratory will be given.

*Department(s):* Department of Clinical Studies

**CLIN\*6620 Ruminant Surgery W [0.50]**

Through lectures/seminars, medical and surgical laboratories, and detailed case discussions, this course provides practical experience in ruminant medical, radiological and surgical procedures and in problem-solving related to ruminant practice.

*Department(s):* Department of Clinical Studies

**CLIN\*6661 Respiratory Physiology & Pathophysiology U [0.50]**

This is a graduate course designed for veterinarians pursuing advanced training in residency and DVSc programs. The course will cover normal respiratory anatomy, physiology and pulmonary function. A focus on respiratory pathophysiology will include respiratory failure, oxygen therapy and positive pressure ventilation. (offered every three years).

*Department(s):* Department of Clinical Studies



<b>CLIN*6670 Structure &amp; Function of Animal Skin F,W,S [0.50]</b>
A review of structure and function of skin in veterinary dermatology including the epidermis, dermis, subcutis and adnexal tissue. Application of knowledge in a clinical setting will follow with attention to modalities that will improve the epidermal barrier
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6680 Readings in Cardiology I F,W,S [0.50]</b>
Original articles, review articles and textbook chapters dealing with the most recent concepts of pathophysiology, diagnostic procedures and therapeutic advancements will be reviewed, analyzed and discussed.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6690 Readings in Cardiology II F,W,S [0.50]</b>
Readings in Cardiology II will be a continuation of the format of Readings in Cardiology I with further readings in clinical cardiology.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6700 Pathophysiology in Small Animal Surgery I F,W,S [0.50]</b>
Based on required reference reading, weekly discussions will cover the disease mechanisms involved in medical problems commonly encountered in small animal surgical practice. Guest lectures on selected topics will be presented.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6710 Pathophysiology in Small Animal Surgery II F,W,S [0.50]</b>
Based on required reference reading, weekly discussions will cover the disease mechanisms involved in medical problems commonly encountered in small animal surgical practice. Guest lectures on selected topics will be presented.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6800 Surgical Oncology Procedures F,W [0.50]</b>
This is a combined reading and laboratory course that will cover the major surgical oncology procedures. The relevant readings will be covered, followed by a cadaver laboratory to teach the students the important features of each procedure. (Offered in alternate years)
<i>Restriction(s):</i> Restricted to DVSc students in small animal surgery Instructor consent required.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6910 Professional Veterinary Communication Competencies F-W [0.50]</b>
This course assists learners in developing professional competencies in several critical areas of professional veterinary practice: 1) the veterinary-patient-client relationship; 2) the preparation and delivery of professional seminars; and 3) clinical teaching in small groups.
<i>Restriction(s):</i> Students in Clinical Studies
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6920 Veterinary Clinical Practice I F [0.50]</b>
These are in-service clinical training courses for intern/graduate-diploma students based on case material presented to the Veterinary Teaching Hospital. Under supervision, the intern/graduate-diploma student, as part of a service team with a faculty clinician, is expected to hone their diagnostic, therapeutic and surgical skills, and gain experience with animal restraint and nursing care. They will also develop a problem-oriented approach to health management and disease. Case material studied in each course reflects the clinical problems commonly occurring in the Fall, Winter and Summer semesters respectively.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6930 Veterinary Clinical Practice II W [0.50]</b>
These are in-service clinical training courses for intern/graduate-diploma students based on case material presented to the Veterinary Teaching Hospital. Under supervision, the intern/graduate-diploma student, as part of a service team with a faculty clinician, is expected to hone their diagnostic, therapeutic and surgical skills, and gain experience with animal restraint and nursing care. They will also develop a problem-oriented approach to health management and disease. Case material studied in each course reflects the clinical problems commonly occurring in the Fall, Winter and Summer semesters respectively.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Clinical Studies

<b>CLIN*6940 Veterinary Clinical Practice III S [0.50]</b>
These are in-service clinical training courses for intern/graduate-diploma students based on case material presented to the Veterinary Teaching Hospital. Under supervision, the intern/graduate-diploma student, as part of a service team with a faculty clinician, is expected to hone their diagnostic, therapeutic and surgical skills, and gain experience with animal restraint and nursing care. They will also develop a problem-oriented approach to health management and disease. Case material studied in each course reflects the clinical problems commonly occurring in the Fall, Winter and Summer semesters respectively.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6950 Special Topics in Clinical Studies F,W,S [0.50]</b>
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6960 Special Topics: Zoological Med F,W [0.50]</b>
Preparation for the ACZM examination and based on the published ACZM examination reading list. Students will prepare reading assignments that will be discussed during scheduled time. Each semester will focus on a specific taxon group. A mock examination will be provided on an ACZM sub-specialty (typically birds, reptiles, wildlife, terrestrial mammals or aquatic medicine).
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6970 Neurology II U [0.50]</b>
Advanced study in neurolocalization with a focus on functional neuroanatomy and diagnostic procedures in the domestic species. This two-semester course is offered every 2-3 years.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Clinical Studies
<b>CLIN*6990 Project in Clinical Studies F,W,S [1.00]</b>
This course involves participation in a clinical research project or clinical retrospective study. A review of the relevant literature will be performed. A manuscript suitable for publication in a peer-reviewed journal will be prepared, and the study will be presented in a departmental seminar.
<i>Restriction(s):</i> Only available to students enrolled in the MSc by Coursework Program.
<i>Department(s):</i> Department of Clinical Studies

## Creative Writing

<b>CRWR*6000 Plenary Course: Writers on Writing F [0.50]</b>
This required plenary course addresses important historical and contemporary perspectives on creative writing as an art, a practice, and a profession. Readings, discussion and visits from writers and other literary professionals will help students to articulate effectively their own literary aesthetic and to develop professional skills.
<i>Restriction(s):</i> MFA.CW students only
<i>Department(s):</i> School of English and Theatre Studies
<b>CRWR*6010 Plenary Course: Writers in the World F [0.50]</b>
This required plenary course addresses changing and conflicting ideas about the responsibilities of the writer in the world. Readings, discussion, and visits from writers and other literary professionals will help students to articulate effectively their own positions and to develop professional skills.
<i>Restriction(s):</i> MFA.CW students only
<i>Department(s):</i> School of English and Theatre Studies
<b>CRWR*6100 Poetry Workshop F-W [0.50]</b>
The Poetry Workshop engages students in an intensive program of reading and writing work. The workshops will be strongly focused on writing and on responding to the work of students in the course with productive, constructive criticism. Students will have the opportunity to work closely with a nationally recognized poet to develop their own skills as poets and editors. Students are expected to read widely and to develop their understanding of the technical aspects of their craft.
<i>Restriction(s):</i> MFA.CW students only
<i>Department(s):</i> School of English and Theatre Studies
<b>CRWR*6200 Fiction Workshop F-W [0.50]</b>
The Fiction Workshop engages students in an intensive program of reading and writing work. The workshops will be strongly focused on writing and on responding to the work of students in the course with productive, constructive criticism. Students will have the opportunity to work closely with a nationally recognized author to develop their skills as writers and editors. Students are expected to read widely and to develop their understanding of the technical aspects of their craft.
<i>Restriction(s):</i> MFA.CW students only
<i>Department(s):</i> School of English and Theatre Studies

<b>CRWR*6220 Writing the Decolonial-Fiction U [0.50]</b>
This course teaches writers to approach writing as a conscious engagement with social and political worlds. Students will pay close critical attention to questions of Decolonial thought and race as they are expressed in the structure, narrative arc, character, voice and geographies of writing. <i>Offering(s):</i> Annually <i>Restriction(s):</i> MFA.CW students only <i>Department(s):</i> School of English and Theatre Studies
<b>CRWR*6240 Hybrid Forms and Mixed-Mode Narratives U [0.50]</b>
This course focuses on narrative that experiments with generic boundaries and received forms. Students will examine the use of multiple narrative lines and blended modes (poetry, fiction, nonfiction, graphic narrative) to deepen meaning and amplify personal-social intersections, including with the natural world. <i>Offering(s):</i> Alternate Years <i>Restriction(s):</i> MFA.CW students only <i>Department(s):</i> School of English and Theatre Studies
<b>CRWR*6300 Drama Workshop U [0.50]</b>
The Drama Workshop engages students in an intensive program of writing and reading work. Students will produce a substantial amount of dramatic writing and will also provide constructive criticism of the work of other workshop participants. Required reading will cover a wide range of dramatic literature and the study of dramatic forms and techniques. <i>Restriction(s):</i> MFA.CW students only <i>Department(s):</i> School of English and Theatre Studies
<b>CRWR*6400 Practicum in Creative Writing U [0.50]</b>
In this course of guided study, the student will work on a creative project with a mentor who is a recognized member of the professional writing community. <i>Restriction(s):</i> MFA.CW students only <i>Department(s):</i> School of English and Theatre Studies
<b>CRWR*6500 Non-Fiction Workshop U [0.50]</b>
The Non-Fiction Workshop engages students in a reading and writing intensive program of creative non-fiction. The workshops will be strongly focused on writing and will involve the creation and revision of a substantial body of new work in the genre, as well as critiquing the work of other students in the course. The reading component will focus on texts from a varied social and cultural range (e.g. family memoir, travel narrative, cultural memoir, themed meditation). <i>Restriction(s):</i> MFA.CW students only <i>Department(s):</i> School of English and Theatre Studies
<b>CRWR*6600 Special Topics in Creative Writing U [0.50]</b>
A variable-content course focusing on a particular issue or approach to writing within one genre of creative writing (fiction, poetry, drama, etc.) or a particular issue or approach to writing that is at work across multiple genres. <i>Department(s):</i> School of English and Theatre Studies

## Criminology and Criminal Justice Policy

<b>CCJP*6000 Courts W [0.50]</b>
This course examines courts from a variety of political, social, and socio-legal perspectives depending on the interest of the instructor(s). Particular attention will be paid to the role of courts in shaping criminal justice policy through such means as constitutional decisions and sentencing decisions. <i>Restriction(s):</i> CCJP students. Instructor consent required. <i>Department(s):</i> Department of Sociology and Anthropology, Department of Political Science
<b>CCJP*6100 Governing Criminal Justice F [0.50]</b>
This course analyzes criminal justice policy and governance of the criminal justice system from applied and theoretical perspectives. Particular attention is paid to the interplay between criminal justice policy and management and the larger political process. <i>Restriction(s):</i> CCJP students <i>Department(s):</i> Department of Political Science
<b>CCJP*6200 Professional Seminar in CCJP F,W [0.25]</b>
This course introduces students to graduate studies in the program; to the professions of sociology, political science and criminology; and to professional life in occupations related to criminal justice. It includes information on the following: the program and how it relates to criminology, sociology and political science; library and computer research; research in the field; challenges facing criminal justice professionals; applying for further graduate study and research funding; and skill development. <i>Restriction(s):</i> CCJP students <i>Department(s):</i> Department of Sociology and Anthropology, Department of Political Science

<b>CCJP*6300 Research Methods in Criminal Justice F [0.75]</b>
This course introduces students to the primary methods, data sources and statistical methods used in criminal justice and criminology research. Particular attention will be paid to the role research and methods and statistics play in shaping criminal justice/criminological theory, research and policy. <i>Restriction(s):</i> CCJP students. Instructor consent required. <i>Department(s):</i> Department of Sociology and Anthropology
<b>CCJP*6660 Major Research Paper S,F,W [1.00]</b>
The major paper is an extensive research paper for those who do not elect to complete a thesis. It may be taken over two semesters. <i>Restriction(s):</i> Restricted to CCJP graduate students <i>Department(s):</i> Department of Sociology and Anthropology, Department of Political Science

## Critical Studies in Improvisation

<b>IMPR*6010 Core Concepts in Critical Studies in Improvisation F-W [1.00]</b>
This required two-term course is based on seminal works that introduce the field of critical studies in improvisation. It is designed to expose students to core concepts and key readings in critical studies in improvisation, with especial attention to the historical, theoretical, and critical literature in the field. <i>Department(s):</i> School of English and Theatre Studies
<b>IMPR*6020 Arts-Based Community Making F-W [1.00]</b>
This required two-term course emphasizes the links between improvisation and social practices, and the connections between principles of improvised artistic practices and those of ethical community-engaged collaboration. <i>Department(s):</i> School of English and Theatre Studies
<b>IMPR*6030 Foundational Research Methods in Critical Studies in Improvisation F [0.50]</b>
This required course provides an overview of a range of research methodologies pertinent to the field of Critical Studies in Improvisation. These include: critical thinking and writing strategies; discursive and qualitative research practices; community literacy and outreach; research ethics; grant-writing and research funding practices and possibilities; practicum-based learning issues and contexts; and knowledge mobilization strategies. <i>Department(s):</i> School of English and Theatre Studies
<b>IMPR*6410 Pedagogy Lab W [0.50]</b>
This practicum experience, required for PhD students, is a closely mentored opportunity to develop the pedagogical skills and mindsets necessary to support learner-centered, improvisation-based, teaching and course design. <i>Department(s):</i> School of English and Theatre Studies
<b>IMPR*6800 Major Research Project in Critical Studies in Improvisation F,W [0.50]</b>
An independent study course, the content of which is agreed upon between the individual MA student and their supervisor. The student will conduct an extended research project that provides them with training in research methodology, culminating in a major project or paper. Subject to the approval of the student's advisory committee and the Graduate Program Committee. <i>Prerequisite(s):</i> IMPR*6010, IMPR*6020, IMPR*6030 <i>Department(s):</i> School of English and Theatre Studies

## Economics

<b>ECON*6000 Microeconomic Theory I U [0.50]</b>
A graduate course in microeconomics, intended for PhD students, presenting a rigorous treatment of the analysis of choices for consumers and producers with and without strategy and uncertainty, partial and general equilibrium, and the fundamental theorems of welfare economics. <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6010 Microeconomic Theory II U [0.50]</b>
Advanced topics in modern microeconomics to include elements of game theory, information economics, economics of risk and uncertainty, the theory of incentives and others. <i>Prerequisite(s):</i> ECON*6000 <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6020 Macroeconomic Theory I U [0.50]</b>
A first graduate course in macroeconomics, presenting a rigorous introduction to the tools and basic models of dynamic general equilibrium theory. The topics covered include economic growth and development, economic fluctuations, and monetary and fiscal policies. <i>Department(s):</i> Department of Economics and Finance

<b>ECON*6040 Macroeconomic Theory II U [0.50]</b>
This course considers the dynamics resulting from intertemporal optimization models. Foundations of unemployment theory. Approaches to business cycles. Models of long-run growth.
<i>Prerequisite(s):</i> ECON*6020
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6050 Introduction to Econometric Methods U [0.50]</b>
Introduction to the specification, estimation and testing of economic models. Topics include the classical linear regression model, t tests, structure tests, specification error, the consequences of the violation of the classical assumptions, detection and correction of autocorrelation and heteroscedasticity.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6060 Mathematical Methods for Economics F [0.00]</b>
This course is designed to provide students with the necessary mathematical tools to follow the contents of the core economics and econometrics courses in the MA program and successfully complete them. The material covered will include advanced topics in linear algebra, multivariate optimization techniques and comparative statics.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6090 Game Theory U [0.50]</b>
This course introduces the student to game theory, which is an important tool for modelling economic situations with multi-person interaction. Economic applications such as oligopoly, bargaining, auctions, and public goods provision will be discussed. Broader applications to voting games, candidate strategy, war games, and parlour games will also be briefly discussed. Students need to be very familiar with optimization and single person decision-making.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6100 Experimental Economics U [0.50]</b>
This course examines the use of the experimental methodology in economics. We will study how experiments have been used to test theories in many subfields within economics. In the process, students will learn how to construct and run economics experiments and analyze experimental data.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6110 Mathematical Economics U [0.50]</b>
This course introduces students to the mathematical techniques used in advanced economic analysis. Topics covered in any year: analysis of dynamic economic models and optimization in dynamic economic models.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6140 Econometrics I U [0.50]</b>
Topics include a review of the classical linear regression model, applications of generalized least squares, maximum likelihood methods and various statistical test procedures.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6160 Econometrics II U [0.50]</b>
Topics include maximum likelihood as a method of estimation and inference, nonlinear estimation and simultaneous equations. Also more specialized topics such as limited-dependent-variable models and non-parametric regression methods may be covered.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6170 Topics in Econometrics U [0.50]</b>
This is an advanced econometrics topics course that covers the area of non-parametric and semiparametric estimation and testing of econometrics models, including time series and panel data semiparametric models.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6180 Econometric Methods U [0.50]</b>
This course follows ECON*6050. It covers estimation by instrumental variables, estimations of simultaneous systems, asymptotic distribution theory, maximum likelihood estimation, binary choice and limited dependent variable models, and issues in time series analysis.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6200 Economic History U [0.50]</b>
This course considers topics in economic history which vary from year to year. The emphasis will be usually on late-19th or 20th century topics and often involves a world emphasis. Student presentations and papers form a large part of the course.
<i>Department(s):</i> Department of Economics and Finance

<b>ECON*6300 International Trade Theory U [0.50]</b>
This course provides a rigorous treatment of both positive and normative aspects of trade theory through extensive use of general equilibrium models under varying assumptions. Topics may also include barriers to trade, international factor movements, growth and development, and strategic trade policy.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6320 International Finance U [0.50]</b>
This course deals with the theoretical policy and issues of international finance. Topics may include exchange rate determination, capital flows in international markets, the financing of trade flows, and open economy macroeconomic models and policy issues.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6350 Economic Development U [0.50]</b>
This course examines economic development from an international perspective: theories, history, policies and prospects.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6370 Economic Development in Historical Perspective U [0.50]</b>
This course will examine the experience of economic development focusing on the emergence of the Third World. Topics for discussion will vary from year to year; they may include the impact of trade expansion during the eighteenth and nineteenth centuries, the role of manufacturing as a leading sector, statist vs. the new classical approaches to government policy, and others.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6380 Financial Economics U [0.50]</b>
This course has three objectives: (i) build a common background for all students in asset pricing and corporate finance in order to facilitate discussion of finance research; (ii) provide an in-depth look at selected finance topics, and (iii) expose students to top published research papers.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6390 Empirical Finance and Financial Econometrics U [0.50]</b>
This course covers topics in empirical finance, involving the integration of financial theory, financial econometrics, and data analysis. Students will learn how empirical research in finance is conducted through reading involving both textbooks and journal articles and from conducting an independent research project.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6400 Public Finance U [0.50]</b>
This course surveys the normative theory of the public sector. Topics may include public expenditure theory, tax theory, cost benefit analysis and fiscal federalism.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6490 Money and Banking U [0.50]</b>
This course studies monetary economies using overlapping generations models, MIU models and CIA models. More specifically, we will study major issues in money and banking, such as the role of money and banks, the cost of inflation, and the optimal monetary policies.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6500 Microeconomic Theory MA U [0.50]</b>
A first graduate course in microeconomics, intended for Master students, presenting a rigorous treatment of the analysis of choices in markets and organizations. It covers consumer theory, general equilibrium, uncertainty, game theory, and information economics.
<i>Restriction(s):</i> Restricted to MA students only.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6600 Labour Economics U [0.50]</b>
Major themes in labour market theory including static and dynamic labour demand and supply, migration and wage structures and dynamics, unemployment, migration and the role of social programs.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6610 Topics in Labour Economics U [0.50]</b>
This course complements ECON*6600. Topics include advanced issues in family labour supply, human capital, wage bargaining and contract theory, search theory, duration analysis and its application to major labour market spells such as employment and unemployment.
<i>Department(s):</i> Department of Economics and Finance
<b>ECON*6650 Economics of Social Welfare U [0.50]</b>
This course deals with the analysis of social welfare programs, concentrating on national health insurance. It covers their structure, incentives and distribution effects, and includes empirical analysis of existing programs.
<i>Department(s):</i> Department of Economics and Finance

<b>ECON*6700 Industrial and Market Organization U [0.50]</b>
The major topics of industrial organization are analyzed from both a game theoretic perspective and from a Structure-Conduct-Performance perspective. Typical topics include: oligopoly theory, determinants of industrial structure, Coase theorem, market entry, advertising, research and development, product differentiation, and price discrimination. <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6750 Managerial Economics U [0.50]</b>
The course introduces students to the latest developments in the economic analysis of the inside workings and organization of firms. The course tries to explain the diversity of economic organizations, and more generally why economic activity is sometimes carried out through firms and sometimes through markets. For graduate students outside the Department of Economics and Finance. <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6770 Financial Management U [0.50]</b>
This course examines the implications of financing decisions made by firms in a world of uncertainty. Topics such as capital budgeting, capital structure, dividend policy, market efficiency and capital asset pricing will be analyzed from the perspective of corporate finance and portfolio management theory. Co-requisite: AGECE*6070. For graduate students outside the Department of Economics and Finance. <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6800 Environmental Economics U [0.50]</b>
A topics course concerning the interrelationships between economic activities and the state of the natural environment. Topics may include: pollution and economic growth; energy use and environmental quality; international trade and pollution; policies for controlling pollution; techniques for assessing the benefits of environmental improvement. <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6810 Economic Theory of Natural Resources Use U [0.50]</b>
This course examines economic models of the use of non-renewable resources to analyze issues such as resource conservation, sustainable development, taxation of resource rents, and price determination in resource markets. <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6820 Security Analysis and Portfolio Management U [0.50]</b>
This course has three goals: 1. to teach students how to analyze companies in the context of constructing equity portfolios. 2. to help students understand the valuation process of firms and calculate companies intrinsic value. 3. to make students aware of the role and activities of equity security analysts in highly competitive markets. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6930 Reading Course U [0.50]</b>
In some circumstances, students may arrange to take a reading course under the direction of a faculty member. <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6940 Research Project U [1.00]</b>
All students who choose the research project option in the MA program will register in this course. Research projects are written under the direct supervision of a faculty member. Normally, research projects are completed within one or two semesters. Students must make a presentation of their work and a copy of the final report must be submitted to the Department before the final grade is submitted to the Office of Graduate and Postdoctoral Studies. <i>Department(s):</i> Department of Economics and Finance
<b>ECON*6950 Finance Research Project S [0.50]</b>
This program is a supervised research project exclusively for students in the Finance Specialization stream in the MA program. Students may elect either to write a major paper in a finance-related topic or to do a placement in a financial consulting company to conduct a structured portfolio analysis. Students must indicate their preference prior to the start of the summer semester to the Graduate Program Coordinator, who will oversee placements. <i>Prerequisite(s):</i> ECON*6000, ECON*6140, ECON*6380, ECON*6820, AND ECON*6930, <i>Restriction(s):</i> For students in the MA Economics Finance Specialization <i>Department(s):</i> Department of Economics and Finance

## Environmental Design and Rural Development

<b>EDRD*6000 Qualitative Analysis in Rural Development U [0.50]</b>
Nature and use of qualitative data collection and analysis techniques by practitioners in the planning, implementation and evaluation of rural planning and development activities in both domestic and international settings. <i>Department(s):</i> School of Environmental Design and Rural Development

<b>EDRD*6050 Farming Systems Analysis and Development W [0.50]</b>
An introduction to the Farming Systems Research/Extension approach to solving problems in tropical and sub-tropical agricultural and livestock production systems including problem diagnosis, stakeholder identification and the process of generation, adaption and validation of solutions. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>EDRD*6100 Disaster Planning and Management U [0.50]</b>
This course take a multi-hazard perspective and is designed to challenge the students to examine the relationship between disaster and development, to learn how hazards become disasters, as well as the techniques for effective planning and managing disasters from a long-term development perspective. <i>Offering(s):</i> Offered through Distance Education format only. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>EDRD*6630 Regional Planning S [0.50]</b>
An examination of the theory and practice of regional planning in an international and Canadian environment, including a discussion of the various tools available to analysis the regional economy. <i>Department(s):</i> School of Environmental Design and Rural Development
<b>EDRD*6690 Program Evaluation U [0.50]</b>
An advanced seminar dealing with the theory and practice of program evaluation focusing on public sector programs in agriculture and rural development, international and domestic case studies. <i>Department(s):</i> School of Environmental Design and Rural Development

## Engineering

<b>ENGG*6000 Advanced Heat and Mass Transfer U [0.50]</b>
Basic physical principles of transport phenomena. Heat and mass transfer methods for physical systems. Time and volume averaging. Dimensional analysis. <i>Department(s):</i> School of Engineering
<b>ENGG*6010 Assessment of Engineering Risk U [0.50]</b>
The question of "how safe is safe enough?" has no simple answer. In response, this course develops the bases by which we can assess and manage risk in engineering. Course deals with fate and transport issues associated with risk, as relevant to engineering and how these aspects are employed in the making of decisions. <i>Prerequisite(s):</i> STAT*2040 or STAT*2120 <i>Department(s):</i> School of Engineering
<b>ENGG*6020 Advanced Fluid Mechanics U [0.50]</b>
Laminar and turbulent flow. Turbulence and turbulence modelling. Boundary-layer flow. Compressible flow. Potential flow. <i>Department(s):</i> School of Engineering
<b>ENGG*6030 Finite Difference Methods U [0.50]</b>
Numerical solution of partial differential equations of flow through porous media; flow of heat and vibrations; characterization of solution techniques and analysis of stability; convergence and compatibility criteria for various finite difference schemes. <i>Department(s):</i> School of Engineering
<b>ENGG*6050 Finite Element Methods U [0.50]</b>
Boundary-value problems. Methods of approximation. Time dependent problems. Isoparametric elements. Numerical integration. Computer implementation. Mesh generation and layouts. Two-dimensional finite elements. <i>Department(s):</i> School of Engineering
<b>ENGG*6060 Engineering Systems Modelling and Simulation U [0.50]</b>
A study of theoretical and experimental methods for characterizing the dynamic behaviour of engineering systems. Distributed and lumped parameter model development. Digital simulation of systems for design and control. <i>Department(s):</i> School of Engineering
<b>ENGG*6070 Medical Imaging U [0.50]</b>
Digital image processing techniques including filtering and restoration; physics of image formation for such modalities as radiography, MRI, ultrasound. <i>Prerequisite(s):</i> ENGG*3390 or equivalent <i>Department(s):</i> School of Engineering
<b>ENGG*6080 Engineering Seminar U [0.00]</b>
The course objective is to train the student in preparing, delivering and evaluating technical presentations. Each student is required to: (a) attend and write critiques on a minimum of six technical seminars in the School of Engineering; and (b) conduct a seminar, presenting technical material to an audience consisting of faculty and graduate students in the school. This presentation will then be reviewed by the student and the instructor. <i>Department(s):</i> School of Engineering

**ENGG\*6090 Special Topics in Engineering U [0.50]**

A course of directed study involving selected readings and analyses in developing knowledge areas which are applicable to several of the engineering disciplines in the School of Engineering.

*Department(s):* School of Engineering

**ENGG\*6100 Machine Vision U [0.50]**

Computer vision studies how computers can analyze and perceive the world using input from imaging devices. Topics covered include image pre-processing, segmentation, shape analysis, object recognition, image understanding, 3D vision, motion and stereo analysis, as well as case studies.

*Department(s):* School of Engineering

**ENGG\*6110 Food and Bio-Process Engineering U [0.50]**

Kinetics of biological reactions, reactor dynamics and design. Food rheology and texture; water activity and the role of water in food processing; unit operations design-thermal processing; and drying, freezing and separation processes.

*Department(s):* School of Engineering

**ENGG\*6120 Fermentation Engineering U [0.50]**

Modelling and design of fermenter systems. Topics include microbial growth kinetics, reactor design, heat and mass transfer. Instrumentation and unit operations for feed preparation and product recovery. Prerequisite: undergraduate course in each of microbiology, heat and mass transfer, and biochemistry or bioprocess engineering.

*Department(s):* School of Engineering

**ENGG\*6130 Physical Properties of Biomaterials U [0.50]**

Rheology and rheological properties. Contact stresses between bodies in compression. Mechanical damage. Aerodynamic and hydro-dynamic characteristics. Friction.

*Department(s):* School of Engineering

**ENGG\*6140 Optimization Techniques for Engineering U [0.50]**

This course serves as a graduate introduction into combinatorics and optimization. Optimization is the main pillar of Engineering and the performance of most systems can be improved through intelligent use of optimization algorithms. Topics to be covered: Complexity theory, Linear/Integer Programming techniques, Constrained/Unconstrained optimization and Nonlinear programming, Heuristic Search Techniques such as Tabu Search, Genetic Algorithms, Simulated Annealing and GRASP.

*Department(s):* School of Engineering

**ENGG\*6150 Bio-Instrumentation U [0.50]**

Instrumentation systems. Transducers. Amplifier circuits. Recording methods. Spectroscopy & colorimetry. Radiation, humidity, pH and noise measurements. Chromatography.

*Restriction(s):* ENGG\*3450 or equivalent.

*Department(s):* School of Engineering

**ENGG\*6160 Advanced Food Engineering U [0.50]**

Application of heat and mass transfer, fluid flow, food properties, and food- processing constraints in the design and selection of food process equipment. Development of process specifications for the control of the flow of heat and moisture and the associated microbial, nutritional and organoleptic change in foods. Food system dynamics and process development.

*Department(s):* School of Engineering

**ENGG\*6170 Special Topics in Food Engineering U [0.50]**

A course of directed study involving selected readings and analyses in developing knowledge areas of food engineering.

*Department(s):* School of Engineering

**ENGG\*6180 Final Project in Biological Engineering U [1.00]**

A project course in which a problem of advanced design or analysis in the area of biological engineering is established, an investigation is performed and a final design or solution is presented.

*Restriction(s):* This course is open only to students in the biological MEng program.

*Department(s):* School of Engineering

**ENGG\*6190 Special Topics in Biological Engineering U [0.50]**

A course of directed study involving selected readings and analyses in developing knowledge areas of biological engineering.

*Department(s):* School of Engineering

**ENGG\*6260 Colloids, Interfaces and Emulsions W [0.50]**

This course focuses on the theory and the applications of colloid and interface science in the environmental, chemical, and food sectors. Major topics include the forces of interactions between colloids, the stabilization and destabilization of emulsions and foams, and polymeric fluids and gels.

*Prerequisite(s):* CHEM\*1040 or equivalent, CHEM\*1050 or equivalent

*Department(s):* School of Engineering

**ENGG\*6290 Special Topics in Mechanical Engineering U [0.50]**

A course of directed study involving selected readings and analyses in developing knowledge areas of mechanical engineering.

*Department(s):* School of Engineering

**ENGG\*6300 Research Methods in Bioengineering U [0.50]**

Research methodologies used in bioengineering are reviewed and assessed in the context of a diverse range of applications: biomechanics, control and instrumentation, ergonomics, diagnostic tools, biomaterials and food safety. The scientific method is discussed in terms of defining research problems, appropriate tests and hypotheses, experimental methods, data analysis and drawing conclusions. The objective is to guide students as they develop a coherent research proposal and deepen their understanding of the breadth of the discipline. (Offered in alternate years)

*Restriction(s):* Instructor consent required.

*Department(s):* School of Engineering

**ENGG\*6310 Advanced Electromechanical Devices U [0.50]**

Course covers: switched reluctance motor, brushless motor, linear motor, axial flux motor, and harmonic drive motor with applicable actuators. Other topics introduced include: Electromagnetic micro power generation, design and analysis of cooling systems and control mechanism. Background in electromagnetism required. (Offered in alternate years)

*Department(s):* School of Engineering

**ENGG\*6320 Advanced Topics in Mechatronics U [0.50]**

This course covers materials related to mechatronics systems in terms of dynamics, control, sensing, estimation. The course covers advanced topics in these areas and provides students the tools to model, analyze, and control these systems. The focus is on vehicles and robots (mobile robots).

*Department(s):* School of Engineering

**ENGG\*6340 Bioenergy and Biofuels U [0.50]**

Theoretical and hands-on experience in bio-renewable energy areas prepares students from diverse backgrounds for a career in the biorefinery industry, academia, or entrepreneurial endeavors. Also deals with the technologies of converting biomass into upgraded energy, value added products, fuels, and chemicals. Thermodynamics background helpful.

*Department(s):* School of Engineering

**ENGG\*6350 Flow Induced Vibrations U [0.50]**

Course covers fluid-structure interaction problems with an emphasis on analytical and numerical methods. Topics include vortex and turbulence induced vibration, galloping and flutter, fluid-elastic instability, and acoustic resonance. Various case studies and applications will be discussed. Background in fluid mechanics and vibrations required. (Offered in alternate years)

*Department(s):* School of Engineering

**ENGG\*6360 Fuel Cell Technology U [0.50]**

Examination of principles governing fuel cell technology and the technical challenges associated with developing fuel cell systems. Topics include the chemical thermodynamics and electrochemical kinetics of fuel cells, the evolution of fuel cell technology, and fuel cell system design. Background in materials and thermodynamics required.

*Department(s):* School of Engineering

**ENGG\*6370 Heat Transfer in Porous Media U [0.50]**

Course covers general conservation equations for studying the flow and heat transfer through porous media. Application and case studies of porous materials will be discussed. Modelling techniques will be shown for a particular application area. Background in Heat Transfer required. (Offered in alternate years)

*Department(s):* School of Engineering

**ENGG\*6380 Simulation Analysis of Discrete Event Systems U [0.50]**

Many complex engineering, operations, and business systems can be modeled as discrete-event systems. Efficient management and operation of these systems requires simulation to study their performance. Case studies and applications will be presented and discussed. (Offered in alternate years)

*Department(s):* School of Engineering

**ENGG\*6390 Final Project in Mechanical Engineering U [1.00]**

A project course in which a problem of advanced design or analysis in the area of mechanical engineering is established, an investigation is performed and a final design or solution is presented.

*Restriction(s):* This course is only open to students registered in the School of Engineering

*Department(s):* School of Engineering

**ENGG\*6400 Mobile Devices App Development U [0.50]**

This course provides an introduction to developing applications for mobile devices. The emphasis will be on the fundamentals of mobile application programming. This is primarily a project-based course in which the goal is to produce a working app by the end of the course. The purpose of this course is to create new inter-disciplinary applications of mobile devices. Graduate students from all disciplines at the University of Guelph are invited to take the course for credit.

*Department(s):* School of Engineering

**ENGG\*6440 Advanced Biomechanical Design U [0.50]**

Biomechanical Design from concept through prototyping and testing. This course will investigate and apply techniques used for biomechanical design including reverse engineering, solid modelling, geometric tolerancing, testing and rapid prototyping. Instructor's signature required.

*Department(s):* School of Engineering

**ENGG\*6450 Queueing Theory & Traffic Modeling in Data Networks U [0.50]**

Network traffic modeling. Transient and steady-state analysis of Markov chains. Queueing analysis. Admission and access control. Flow control protocols. Congestion control. End-to-end performance bounds analysis.

*Restriction(s):* Engineering graduate students. Instructor consent required.

*Department(s):* School of Engineering

**ENGG\*6500 Introduction to Machine Learning U [0.50]**

The aim of this course is to provide students with an introduction to algorithms and techniques of machine learning particularly in engineering applications. The emphasis will be on the fundamentals and not specific approach or software tool. Class discussions will cover and compare all current major approaches and their applicability to various engineering problems, while assignments and project will provide hands-on experience with some of the tools.

*Department(s):* School of Engineering

**ENGG\*6510 Analog Integrated Circuit Design U [0.50]**

In this course, operating principles and design techniques of analog integrated circuits are introduced with emphasis on device and system modelling. These circuits include analog and switched-capacitor filters, data converters, amplifiers, oscillators, modulators, circuits for communications, sensor readout channels, and circuits for integrated memories. It is recommended that students are familiar with the fundamentals of linear systems, circuit analysis, and electronic devices.

*Department(s):* School of Engineering

**ENGG\*6520 VLSI Digital Systems Design U [0.50]**

This course will introduce the principles of VLSI MOSFET digital design from a circuit and system perspective. Advanced topics include: power issues related to each level of design abstraction; voltage and frequency scaling; power to speed tradeoffs; ASIC digital design flow; Verilog intergrationintegration; ASIC case studies. It is recommended that students are familiar with the fundamentals of digital circuits and electronic devices.

*Department(s):* School of Engineering

**ENGG\*6530 Reconfigurable Computing U [0.50]**

This course serves as a graduate introduction into reconfigurable computing systems. It introduces students to the analyses, synthesis and design of embedded systems and implementing them using Field Programmable Gate Arrays. Topics include: Programmable Logic devices, Hardware Description Languages, Computer Aided Design Flow, Hardware Accelerators, Hardware/Software Co-design techniques, Run Time Reconfiguration, High Level Synthesis. It is recommended that students are familiar with the fundamentals of digital design and hardware description languages.

*Department(s):* School of Engineering

**ENGG\*6540 Advanced Robotics U [0.50]**

This course is intended for graduate students who have some knowledge and interest in robotics. The course covers modelling, design, planning control, sensors and programming of robotic systems. In addition to lectures, students will work on a term project in which a problem related to robotics systems will be studied. Instructors signature required.

*Department(s):* School of Engineering

**ENGG\*6550 Intelligent Real-Time Systems U [0.50]**

Soft real-time systems, hard real-time systems, embedded systems, time handling and synchronization, deadlines, preemption, interruption, RTS languages, RTS/ operating systems, system life-cycle, petri nets, task scheduling and allocation, fault-tolerance, resource management, RTS/search techniques, dealing with uncertainty.

*Department(s):* School of Engineering

**ENGG\*6560 Advanced Digital Signal Processing U [0.50]**

Discrete-time signals and systems, z transform, frequency analysis of signals and systems, fourier transform, fast fourier transform, design of digital filters, signal reconstruction, power spectrum estimation.

*Department(s):* School of Engineering

**ENGG\*6570 Advanced Soft Computing U [0.50]**

Neural dynamics and computation from a single neuron to a neural network architecture. Advanced neural networks and applications. Soft computing approaches to uncertainty representation, multi-agents and optimization.

*Prerequisite(s):* ENGG\*4430 or equivalent

*Department(s):* School of Engineering

**ENGG\*6580 Advanced Control Systems U [0.50]**

This course will start with state space analysis of multi-input multi-output control systems. Then state space design will be presented. After that, nonlinear control systems and soft computing based intelligent control systems will be studied. Finally, hybrid control systems, H infinite control and uncertainty and robustness in control systems will be addressed.

*Department(s):* School of Engineering

**ENGG\*6590 Final Project in Engineering Systems and Computing U [1.00]**

A project course in which a problem of advanced design or analysis in the area of Engineering Systems and Computing is established by the student, an investigation is performed, and a report on the final design or solution selected is presented.

*Restriction(s):* This course is only open to students in the engineering systems and computing MEng program.

*Department(s):* School of Engineering

**ENGG\*6600 Special Topics in Engineering Systems and Computing U [0.50]**

A course of directed study involving selected readings and analyses in developing knowledge areas of Engineering Systems and Computing.

*Department(s):* School of Engineering

**ENGG\*6610 Urban Stormwater Management U [0.50]**

Continuous stormwater management models and model structure. Catchment discretization and process disaggregation. Pollutant build-up, wash off and transport. Flow and pollutant routing in complex, looped, partially surcharged pipe/channel networks including pond storage, storage tanks, diversion structures, transverse and side weirs, pump stations, orifices, radical and leaf gates and transient receiving water conditions (including tides). Pollutant removal in sewer networks, storage facilities and treatment plants.

*Department(s):* School of Engineering

**ENGG\*6630 Environmental Contaminants: Fate Mechanisms U [0.50]**

Analysis of fate mechanisms associated with environmental contaminants. Focus on substances which are generally considered to be hazardous to humans, or other animal life at low concentrations. Study of physicochemical properties and fate estimation on control and remediation strategies. Quantitative analysis of contaminant partitioning and mass flows, including cross-media transport and simultaneous action of contaminant fate mechanisms.

*Department(s):* School of Engineering

**ENGG\*6650 Advanced Air Quality Modelling U [0.50]**

Analysis of analytical and computational models used to predict the fate of airborne contaminants; role of air quality models for the solution of engineering-related problems; analysis of important boundary layer meteorology phenomena that influence the fate of air pollutants; conservation equations and mathematical solution techniques; model input requirements such as emissions inventories; Gaussian models; higher-order closure models; Eulerian photochemical grid models.

*Department(s):* School of Engineering

**ENGG\*6660 Renewable Energy U [0.50]**

The engineering principles of renewable energy technologies including wind, solar, geothermal and biomass will be examined, including technology-specific design, economic and environmental constraints. Students will compare the relative merits of different energy technologies and gain a knowledge base for further study in the field.

*Restriction(s):* Engineering graduate students. Instructor consent required.

*Department(s):* School of Engineering

<b>ENGG*6670 Hazardous Waste Management U [0.50]</b>
This course will define the different types of hazardous wastes that currently exist and outline the pertinent legislation governing these wastes. Information will be presented on different ways to handle, treat and dispose the hazardous waste, including separation, segregation, minimization, recycling and chemical, physical, biological, and thermal treatment. Also to be discussed are hazardous waste landfills and site remediation technologies. Specifics include design and operation of hazardous landfill sites, handling and treatment of leachate, comparison of pertinent soil remediation technologies. Case studies will be reviewed.
<i>Department(s):</i> School of Engineering
<b>ENGG*6680 Advanced Water and Wastewater Treatment U [0.50]</b>
This design course will discuss advanced technologies not traditionally covered during an undergraduate curriculum. An important consideration will be the reuse of water.
<i>Department(s):</i> School of Engineering
<b>ENGG*6740 Ground Water Modelling U [0.50]</b>
Introduction to current groundwater issues, definition of terms, review of fundamental equations describing fluid and contaminant transport in saturated groundwater zones. Mathematical techniques (analytical, FE and FD) for the solution of the fundamental equations. Application of numerical groundwater models to a variety of situations. Case studies. Review of groundwater models used in industry.
<i>Department(s):</i> School of Engineering
<b>ENGG*6790 Special Topics in Environmental Engineering U [0.50]</b>
A course of directed study involving selected readings and analyses in developing knowledge areas of environmental engineering.
<i>Department(s):</i> School of Engineering
<b>ENGG*6800 Deterministic Hydrological Modelling U [0.50]</b>
Deterministic hydrological models. Function of watershed models for hydraulic design, environmental assessment, operation of water control structures, flood warning. Calculation algorithms.
<i>Department(s):</i> School of Engineering
<b>ENGG*6820 Measurement of Water Quantity and Quality U [0.50]</b>
This course covers techniques used to measure rates of movement and amounts of water occurring as precipitation, soil water, ground water and streamflow. Available measurements of water quality are surveyed. Calculation procedures involved in the use of indirect indicators of water quantity and quality individually and in combination are described.
<i>Department(s):</i> School of Engineering
<b>ENGG*6840 Open Channel Hydraulics U [0.50]</b>
Basic concepts, energy principle; momentum principle; flow resistance; non-uniform flow; channel controls and transitions; unsteady flow; flood routing.
<i>Department(s):</i> School of Engineering
<b>ENGG*6860 Stream and Wetland Restoration Design U [0.50]</b>
Explores the multi-disciplinary principles of stream and wetland restoration and the tools and techniques for restoration design. Restoration design is approached from a water resources engineering perspective with emphasis on hydrological and hydraulic techniques. Numerous case studies are examined as a means to identify more successful design approaches.
<i>Prerequisite(s):</i> ENGG*3650 or equivalent.
<i>Department(s):</i> School of Engineering
<b>ENGG*6880 Soil Erosion and Fluvial Sedimentation U [0.50]</b>
Students will be able to (i) describe processes related to soil erosion by water, (ii) describe processes related to fluvial sedimentation, (iii) evaluate and prescribe structural and non-structural control methods, and (iv) run at least one soil erosion/fluvial sedimentation computer model if the course is satisfactorily completed.
<i>Department(s):</i> School of Engineering
<b>ENGG*6900 Final Project in Water Resources Engineering U [1.00]</b>
A project course in which an advanced design problem in the area of watershed engineering is established, a feasibility investigation performed and a final design presented.
<i>Restriction(s):</i> This course is open only to students in the water resources MEng program.
<i>Department(s):</i> School of Engineering
<b>ENGG*6910 Special Topics in Water Resources Engineering U [0.50]</b>
A course of directed study involving selected readings and analyses in developing knowledge areas of water resources engineering.
<i>Department(s):</i> School of Engineering

<b>ENGG*6950 Final Project in Environmental Engineering U [1.00]</b>
A project course in which a problem of advanced design or analysis in the area of environmental engineering is established, an investigation is performed and a final design or solution is presented.
<i>Restriction(s):</i> This course is only open to students in the Environmental MEng program.
<i>Department(s):</i> School of Engineering
<b>ENGG*6980 Special Topics in Computer Engineering U [0.50]</b>
This course addresses specialized topics in one or more aspects of Computer Engineering not covered by other graduate courses. Includes selected readings and thorough analyses in emerging knowledge areas, advanced engineering tools, and current technical developments. May be repeated for credit as topics vary.
<i>Department(s):</i> School of Engineering
<b>ENGG*6990 Final Project in Computer Engineering U [1.00]</b>
An independent project carried out under the supervision of a Computer Engineering faculty member in which an advanced modelling or design problem and the desired outcomes are defined, possible solutions are synthesized and analyzed, and a final model or design is evaluated. Regular meetings, final report, and presentation required.
<i>Restriction(s):</i> This course is open only to students in the Computer Engineering MEng program.
<i>Department(s):</i> School of Engineering

## English

<b>ENGL*6002 Topics in the History of Criticism U [0.50]</b>
This course deals with various aspects of the field of literary criticism, focusing on a specific problem or question each time it is offered. Topics may include the investigation of a specific critical debate - the debate between the Ancients and the Moderns, for instance - or the various ways in which a particular concept - such as didacticism or intentionality - has been treated or is being treated in literary studies.
<i>Department(s):</i> School of English and Theatre Studies
<b>ENGL*6003 Problems of Literary Analysis U [0.50]</b>
Variable in content and practical in orientation this course seeks to familiarize the student with particular critical techniques and approaches by applying specific examples of those approaches and methods to particular topics (e.g., cultural studies and renaissance literature, discourse analysis and the Victorian novel, computer-mediated analysis and the theatre of the absurd).
<i>Department(s):</i> School of English and Theatre Studies
<b>ENGL*6201 Topics in Canadian Literature U [0.50]</b>
A course to be offered at least once every academic year. This course in Canadian Literature may focus on cross-genre study or on single genres such as poetry, biography, the short story, literary memoir and/or autobiography, and poetic prose. The focus may be on such topics as the literary and general cultural production of a time-period, an age group (such as children's literature), or a specific region (such as Atlantic Canada, the Prairies, or the West Coast), or may bring together texts from two or more categories to allow for a comparative study. Other possible topics include: post-modernism and the creation of an ex-centric Canadian canon; multiculturalism and the transcultural aesthetics of Canadian writing; the construction and reinvention of a national identity and literature; and literary history, influence, reception and critique.
<i>Department(s):</i> School of English and Theatre Studies
<b>ENGL*6209 Topics in Colonial, Postcolonial and Diasporic Literature U [0.50]</b>
A course to be offered at least once every academic year. A comparative study of postcolonial literatures in English. Topics may include a focus on a single area, such as India, the Caribbean, Africa, Australia, or New Zealand or may focus on the comparative study of some of these literatures, considering the construction of Third World, diasporic, or settler-invader colonies, or writing and reading practices in colonial, neo-colonial, and postcolonial environments.
<i>Department(s):</i> School of English and Theatre Studies
<b>ENGL*6412 Topics in Medieval/Renaissance Literature U [0.50]</b>
An examination of the literature of Britain in the medieval and/or early modern periods. Topics may focus on a single author, a specific genre, or relationships between the literary and the cultural.
<i>Department(s):</i> School of English and Theatre Studies
<b>ENGL*6421 Topics in Eighteenth Century and Romantic Literature U [0.50]</b>
A examination of the literature of Britain between the 17th century and the latter part of the 18th century. Topics may focus on a single author, a specific genre, or relationships between the literary and the cultural.
<i>Department(s):</i> School of English and Theatre Studies

**ENGL\*6431 Topics in Nineteenth Century Literature U [0.50]**

This course is a study of the literature of Britain, Canada, the United States, or another region from the late 18th century until the start of the First World War. Topics may focus on a single author, a specific genre, or a central critical question.

*Department(s):* School of English and Theatre Studies

**ENGL\*6441 Topics in Modern British Literature U [0.50]**

A study of the literature of Britain in the twentieth century. This course includes a consideration of the interaction between literature and culture in the period - sometimes through the examination of a specific author, sometimes through the study of a particular genre or issue.

*Department(s):* School of English and Theatre Studies

**ENGL\*6451 Topics in American Literature U [0.50]**

Topics may include a focus on a single region, such as the American West, on a single time period, such as the Civil War, on a specific genre, such as the novels of frontier women, or other issues in American literary studies.

*Department(s):* School of English and Theatre Studies

**ENGL\*6611 Topics in Women's Writing U [0.50]**

In the past the course has dealt with Victorian women poets, with the place of women in the literature of the American West, and with other issues of interest to students of women's writing and the broader issues of feminist theory.

*Department(s):* School of English and Theatre Studies

**ENGL\*6621 Topics in Children's Literature U [0.50]**

Past offerings have involved a focus on a specific author - such as Lucy Maud Montgomery - or on a specific kind of writing for or by children.

*Department(s):* School of English and Theatre Studies

**ENGL\*6641 Topics in Scottish Literature U [0.50]**

Courses under this rubric are concerned with the various literatures produced by Scots both within and beyond the boundaries of Scotland. The course could involve the study of a specific genre, the investigation of a specific theme, or the examination of a particular author over the course of her/his career.

*Department(s):* School of English and Theatre Studies

**ENGL\*6691 Interdisciplinary Studies U [0.50]**

Designed to provide the opportunity to explore alternative fields and modes of critical inquiry, this variable-content course will study the relationship between literary study and other forms of intellectual inquiry such as the relationship between literature and sociology, between critical theory and psychology, between literary history and historical fact.

*Department(s):* School of English and Theatre Studies

**ENGL\*6801 Reading Course I U [0.50]**

An independent study course, the nature and content of which is agreed upon between the individual student and the person offering the course. Subject to the approval of the student's advisory committee and the graduate program committee.

*Department(s):* School of English and Theatre Studies

**ENGL\*6802 Reading Course II U [0.50]**

An independent study course, the nature and content of which is agreed upon between the individual student and the person offering the course. Subject to the approval of the student's advisory committee and the graduate program committee.

*Department(s):* School of English and Theatre Studies

**ENGL\*6803 Research Project U [1.00]**

An independent study course, the content of which is agreed upon between the individual student and the person offering the course. Subject to the approval of the student's advisory committee and the Graduate Program Committee. This course is designed to provide the student with the opportunity to conduct an extended research project that, while not as complex or as extensive as a thesis, still provides the student with training in research methodology.

*Department(s):* School of English and Theatre Studies

**ENGL\*6811 Special Topics in English U [0.50]**

Depending on the research interests of the instructor, courses under this rubric explore topics in the study of literature that do not fall neatly under the rubrics above. In the past the course has dealt with literature and aging, and with issues in the field of popular culture.

*Department(s):* School of English and Theatre Studies

**Environmental Sciences****ENVS\*6000 Physical Environment of Crops and Forests F [0.50]**

Recent literature on temperature, humidity, radiation, wind, gases and particles in crop and forest environments; evapotranspiration and photosynthesis of plant communities; modification of microclimates; applied micrometeorology.

*Offering(s):* Offered in even-numbered years.

*Department(s):* School of Environmental Sciences

**ENVS\*6040 Molecular Basis of Plant-Microbe Interactions F [0.50]**

A lecture and seminar course on recent advances in the study of plant-microbe interactions. Topics included are the biochemical, physiological and genetic aspects of plant defenses and the interaction of plants with pathogenic and mutualistic bacteria, fungi and viruses. Offered in conjunction with PBIO\*4000. Extra work is required of graduate students.

*Restriction(s):* Credit may be obtained for only one of ENVS\*6040 or PBIO\*4000.

*Department(s):* School of Environmental Sciences

**ENVS\*6050 Micrometeorology W [0.50]**

Exchanges of mass, momentum and energy between the surface and the atmosphere will be studied in the context of larger-scale meteorology. Diffusion and turbulence in and above plant canopies will be examined from theoretical and practical perspectives. Topics include time-series analysis, micrometeorological measurement theory, and basic principles of atmospheric science.

*Offering(s):* Offered in even-numbered years.

*Department(s):* School of Environmental Sciences

**ENVS\*6060 Meteorological Instrumentation W [0.50]**

Theoretical and practical aspects of electronic circuits, sensors, and equipment used in meteorological research.

*Prerequisite(s):* ENVS\*4210 or equivalent

*Department(s):* School of Environmental Sciences

**ENVS\*6190 Environmental Microbial Technology U [0.50]**

Current topics in selected areas of environmental microbial technology. An emphasis will be placed on the physiology and genetics of microorganisms useful in environmental biotechnology. The course involves extensive use of current journal articles.

*Restriction(s):* Undergraduate degree in microbiology or related discipline.

*Department(s):* School of Environmental Sciences

**ENVS\*6242 Special Topics in Atmospheric Science F,W,S [0.50]**

Students will explore topics within atmospheric science such as climatology, animal biometeorology, air pollution meteorology, and hydrometeorology. Normally, an independent course of study will be developed with a faculty advisor and one or more students in the semester prior to enrollment. Occasionally, the course will be offered as a lecture/seminar in a particular area, to be advertised in the semester prior to offering. Typically, students will produce a major paper or scientific report.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Sciences

**ENVS\*6280 Soil Physics W [0.50]**

The soil as a physical system with special regard to soil water movement and the diffusion and dispersion of chemical substances. Numerical techniques and computer solutions will be developed.

*Department(s):* School of Environmental Sciences

**ENVS\*6300 Quantitative Pedology F [0.50]**

Pedology considers the morphology, survey, geography, characterization and analysis, development, classification, and interpretation of soil. This course focuses on the quantification of pedology, employing modern digital instrumentation, computational capacity and analytical strategies. Students explore how such multi-scale, spatial-temporal information is used in critical zone modeling.

*Prerequisite(s):* At least an introductory soil, ecology or physical geography course.

*Co-requisite(s):* Students with only an introductory level soil course are encouraged to audit ENVS\*4390.

*Department(s):* School of Environmental Sciences

**ENVS\*6340 Colloquium in Insect Systematics W [0.25]**

Weekly discussions and seminars dealing with current topics in systematic entomology.

*Offering(s):* Offered in odd-numbered years.

*Department(s):* School of Environmental Sciences

**ENVS\*6350 Soil Organic Matter and Biochemistry F [0.50]**

(1) Soil organic matter characterization, (2) dynamics of soil organic matter, (0.5) nutrient cycling.

*Offering(s):* Offered in odd-numbered years.

*Department(s):* School of Environmental Sciences



**ENVS\*6360 Soil and Water Chemistry F [0.50]**

Thermodynamics of soil solutions; solution-solid phase equilibria; reaction kinetics; computer modelling of solute-mineral interactions.

*Department(s):* School of Environmental Sciences

**ENVS\*6400 Soil Nitrogen Fertility and Crop Production W [0.50]**

Emphasis will be placed on soil N transformations and processes, and N sources for crops; field experimentation methods; environmental issues.

*Department(s):* School of Environmental Sciences

**ENVS\*6440 Field Sampling Strategies and Geostatistics W [0.50]**

Concepts and practical aspects of collecting, synthesizing and interpreting data from spatially and temporally variable and/or correlated fields. Hands-on experience in describing spatial structure of large data sets (supplied by student or instructor) using available software.

*Offering(s):* Offered in even-numbered years.

*Department(s):* School of Environmental Sciences

**ENVS\*6450 Multivariate Environmental Data Analysis W [0.50]**

This course will examine the application of statistical techniques to analyzing multivariate environmental data. Methods will include Ordination (e.g., Principal Components Analysis, NDMS), Multivariate Regression (e.g., Partial Least Squares Regression), and Structural Equation Modelling. Emphasis will be placed on peer and collaborative learning through discussion, and comparative application of analyses to multivariate environmental data.

*Prerequisite(s):* At least one undergraduate course in statistics.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Sciences

**ENVS\*6452 Special Topics in Ecosystem Science and Biodiversity F,W,S [0.50]**

Students will explore topics within ecosystem science such as terrestrial ecology, forest science, aquatic systems and environmental biology. Normally, an independent course of study will be developed with a faculty advisor and one or more students in the semester prior to enrollment. Occasionally, the course will be offered as a lecture/seminar in a particular area, to be advertised in the semester prior to offering. Typically, students will produce a major paper or scientific report.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Sciences

**ENVS\*6460 Environmental Remediation W [0.50]**

This course will discuss environmental remediation topics including, but not limited to, using plants, microorganisms and substrates (e.g., soil and engineered materials) to improve air, water and soil quality. For example, this course will explore the current sciences and technologies of living walls to improve indoor air quality, green roofs to manage storm water and air pollutants, and constructed wetlands to treat wastewater. Environmental remediation is, by nature, multidisciplinary, involving chemistry, physics, biology, engineering, landscape design, etc.

*Department(s):* School of Environmental Sciences

**ENVS\*6470 The Science and Management of Multiple Stressors in the Great Lakes F [0.50]**

In this two-week lecture-field course, students will learn about historical and current environmental issues affecting the Great Lakes basin from the perspective of multiple stressors and their cumulative impacts. The importance of linking science and policy, and the role important of governments, are emphasized.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Sciences

**ENVS\*6500 Environmental Sciences Research Project U [1.00]**

A concise, critical review of an area of study related to the field chosen by the student including analyses and interpretation of relevant data. The project will be written in the form of a scientific paper and presented to the department as a seminar.

*Restriction(s):* Available only to students registered in the Environmental Sciences: MES program.

*Department(s):* School of Environmental Sciences

**ENVS\*6501 Integrating Science and Policy in Environmental Science F [0.50]**

A case-study approach, based on current and historical issues, and involving presentations from faculty, professionals and students, will be used to develop an advanced understanding of current issues in the environmental sciences, including examination of the underlying science and management of the issues, and the effectiveness of associated policies.

*Restriction(s):* Preference will be given to students in the MES.ENVS:L.

*Department(s):* School of Environmental Sciences

**ENVS\*6502 Seminar in Environmental Sciences W [0.50]**

This course will provide an interactive and critical forum for students to participate in an advanced discussion and debate on current environmental issues, and to learn about the practical skill set(s) required by various employment sectors in solving these issues.

*Restriction(s):* Instructor consent required. Preference will be given to students in the MES program.

*Department(s):* School of Environmental Sciences

**ENVS\*6503 Biogeochemistry of Wetlands F [0.50]**

This course is focused on the role of wetlands in maintaining healthy ecosystems and in controlling contaminant fluxes to water. Lectures complement field and laboratory assessments of wetlands to understand element biogeochemical cycles in these transitional environments. The course includes field trips to Ontario wetlands.

*Restriction(s):* Preference will be given to students in MES.ENVS:L, MSc.ENVS and PhD.ENVS

*Department(s):* School of Environmental Sciences

**ENVS\*6505 Soil Survey and Interpretation S [0.50]**

Students will learn concepts, techniques and analysis related to the characterization of soil in the landscape. Focus will be given to soils encountered in southern Ontario. Course involves multiple field excursions to examine the distribution of soils in this region.

*Restriction(s):* Preference will be given to students in MES.ENVS:L, MSc.ENVS, PhD.ENVS

*Department(s):* School of Environmental Sciences

**ENVS\*6506 Forest Ecosystem Patterns and Processes S [0.50]**

Students will learn concepts, techniques and analysis related to the ecological characterization of forests. Focus will be on southern and mid-central Ontario forests and will involve periodic excursions to various locations for the purpose of demonstrating theoretical principles, sampling techniques, in-field measurements, and collecting samples for in-lab assessment.

*Restriction(s):* Preference will be given to students in MES.ENVS:L, MSc.ENVS, PhD.ENVS

*Department(s):* School of Environmental Sciences

**ENVS\*6520 Pollinator Biology F [0.50]**

The biology of pollinators will be discussed in lectures and seminars stressing fundamental and applied aspects. The honey bee will be used as the model system.

*Offering(s):* Offered in odd-numbered years.

*Department(s):* School of Environmental Sciences

**ENVS\*6530 Pollinator Conservation W [0.50]**

In this course students will explore the ecology of pollination with an emphasis on the factors affecting declines in pollinating insects as well as potential mitigation strategies to ensure long-term stability of food production and maintenance of biodiverse wild plant communities. Offered in conjunction with ENVS\*4070. Extra work is required of graduate students.

*Restriction(s):* Credit may be obtained for only one of ENVS\*6530 or ENVS\*4070.

*Department(s):* School of Environmental Sciences

**ENVS\*6540 Integrated Pest Management - Insects W [0.50]**

Concepts associated with integrated pest management of insect pests of various plant hosts will be introduced to students in an interactive lecture and laboratory format. Experiential learning and skill development, associated with economic entomology, will also be emphasized. Offered in conjunction with ENVS\*4100. Extra work is required of graduate students.

*Offering(s):* Offered annually

*Restriction(s):* Credit may be obtained for only one of ENVS\*6540 and ENVS\*4100

*Department(s):* School of Environmental Sciences

**ENVS\*6550 Bioactivity and Metabolism of Insecticides W [0.50]**

The basis of insecticide bioactivity will be examined, with emphasis on mode of action, structure-activity relationships and analytical methods. Students will choose a specific insecticide or class of insecticides as their primary topic of study for the semester. Students will participate in seminars, prepare a conference poster and complete a research paper.

*Offering(s):* Offered in even-numbered years.

*Department(s):* School of Environmental Sciences

**ENVS\*6560 Forest Ecosystem Dynamics F [0.50]**

An exploration of energy flow and distribution in forest ecosystems. Both components will be examined in the context of biomass and productivity, perturbations and resilience. Some aspects of modelling will be covered.

*Offering(s):* Offered in odd-numbered years.

*Department(s):* School of Environmental Sciences

**ENVS\*6582 Special Topics in Soil Science F,W,S [0.50]**

Students will explore topics within soil science such as soil physics, pedology, soil chemistry and microbiology. Normally, an independent course of study will be developed with a faculty advisor and one or more students in the semester prior to enrollment. Occasionally, the course will be offered as a lecture/seminar in a particular area, to be advertised in the semester prior to offering. Typically, students will produce a major paper or scientific report.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Sciences

**ENVS\*6700 Glacial Sedimentary Environments U [0.50]**

Students will learn about the processes and deposits of glacial environments as well as the use of sedimentary records to reconstruct past glacial environments. Case studies from modern to ancient glacial sedimentary environments will be used. Field trip included.

*Offering(s):* Offered only as needed

*Department(s):* School of Environmental Sciences

**ENVS\*6710 Advanced Sedimentology U [0.50]**

Topics covered through case studies of sedimentary deposits and environments include facies analysis, large scale controls, and novel techniques in sedimentology. Topics may also include specific sedimentary environments or specific sedimentary deposits such as turbidites, cross-bedded strata or seismites depending on student interest. (Offered only as needed)

*Offering(s):* Offered only as needed

*Department(s):* School of Environmental Sciences

**ENVS\*6720 Geology of Groundwater Systems W [0.50]**

This course will examine the geological characteristics and processes that influence groundwater flow systems and contaminant transport and fate in different geological settings. The course will include seminar discussions of readings, guest speakers from industry and government agencies as well as hands-on exercises in class.

*Offering(s):* Offered in alternate years

*Department(s):* School of Environmental Sciences

**ENVS\*6730 Special Topics in Environmental Earth Science F,W,S [0.50]**

Students will explore topics within environmental earth science such as glacial geology, environmental geophysics and hydrogeology. Normally, an independent course of study will be developed with a faculty advisor and one or more students in the semester prior to enrollment. Occasionally, the course will be offered as a lecture/seminar in a particular area, to be advertised in the semester prior to offering. Typically, students will produce a major paper or scientific report.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Sciences

**ENVS\*6740 Environmental Organic Chemistry W [0.50]**

This course explores the chemical processes that influence organic compounds in the environment. Topics discussed include: the transformation of anthropogenic organic contaminants, the form and function of natural organic matter, and analytical methods including compound specific stable isotope analysis and environmental nuclear magnetic resonance. Offered in conjunction with ENVS\*4370. Extra work is required of graduate students.

*Restriction(s):* Credit may be obtained for only one of ENVS\*6740 or ENVS\*4370. Preference will be given to students in the MES.ENVS, MSc.ENVS and PhD.ENVS programs.

*Department(s):* School of Environmental Sciences

**ENVS\*6882 Special Topics in Plant and Environmental Health F,W,S [0.50]**

Students will explore topics within plant and environmental health such as integrated pest management, apiculture and environmental microbiology. Normally, an independent course of study will be developed with a faculty advisor and one or more students in the semester prior to enrollment. Occasionally, the course will be offered as a lecture/seminar in a particular area, to be advertised in the semester prior to offering. Typically, students will produce a major paper or scientific report.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Sciences

**ENVS\*6900 Research Seminar in Environmental Sciences F-W [0.50]**

This course provides information and training in scientific presentations for thesis-based Environmental Sciences (ENVS) programs. Students will prepare a written research proposal and make an oral presentation of their proposed studies. Students are expected to complete this course in their second or third semester of study.

*Restriction(s):* Offered only to MSc.ENVS and PhD.ENVS students

*Department(s):* School of Environmental Sciences

**European Studies****EURO\*6000 Research Methods F [0.50]**

This course will: a) introduce students to the field and research methods of European Studies, b) familiarize them with field-relevant research skills and methodologies.

*Department(s):* School of Languages and Literatures

**EURO\*6010 European Identities W [0.50]**

This core course examines historical and contemporary ideas of the 'nation' and of 'Europe' and their relationships to identity, from an interdisciplinary perspective. Using core concepts that span various disciplines, the course investigates the construction and implications of national, minority, European and EU identities.

*Department(s):* School of Languages and Literatures

**EURO\*6020 Myth, Fairy Tales and European Identities U [0.50]**

An exploration of how myths and fairy tales have been refashioned in European literature, music and art to express political, social or psychological concerns. Examples will be chosen from different national cultures and epochs. Content will vary according to the interests of the instructor(s).

*Department(s):* School of Languages and Literatures

**EURO\*6030 Women and the Arts in Europe: Seeking Expression U [0.50]**

This course examines women's participation in the arts in Europe. Content will vary according to the interests of the instructor(s). Possible approaches: an examination of women's relationships to European cultural institutions, or the extent of women's participation in central pan-European artistic movements.

*Department(s):* School of Languages and Literatures

**EURO\*6040 Europe and the Discourse of Civilization U [0.50]**

This course explores the genealogy of the idea of 'civilization' with respect to Europe as it emerges from the writings of medieval, renaissance, early modern and modern art historians, and its role in contemporary political discourse. Literature and music may also be included.

*Department(s):* School of Languages and Literatures

**EURO\*6060 Contemporary Europe U [0.50]**

This course examines the major trends and developments in European culture and society since the end of the Cold War and the post-1989 geo-political, social and cultural events. The course will focus on literature, film, art, political and economic theory and will address Europe's transcontinental relationships, inter-European immigration, the role of religious and cultural minorities, the impact of the financial crisis on the Eurozone. Offered in conjunction with EURO\*4050. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one or EURO\*6060 or EURO\*4050.

*Department(s):* School of Languages and Literatures

**EURO\*6070 Topics in Comparative European Culture I U [0.50]**

An examination of a topic, period, or region in any aspect of European culture. The content of the course will vary according to the topic and the professor teaching the course at any given time. It will also differ from the content of Topics in Comparative European Culture II.

*Department(s):* School of Languages and Literatures

**EURO\*6072 Topics in Comparative European Culture II U [0.50]**

An examination of a topic, period, or region in any aspect of European culture. The content of the course will vary according to the topic and the professor teaching the course at any given time. It will also differ from the content of Topics in Comparative European Culture I.

*Department(s):* School of Languages and Literatures

**EURO\*6080 Directed Reading Course F,W,S [0.50]**

An independent reading project carried out by the student under the supervision of a European Studies graduate faculty member.

*Department(s):* School of Languages and Literatures

**EURO\*6100 Research Project U [1.00]**

This research project will result in a major paper of about 12,000 words. The student chooses a topic with guidance of a faculty member. Oral examination of this work is required. The topic must be approved by the Graduate Committee.

*Department(s):* School of Languages and Literatures

**Family Relations and Applied Nutrition****FRAN\*6000 Quantitative Research Methods F [0.50]**

This course includes critical appraisal of the research literature. Research ethics, subject selection, measurement issues, survey design, experimental and quasi-experimental designs, cross-sectional and longitudinal designs, scale development, questionnaire development and sampling strategies are discussed.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6010 Applied Statistics F [0.50]**

Students will learn conceptual and practical applications of statistical analyses with emphasis on hypothesis formation, data screening, test selection, inferential statistics, univariate and multivariate analysis of variance/covariance (including repeated measures designs), simple and multiple regression, logistic regression, regression diagnostics, model building and path analytic techniques. FRAN\*6000 can be taken before or while taking this course.

*Restriction(s):* Consent required for non- FRAN students.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6020 Qualitative Research Methods W [0.50]**

This course teaches students how to use qualitative methods as a mode of inquiry for understanding issues in human development, nutrition and family relationships. The emphasis is on project design, data collection techniques, analysis strategies and procedures for final write-up.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6070 Sexual Issues and Clinical Interventions Across the Life Span S [0.50]**

This course examines sexual issues and clinical interventions from a life span perspective. Focusing upon theory, research and clinical interventions it explores the relationship between issues in sexual development and sexual functioning. This course is offered in a one-week intensive format in coordination with the Guelph Sexuality Conference.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6080 Power Relations and Diversity in CFT U [0.50]**

This course provides a foundational review of current perspectives within and outside of the couple and family therapy literature that relate to the intersection of culture (race, ethnicity, class, gender, sexuality, ability, etc.) and oppression. Attention is given to the translation of knowledge about power relations and diversity into practice when working as a couple and family therapist with clients and professional colleagues.

*Restriction(s):* Instructor consent required for non Couple and Family Therapy students.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6090 Practicum in Couple and Family Therapy\* U [1.00]**

This course features supervised clinical practice in couple and family therapy. It involves regular clinical work with couples, families, and individuals. Students meet with faculty each week for up to six hours of supervision. Supervision over the semester will involve both group and individual/dyadic meetings.

*Restriction(s):* Available only to students in the Couple and Family Therapy field of study

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6095 Externship in Couple and Family Therapy S [1.00]**

This is an advanced clinical practicum in Couple and Family Therapy. Students are placed in a community agency where they accumulate 10-15 hours per week (over 3 days) of direct clinical contact time. All clinical work is supervised by a clinical supervisor on site. Travel to the community agency is usually required.

*Prerequisite(s):* FRAN\*6090

*Restriction(s):* Available only to students in the Couple and Family Therapy field of study

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6100 Clinical Issues in Couple and Family Therapy\* U [0.50]**

This course is taken four times in the two year program of study. Each offering features selected clinical issues; examination of each issue will include the socio-cultural context, theoretical location, and conceptual and practical implications for couple and family therapy.

*Restriction(s):* Available only to students in the Couple and Family Therapy field of study.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6120 Theories and Methods of Family Therapy I W [0.50]**

This course will offer an historical perspective on the development of the field of couple and family therapy beginning with family systems therapy, through intergenerational models, to current constructionist approaches. Intervention methods consistent with these conceptual frameworks are examined.

*Offering(s):* Offered in alternate years.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6130 Theories and Methods of Family Therapy II F [0.50]**

This course explores clinical theory and methods associated with structural, strategic and solution focused models of couple and family therapy. Feminist perspectives and approaches are used to examine power and gender dynamics in therapy.

*Offering(s):* Offered in alternate years.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6140 Professional Issues U [0.50]**

An exploration of ethics in couple and family therapy; legal issues in the practice of family therapy; and professional issues regarding identity, licensure and practice.

*Restriction(s):* Instructor consent required for non Couple and Family Therapy students.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6160 Introduction to Systemic Practice in Couple and Family Therapy F [0.50]**

An exploration of family process to understand diversity in family structures and functioning from a systemic conceptual framework. Applied activities in the associated tutorial section focus on developing basic communication, observational, and therapy skills. Student participation in small learning groups supports skill development and integration of theory and practice.

*Restriction(s):* Available only to students in the Couple and Family Therapy field of study

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6180 Research Issues in Couple and Family Therapy F [0.50]**

The focus of this course is on research in Couple & Family Therapy, including issues related to evidence-based practice, therapeutic outcome, and therapeutic process. A selected review of quantitative and qualitative research methods and exemplary research is included.

*Offering(s):* Offered in alternate years.

*Restriction(s):* Instructor consent required for non FRAN students.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6200 Special Topics in Family Relations and Human Development U [0.50]**

Contemporary research in family relations and human development. Research topics vary.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6210 Program Evaluation U [0.50]**

An examination of the theoretical principles and practical applications of evaluation issues and strategies. Special attention is given to services for children and families across the life span.

*Offering(s):* Offered in alternate years.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6221 Evidence-Based Practice and Knowledge Translation U [0.50]**

The principles of evidence-based practice are examined using various examples of psychosocial, behavioural and health interventions. The levels of evidence, criteria for efficacy and effectiveness, and the importance and limitations of evidence-based practice will be evaluated. The process of moving knowledge derived from high quality evidence into practice will be appraised throughout the course. Students will have the opportunity to build knowledge in their own areas of interest.

*Offering(s):* Offered in alternate years.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6260 Practicum in Family Relations and Human Development U [0.50]**

Supervised practicum experience in a variety of agencies or services. Interested students are encouraged to discuss this option with their faculty advisor. Placements are arranged on an individual basis subject to the requirements of students' programs of study and must be negotiated with faculty in advance of registration.

*Offering(s):* Offered in alternate years.

*Restriction(s):* Available to FRAN students only.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6270 Issues in Family-Related Social Policy U [0.50]**

This course investigates definitions of social policy, comparative family-related social policy, selected issues in Canadian family policy and frameworks for analysis of social policy. Issues in policy-related research are also explored.

*Offering(s):* Offered in alternate years.

*Department(s):* Department of Family Relations and Applied Nutrition

**FRAN\*6280 Theorizing in Family Relations and Human Development U [0.50]**

An examination of the meaning of science and theory in relation to the study of families and human development. Included is a discussion of the major social science paradigms including positivism, critical theory, social constructionism and post-modernity. This course is designed for doctoral students.

*Offering(s):* Offered in alternate years.

*Department(s):* Department of Family Relations and Applied Nutrition

<b>FRAN*6310 Family Relationships Across the Life Span U [0.50]</b>
Considers theory and research on family and social relationships across the life span. Examples may include: parent-child, sibling, grandparent, couples, etc. <i>Offering(s):</i> Offered in alternate years. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6320 Human Sexuality Across the Life Span U [0.50]</b>
This course covers research, theoretical and substantive issues relevant to studying human sexuality across the life span. Topics include: child and adolescent sexuality, sexual identity, sexuality in adulthood and old age, sexual assault, international research and sex education. <i>Offering(s):</i> Offered in alternate years. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6330 Research Seminar U [0.25]</b>
Research literature in Family Relations and Human Development. Registration for this course occurs in semester 5 for MSc students and semester 7 for PhD students. Thesis students attend weekly seminars in each of the Fall and Winter semesters of their program of study. <i>Restriction(s):</i> Available to FRAN students only. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6340 Interdisciplinary Perspectives in Family Relations and Human Development U [0.50]</b>
This course acquaints students with the diverse disciplinary perspectives used in the study of family relations and human development. Substantive research issues provide a forum for integrating the separate perspectives and understanding the reciprocal relationship between individual and family growth and development. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6350 Major Research Paper U [1.00]</b>
The major research paper is an option open <b>only</b> to MSc students within the Couple and Family Therapy area. Students must demonstrate their ability to accurately synthesize and critically evaluate the literature in a specific area of interest. Detailed guidelines are provided. <i>Restriction(s):</i> Available only to students in the Couple and Family Therapy field of study. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6370 Social Development During Childhood and Adolescence U [0.50]</b>
A detailed study of factors important to social development and competence from infancy through adolescence. <i>Offering(s):</i> Offered in alternate years. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6440 Applied Factor Analysis &amp; Structural Equation Modelling U [0.50]</b>
This course introduces students to exploratory factor analysis, confirmatory factor analysis, and structural equation modeling. Topics include: model selection and validation, multiple group models, measurement equivalence/invariance and latent mean analyses. This course is data-driven and students will learn through hands-on analytic experiences accompanied by in-class lectures and readings. <i>Offering(s):</i> Offered in alternate years. <i>Prerequisite(s):</i> FRAN*6000, FRAN*6010 <i>Restriction(s):</i> Consent required for non- FRAN students. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6510 Nutrition in the Community W [0.50]</b>
Concepts and knowledge of nutrition as applied in community and public health nutrition. Examination of current programs in applied nutrition. <i>Restriction(s):</i> Consent required for non-FRAN students. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6550 Research Seminar U [0.25]</b>
Research literature in applied nutrition. Registration for this course occurs in semester 5 for MSc students and semester 7 for PhD students. Students attend weekly seminars in each of the Fall and Winter semesters of their program of study. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6560 Special Topics in Applied Human Nutrition U [0.50]</b>
Contemporary research and special topics in applied human nutrition. Course content is unique to each offering. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of Family Relations and Applied Nutrition

<b>FRAN*6610 Advances in Clinical Nutrition/Assessment I F [0.50]</b>
An advanced overview of nutritional assessment and clinical nutrition with emphasis on issues relevant to community based and non-acute care settings. Nutrition assessment methods will be discussed in depth along with emerging issues. Emphasis on clinical nutrition will be integration of theory and practice. <i>Restriction(s):</i> For MAN and AHN students only. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6710 Practicum in Applied Human Nutrition I F [1.50]</b>
This course provides a practicum of 3 days per week with a dietetic-related agency or organization to develop and perform dietetic competencies (internship experience). In weekly seminars, students discuss and reflect on theory and dietetic practice issues. <i>Restriction(s):</i> For MAN students only. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6720 Practicum in Applied Human Nutrition II W [1.50]</b>
This course provides a practicum of 3 days per week with a dietetic-related agency or organization to develop and perform dietetic competencies (internship experience). In weekly seminars, students discuss and reflect on theory and dietetic practice issues <i>Prerequisite(s):</i> FRAN*6710 <i>Restriction(s):</i> For MAN students only. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6730 Practicum in Applied Human Nutrition III S [1.50]</b>
This course provides a practicum of 3 days per week with a dietetic-related agency or organization to develop and perform dietetic competencies (internship experience). In weekly seminars, students discuss and reflect on theory and dietetic practice issues. <i>Prerequisite(s):</i> FRAN*6720 <i>Restriction(s):</i> For MAN students only. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6740 Foodservice Management in Healthcare W [0.50]</b>
Students will critically assess and integrate foodservice management literature and theories to address the multifactorial issues in foodservice operations in healthcare. Case studies presented by expert guests and operational projects will support student synthesis and evaluation of the literature. <i>Restriction(s):</i> For MAN and AHN students only. <i>Department(s):</i> Department of Family Relations and Applied Nutrition
<b>FRAN*6750 Final Project in Applied Human Nutrition S,F,W [0.50]</b>
This supervised project includes a written report and oral presentation of an applied research project or a proposal for a research project, consisting of a literature view, purpose, methodology, and analysis plan. Students register in and work on the project for 3 consecutive semesters. <i>Restriction(s):</i> For MAN students only. <i>Department(s):</i> Department of Family Relations and Applied Nutrition

## Food, Agricultural and Resource Economics

<b>FARE*6100 The Methodologies of Economics W [0.50]</b>
Alternative views on the methodology of economics are reviewed and assessed. The process of problem identification in the development of a research project proposal is investigated. <i>Department(s):</i> Department of Food, Agricultural and Resource Economics
<b>FARE*6140 Major Paper in Food, Agricultural and Resource Economics U [1.00]</b>
The major paper is an option only available to MFARE students registered in the course work master program. An original research project related to the specialization of choice in food, agricultural and resource economics will be undertaken. The project will include preparation of a written paper and an oral presentation of the findings to the faculty. <i>Restriction(s):</i> Restricted to students in the course-based MFARE program in FARE <i>Department(s):</i> Department of Food, Agricultural and Resource Economics
<b>FARE*6380 Applied Microeconomics for Agricultural Economists F [0.50]</b>
The objective of this course is to foster a deeper understanding of standard microeconomic concepts and their application to a wide variety of topics in food, agricultural, and resource economics. Emphasis is placed on what tool(s) to use in a wide variety of circumstances to address real life problems. Topics will include decisions by firms and consumers, market equilibrium, and production decisions. <i>Prerequisite(s):</i> ECON*2770 or equivalent, ECON*3710 or equivalent, ECON*3740 or equivalent <i>Department(s):</i> Department of Food, Agricultural and Resource Economics
<b>FARE*6400 Advanced Topics in Agricultural Economics U [0.50]</b>
The application of economic theory and various contemporary tools of economic analysis in solving production problems in the agricultural sector of the economy. <i>Department(s):</i> Department of Food, Agricultural and Resource Economics

**FARE\*6600 Food Security and the Economics of Agri-Food Systems in Developing Countries F [0.50]**

The aim of this course is to understand the nature of food security in developing countries and relations with the economic performance of the agri-food system. Towards this aim, the course focuses on both the agri-food system's role in the supply of nutritious food and its importance as a source of livelihood and as a driver of overall processes of economic development.

*Prerequisite(s):* ECON\*1050 or equivalent, ECON\*1100 or equivalent

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6720 Readings in Agricultural Economics F,S,W [0.50]**

A reading course on selected topics of special interest. May be offered to individual students or to groups of students in any semester.

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6800 Seminar in Agricultural Economics U [0.00]**

Students in the MSc and MFARE major research paper option program must give two presentations at the annual research symposium; one in their first year outlining their research plan, and one in their second year on their thesis research results or major research paper.

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6910 Applied Policy Analysis I W [0.50]**

An overview of domestic and international agri-food policies and an introduction to the concepts and methods used to evaluate domestic trade policies.

*Prerequisite(s):* FARE\*6380

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6920 Applied Policy Analysis II U [0.50]**

A presentation and evaluation of advanced quantitative agri-food policy models and selected special topics related to domestic and trade policy evaluation.

*Prerequisite(s):* AGECE\*6910 or FARE\*6910 or equivalent

*Co-requisite(s):* ECON\*3710

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6930 Food Firms, Consumers and Market I F [0.50]**

This course examines the application of microeconomic theory to food markets. Topics covered include: optimizing behaviour by economic agents, the certainty equivalent profit model and decision making under risk, optimal capital replacement models and their application to food system economics, consumer behaviour with respect to food products and behaviour with respect to food products and behaviour of marketing intermediaries and food processors. New developments in the economic theory of the form are surveyed.

*Prerequisite(s):* ECON\*2310 or equivalent, ECON\*3740 or equivalent

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6940 Food Firms, Consumers and Markets II U [0.50]**

This course builds on Food Firms, Consumers and Markets I by extending the breadth and depth of student's understanding and scope of economic analysis. Advanced techniques in producer and consumer theory, as well as advance market analysis techniques are presented and utilized. Understanding of the research process and advanced methods is emphasized throughout.

*Prerequisite(s):* AGECE\*6930 or FARE\*6930

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6950 Natural Resource Economics I W [0.50]**

Natural Resources I introduces conventional theoretical modeling approaches to renewable resources, e.g. fisheries & forestry. Seminal theoretical literature is discussed. Emphasis is placed on setting up economic models, deriving and interpreting general results. Applied methods include dynamic optimization and regression analysis. Additional topics include Land Economics and the property rights approach.

*Prerequisite(s):* FARE\*6380

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6960 Natural Resource Economics II U [0.50]**

Natural Resources II reviews & extends conventional theoretical modeling approaches to renewable resources, e.g. fisheries & forestry. Seminal literature is reviewed and contemp. theoretical work and empirical papers discussed. Emphasis on extending economic models addressing natural resource issues - uncertainty, externalities & policy instruments, and derive reduced-form versions of forestry & fishery for empirical estim. & analysis. Primary method of math analysis involves dyn. opt. techniques. Detailed math derivations & proofs expected. Also- extinction, climate change, carb sequent.

*Prerequisite(s):* AGECE\*6950 or FARE\*6950

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6970 Applied Quantitative Methods for Agricultural Economists F [0.50]**

This course exposes students to the empirical tools agricultural economists use when conducting research. Emphasis is placed on what tool(s) to use in a variety of circumstances. Topics covered will include advanced econometric techniques, optimization and simulation modelling. Students will also be exposed to the different quantitative software packages used in empirical research.

*Prerequisite(s):* ECON\*3740 or equivalent and ECON\*2770 or equivalent

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6980 Agricultural Trade Relations W [0.50]**

An examination of the institutional, theoretical and empirical aspects of international agri-food trade.

*Prerequisite(s):* FARE\*6380

*Department(s):* Department of Food, Agricultural and Resource Economics

**FARE\*6990 Applied Quantitative Methods for Agricultural Economists II W [0.50]**

Students will develop econometric methods and models that will provide solutions to a "real world" economic problem posed by an economic firm. Along a second vein, students will replicate the empirical findings of a published paper central to their thesis. Advanced quantitative methods will be introduced.

*Prerequisite(s):* FARE\*6970

*Department(s):* Department of Food, Agricultural and Resource Economics

**Food Safety and Quality Assurance****FSQA\*6000 Food Safety and Quality Assurance Seminar F [0.50]**

Provides experiential training in forms of communication that are likely to be required in professional or academic careers in food science and technology.

*Restriction(s):* This course is open only to students in the MSc FSQA program.

*Department(s):* Department of Food Science

**FSQA\*6100 Food Law and Policy F [0.50]**

The fundamentals of food policy development and Canadian and international food law are learned and practiced through online presentations, independent study and online interactions with other students and industry professionals.

*Offering(s):* Offered through Distance Education format only.

*Department(s):* Department of Food Science

**FSQA\*6150 Food Quality Assurance Management W [0.50]**

Examination and review of principles and concept of quality assurance and their application to consumer products and services. Topics include applied aspects of total-quality management principles.

*Offering(s):* Offered through Distance Education format only.

*Department(s):* Department of Food Science

**FSQA\*6200 Food Safety Systems Management W [0.50]**

Food safety systems are studied in four modules. (1) A brief review of plant hygiene and HACCP principles. Students with insufficient background will do supplemental study in these areas; (2) HACCP implementation and verification; (3) HACCP-based food safety programs in Canada; and (4) International Food Safety Management Systems.

*Offering(s):* Offered through Distance Education format only.

*Department(s):* Department of Food Science

**FSQA\*6500 Food Safety and Quality Assurance Research Project S,F,W [1.00]**

An original research project related to food safety and quality assurance which includes the preparation of a written report suitable for publication and an oral presentation of the findings to the graduate faculty.

*Department(s):* Department of Food Science

**FSQA\*6600 Principles of Food Safety and Quality Assurance F [0.50]**

An integrated approach to factors affecting food safety and quality including microbial and chemical contamination is provided. Major food-borne disease outbreaks are studied as examples. Modern methods of quality management to minimize contamination of processed foods is discussed.

*Offering(s):* Offered through Distance Education format only.

*Department(s):* Department of Food Science

**Food Science****FOOD\*6190 Advances in Food Science U [0.50]**

Topics of current research interest and importance are examined. A project supervised by a faculty member is undertaken, the topic of which is chosen after considering the interests of the student.

*Department(s):* Department of Food Science

<b>FOOD*6300 Food Science Communication U [0.50]</b>
This course provides experiential training in forms of communication that are likely to be required in professional or academic careers in food science and technology. <i>Restriction(s):</i> This course is only open to students in the MSc Food program. <i>Department(s):</i> Department of Food Science
<b>FOOD*6710 Special Topics in Food Chemistry U [0.25]</b>
This is a modular course in which several faculty members lecture and/or lead discussions in current topics in food chemistry. Students will complete an independent review in the area of food chemistry, participate in discussions, complete case studies, and present talks related to food chemistry. <i>Department(s):</i> Department of Food Science
<b>FOOD*6720 Special Topics in Food Microbiology U [0.25]</b>
This is a modular course in which several faculty members lecture and/or lead discussions in current topics in food microbiology. Students will complete an independent review in the area of food microbiology, participate in discussions, complete case studies, and present talks related to food microbiology. <i>Department(s):</i> Department of Food Science
<b>FOOD*6730 Special Topics in Food Physics U [0.25]</b>
This is a modular course in which several faculty members lecture and/or lead discussions in current topics in food physics. Students will complete an independent review in the area of food physics, participate in discussions, complete case studies, and present talks related to physics in foods. <i>Department(s):</i> Department of Food Science
<b>FOOD*6740 Special Topics in Food Processing U [0.25]</b>
This is a modular course in which several faculty members lecture and/or lead discussions in current topics in food processing. Students will complete an independent review in the area of food processing, participate in discussions, complete case studies, and present talks related to conventional and emerging methodologies for the processing of foods. <i>Department(s):</i> Department of Food Science
<b>FOOD*6750 Special Topics in Food for Health U [0.25]</b>
This is a modular course in which several faculty members lecture and/or lead discussions in current topics in food for health. Students will complete an independent review in the area of food and health, participate in discussions, complete case studies, and present talks related to the impact of food for health. <i>Department(s):</i> Department of Food Science
<b>FOOD*6760 Special Topics in Food Quality U [0.25]</b>
This is a modular course in which several faculty members lecture and/or lead discussions in current topics in food quality. Students will complete an independent review in the area of food quality, participate in discussions, complete case studies, and present talks related to quality of foods. <i>Department(s):</i> Department of Food Science
<b>FOOD*6770 PhD Research Writing in Food Science F,W [0.50]</b>
PhD Research Writing in Food Science provides experiential training in forms of communication that are likely to be required in professional or academic careers, helps PhD students position their research in the broader context of Food Science and Technology, and helps prepare students for the qualifying examination. <i>Restriction(s):</i> Only for Ph.D. students in Food Science Instructor consent required. <i>Department(s):</i> Department of Food Science

## French

<b>FREN*6000 Research Methods Seminar F [0.50]</b>
This course will introduce students to the field and research methods of various disciplines and of interdisciplinary studies, and it will familiarize them with field-relevant research skills and methodologies. <i>Department(s):</i> School of Languages and Literatures
<b>FREN*6020 Topics in French Literature U [0.50]</b>
This course will focus on European French literature in relation to thematic approaches including: gender and feminism, transgression, (post)colonialisms, identity and alterity. <i>Department(s):</i> School of Languages and Literatures
<b>FREN*6021 Topics in Quebec and French-Canadian Literatures U [0.50]</b>
This course will focus on how literature functions as a socio-political institution in Quebec and in French Canada. It will also deal with elements that relate more broadly to identity, reception theory and semiotics. <i>Department(s):</i> School of Languages and Literatures

<b>FREN*6022 Topics in Caribbean and African Literatures U [0.50]</b>
This course focuses on the works of major Francophone African and Caribbean fictional and theoretical works with particular attention being given to links between notions of cultural hierarchies, identity, métissage and creolization. <i>Department(s):</i> School of Languages and Literatures
<b>FREN*6030 Topics in Translation U [0.50]</b>
This course deals with various aspects of literary translation, including theories of translation, the role of reading in translation, the active translation of a text from English into French, and the reflection upon the influence of each of these categories on the others. <i>Department(s):</i> School of Languages and Literatures
<b>FREN*6031 Topics in Intermediality U [0.50]</b>
An investigation of the intersection of artistic expression taking place in literature, theatre, film, television and new media and the various effects produced by the interaction of two or more media. <i>Department(s):</i> School of Languages and Literatures
<b>FREN*6041 Topics in French and French-Canadian Sociolinguistics U [0.50]</b>
This course will allow students to explore, within the framework of sociolinguistics and applied linguistics, the relationship between language and society, with particular reference to French and the French-speaking world. <i>Department(s):</i> School of Languages and Literatures
<b>FREN*6042 Topics in FSL Pedagogy U [0.50]</b>
This compulsory course covers theories, methods, and real-life applications of the teaching/learning of a second language, specifically French. <i>Department(s):</i> School of Languages and Literatures
<b>FREN*6050 Reading Course S [0.50]</b>
An independent study course, the nature and content of which is agreed upon between the student and the professor offering the course. Subject to the approval of the graduate program coordinator. <i>Department(s):</i> School of Languages and Literatures
<b>FREN*6051 Major Research Paper U [0.50]</b>
This independent, required course allows students to pursue research in an area of particular interest to them in the field of French Studies. A compulsory major paper 40 pages in length will be required. <i>Prerequisite(s):</i> FREN*6000 <i>Department(s):</i> School of Languages and Literatures
<b>FREN*6053 Practicum in French Studies S [0.50]</b>
This course will allow students to engage in volunteer service in a francophone community. Students will be asked to forge links between knowledge acquired in the academic setting and problem-based learning in a real-world context. A list of authorized community partners will be provided. <i>Prerequisite(s):</i> FREN*6000 and FREN*6042 <i>Department(s):</i> School of Languages and Literatures

## Geography

<b>GEOG*6060 Special Topics in Geography S,F,W [0.50]</b>
A course on some specific topic not covered by the regular graduate courses for which there are both available faculty and sufficient interest among students. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of Geography
<b>GEOG*6090 Geographical Research Methods I F [0.50]</b>
A review of philosophies and research methods in geography. The development and presentation of a context paper for the thesis or research project. <i>Department(s):</i> Department of Geography
<b>GEOG*6091 Geographical Research Methods II W [0.50]</b>
A review of philosophies and research methods in geography. The development and presentation of a research proposal for the thesis or research project. <i>Prerequisite(s):</i> GEOG*6090 <i>Department(s):</i> Department of Geography
<b>GEOG*6100 Geographic Scholarship and Research F-W [0.50]</b>
A review of geographic scholarship including conceptual, theoretical and methodological issues in resource assessment, biophysical resources and rural socio-economic resources. <i>Offering(s):</i> The course extends over two semesters (Fall and Winter). <i>Department(s):</i> Department of Geography

**GEOG\*6180 Research Project in Geography S,F,W [1.00]**

The preparation and presentation of a report on the research project approved in GEOG\*6090.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Geography

**GEOG\*6281 Environmental Management and Governance F [0.50]**

Analysis and evaluation of environmental management and governance using geographical approaches. Emphasis is on socio-economic theories, concepts and methods which offer a more comprehensive and integrative basis for understanding environmental decisions.

*Restriction(s):* Signature required for non-geography students.

*Department(s):* Department of Geography

**GEOG\*6330 Biotic Processes and Biophysical Systems U [0.50]**

Investigation of biotic processes influencing the composition, structure and distribution of plant and animal communities and of approaches to biophysical systems analysis, focusing on environmental system interaction at the landscape scale.

*Department(s):* Department of Geography

**GEOG\*6340 Human-Environment Relations W [0.50]**

A critical review of philosophies, concepts and analytical methods for analysis and management of systems involving the interaction of environmental processes and human spatial activity.

*Department(s):* Department of Geography

**GEOG\*6450 Development Geography U [0.50]**

Group identities at various scales in relation to concepts of territory and territoriality, and their changing impact on the world's political map.

*Offering(s):* Offered in alternate years.

*Department(s):* Department of Geography

**GEOG\*6550 Environmental Modelling W [0.50]**

This course aims to provide students with an understanding of the processes and techniques involved in environmental modeling practice and will focus on the power and limitations of existing models.

*Department(s):* Department of Geography

**GEOG\*6610 Global Hydrology F [0.50]**

An examination of global environmental hydrology including precipitation, evaporation, subsurface water and runoff. Physical processes, measurement, analytical techniques and modelling strategies will be considered in the context of global change.

*Department(s):* Department of Geography

## History

**HIST\*6000 Historiography U [0.50]**

This course will introduce students to some of the essential components of the historical process. It will also assess history as a cognitive discipline in contemporary society. While the scope of the course may extend from ancient times to the present, emphasis on the historiography of particular periods may vary according to instructor expertise and student research needs.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of History

**HIST\*6040 Special Reading Course U [0.50]**

Students selecting this course should speak to individual instructors to arrive at appropriate topics.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of History

**HIST\*6150 Scottish Archival Research U [0.50]**

This course will comprise of classroom teaching, practical instruction and work-placement within the Scottish Collection of the University of Guelph's Archives. It will introduce students to basic skills in the digitization of sources and teach competence in conservation, record creation and archival research.

*Restriction(s):* Student numbers are limited by the number of placements available in the University Archives.

*Department(s):* Department of History

**HIST\*6190 Topics in Scottish History I U [0.50]**

This course will introduce students to selected aspects of medieval and early modern Scottish history and historiography, including the use of source materials, and practical training involving manuscripts in the University Archives.

*Department(s):* Department of History

**HIST\*6191 Scottish History I Research U [0.50]**

Continuation of HIST\*6190 in which students prepare an in-depth research paper based on primary sources.

*Prerequisite(s):* HIST\*6190

*Restriction(s):* Instructor consent required.

*Department(s):* Department of History

**HIST\*6200 Scottish Highland and Lowland History U [0.50]**

This course will introduce students to selected aspects of Scottish history and historiography considered from a Highlands perspective and a (sometimes significantly different) Lowlands perspective, including issues surrounding the selection and use of source materials, and provide practical training involving manuscripts in the University Archives.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of History

**HIST\*6201 Scottish Highland and Lowland Research U [0.50]**

Continuation of HIST\*6200 in which students prepare an in-depth research paper based on primary sources.

*Prerequisite(s):* HIST\*6200

*Restriction(s):* Instructor consent required.

*Department(s):* Department of History

**HIST\*6230 Canada: Culture and Society U [0.50]**

A course that examines the current historiography of selected aspects of Canadian history. Topics will vary with the expertise of individual instructors.

*Department(s):* Department of History

**HIST\*6231 Canada: Culture and Society Research U [0.50]**

Continuation of HIST\*6230 in which students prepare an indepth research paper based on primary sources.

*Prerequisite(s):* HIST\*6230

*Restriction(s):* Instructor consent required.

*Department(s):* Department of History

**HIST\*6280 Canada: Community and Identity U [0.50]**

A course that examines the current historiography of selected aspects of Canadian history. Topics will vary with the expertise of individual instructors.

*Department(s):* Department of History

**HIST\*6281 Canada: Community and Identity Research U [0.50]**

Continuation of HIST\*6280 in which students prepare an in-depth research paper based on primary sources.

*Prerequisite(s):* HIST\*6280

*Restriction(s):* Instructor consent required.

*Department(s):* Department of History

**HIST\*6290 Topics in North American History U [0.50]**

Depending on the expertise of the instructor, this course may concentrate on either the United States or Canada, or it may select an historical theme or themes common to the larger continent.

*Department(s):* Department of History

**HIST\*6291 North American History Research U [0.50]**

Continuation of HIST\*6290 in which students prepare an in-depth research paper based on primary sources.

*Prerequisite(s):* HIST\*6290

*Restriction(s):* Instructor consent required.

*Department(s):* Department of History

**HIST\*6300 Topics in Modern European History I U [0.50]**

This seminar course will focus on selected aspects of the political and social history of Europe between 1789 and 1989. Topics to be examined will vary according to the expertise of the faculty and the interest of the students.

*Department(s):* Department of History

**HIST\*6301 Modern European History Research I U [0.50]**

Continuation of HIST\*6300 in which students prepare an in-depth research paper based on primary sources.

*Prerequisite(s):* HIST\*6300

*Restriction(s):* Instructor consent required.

*Department(s):* Department of History

<b>HIST*6310 Topics in Modern European History II U [0.50]</b>
This seminar course will focus on selected aspects of the political and social history of Europe between 1789 and 1989. Topics to be examined will vary according to the expertise of the faculty and the interest of the students. <i>Department(s):</i> Department of History
<b>HIST*6311 Modern Europe II Research U [0.50]</b>
Continuation of HIST*6310 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6310 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History
<b>HIST*6360 History of Sexuality and Gender U [0.50]</b>
This course will examine the history of gender and/or sexuality in different cultures, paying close attention to various theoretical approaches to understanding the history of gender and/or sexuality. The chronological and geographic focus of the course may vary according to the interests and expertise of the instructor. <i>Department(s):</i> Department of History
<b>HIST*6361 Sexuality History Research U [0.50]</b>
Continuation of HIST*6360 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6360 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History
<b>HIST*6370 Topics in Cultural History U [0.50]</b>
History 6370 investigates the practices of cultural history and the utility of the cultural history paradigm in the investigation of topics including politics and power, religion, war, empire, gender, class, 'race', ethnicity, the environment, and consumption. <i>Department(s):</i> Department of History
<b>HIST*6371 Cultural History Research U [0.50]</b>
Continuation of HIST*6370 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6370 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History
<b>HIST*6380 Topics in Early Modern European History U [0.50]</b>
This seminar course examines current issues in early modern European history as selected by the instructor(s). Participants review current research and historiography, discuss the principal debates, and develop their own perspectives through encounters with primary source materials. <i>Department(s):</i> Department of History
<b>HIST*6381 Early Modern European History Research U [0.50]</b>
Continuation of HIST*6380 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6380 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History
<b>HIST*6400 Major Paper U [1.00]</b>
This is to be a major piece of research, based on the extensive use of primary sources. An oral examination of this work is required. <i>Department(s):</i> Department of History
<b>HIST*6450 Quantitative Evidence and Historical Methods U [0.50]</b>
An overview of the use for historical research of quantitative evidence and methodologies. <i>Department(s):</i> Department of History
<b>HIST*6500 Topics in Global History U [0.50]</b>
This is a topical course, that explores the history of processes that take place on a worldwide scale. These may include social, cultural, economic, or environmental processes. <i>Department(s):</i> Department of History
<b>HIST*6501 Global History Research U [0.50]</b>
Continuation of HIST*6500 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6500 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History

<b>HIST*6520 Topics in Latin American History U [0.50]</b>
In-depth study of a particular event or process in Latin American history. Topics may include: religions, women, race and ethnicity, environment issues, intellectual history, or have a regional or temporal focus. <i>Department(s):</i> Department of History
<b>HIST*6521 Latin American History Research U [0.50]</b>
Continuation of HIST*6520 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6520 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History
<b>HIST*6550 Rural History U [0.50]</b>
The countryside was not the city in overalls; it had its own complex trajectory intersecting with the rest of society in interesting and surprising ways. This seminar course introduces students to the economic, social, and cultural themes of rural history. Readings come from a variety of disciplines and explore the environment, agriculture, other resource-based activities, gender, cultural traditions, material artifacts and consumption. These themes will be related to community, identity and the countryside's relationship to the larger society. <i>Department(s):</i> Department of History
<b>HIST*6560 Rural History Research U [0.50]</b>
Continuation of HIST*6550 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6550 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History
<b>HIST*6570 Health, Science, Medicine U [0.50]</b>
This course will examine the history of health, science, and medicine. Topics may include the histories of mental illness, epidemic diseases, disability, public health, or alternative medicine. It will address expert and popular constructions of health, illness and science. <i>Department(s):</i> Department of History
<b>HIST*6580 Health, Science, Medicine Research U [0.50]</b>
Continuation of HIST*6570 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6570 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History
<b>HIST*6590 Public History, Heritage, and Historical Consciousness U [0.50]</b>
This seminar course will examine how history is displayed in public and the formation of historical consciousness. Areas of public history to be discussed may include digital history, museum exhibits, television and film productions, historical re-enactments, commemorations, celebrations, public holidays, monuments and historic sites. <i>Department(s):</i> Department of History
<b>HIST*6600 Public History Research U [0.50]</b>
Continuation of HIST*6590 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6590 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History
<b>HIST*6610 Histories of Tourism and Travel U [0.50]</b>
This seminar course will explore the history of modern tourism, examining the distinctions between travel and tourism in historical discourses and historiography, and engaging extensively with primary source material to examine the sector's evolution in trans-national perspective. Emphasis is placed on the development of key institutions, the influence of political environments, intercultural encounters, environmental impacts and global citizenship. <i>Department(s):</i> Department of History
<b>HIST*6620 Tourism, and Travel Histories Research U [0.50]</b>
Continuation of HIST*6610 in which students prepare an in-depth research paper based on primary sources. <i>Prerequisite(s):</i> HIST*6610 <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of History



<b>HIST*6630 Indigenous Research Relations and Methodologies F,W [0.50]</b>
This course examines the development of Indigenous research methodologies in the academy in North America and invites students to engage in contemporary debates about how to best research and represent Indigenous issues. Students will consider the politics of knowledge mobilization, academic freedom, and intellectual theft.
<i>Offering(s):</i> Offered alternate years
<i>Department(s):</i> Department of History
<b>HIST*7000 Professional Development Seminar U [0.00]</b>
All doctoral students attend the professional development seminar in their first year of the program. The seminar is designed to prepare students for success as a PhD student for their future careers.
<i>Department(s):</i> Department of History
<b>HIST*7010 Qualifying Examination U [0.50]</b>
This oral examination is designed to assess 1) the student's knowledge of the subject matter and ability to integrate the material read and 2) the student's ability and promise in research.
<i>Department(s):</i> Department of History
<b>HIST*7030 Language Requirement U [0.00]</b>
A written demonstration of the student's knowledge of written French (or other appropriate second language).
<i>Department(s):</i> Department of History
<b>HIST*7040 Major Field U [0.50]</b>
The examination written following completion of the major field seminar and before the oral qualifying examination.
<i>Department(s):</i> Department of History
<b>HIST*7070 Thesis Proposal U [0.00]</b>
A written (up to 2,000 words, including citations) and oral demonstration of the proposed dissertation. The proposal will include a statement of the overall thesis of the dissertation, a description/discussion of the major research question(s), a review of the principal primary/archival sources being used, a chapter or topic outline, and a clear explanation of the originality of the thesis. Graded SAT/UNS.
<i>Restriction(s):</i> For PhD students only.
<i>Department(s):</i> Department of History
<b>HIST*7080 Colloquium U [0.00]</b>
The colloquium is a public presentation of original research, normally a chapter, significant portion, or summary of the student's thesis. Graded SAT/UNS.
<i>Restriction(s):</i> For PhD students only.
<i>Department(s):</i> Department of History
<b>HIST*7100 Canadian History Major Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7120 Scottish History Major Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7140 Early Modern European History Major Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7150 Modern European History Major Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7170 Race, Slavery, and Imperialism Major Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7190 War and Society Major Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7250 Cold War Era History Major Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7260 Medieval History Major Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7270 World History Major Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7280 Indigenous Histories of Turtle Island Major Seminar U [1.00]</b>
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of History
<b>HIST*7590 War and Society Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History

<b>HIST*7600 Canadian History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7610 British History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7620 Scottish History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7630 Community Studies Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7640 Early Modern European History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7650 Modern European History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7660 Gender, Women and Family Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7670 Race, Slavery, and Imperialism Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7680 United States History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7690 International History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7700 Science, Medicine and Technology Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7710 Other Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7750 Cold War Era History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7760 Medieval History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7770 World History Minor Seminar U [1.00]</b>
<i>Department(s):</i> Department of History
<b>HIST*7780 Indigenous Histories of Turtle Island Minor Seminar U [1.00]</b>
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of History
<b>HIST*7990 Doctoral Thesis U [0.00]</b>
Students are required to write and successfully defend a thesis of such cogency and originality as will represent a significant contribution to knowledge. The thesis will normally be between 50,000 and 90,000 words in length. University of Guelph regulations and procedures govern this process.
<i>Department(s):</i> Department of History

## Hospitality and Tourism Management

<b>HTM*6120 Special Topics in Hospitality Organizational Behaviour U [0.50]</b>
Advanced course for those specializing in organizational behaviour. Deals with in-depth analysis of industry organizational behaviour, management of current and future problems, reorganizations, corporate cultures, multi-cultural organizations, and ethics.
<i>Restriction(s):</i> Executive Programs students only
<i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>HTM*6170 Hospitality and Tourism Economics and Policy U [0.50]</b>
The course introduces participants to economic and government policy issues that impact the hospitality and tourism industry. The course provides a strategic framework for understanding the macroeconomic and policy environment that is shaped by multilateral institutions, government and the hospitality and tourism industry.
<i>Restriction(s):</i> Executive Programs students only
<i>Department(s):</i> Executive Programs
<b>HTM*6330 Special Topics in Hospitality Marketing U [0.50]</b>
An advanced course for those specializing in marketing. Deals with marketing theories, models, and specific subsets of marketing such as pricing, consumer and industrial-buyer behaviour, distribution, services, and service-delivery concepts.
<i>Restriction(s):</i> Executive Programs students only
<i>Department(s):</i> School of Hospitality, Food and Tourism Management

<b>HTM*6600 International Tourism and Tourism Marketing U [0.50]</b>
Analyzes the social, political and economic impacts of tourism on the world scene, as well as the global integration of tourism in today's society.
<i>Restriction(s):</i> Executive Programs students only
<i>Department(s):</i> School of Hospitality, Food and Tourism Management

<b>HTM*6620 Special Topics in Tourism U [0.50]</b>
Advanced course for those specializing in tourism. Deals with theories of tourism generators, multi-markets, tourism multipliers, current and future trends, regulatory environments, and distributions systems.
<i>Restriction(s):</i> Executive Programs students only
<i>Department(s):</i> School of Hospitality, Food and Tourism Management

<b>HTM*6710 Services Management Theory I F [0.50]</b>
In this doctoral seminar students will assess the 'services' driven economy and the theory and practices of its constituent organizations and relationships. Through readings, facilitated discussions and seminar presentations, students will be able to identify, explain and evaluate the key theories of services management and how they are being used to apply and extend current theories and practice of services management.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> School of Hospitality, Food and Tourism Management

<b>HTM*6720 Services Management Theory II W [0.50]</b>
This doctoral seminar is an examination of the 'services' driven economy and the theory and practices of its constituent organizations and relationships. This course builds on the foundation of Services Management I and explores key contemporary research areas on services management in more detail. Students will examine services management and value chains theory research and practice in a selection of industries, with a focus on one of the following: tourism, hospitality, food and environmental services.
<i>Prerequisite(s):</i> HTM*6710
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> School of Hospitality, Food and Tourism Management

<b>HTM*6730 Cases in Management F,W,S [0.50]</b>
In this course, students learn how to design, research and write cases used in the management discipline: (1) the teaching case, (2) the research case, and (3) the management decision-making case, as well as related research methods and professional and creative non-fiction writing.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> School of Hospitality, Food and Tourism Management

## Human Health and Nutritional Sciences

<b>HHNS*6000 Students Promoting Awareness of Research Knowledge S,F,W [0.25]</b>
This course will explore research communication through practical experience. The course will be part of the SPARK program in which students write, edit and coordinate a variety of news publications that highlight University of Guelph research activities for a wide range of audiences.
<i>Restriction(s):</i> Limited to HHNS MSc course work and project students only. Instructor consent required.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6010 Seminar in Human Health and Nutritional Sciences S [0.50]</b>
Students will develop their scientific communication skills by translating a specific body of knowledge on a chosen topic into a seminar. The class will also explore scientific process-oriented concepts and issues such as effective scientific communication and dissemination of results.
<i>Restriction(s):</i> Limited to HHNS MSc course work and project students only.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6040 Research Fronts in Nutritional and Nutraceutical Sciences F [0.50]</b>
Building on an information base in nutrition, biochemistry and physiology, the course comprises selected research topics pertaining to the importance of nutrition as a determinant of health throughout the life span. Distinction will be drawn between the metabolic basis of nutrient essentiality and the health protectant effects of nutraceuticals.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6130 Advanced Skeletal Muscle Metabolism in Humans W [0.50]</b>
This course examines how the energy provision pathways in human skeletal muscle and associated organs meet the energy demands of the muscle cell during a variety of metabolically demanding situations.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6320 Advances in Human Health and Nutritional Sciences Research S,F,W [0.50]</b>
This course provides the student with an opportunity to study a topic of choice and involves literature research on a chosen topic. The course may stand alone (MSc thesis and PhD students) or provide the background information for an experimental approach to the topic (MSc course work and project students).
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6400 Functional Foods and Nutraceuticals F [0.50]</b>
This course considers the relation of nutraceuticals, functional foods, designer foods, medical foods and food additives to foods and drugs. The course emphasizes the development and commercialization of nutraceuticals.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6410 Applied Functional Foods and Nutraceuticals W [1.00]</b>
This course prepares students to develop an innovative product or service from conceptualization to market entry considering regulatory, product development, safety/efficacy and market readiness issues. The course applies and integrates the concepts defined in HHNS*6400
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6440 Nutrition, Gene Expression and Cell Signalling W [0.50]</b>
This course emphasizes the role nutrients play as modulators of gene expression at the molecular level. The mechanisms by which nutrients modulate gene expression through specific cell signalling cascades are examined. (offered annually)
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6500 Cardiovascular and Respiratory Physiology F [0.50]</b>
This course will use both review articles and the primary literature to build a broad base of understanding of the cardiovascular and respiratory systems as well as explore current research in specific areas in this knowledge paradigm. Further, this course will build research skills through by strengthening critical analysis skills and both oral and written communication skills through learning about the cardiovascular and respiratory system and how they integrate.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6700 Nutrition, Exercise and Metabolism F [0.50]</b>
A discussion of recent concepts in the relationships among nutrition, exercise and metabolism. Information from the molecular to the whole-body level will be presented with a focus on understanding nutrition and exercise in the human. Emphasis is placed on the development and testing of experimental hypotheses in these areas of research.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6710 Advanced Topics in Nutrition and Exercise F [0.50]</b>
Advanced topics will be presented to establish an in-depth understanding of current investigations in nutrition and exercise. Based on the integrated understanding of nutrition and exercise developed in HHNS*6700, the focus of this course will be to develop the student's ability to independently analyze original research investigations.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6800 Research Frontiers in Integrative Biomechanics and Neurophysiology F [0.50]</b>
This course will provide students with a breadth of knowledge and understanding across the research frontiers pursued by the integrative biomechanics and neurophysiology group. Students will be given opportunity to practice and improve oral and written communication skills and provide constructive feedback to their peers. Additionally, this class will engage students in dialogue around topics pertinent to designing and conducting successful experiments such as hypothesis generation and ethical and practical considerations.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

<b>HHNS*6810 Research Methods in Integrative Biomechanics and Neurophysiology I F [0.50]</b>
This course develops a comprehensive understanding of methods and analysis related to research in biomechanics & neuroscience. Critical evaluation and application of basic signal to noise processing and electromyography is a priority. The course uses labs, assignments, and critical review of primary literature articles to develop a strong research foundation. Scientific writing and oral communication skills are emphasized via written reports and presentations, and numeracy throughout the course in data and lab assignments.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences

**HHNS\*6820 Research Methods in Integrative Biomechanics and Neurophysiology II W [0.50]**

This course develops a comprehensive understanding of methods and analysis related to research in biomechanics & neuroscience. Critical evaluation and application of 3D kinematics and programming/modelling is a priority. The course uses labs, assignments, and critical review of primary literature articles to develop a strong research foundation. Scientific writing and oral communication skills are emphasized via written reports and presentations, and numeracy throughout the course in data and lab assignments.

*Prerequisite(s):* HHNS\*6810

*Department(s):* Department of Human Health and Nutritional Sciences

**HHNS\*6910 Basic Research Techniques and Processes S,F,W [0.50]**

Working with a faculty advisor, students will gain experience in basic aspects of scientific research. This will be accomplished through experience of one or more components of the scientific method in a laboratory setting. Objective outcomes will be evaluated and will include documentation of the experience in a written report.

*Restriction(s):* Restricted to HHNS MSc. course work and project students. Instructor consent required.

*Department(s):* Department of Human Health and Nutritional Sciences

**HHNS\*6920 Applied Research Techniques and Processes S,F,W [0.50]**

Under the supervision of a faculty advisor, students will gain practical experience in discipline-specific aspects of research. This will be accomplished through experience in a pre-arranged practicum in an applied setting. Objective outcomes will be evaluated and will include documentation of the experience in a written report.

*Restriction(s):* Restricted to HHNS MSc. course work and project students. Instructor consent required.

*Department(s):* Department of Human Health and Nutritional Sciences

**HHNS\*6930 Research Project S,F,W [0.50]**

Under the supervision of a faculty advisor and building on knowledge gained from Basic or Applied Research Techniques and Processes, students will carry out a specific research project to its completion. Results will be documented in a written report and communicated through a scientific poster.

*Prerequisite(s):* HHNS\*6910 or HHNS\*6920

*Restriction(s):* Restricted to HHNS MSc. course work and project students. Instructor consent required.

*Department(s):* Department of Human Health and Nutritional Sciences

**Integrative Biology****IBIO\*6000 Special Topics in Ecology and Behaviour U [0.50]**

This is a course in which several faculty lecture and/or lead discussion groups in tutorials about advances in their broad areas, or related areas, of ecology and behaviour. Topics may include animal communication, optimal foraging, life-history evolution, mating systems, population dynamics, niche theory and food-web dynamics, and will depend on who is co-ordinating the course for that particular offering. The course includes lectures and seminars in which the students actively participate.

*Department(s):* Department of Integrative Biology

**IBIO\*6010 Special Topics in Physiology U [0.50]**

This is a course in which several faculty lecture and/or lead discussion groups in tutorials about advances in their broad areas, or related areas, of physiology. Topics may include metabolic adaptation to extreme environments, behavioural and molecular endocrinology, and exercise and muscle physiology, and will depend on who is co-ordinating the course for that particular offering. The course includes lectures and seminars in which the students actively participate.

*Department(s):* Department of Integrative Biology

**IBIO\*6020 Special Topics in Evolutionary Biology U [0.50]**

This modular course reviews books and/or other publications in the field of evolutionary biology, providing knowledge of progress in this area of biology. Topics may include epigenetics, phylogenetics, developmental basis of evolutionary change, and molecular evolution. The course includes lectures and seminars in which the students participate. Offered annually.

*Department(s):* Department of Integrative Biology

**IBIO\*6070 Advances in Integrative Biology I U [0.50]**

This course provides graduate students, either individually or in groups, with the opportunity to pursue topics in specialized fields of integrative biology under the guidance of graduate faculty. Courses may be offered in any of lecture, reading/seminar, or individual project formats. A minimum enrolment may be required for some course offerings.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Integrative Biology

**IBIO\*6080 Advances in Integrative Biology II U [0.50]**

This course provides graduate students, either individually or in groups, with the opportunity to pursue topics in specialized fields of integrative biology under the guidance of graduate faculty. Courses may be offered in any of lecture, reading/seminar, or individual project formats. A minimum enrolment may be required for some course offerings.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Integrative Biology

**IBIO\*6630 Scientific Communication U [0.50]**

This course involves development and refinement of the skills of scientific communication, with emphasis on writing skills, in the context of developing a thesis proposal. This course is mandatory for MSc AND DIRECT ENTRY PhD students in the Department of Integrative Biology.

*Department(s):* Department of Integrative Biology

**International Development Studies****IDEV\*6000 Regional Context U [0.50]**

This reading course provides an opportunity for in-depth investigation about a particular region in preparation for a thesis, major paper or research project. The course normally is directed by the student's advisor.

*Department(s):* Dean's Office, College of Social and Applied Human Sciences

**IDEV\*6200 Development Theory, Issues and Process F-W [1.00]**

This course will examine key issues in development, for example: social justice, poverty and inequality, sustainability, governance and inclusiveness, and how perspectives on these issues have changed over time and differ across disciplinary perspectives. The course will be writing-intensive and focus on the development of skills in oral communication of development issues.

*Department(s):* Dean's Office, College of Social and Applied Human Sciences

**IDEV\*6300 Research and Analysis in a Development Context S [0.50]**

Students will explore alternative approaches to development research and analysis across documentary, qualitative and quantitative methods and the ethical issues associated with research in a development context. The course involves guided readings and seminar based discussions related to development research. There will be emphasis on written and oral communication of development research and analysis to diverse audiences. The course will be taught over a two-week period at the start of the summer semester. Subsequently, students will reflect on their own positionality and the development context of their research of practicum through the remainder of the Summer semester and while engaged in this activity.

*Department(s):* Dean's Office, College of Social and Applied Human Sciences

**IDEV\*6500 Fieldwork in International Development Studies U [0.50]**

This course recognizes an intensive commitment to research in an archival repository, 'in the field' or at an appropriate development institution in Canada or abroad. The course normally is directed by the student's advisor in consultation with the advisory committee

*Department(s):* Dean's Office, College of Social and Applied Human Sciences

**IDEV\*6800 Theories and Debates in Development F [0.50]**

This course examines recent approaches in development theory explaining international inequality, poverty and long-term change. It also investigates selected current debates in international development – such as food security, trade, good governance, sustainability or gender – from various discipline-based and interdisciplinary perspectives, and analyzes selected regional experiences of development.

*Restriction(s):* Restricted to students in doctoral IDEV collaborative specializations. A minimum final grade of 75% is required to remain in the IDEV collaborative specialization.

*Department(s):* Dean's Office, College of Social and Applied Human Sciences

**IDEV\*6850 Development Research and Practice W [0.50]**

In this course students establish the linkages between their doctoral research topic and the wider field of development studies and practice. The course will examine development policies and projects, ethical issues related to (cross-cultural) development research, and relationships between research and development practice.

*Restriction(s):* Restricted to students in doctoral IDEV collaborative specializations. A minimum final grade of 75% is required to remain in the IDEV collaborative specialization.

*Department(s):* Dean's Office, College of Social and Applied Human Sciences

## Landscape Architecture

### LARC\*6010 Landscape Architecture Studio I F [0.50]

Studio and field instruction introduces the student to landscape architecture through acquisition of basic professional skills and knowledge. Topics include design theory, landscape inventory and analysis, application of the design process to projects at the site scale, graphic and oral communication.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6020 Landscape Architecture Studio II F [0.50]

Studio and field instruction introduces the student to basic knowledge and skills of site engineering as it relates to landscape architecture. Topics include surveying, principles of site grading and drainage, introduction to materials and methods of construction, and graphic communication.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6030 Landscape Architecture Studio III W [0.50]

Studio and field instruction continues the student's development of professional knowledge and skills at the site scale. Topics include site planning principles, social factors in design, introduction to principles of planting design and architectural structures, facilitation and computer applications in design.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6040 Landscape Architecture Studio IV W [0.50]

Studio instruction emphasizes design implementation, materials and methods of construction, principles of stormwater management, construction specifications and graphic communication using computer applications.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6120 Community Design W [0.50]

Studio and field instruction emphasizes integration of ecological, social, cultural and historical factors in the comprehensive design of urban and special use landscapes at the neighbourhood and community scale.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6340 Landscape History Seminar F [0.25]

A lecture/seminar course focussed on the history of Landscape Architecture. Skills emphasize the development of oral and writing skills.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6360 Professional Practice Seminar F [0.25]

A lecture/seminar course focussed on the legal, business, ethical and professional practices of Landscape Architecture professionals. Skills emphasize the development of oral and writing skills.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6380 Research Seminar W [0.25]

A seminar course focussed on the process and communication of research, influenced by the current research of the participants. Participants organize a conference to present their research results.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6430 Landscape Resource Analysis F [0.50]

Integrated field and classroom instruction introduces the student to inventory and analysis of biological, physical, social and cultural elements of the landscape. Projects will incorporate principles of landscape ecology and landscape planning. Field study will require some travel at student's expense.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6440 Environmental Design F [0.50]

This course integrates field and classroom study to apply landscape ecology to current landscape problems, including analysis of regional landscapes, restoration of degraded landscapes, and application of aesthetic and ecological principles across scales in site to regional settings. Case studies component will require some travel at students' expense.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6470 Integrative Environmental Planning W [0.50]

Landscape planning emphasizing the integration and interrelationships between biophysical and cultural resources, with application at a regional landscape planning scale. This course typically incorporates community-outreach projects.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6600 Critical Inquiry & Research Analysis W [0.50]

Students are introduced to critical inquiry and research analysis in order to evaluate information related to landscape architecture. The focus of the course is on qualitative and quantitative analysis and interpretation. Students will review, critique, summarize, and explain academic research that is relevant for landscape architecture.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6610 Research Methods F [0.50]

An introduction to a broad array of research methods as they apply to landscape planning and design, with a focus on the connections between research and design. Emphasis is on developing foundations for the creation of appropriate research questions.

*Restriction(s):* Available only to students registered in the MLA program.

*Department(s):* School of Environmental Design and Rural Development

### LARC\*6710 Special Study S,F,W [0.50]

Independent study. A proposal for the content and product required for this course must be developed in conjunction with the student's Advisory Committee.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Design and Rural Development

## Latin American and Caribbean Studies

### LACS\*6000 Research Methods Seminar U [0.50]

This course will introduce students to the field and research methods of various disciplines and of interdisciplinary studies, and it will familiarize them with field-relevant research skills and methodologies.

*Department(s):* School of Languages and Literatures

### LACS\*6010 Latin American Identity & Culture F [0.50]

This is the first of the two required LACS culture core courses. They will address theoretical issues relevant to Latin American identities and cultures, and will use these as heuristic devices in the study of major and marginalized cultural events, narratives, and visual and musical expressions. In LACS\*6010 students will analyze the concept of "hybridity" and study how hybrid culture has been incorporating past with the present, and how it is and has been incorporating local and African forms and themes with European and US derived high culture.

*Department(s):* School of Languages and Literatures

### LACS\*6020 Re-Imagining Community in Latin America W [0.50]

This graduate seminar examines recent developments in community theory, studying representative works of literature, film, and music that re-imagine the ideas and formations of Latino, Latin American and Caribbean communities. Students going an exchange may replace this course with a similar course taken at the exchange university.

*Department(s):* School of Languages and Literatures

### LACS\*6030 Globalization & Insecurity in the Americas F [0.50]

An analytical, critical and interdisciplinary introductory overview of Latin America and the Caribbean in the larger context of the Americas, from the point of view of the security and insecurity of its people. It will concentrate on the interplay of environmental, economic, social, political, and cultural factors upon such security in an era of globalization.

*Department(s):* School of Languages and Literatures

### LACS\*6040 Novel & Nation in Spanish America W [0.50]

This course will study the constitution of Spanish American nation in the novel since 1900 from a variety of theoretical perspectives. Particular attention will be paid to the novel's appropriation of foreign artistic and cultural influences to articulate Spanish American history. Offered in conjunction with SPAN\*4100 or SPAN\*4410. Extra work is required of graduate students.

*Restriction(s):* Credit may be obtained for only one of LACS\*6040 or SPAN\*4100/SPAN\*4410.

*Department(s):* School of Languages and Literatures

### LACS\*6070 Civil Society and Activism in Latin America U [0.50]

This graduate seminar will provide an analytical, critical and interdisciplinary overview of relevant sociopolitical topics in contemporary Latin America, with a focus on the role of civil society and collective action in reshaping the social and political landscape of the region.

*Department(s):* School of Languages and Literatures

**LACS\*6100 Research Project U [1.00]**

This research project will result in a major paper of about 15,000 words. The student chooses a topic and writes a paper on the topic with the guidance of a faculty member. The topic must be approved by the Graduate Program Committee.

*Department(s):* School of Languages and Literatures

**LACS\*6200 Topics in Latin American and Caribbean Studies U [0.50]**

An independent study course, the nature and content of which is agreed upon between the individual student and the person offering the course.

*Restriction(s):* Instructor and Graduate Program Coordinator signatures required.

*Department(s):* School of Languages and Literatures

**Leadership****LEAD\*6000 Foundations of Leadership U [0.50]**

The course will enhance participants' interpersonal competency, as well as their knowledge and understanding of the theory and research underlying the impact of team management and collaboration on the organization.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6100 Theories of Leadership U [0.50]**

This course traces the development of the concept of leadership. Through the interplay of theory and practical application, participants will gain a deeper appreciation for the requirements, responsibilities, and consequences of effective leadership.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6200 Leadership of Organizational Change U [0.50]**

This course studies the role of leadership in the management of change within an organization and the changes required of management. The course examines the development of trust, the building of organizational loyalty, and motivation and inspiring of high performance teams.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6220 Strategic Leadership and Management U [0.50]**

As a research-intensive course in the MA in Leadership program, this course examines the conceptual and practical dimensions of strategic leadership and management in a variety of organizational, external and individual contexts using a selection of readings, discussions, case analyses and a final paper.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6300 Role of the Leader in Decision-Making U [0.50]**

The role of the leader in decision-making is explored through the study of the rational model for decision-making, human biases, creativity, and risk and uncertainty in decision-making. The course will also examine ethical issues and group decision-making.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6350 The Role of the Leader as Reflective Practitioner U [0.50]**

This course will enhance the leader's ability to navigate the complexity of organizational life and contribute to building a more sustainable society by developing skills in reflective practice. Reflective practice is divided into four areas that stretch over eight modules: Rethinking, Relating, Responding and Reinventing.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6400 Research Methods for Decision-Making U [0.50]**

The course will explore both quantitative and qualitative techniques used in the analysis of research results from a variety of sources (surveys, government statistics, in-depth interview, focus groups and program evaluation results). Case studies will be used to demonstrate the application of multiple research methods.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6500 Ethics in Leadership U [0.50]**

Issues in the use and application of ethical standards by leaders are explored through examples from history, current events, novels, films and television. Relevant theory is applied to leadership examples to help students develop an ethical framework for the exercise of leadership skills.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6600 Foundations of Leadership for Retirement and Senior Living U [0.50]**

Leadership in the senior living sector requires unique skills, competencies and practice. The purpose of this course is to explore leadership theories and concepts in this context. Understanding the rights and choices of seniors, the future of the aging population, care and support services available and legislative requirements is essential to individuals interested in pursuing career growth in senior living.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6720 Politics of Organizations U [0.50]**

This course reviews a variety of theories and models that help to explain the behavioural underpinnings that influence and shape management and leadership processes within organizations. Examples from history and current events are explored to illustrate theory.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6740 Coaching and Developing Others U [0.50]**

This course will provide student with an opportunity to design developmental plans for direct reports, assess their coaching skills, and develop their coaching skills to support the development of others.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6800 Personal Skill Self-Assessment U [0.50]**

Using the "Basis of Competence" model, this course examines personal skills in four areas: Managing Self, Communicating, Managing People and Tasks, and Mobilizing Innovation and Change. The skills required to make smooth transitions from one job to another in a dynamic workplace will be explored.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**LEAD\*6900 Major Research Project U [1.00]**

This course involves a directed research project leading to a referenced, professional report on a leadership problem or issue.

*Restriction(s):* Lang Executive Programs students only

*Department(s):* Executive Programs

**Literature and Theatre Studies****LTS\*7770 Language Requirement U [0.00]**

A written demonstration of a student's reading knowledge of one language other than English, as approved by the Graduate Studies Committee.

*Department(s):* School of English and Theatre Studies

**LTS\*7900 Directed Studies U [0.50]**

The study of a special topic under the guidance of a member of the graduate faculty.

*Department(s):* School of English and Theatre Studies

**Management****MGMT\*6000 Management Seminar Series F,W [0.00]**

This seminar provides students with exposure to current and emerging research topics in the field of management. Academic speakers (faculty and students) present their work in weekly meetings. Students are encouraged to be engaged and participate actively during the presentations.

*Restriction(s):* Students in MA.MGMT

*Department(s):* Department of Management

**MGMT\*6100 Evidence Based Management Research U [0.50]**

This course provides a conceptual overview of the management research and its functions for academic and practitioner audiences. Students will explore the purpose of research, its relationship to theory, the benefits of various epistemological approaches and the notion of research impact. Topics include research problem definition and objectives, hypothesis development, research design, ethics approval, measurement, sampling methods, analysis, interpretation of results, and report writing.

*Restriction(s):* Students in MA.MGMT

*Department(s):* Department of Management

<b>MGMT*6120 Quantitative Methods for Evidence Based Management U [0.50]</b>
This course provides a practical overview of statistical methods for evidence-based management applications. Students will work with quantitative data to conduct a variety of statistical analysis, including descriptive statistics, visualization of data, null hypothesis significance testing, univariate and multivariate analysis of variance and covariance, correlation, linear and logistic regression and exploratory factor analysis. The course puts an emphasis on the interpretation of results in terms of their practical managerial implications.
<i>Prerequisite(s):</i> MGMT*6100
<i>Restriction(s):</i> Students in MA.MGMT
<i>Department(s):</i> Department of Management
<b>MGMT*6130 Creative Process of Innovation U [0.50]</b>
This course is focused on the creative process of innovation required to effectively engage in problem solving and opportunity creation toward organizational and societal flourishing. Students will develop both a theoretical understanding and the practical skills to engage in creative experimentation for novel idea generation.
<i>Department(s):</i> Department of Management
<b>MGMT*6200 Leadership Assessment and Development U [0.50]</b>
This course provides a conceptual overview of the leadership competencies that lead to leadership performance. Students will explore and learn a method for assessing their own leadership competencies. They will learn a process for developing in themselves those knowledge and skills relevant to effective leadership. Topics include managerial competencies models, assessment models, learning styles, intentional change process, and personal development plan. This course emphasizes those techniques most frequently used in personal development and coaching individuals and teams.
<i>Offering(s):</i> Offered through Distance Education and on-campus.
<i>Restriction(s):</i> Students in the MA in Management and Master of Conservation Leadership programs only.
<i>Department(s):</i> Department of Management
<b>MGMT*6300 Business Consulting U [0.50]</b>
This course provides students with an understanding of the concepts, principles, and practices for management consulting. Students will be exposed to the various components of the consulting process, consulting approaches and styles, client- consultant relationships, issue and problem diagnosis, reporting of results, and professional codes of conduct and ethics. The emphasis is on techniques most frequently used in the context of both internal and external organizational roles and as a career choice.
<i>Restriction(s):</i> Students in the MA in Management program only.
<i>Department(s):</i> Department of Management
<b>MGMT*6400 Project Management U [0.50]</b>
This course provides students with an understanding of the concepts, principles, and practices for project management. It introduces an understanding and appreciation of the importance of managing projects, project teams, the project management systems and tools, the various components of the project management process, and professional codes of conduct and ethics. The emphasis is on the techniques most frequently used in the context of, both internal and external organizational roles of a project manager.
<i>Restriction(s):</i> Students in the MA in Management program only.
<i>Department(s):</i> Department of Management
<b>MGMT*6500 Major Research Project U [1.00]</b>
This course is available to individuals or groups of graduate students. Students will complete a set of readings and an associated paper as approved by designated faculty. Specific learning objectives consistent with the University's will be developed each time the course is offered.
<i>Prerequisite(s):</i> MGMT*6100 and MGMT*6200
<i>Restriction(s):</i> Students in the MA in Management program.
<i>Department(s):</i> Department of Management
<b>MGMT*6800 Philosophy of Social Science Research S [0.50]</b>
This course introduces students to the underlying philosophical assumptions that support empirical research methods within social science disciplines. The aim of this course is to examine the philosophy of knowledge generation and claims, particularly in the context of management phenomena.
<i>Department(s):</i> Department of Marketing and Consumer Studies
<b>MGMT*6820 Theory of Management F [0.50]</b>
This course examines the evolution of management thought and the overarching theories that have been successfully applied to multiple functional areas of the organization. Examples of theories that apply to such disparate areas as operations, marketing, and organizational behaviour include agency theory, transaction cost analysis, and contingency theory.
<i>Department(s):</i> Department of Management

<b>MGMT*6830 Applied Univariate Statistical Analysis for Management F [0.50]</b>
This course focuses on the use of univariate statistics as applied to social and behavioural research within the fields of organizational, management, and consumer studies. Emphasis will be place on providing a solid understanding of descriptive statistics, mean difference testing, analysis of variance and covariance, linear and logistic regression, and power and effect size. Laboratory sessions will focus on analysis application using statistical packages such as SPSS, R, SAS, Stata, and Mplus.
<i>Department(s):</i> Department of Management
<b>MGMT*6840 Quantitative Research Methods: Multivariate Techniques W [0.50]</b>
This course provides a review of selected multivariate analysis techniques with applications to management. Students will learn to determine which multivariate technique is appropriate for a specific research problem and how to apply multivariate quantitative techniques to research questions. Topics include regression analysis, anova, principal components, factor and discriminant analysis, nonmetric scaling and trade-off analysis. The course uses a hands-on approach and requires computer-program analysis.
<i>Department(s):</i> Department of Management
<b>MGMT*6850 Qualitative Research Methods W [0.50]</b>
This doctoral seminar provides students with the historical roots, underlying theoretical frameworks, and methods of qualitative research for consumer and management studies. Students will develop their capacity to conduct qualitative research through the development of an original qualitative research project.
<i>Department(s):</i> Department of Management
<b>MGMT*6900 PhD Research Seminar Project S [0.00]</b>
The summer project seminar has the objective to start familiarizing students with the research process. Students will prepare and submit a research piece drawing on techniques acquired in the research methods courses.
<i>Department(s):</i> Department of Management
<b>MGMT*6950 Doctoral Research Seminar F,W [0.00]</b>
This is a seminar course attended by graduate students and faculty. Academic guest speakers present their work in weekly meetings. Students are encouraged to be engaged and participate actively during the presentations.
<i>Restriction(s):</i> Must be registered in the PhD Management program
<i>Department(s):</i> Department of Management
<b>Marketing and Consumer Studies</b>
<b>MCS*6000 Consumption Behaviour Theory I F [0.50]</b>
A review of the nature and scope of consumption behaviour and the approaches to studying the role of human consumption using the major theoretical perspectives.
<i>Department(s):</i> Department of Marketing and Consumer Studies
<b>MCS*6010 Consumption Behaviour Theory II W [0.50]</b>
Consumption behaviour is an interdisciplinary field of study which applies theories from multiple disciplines to the activities and processes people engage in when choosing, using and disposing of goods and services. The purpose of this course is to provide a basic review of the theoretical foundations of aspects of consumption and consumer behaviour and to demonstrate their applicability to marketing management. The course is designed to allow participants to bring their own background and interests to bear on the review and application of the theories underlying consumer behaviour.
<i>Prerequisite(s):</i> MCS*6000 or consent of instructor
<i>Department(s):</i> Department of Marketing and Consumer Studies
<b>MCS*6050 Research Methods in Marketing and Consumer Studies F [0.50]</b>
A comprehensive review of measurement theory, including issues such as construct definition, scale development, validity and reliability. Applicants of measurement principles will be demonstrated, particularly as they relate to experimental and survey research design.
<i>Department(s):</i> Department of Marketing and Consumer Studies
<b>MCS*6060 Multivariate Research Methods W [0.50]</b>
A review of selected multivariate analysis techniques as applied to marketing and consumer research. Topics include regression, anova, principal components, factor and discriminant analysis, nonmetric scaling and trade-off analysis. The course uses a hands-on approach with small sample databases available for required computer-program analysis.
<i>Prerequisite(s):</i> MCS*6050 or consent of instructor
<i>Department(s):</i> Department of Marketing and Consumer Studies

**MCS\*6070 Introduction to Structural Equation Modeling W [0.50]**

This course introduces students to the theory, concepts and application of structural equation modeling. Topics covered include path analysis, confirmatory factor analysis and measurement models, latent variable modeling, multi-group modeling, and measurement invariance testing. Emphasis is placed on applying the principles of SEM to the creation and testing of theoretically driven models using both categorical and continuous data.

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6080 Qualitative Research Methods W [0.50]**

A review of the nature, importance and validity issues associated with qualitative research. Topics include theory and tactics in design, interpersonal dynamics, analysis of interaction and transcripts.

*Prerequisite(s):* MCS\*6050 or consent of instructor

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6090 Special Topics in Consumer Research and Analysis U [0.50]**

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6100 Marketing Theory F [0.50]**

A theoretical understanding of marketing, including philosophy of science and marketing, a history of marketing thought, market orientation, marketing strategy theory, modeling, social marketing, and ethical issues in marketing.

*Restriction(s):* Signature required for non-MCS students.

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6120 Marketing Management U [0.50]**

This course is designed to increase depth of knowledge of marketing by helping the student understand how marketing theory can directly affect marketing practice and firm performance. As this is an MSc course and NOT an MBA course, there is an expectation that the level of critical thinking and knowledge growth falls within the realm of the science of marketing and/or the empirical nature of marketing research and is not simply about marketing practice.

*Prerequisite(s):* MCS\*6100

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6200 Marketing Analytics F [0.50]**

Course will cover major marketing decisions and the analytical tools to make decisions for business solutions. Topics and tools include market segmentation, targeting and positioning, new product design and forecasting, marketing mix and resource allocation and customer life time value.

*Restriction(s):* Restricted to MSc.MCS, MSc.TRMH, MA.MGMT, PhD.MGMT students

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6260 Special Topics in Food Marketing U [0.50]**

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6710 Special Topics in Marketing U [0.50]**

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6720 Special Topics in Housing and Real Estate U [0.50]**

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6800 Best Worst Scaling and Discrete Choice Analysis U [0.50]**

This course is designed to cover an array of related topics in the recent developments of Best-Worst Scaling (BWS) and Discrete Choice Experiments (DCEs) data collection. Students will develop an understanding of different preference elicitation methods and response formats and the ability to design experiments for best-worst and choice experiments. Multiple software will be used to analyze data, interpret results and write research reports.

*Prerequisite(s):* Graduate level course in Statistics or equivalent

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6810 Experimental Design and Analysis for Behavioural Research in Management Studies F [0.50]**

This course focuses on experimental methods within the fields of organizational, management and consumer studies. Specifically students will learn how to design and analyze experiments. Emphasis will be placed on hypothesis testing with factorial and mixed designs, issues related to design, power, continuous and categorical data and scientific communication. Laboratory sessions will focus on analysis application using statistical packages that may include SPSS, R, SAS and Mplus.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Marketing and Consumer Studies

**MCS\*6950 Marketing & Consumer Studies Seminar F,W [0.00]**

*Department(s):* Department of Marketing and Consumer Studies

**Mathematics****MATH\*6010 Analysis U [0.50]**

Half the course covers metric spaces, normed linear spaces, and inner product spaces, including Banach's and Schauder's fixed point theorems, Lp spaces, Hilbert spaces and the projection theorem. The remaining content may include topics like operator theory, inverse problems, measure theory and spectral analysis.

*Department(s):* Department of Mathematics and Statistics

**MATH\*6011 Dynamical Systems I U [0.50]**

Basic theorems on existence, uniqueness and differentiability; phase space, flows, dynamical systems; review of linear systems, Floquet theory; Hopf bifurcation; perturbation theory and structural stability; differential equations on manifolds. Applications drawn from the biological, physical, and social sciences.

*Department(s):* Department of Mathematics and Statistics

**MATH\*6012 Dynamical Systems II U [0.50]**

The quantitative theory of dynamical systems defined by differential equations and discrete maps, including: generic properties; bifurcation theory; the center manifold theorem; nonlinear oscillations, phase locking and period doubling; the Birkhoff-Smale homoclinic theorem; strange attractors and deterministic chaos.

*Department(s):* Department of Mathematics and Statistics

**MATH\*6020 Scientific Computing U [0.50]**

This course covers the fundamentals of algorithms and computer programming. This may include computer arithmetic, complexity, error analysis, linear and nonlinear equations, least squares, interpolation, numerical differentiation and integration, optimization, random number generators, Monte Carlo simulation; case studies will be undertaken using modern software.

*Department(s):* Department of Mathematics and Statistics

**MATH\*6021 Optimization I U [0.50]**

A study of the basic concepts in: linear programming, convex programming, non-convex programming, geometric programming and related numerical methods.

*Department(s):* Department of Mathematics and Statistics

**MATH\*6022 Optimization II U [0.50]**

A study of the basic concepts in: calculus of variations, optimal control theory, dynamic programming and related numerical methods.

*Department(s):* Department of Mathematics and Statistics

**MATH\*6031 Functional Analysis U [0.50]**

Hilbert, Banach and metric spaces are covered including applications. The Baire Category theorem is covered along with its consequences such as the open mapping theorem, the principle of uniform boundedness and the closed graph theorem. The theory of linear functionals is discussed including the Hahn-Banach theorem, dual spaces, and if time permits, weak topologies or generalized functions. Basic operator theory is covered including topics such as adjoints, compact operators, the Frechet derivative and spectral theory. A brief introduction to the concepts of measure and integration required for some of the aforementioned topics is also included. Offered in conjunction with MATH\*4220. Extra work is required of graduate students.

*Restriction(s):* Credit may be obtained for only one of MATH\*4220 or MATH\*6031

*Department(s):* Department of Mathematics and Statistics

**MATH\*6041 Partial Differential Equations I U [0.50]**

Classification of partial differential equations. The Hyperbolic type, the Cauchy problem, range of influence, well- and ill-posed problems, successive approximation, the Riemann function. The elliptic type: fundamental solutions, Dirichlet and Neumann problems. The parabolic type: boundary conditions, Green's functions and separation of variables. Introduction to certain non-linear equations and transformations methods. Offered in conjunction with MATH\*4270. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of MATH\*4270 or MATH\*6041

*Department(s):* Department of Mathematics and Statistics

**MATH\*6042 Partial Differential Equations II U [0.50]**

A continuation of some of the topics of Partial Differential Equations I. Also, systems of partial differential equations, equations of mixed type and non-linear equations.

*Department(s):* Department of Mathematics and Statistics

**MATH\*6051 Mathematical Modelling U [0.50]**

The process of phenomena and systems model development, techniques of model analysis, model verification, and interpretation of results are presented. The examples of continuous or discrete, deterministic or probabilistic models may include differential equations, difference equations, cellular automata, agent based models, network models, stochastic processes.

*Department(s):* Department of Mathematics and Statistics

<b>MATH*6071 Biomathematics U [0.50]</b>
The application of mathematics to model and analyze biological systems. Specific models to illustrate the different mathematical approaches employed when considering different levels of biological function. <i>Department(s):</i> Department of Mathematics and Statistics
<b>MATH*6091 Topics in Analysis U [0.50]</b>
Selected topics from topology, real analysis, complex analysis, and functional analysis. <i>Department(s):</i> Department of Mathematics and Statistics
<b>MATH*6181 Topics in Applied Mathematics I U [0.50]</b>
This course provides graduate students, either individually or in groups, with the opportunity to pursue topics in applied mathematics under the guidance of graduate faculty. Course topics will normally be advertised by faculty in the semester prior to their offering. Courses may be offered in any of lecture, reading/seminar, or individual project formats. <i>Department(s):</i> Department of Mathematics and Statistics
<b>MATH*6182 Topics in Applied Mathematics II U [0.50]</b>
This course provides graduate students, either individually or in groups, with the opportunity to pursue topics in applied mathematics under the guidance of graduate faculty. Course topics will normally be advertised by faculty in the semester prior to their offering. Courses may be offered in any of lecture, reading/seminar, or individual project formats. <i>Department(s):</i> Department of Mathematics and Statistics
<b>MATH*6400 Numerical Analysis I U [0.50]</b>
Topics selected from numerical problems in: matrix operations, interpolation, approximation theory, quadrature, ordinary differential equations, partial differential equations, integral equations, nonlinear algebraic and transcendental equations. <i>Department(s):</i> Department of Mathematics and Statistics
<b>MATH*6410 Numerical Analysis II U [0.50]</b>
One or more topics selected from those discussed in Numerical Analysis I, but in greater depth. <i>Department(s):</i> Department of Mathematics and Statistics
<b>MATH*6990 Mathematics Seminar U [0.00]</b>
Students will review mathematical literature and present a published paper. <i>Department(s):</i> Department of Mathematics and Statistics
<b>MATH*6998 MSc Project in Mathematics U [1.00]</b>
This course is intended for students in the course-based MSc program in Mathematics. The MSc project will be written under the supervision of a faculty member and will normally be completed within one or two semesters. Once completed, students will submit a final copy of their project to the Department and give an oral presentation of their work. <i>Restriction(s):</i> Restricted to MSC.MAST:L-MATH students in Mathematics <i>Department(s):</i> Department of Mathematics and Statistics
<b>Molecular and Cellular Biology</b>
<b>MCB*6310 Advanced Topics in Molecular and Cellular Biology F [0.50]</b>
This course will consider fundamental cellular processes from multiple perspectives: biochemistry, cell biology, microbiology, molecular biology and genetics, and plant biology. Topics will vary from semester to semester but a multi-disciplinary approach to advanced concepts and experimental strategies will be a common theme. <i>Department(s):</i> Department of Molecular and Cellular Biology
<b>MCB*6370 Protein Structural Biology and Bioinformatics U [0.50]</b>
This course explores structural biology from three perspectives: 1) the fundamental concepts in structural biology; 2) the methods used to determine structures (including x-ray crystallography, NMR, electron microscopy, and computational modeling); 3) the bioinformatic concepts and tools used to compare, contrast and assign biochemical function to protein structures and sequences. The course emphasizes building a conceptual and practical skill set that will be applicable to any structure related problem. <i>Department(s):</i> Department of Molecular and Cellular Biology
<b>MCB*6500 MSc Research Topics in Molecular and Cellular Biology U [1.00]</b>
This mandatory two semester course emphasizes the development and refinement of the skills of scientific communication. Students submit a written thesis proposal and present a public seminar on a contemporary subject in the molecular biosciences. MCB MSc students normally complete this course within the first two semesters of their program. Students will register in each semester and receive a grade of INP (in progress) at the end of the first semester and a grade at the end of the second semester. <i>Department(s):</i> Department of Molecular and Cellular Biology

<b>MCB*7500 PhD Research Topics in Molecular and Cellular Biology U [1.00]</b>
This mandatory two semester course emphasizes the development and refinement of the skills of scientific communication. Students submit a written thesis proposal and present a public seminar on a contemporary subject in the molecular biosciences. MCB PhD students normally complete this course within the first two semesters of their program. Students will register in each semester and receive a grade of INP (in progress) at the end of the first semester and a grade at the end of the second semester. <i>Department(s):</i> Department of Molecular and Cellular Biology

## Neuroscience

<b>NEUR*6000 Principles of Neuroscience U [0.50]</b>
This course is designed to ensure that graduate students with diverse neuroscience backgrounds registered in the collaborative specialization in Neuroscience are exposed to the fundamentals in all areas of neuroscience. <i>Department(s):</i> Department of Biomedical Sciences
<b>NEUR*6100 Seminar in Neuroscience U [0.00]</b>
This course will expose graduate students to some of the major theories, issues and methodologies driving research in neuroscience. Students will learn to critically evaluate presentations by researchers in this field as well as to communicate the results of their own research. <i>Department(s):</i> Department of Psychology

## Pathobiology

<b>PABI*6000 Bacterial Pathogenesis F [0.50]</b>
An overview of key concepts in bacterial pathogenesis with emphasis on veterinary and zoonotic pathogens. <i>Department(s):</i> Department of Pathobiology
<b>PABI*6030 Applied Clinical Pathology I F,W,S [0.50]</b>
Introduction to laboratory procedures and interpretation of data arising from hematology, cytology, clinical chemistry, urinalysis and hemostatis analysis of clinical material (Intended for students training in clinical pathology.) <i>Restriction(s):</i> Veterinarians licensed by CVO. <i>Department(s):</i> Department of Pathobiology
<b>PABI*6040 Applied Clinical Pathology II U [0.50]</b>
A continuation of PABI*6030 with greater depth in the interpretation of data and increased understanding of ancillary diagnostic methods applied in clinical case material. (Intended for students in training in clinical pathology). <i>Prerequisite(s):</i> PABI*6030 <i>Restriction(s):</i> Veterinarians licensed by CVO. <i>Department(s):</i> Department of Pathobiology
<b>PABI*6041 Applied Clinical Pathology III U [0.50]</b>
A continuation of PABI*6040 with independent and comprehensive interpretation of diagnostic test results, and analysis of laboratory quality assurance quality control procedures. (Intended for students training in clinical pathology) <i>Prerequisite(s):</i> PABI*6030 and PABI*6040 <i>Restriction(s):</i> Veterinarians licensed by CVO. <i>Department(s):</i> Department of Pathobiology
<b>PABI*6050 Applied Avian Pathology I F [0.50]</b>
Examination and interpretation of gross and microscopic lesions of domestic poultry. <i>Restriction(s):</i> Instructor consent required. Veterinarians licensed by CVO. Students who are not DVM students and/or do not have a protective rabies titre need instructors permission. <i>Department(s):</i> Department of Pathobiology
<b>PABI*6060 Applied Avian Pathology II W [0.50]</b>
A continuation of PABI*6050, emphasizing seasonal differences in diseases as well as diseases more commonly associated with winter conditions. <i>Prerequisite(s):</i> PABI*6050 <i>Restriction(s):</i> Instructor consent required. Veterinarians licensed by CVO. Students who are not DVM students and/or do not have a protective rabies titre need instructors permission. <i>Department(s):</i> Department of Pathobiology



<b>PABI*6070 Applied Avian Pathology III S [0.50]</b>
A continuation of PABI*6060, emphasizing seasonal differences in diseases as well as diseases more commonly associated with summer conditions.
<i>Prerequisite(s):</i> PABI*6050 and PABI*6060
<i>Restriction(s):</i> Instructor consent required. Veterinarians licensed by CVO. Students who are not DVM students and/or do not have a protective rabies titre need instructors permission.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6080 Diagnostic Pathology I S,F,W [0.50]</b>
An introductory course of diagnostic pathology, including all body systems but emphasizing diseases affecting the whole body and respiratory, urinary and digestive (including liver and pancreas) systems. (Intended for students in training in anatomic pathology.)
<i>Restriction(s):</i> Instructor consent required. Veterinarians licensed by CVO, engaged in applied anatomic pathology training
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6090 Diagnostic Pathology II S,F,W [0.50]</b>
An intermediate course that builds on the skills acquired in PABI*6080 and further enhances diagnostic veterinary pathology skills to include diseases of the nervous, endocrine and musculoskeletal systems. (Intended for students training in anatomic pathology.)
<i>Prerequisite(s):</i> PABI*6080
<i>Restriction(s):</i> Veterinarians licensed by CVO, engaged in applied anatomic pathology training
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6091 Diagnostic Pathology III S,F,W [0.50]</b>
An advanced course that builds on the skills acquired in PABI*6090 and further enhances diagnostic veterinary pathology skills to include diseases of all organ systems. (Intended for students training in anatomic pathology.)
<i>Prerequisite(s):</i> PABI*6080 and PABI*6090
<i>Restriction(s):</i> Veterinarians licensed by CVO, engaged in applied anatomic pathology training
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6100 Immunobiology F [0.50]</b>
Major areas of immunology, including initiation, regulation, receptors, genetics, immune system development and function.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6104 Mechanisms of Disease W [0.50]</b>
Molecular, cellular and tissue processes involved in the pathogenesis of adaptive, degenerative, inflammatory, infectious, proliferative and neoplastic diseases.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6190 Topics in Immunology W [0.50]</b>
Aspects of immune and non-specific host resistance, diagnostic immunology and immune-mediated disease.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6221 Comparative Veterinary Pathology I U [0.50]</b>
Pathological changes associated with diseases of amphibians, reptiles, wild and captive non-domestic birds, and wild mammals including fur-bearers.
<i>Offering(s):</i> Offered in even-numbered years.
<i>Restriction(s):</i> Instructor consent required. Students who are not DVM students and/or do not have a protective rabies titre need instructors permission.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6222 Comparative Veterinary Pathology II U [0.50]</b>
Pathological changes associated with diseases of poultry and pet birds, fish and various laboratory animals.
<i>Offering(s):</i> Offered in even-numbered years.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6300 Clinical Pathology I U [0.50]</b>
Principles and applications of veterinary hematology and cytology, with emphasis on the hematopoietic systems.
<i>Restriction(s):</i> Veterinarians licensed by CVO.
<i>Department(s):</i> Department of Pathobiology

<b>PABI*6320 Clinical Pathology II W [0.50]</b>
In depth study of principles and applications of biochemical tests to evaluate the function of selected organ systems, including the renal, hepatic, pancreatic and endocrine systems.
<i>Restriction(s):</i> Veterinarians licensed by CVO.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6330 Viral Diseases F [0.50]</b>
A study of important viral diseases of animals, with emphasis on etiology, host responses, diagnosis and control.
<i>Offering(s):</i> Offered in odd-numbered years.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6350 Molecular Epidemiology of Bacterial Diseases F [0.50]</b>
This is a basic introduction to molecular epidemiology of bacterial diseases. It provides an understanding of molecular epidemiology methodologies and of their use for improving our understanding of infectious diseases epidemiology and control.
<i>Prerequisite(s):</i> STAT*2040 Statistics I
<i>Restriction(s):</i> Lab component: limited number of participants and WHIMIS certificate compulsory.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6430 Academic and Professional Skills in Pathobiology S,F [0.00]</b>
Students will be introduced to fundamental elements of scientific research and communication and to various academic skills through lectures, seminars, and completion of in class activities. Throughout the course, relevant ethical, and regulatory issues will be discussed.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6440 MSc Seminar in Pathobiology S,F,W [0.50]</b>
Students registered in the MSc program will develop a written critical review of the literature and plan for their thesis research. This material will also be presented in the form of a public seminar. Students are also required to provide oral and written critical reviews of thesis plan presentations.
<i>Prerequisite(s):</i> PABI*6430
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6450 Doctoral Seminar in Pathobiology S,F,W [0.50]</b>
Students registered in the PhD or DVSc programs will develop a written critical review of the literature and plan for their thesis research. This material will also be presented in the form of a public seminar. Students are also required to provide oral and written critical reviews of the thesis plan presentations of other students.
<i>Prerequisite(s):</i> PABI*6430
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6500 Infectious Diseases and Public Health F [0.50]</b>
Prevention and control of infectious diseases is an important aspect of public health. This course will involve detailed discussion of selected infectious diseases of public health concern, excluding zoonotic diseases. Relevant aspects of microbiology, epidemiology, clinical presentation, diagnosis and treatment will be covered, with additional emphasis on prevention and control.
<i>Restriction(s):</i> Restricted to students in Public Health programs.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6550 Epidemiology of Zoonoses W [0.50]</b>
Characterization and distribution of diseases common to people and animals.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6560 Principles and Practice of Antimicrobial Therapy U [0.50]</b>
This course will cover antimicrobial therapy in veterinary medicine, encompassing microbial, pharmacological and clinical aspects of prudent and effective antimicrobial use.
<i>Offering(s):</i> Offered in alternate years.
<i>Restriction(s):</i> Instructor consent required. DVM degree or equivalent required.
<i>Department(s):</i> Department of Pathobiology
<b>PABI*6630 Applied Comparative Pathology I U [0.50]</b>
Introductory course in the diagnostic pathology of mammals, birds, reptiles, amphibians, and fish. Cases may be restricted by animal taxa or context (e.g., free-ranging Canadian wildlife, zoological collections, aquaculture). The three-semester course in Applied Comparative Pathology builds in expected level of accomplishment.
<i>Restriction(s):</i> Veterinarians licensed by CVO. Students who are not DVM students and/or do not have a protective rabies titre need instructors permission.
<i>Department(s):</i> Department of Pathobiology

<b>PABI*6640 Applied Comparative Pathology II U [0.50]</b>
Intermediate course in the diagnostic pathology of mammals, birds, reptiles, amphibians, and fish. Cases may be restricted by animal taxa or context (e.g., free-ranging Canadian wildlife, zoological collections, aquaculture). The three-semester course in Applied Comparative Pathology builds in expected level of accomplishment.
<i>Prerequisite(s):</i> PABI*6630
<i>Restriction(s):</i> Veterinarians licensed by CVO. Students who are not DVM students and/or do not have a protective rabies titre need instructors permission.
<i>Department(s):</i> Department of Pathobiology

<b>PABI*6650 Applied Comparative Pathology III U [0.50]</b>
Advanced course in the diagnostic pathology of mammals, birds, reptiles, amphibians, and fish. Cases may be restricted by animal taxa or context (e.g., free-ranging Canadian wildlife, zoological collections, aquaculture). The three-semester course in Applied Comparative Pathology builds in expected level of accomplishment.
<i>Prerequisite(s):</i> PABI*6630 PABI*6640
<i>Restriction(s):</i> Veterinarians licensed by CVO. Students who are not DVM students and/or do not have a protective rabies titre need instructors permission.
<i>Department(s):</i> Department of Pathobiology

<b>PABI*6700 Laboratory Animal Science U [0.50]</b>
Basic information on various aspects of laboratory animal science, including IACUC function, regulatory oversight, ethics, historical review of animal research, animal models and alternatives, experimental design and considerations, biology, management and uses of common species in research.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Pathobiology

<b>PABI*6710 Applied Laboratory Animal Science I U [0.50]</b>
This course will emphasize practical aspects of laboratory animal science including research protocol review, writing and reviewing standard operating procedures, animal monitoring, pathology procedures, and case management.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Pathobiology

<b>PABI*6720 Applied Laboratory Animal Science II U [0.50]</b>
Continuation of I with emphasis on biohazard and personnel safety, monitoring for disease, quality control and diagnostic procedures.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Pathobiology

<b>PABI*6730 Applied Laboratory Animal Science III U [0.50]</b>
Continuation of I and II, with emphasis on a comparison of programs and procedures in other facilities in Canada, nonhuman primate medicine, and surgical, clinical and necropsy procedures.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Pathobiology

<b>PABI*6740 Avian Diseases U [0.50]</b>
Detailed study of recent concepts of preventive medicine, diagnosis and therapeutics as applied to clinical recognition and control of avian diseases.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Pathobiology

<b>PABI*6960 Special Topics in Pathobiology F,W,S [0.50]</b>
In-depth independent study of subjects related to student's principal area of interest. Major paper(s), laboratory studies, and/or written and oral examination, with or without seminar preparation.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Pathobiology

## One Health

<b>ONEH*6000 One Health Approaches to Research W [0.50]</b>
A multidisciplinary course for graduate students that provides in-depth knowledge on the One Health approach, exploring complex issues at the interface of human, animal, and environmental health. Active learning lessons will foster strong skill development for One Health research in collaboration, systems thinking, transdisciplinarity, critical thinking, problem solving, leadership, and communication.
<i>Restriction(s):</i> Instructor consent required. Preference will be given to students in the Collaborative Specialization in One Health. If capacity remains after enrolling those students, any other student is eligible to take the course.
<i>Department(s):</i> Department of Population Medicine

<b>ONEH*6100 Master's Seminar in One Health F [0.50]</b>
This course offers a university-wide multidisciplinary forum for discussion of One Health. Master's students will discover One Health through different disciplinary lenses, facilitate and actively engage in academic discussion about One Health, and practice leadership and networking skills necessary for success as a One Health practitioner.
<i>Prerequisite(s):</i> ONEH*6000
<i>Restriction(s):</i> Instructor consent required. Preference will be given to master's students in the Collaborative Specialization in One Health. If capacity remains after enrolling those students, any other master's student is eligible to take this course.
<i>Department(s):</i> Department of Population Medicine

<b>ONEH*6200 Doctoral Seminar in One Health F [0.50]</b>
This course offers a university-wide multidisciplinary forum for discussion of One Health. Doctoral students will discover One Health through different disciplinary lenses, facilitate and actively engage in academic discussion about One Health, and practice leadership and networking skills necessary for success as a One Health practitioner.
<i>Prerequisite(s):</i> ONEH*6000
<i>Restriction(s):</i> Instructor consent required. Preference will be given to doctoral students in the Collaborative Specialization in One Health. If capacity remains after enrolling those students, any other doctoral student is eligible to take this course.
<i>Department(s):</i> Department of Population Medicine

## Philosophy

<b>PHIL*6000 Value Theory U [0.50]</b>
A critical examination of some selected contemporary works in value theory or aesthetics.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6060 Logic U [0.50]</b>
A course designed to bring the individual student to the level of competence in logical techniques and theory required for graduate studies.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6110 Philosophy of Religion U [0.50]</b>
A critical examination of some selected major works or central problems in the philosophy of religion.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6120 Philosophy of Mind U [0.50]</b>
A study of contemporary theories of mind and philosophies of psychology.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6140 Contemporary European Philosophy I U [0.50]</b>
A study of the historical and contemporary origins of existentialism, phenomenology and post-modernism, concentrating on one or several of the classic texts.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6150 Contemporary European Philosophy II U [0.50]</b>
A study of the historical and contemporary origins of existentialism, phenomenology and post-modernism, concentrating on texts not covered in PHIL*6140 in the same year.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6200 Problems of Contemporary Philosophy U [0.50]</b>
A study of a particular set of problems in contemporary philosophy.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6210 Metaphysics U [0.50]</b>
A critical examination of some selected major works or central problems in metaphysics.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6220 Epistemology U [0.50]</b>
A critical examination of some selected major works or central problems in epistemology.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6230 Ethics U [0.50]</b>
A critical examination of some selected contemporary works or problems in ethical theory.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6240 Biomedical Ethics U [0.50]</b>
A critical examination of some selected contemporary works or of problems in biomedical ethics.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6310 Plato U [0.50]</b>
A study of some of the major works of Plato.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6311 Aristotle U [0.50]</b>
A study of some of the major works of Aristotle.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6320 Medieval Philosophy U [0.50]</b>
A close examination of particular problems and texts of the medieval period
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6340 Modern Philosophy U [0.50]</b>
An examination of major texts, from Descartes to Mill.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6500 John Locke U [0.50]</b>
A critical examination of the works of John Locke.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6530 Kant U [0.50]</b>
A critical examination of the works of Immanuel Kant.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6600 Social and Political Philosophy U [0.50]</b>
A critical examination of some selected contemporary works or central problems in the field of social philosophy.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6700 Survey of Ancient Philosophy U [0.50]</b>
A survey of ancient philosophy.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6710 Survey of Early Modern Philosophy U [0.50]</b>
A survey of modern philosophy from Hobbes to Hume.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6720 History of the Philosophy of Science U [0.50]</b>
A survey of the history of the philosophy of science from the Presocratics to the Positivists.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6730 Contemporary Philosophy of Science U [0.50]</b>
An examination of the contemporary discipline of the philosophy of science.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6740 Philosophy of Biology U [0.50]</b>
A general introduction to the history and philosophy of biology.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6760 Science and Ethics U [0.50]</b>
A consideration of the problems which arise in the conjunction of science and ethics.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6810 Survey of Late Modern Philosophy U [0.50]</b>
A survey of modern philosophy from Kant to the late 19th century.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6900 Reading Course U [0.50]</b>
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6930 Selected Topics I U [0.50]</b>
Topics in this course will vary from offering to offering.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6940 Selected Topics II U [0.50]</b>
Topics in this course will vary from offering to offering.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6950 MA Seminar U [0.50]</b>
A seminar course in which students work on developing a range of academic skills for doing professional philosophy. This course is pass/fail and is mandatory for all incoming MA students. Please refer to the Philosophy Department website for a comprehensive description of this course.
<i>Department(s):</i> Department of Philosophy
<b>PHIL*6960 PhD Graduate Seminar F,W [0.50]</b>
A seminar course in which students work on developing a range of academic skills for doing professional philosophy. This course is pass/fail and is mandatory for all first year PhD students. Please refer to the Philosophy Department website for a comprehensive description of this course.
<i>Department(s):</i> Department of Philosophy

<b>PHIL*6990 Major Research Project U [1.00]</b>
A major research project undertaken by students doing an MA by course work, under the supervision of a faculty member.
<i>Department(s):</i> Department of Philosophy
<b>Physics</b>
<b>PHYS*6010 PSI Quantum Field Theory I U [0.50]</b>
Canonical quantization of fields, perturbation theory, derivation of Feynman diagrams, applications in particle and condensed matter theory, renormalization in $\phi^4$ .
<i>Department(s):</i> Department of Physics
<b>PHYS*6020 PSI Statistical Physics U [0.50]</b>
A brief review of ensembles and quantum gases, Ising model, Landau theory of phase transitions, order parameters, topology, classical solutions.
<i>Department(s):</i> Department of Physics
<b>PHYS*6030 PSI Quantum Field Theory II U [0.50]</b>
Feynman Path Integral, abelian and nonabelian gauge theories and their quantization, spontaneous symmetry breaking, nonperturbative techniques: lattice field theory, Wilsonian renormalization.
<i>Department(s):</i> Department of Physics
<b>PHYS*6040 PSI Relativity U [0.50]</b>
Special relativity, foundations of general relativity, Riemannian geometry, Einstein's equations, FRW and Schwarzschild geometries and their properties.
<i>Department(s):</i> Department of Physics
<b>PHYS*6050 PSI Quantum Theory U [0.50]</b>
Schrodinger equation: free particle, harmonic oscillator, simple time-dependent problems, Heisenberg picture and connection with classical physics. Entanglement and non-locality. Pure and mixed states, quantum correlators, measurement theory and interpretation.
<i>Department(s):</i> Department of Physics
<b>PHYS*6060 PSI Information and Data Analysis U [0.50]</b>
Probability, entropy, Bayesian inference and information theory. Maximum likelihood methods, common probability distributions, applications to real data including Monte Carlo methods.
<i>Department(s):</i> Department of Physics
<b>PHYS*6070 PSI Dynamical Systems U [0.50]</b>
Maps, flows, stability, fixed points, attractors, chaos, bifurcations, ergodicity, approach to chaos. Hamiltonian systems, Liouville, measure, Poincare theorem, integrable systems with examples.
<i>Department(s):</i> Department of Physics
<b>PHYS*6080 PSI Computation U [0.50]</b>
Common algorithms for ode and pde solving, with numerical analysis. Common tasks in linear algebra. Focus on how to write a good code, test it, and obtain a reliable result. Parallel programming.
<i>Department(s):</i> Department of Physics
<b>PHYS*6210 PSI Cosmology U [0.25]</b>
FRW metric, Hubble expansion, dark energy, dark matter, CMB, Thermodynamic history of early universe. Growth of perturbations, CDM model of structure formation and comparison to observations, cosmic microwave background anisotropies, inflation and observational tests.
<i>Department(s):</i> Department of Physics
<b>PHYS*6220 PSI Standard Model U [0.25]</b>
Application of Yang-Mills theory to particle physics, QCD and its tests in the perturbative regime, theory of weak interactions, precision tests of electroweak theory, CKM matrix and flavour physics, open questions.
<i>Department(s):</i> Department of Physics
<b>PHYS*6230 PSI String Theory U [0.25]</b>
Superstring spectrum in 10d Minkowski, as well as simple toroidal and orbifold compactifications. T-duality, D-branes, tree amplitudes. Construct some simple unified models of particle physics. Motivate the 10- 11-dimensional supergravities. Simple supergravity solutions and use these to explore some aspects of AdS/CFT duality.
<i>Department(s):</i> Department of Physics
<b>PHYS*6240 PSI Mathematical Physics Topics U [0.25]</b>
Differential forms, de Rham cohomology, differential topology and characteristic classes, monopoles and instantons, Kahler manifolds, Dirac equations, zero modes and index theorems.
<i>Department(s):</i> Department of Physics

<b>PHYS*6350 PSI Quantum Information Review U [0.25]</b>
Review of selected topics in Quantum Information. <i>Department(s):</i> Department of Physics
<b>PHYS*6360 PSI Gravitational Physics Review U [0.25]</b>
Review of selected topics in Gravitational Physics. <i>Department(s):</i> Department of Physics
<b>PHYS*6370 PSI Condensed Matter Theory U [0.25]</b>
Review of selected topics in Condensed Matter Theory. <i>Department(s):</i> Department of Physics
<b>PHYS*6380 PSI Quantum Gravity U [0.25]</b>
Review of selected topics in Quantum Gravity. <i>Department(s):</i> Department of Physics
<b>PHYS*6390 PSI Foundations of Quantum Theory U [0.25]</b>
Review of selected topics in Foundations of Quantum Theory. <i>Department(s):</i> Department of Physics
<b>PHYS*6410 PSI Explorations in Quantum Information U [0.25]</b>
Review of selected topics in Quantum Information. <i>Department(s):</i> Department of Physics
<b>PHYS*6420 PSI Explorations in Gravitational Physics U [0.25]</b>
Review of selected topics in Gravitational Physics. <i>Department(s):</i> Department of Physics
<b>PHYS*6430 PSI Exploration in Condensed Matter Theory U [0.25]</b>
Review of selected topics in Condensed Matter Theory. <i>Department(s):</i> Department of Physics
<b>PHYS*6440 PSI Exploration in Quantum Gravity U [0.25]</b>
Review of selected topics in Quantum Gravity. <i>Department(s):</i> Department of Physics
<b>PHYS*6450 PSI Explorations in Foundations of Quantum Theory U [0.25]</b>
Review of selected topics in Foundations of Quantum Theory. <i>Department(s):</i> Department of Physics
<b>PHYS*6460 PSI Explorations in Particle Physics U [0.25]</b>
Review of selected topics in Particle Physics. <i>Department(s):</i> Department of Physics
<b>PHYS*6470 PSI Explorations in String Theory U [0.25]</b>
Review of selected topics in String Theory. <i>Department(s):</i> Department of Physics
<b>PHYS*6480 PSI Explorations in Complex Systems U [0.25]</b>
Review of selected topics in Complex Systems. <i>Department(s):</i> Department of Physics
<b>PHYS*6490 PSI Explorations in Cosmology U [0.25]</b>
Review of selected topics in Cosmology. <i>Department(s):</i> Department of Physics
<b>PHYS*7010 Quantum Mechanics I * U [0.50]</b>
Review of formalism of nonrelativistic quantum mechanics including symmetries and invariance. Approximation methods and scattering theory. Elementary quantum theory of radiation. Introduction to one-particle relativistic wave equations. <i>Department(s):</i> Department of Physics
<b>PHYS*7020 Quantum Mechanics II U [0.50]</b>
Concepts of relativistic quantum mechanics, elementary quantum field theory, and Feynman diagrams. Application to many-particle systems. <i>Prerequisite(s):</i> PHYS*7010 or equivalent <i>Department(s):</i> Department of Physics
<b>PHYS*7030 Quantum Field Theory U [0.50]</b>
Review of relativistic quantum mechanics and classical field theory. Quantization of free quantum fields (the particle interpretation of field quanta). Canonical quantization of interacting fields (Feynman rules). Application of the formalism of interacting quantum fields to lowest-order quantum electrodynamic processes. Radiative corrections and renormalization. <i>Prerequisite(s):</i> PHYS*7010 or equivalent. <i>Department(s):</i> Department of Physics

<b>PHYS*7040 Statistical Physics I* U [0.50]</b>
Statistical basis of thermodynamics; microcanonical, canonical and grand canonical ensembles; quantum statistical mechanics, theory of the density matrix; fluctuations, noise, irreversible thermodynamics; transport theory; application to gases, liquids, solids. <i>Department(s):</i> Department of Physics
<b>PHYS*7050 Statistical Physics II U [0.50]</b>
Phase transitions. Fluctuation phenomena. Kubo's theory of time correlation functions for transport and spectral properties; applications selected from a variety of topics including linearized hydrodynamics of normal and superfluids, molecular liquids, liquid crystals, surface phenomena, theory of the dielectric constant, etc. <i>Prerequisite(s):</i> PHYS*7040 or equivalent. <i>Department(s):</i> Department of Physics
<b>PHYS*7060 Electromagnetic Theory * U [0.50]</b>
Solutions to Maxwell's equations; radiation theory, normal modes; multipole expansion; Kirchhoff's diffraction theory; radiating point charge; optical theorem. Special relativity; transformation laws for the electromagnetic field; line broadening. Dispersion; Kramers-Kronig relations. Magnetohydrodynamics and plasmas. <i>Department(s):</i> Department of Physics
<b>PHYS*7080 Applications of Group Theory U [0.50]</b>
Introduction to group theory; symmetry, the group concept, representation theory, character theory. Applications to molecular vibrations, the solid state, quantum mechanics and crystal field theory. <i>Department(s):</i> Department of Physics
<b>PHYS*7090 Green's Function Method U [0.50]</b>
Review of essential quantum field theory. Zero and finite temperature. Green's functions. Applications. <i>Department(s):</i> Department of Physics
<b>PHYS*7100 Atomic Physics U [0.50]</b>
Emphasis on atomic structure and spectroscopy. Review of angular momentum, rotations, Wigner-Eckart theorem, n-j symbols. Energy levels in complex atoms, Hartree-Fock theory, radiative-transitions and inner-shell processes. Further topics selected with class interest in mind, at least one of which is to be taken from current literature. <i>Department(s):</i> Department of Physics
<b>PHYS*7120 Special Topics in Theoretical Physics U [0.50]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7130 Molecular Physics U [0.50]</b>
Angular momentum and the rotation of molecules; introduction to group theory with application to molecular vibrations; principles of molecular spectroscopy; spectra of isolated molecules; intermolecular interactions and their effects on molecular spectra; selected additional topics (e.g., electronic structure of molecules, experimental spectroscopic techniques, neutron scattering, correlation functions, collision induced absorption, extension of group theory to molecular crystals, normal co-ordinate analysis, etc.). <i>Department(s):</i> Department of Physics
<b>PHYS*7140 Nonlinear Optics U [0.50]</b>
Classical and Quantum Mechanical descriptions of nonlinear susceptibility, nonlinear wave propagation, nonlinear effects such as Peckel's and Kerr effects, harmonic generation, phase conjugation and stimulated scattering processes. <i>Department(s):</i> Department of Physics
<b>PHYS*7150 Nuclear Physics U [0.50]</b>
Static properties of nuclei; alpha, beta, gamma decay; two-body systems; nuclear forces; nuclear reactions; single-particle models for spherical and deformed nuclei; shell, collective, interacting boson models. <i>Department(s):</i> Department of Physics
<b>PHYS*7160 Special Topics in Subatomic and Nuclear Physics U [0.50]</b>
<i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of Physics
<b>PHYS*7170 Intermediate and High Energy Physics U [0.50]</b>
Strong, electromagnetic and weak interactions. Isospin, strangeness, conservation laws and symmetry principles. Leptons, hadrons, quarks and their classification, formation, interactions and decay. <i>Department(s):</i> Department of Physics
<b>PHYS*7180 Special Topics in Subatomic and Nuclear Physics U [0.25]</b>
<i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of Physics

<b>PHYS*7310 Solid State Physics I U [0.50]</b>
Phonons, electron states, electron-electron interaction, electron-ion interaction, static properties of solids. <i>Department(s):</i> Department of Physics
<b>PHYS*7320 Solid State Physics II U [0.50]</b>
Transport properties; optical properties; magnetism; superconductivity; disordered systems. <i>Department(s):</i> Department of Physics
<b>PHYS*7330 Special Topics in Theoretical Condensed Matter Physics U [0.50]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7370 Special Topics in Surface Physics U [0.50]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7380 Special Topics in Condensed Matter and Materials Physics U [0.25]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7450 Special Topics in Experimental Physics * U [0.50]</b>
A modular course in which each module deals with an established technique of experimental physics. Four modules will be offered during the Winter and Spring semesters, but registration and credit will be in the spring semester. Typical topics are neutron diffraction, light scattering, acoustics, molecular beams, NMR, surface analysis, etc. <i>Department(s):</i> Department of Physics
<b>PHYS*7470 Optical Electronics U [0.50]</b>
Optoelectronic component fabrication, light propagation in linear and nonlinear media, optical fiber properties, electro-optic and acousto-optic modulation, spontaneous and stimulated emission, semiconductor lasers and detectors, noise effects in fiber systems. <i>Department(s):</i> Department of Physics
<b>PHYS*7510 Clinical Applications of Physics in Medicine U [0.50]</b>
This course provides an overview of the application of physics to medicine. The physical concepts underlying the diagnosis and treatment of disease will be explored. Topics will include general imaging principles such as resolution, intensity, and contrast; x-ray imaging and computed tomography; radioisotopes and nuclear medicine, SPECT and PET; magnetic resonance imaging; ultrasound imaging and radiation therapy. Offered in conjunction with PHYS*4070. Extra work is required of graduate students. <i>Restriction(s):</i> Credit may be obtained for only one of PHYS*4070 or PHYS*7510. <i>Department(s):</i> Department of Physics
<b>PHYS*7520 Molecular Biophysics U [0.50]</b>
Physical methods of determining macromolecular structure: energetics, intramolecular and intermolecular forces, with application to lamellar structures, information storage, DNA and RNA, recognition and rejection of foreign molecules. Offered in conjunction with PHYS*4540. Extra work is required of graduate students. <i>Restriction(s):</i> Credit may be obtained for only one of PHYS*4540 or PHYS*7520 <i>Department(s):</i> Department of Physics
<b>PHYS*7540 Special Topics in Biophysics U [0.50]</b>
Offered on demand <i>Department(s):</i> Department of Physics
<b>PHYS*7570 Special Topics in Biophysics U [0.25]</b>
Offered on demand <i>Department(s):</i> Department of Physics
<b>PHYS*7670 Introduction to Quantum Information Processing F [0.50]</b>
Quantum superposition, interference, and entanglement. Postulates of Quantum Mechanics. Quantum computational complexity. Quantum Algorithms. Quantum communication and cryptography. Quantum error correction. Implementations. <i>Department(s):</i> Department of Physics
<b>PHYS*7680 Special Topics in Quantum Information Processing U [0.50]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7690 Special Topics in Quantum Information Processing U [0.25]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7710 Special Lecture and Reading Course U [0.50]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7730 Special Topics in Physics U [0.50]</b>
<i>Department(s):</i> Department of Physics

<b>PHYS*7750 Interinstitution Exchange U [0.50]</b>
At the GWPI director's discretion, a PhD or MSc student may receive credit for a term of specialized studies at another institution. Formal evaluation is required. <i>Restriction(s):</i> GWPI director approval required <i>Department(s):</i> Department of Physics
<b>PHYS*7760 Special Topics in Physics U [0.50]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7770 Special Topics in Physics U [0.25]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7810 Fundamentals of Astrophysics U [0.50]</b>
The fundamental astronomical data: techniques to obtain it and the shortcomings present. The classification systems. Wide- and narrow-band photometric systems. The intrinsic properties of stars: colours, luminosities, masses, radii, temperatures. Variable stars. Distance indicators. Interstellar reddening. Related topics. <i>Department(s):</i> Department of Physics
<b>PHYS*7840 Advanced General Relativity W [0.50]</b>
Review of elementary general relativity. Timelike and null geodesic congruences. Hypersurfaces and junction conditions. Lagrangian and Hamiltonian formulations of general relativity. Mass and angular momentum of a gravitating body. The laws of black-hole mechanics. <i>Department(s):</i> Department of Physics
<b>PHYS*7850 Quantum Field Theory for Cosmology U [0.50]</b>
Introduction to scalar field theory and its canonical quantization in flat and curved spacetimes. The flat space effects of Casimir and Unruh. Quantum fluctuations of scalar fields and of the metric on curved space-times and application to inflationary cosmology. Hawking radiation. <i>Prerequisite(s):</i> PHYS*7010 <i>Department(s):</i> Department of Physics
<b>PHYS*7860 General Relativity for Cosmology U [0.50]</b>
Introduction to the differential geometry of Lorentzian manifolds. The principles of general relativity. Causal structure and cosmological singularities. Cosmological space-times with Killing vector fields. Friedmann-Lemaître cosmologies, scalar vector and tensor perturbations in the linear and nonlinear regimes. De Sitter space-times and inflationary models. <i>Department(s):</i> Department of Physics
<b>PHYS*7870 Cosmology U [0.50]</b>
Friedmann-Robertson-Walker metric and dynamics; big bang thermodynamics; nucleosynthesis; recombination; perturbation theory and structure formation; anisotropies in the Cosmic Microwave Background; statistics of cosmological density and velocity fields; galaxy formation; inflation. <i>Department(s):</i> Department of Physics
<b>PHYS*7880 Special Topics in Astronomy U [0.50]</b>
Offered on demand <i>Department(s):</i> Department of Physics
<b>PHYS*7890 Special Topics in Astrophysics U [0.25]</b>
Offered on demand <i>Department(s):</i> Department of Physics
<b>PHYS*7970 MSc Project U [1.00]</b>
Study of a selected topic in physics presented in the form of a written report. For students whose MSc program consists entirely of courses <i>Department(s):</i> Department of Physics
<b>PHYS*7900 Special Topics in Gravitation and Cosmology U [0.50]</b>
<i>Department(s):</i> Department of Physics
<b>PHYS*7910 Special Topics in Gravitation and Cosmology U [0.25]</b>
<i>Department(s):</i> Department of Physics
<b>Plant Agriculture</b>
<b>PLNT*6010 Physiology of Crop Yield W [0.50]</b>
This course covers factors affecting biomass production and yield, with primary focus on phenomena measured at the whole canopy scale. Yield-limiting abiotic stresses (temperature, water deficit, nutrient deficiency) are considered in detail, as are technical aspects of instrumentation used in crop physiology research. (Offered annually) <i>Prerequisite(s):</i> PBIO*3110 or permission of instructor <i>Department(s):</i> Department of Plant Agriculture

**PLNT\*6080 Plant Disease Epidemiology and Management F [0.50]**

Epidemiology and management of plant diseases caused by fungi, viruses, and bacteria.

*Offering(s):* Offered in even-numbered years.

*Department(s):* Department of Plant Agriculture

**PLNT\*6100 Advanced Plant Breeding I W [0.50]**

The practical consideration of genetic theory and biological limitations to improving plant populations and developing cultivars are discussed. Current and emerging breeding methodologies and sources of variation used to achieve plant breeding goals are examined through lectures, paper discussion, site visits and invited talks.

*Department(s):* Department of Plant Agriculture

**PLNT\*6110 Fruit and Vegetable Technology F [0.50]**

The course is primarily intended to address science and technology aspects of fruits and vegetables, with specific reference to storage, packaging, quality, processing, products and ingredients, health regulatory properties and biotechnology issues. Methods of instruction include lectures and seminars. Students are evaluated during their seminar presentations, term papers and participation in discussions.

*Offering(s):* Offered in even-numbered years.

*Department(s):* Department of Plant Agriculture

**PLNT\*6140 Biological and Cultural Control of Plant Diseases W [0.50]**

This course explores current concepts and approaches to managing pathogens and diseases in detail but other methods (e.g. genetic resistance) will be presented as well. Offered in conjunction with PBIO\*4070. Extra work is required of graduate students.

*Offering(s):* Offered Annually

*Restriction(s):* Credit may be obtained for only one of PBIO\*4070 or PLNT\*6140

*Department(s):* Department of Plant Agriculture

**PLNT\*6160 Advanced Plant Breeding II W [0.50]**

Fundamentals of quantitative genetics. Topics include gene and genotype frequencies means, variances, covariances and resemblance among relatives. Lecture topics are expanded through discussion of classic and current papers.

*Offering(s):* Offered in odd-numbered years.

*Department(s):* Department of Plant Agriculture

**PLNT\*6170 Statistics in Plant Agriculture W [0.50]**

The application of statistical techniques to research in plant agriculture. SAS is the software used to perform data analysis. Emphasis is placed on statistical principles, the design of experiments, the testing of hypotheses, and communication of findings to other scientists.

*Department(s):* Department of Plant Agriculture

**PLNT\*6210 Herbicide Activity, Modes-of-Action, Selectivity and Resistance F [0.50]**

This course provides a comprehensive study of the major herbicide groups. The various herbicide groups will be discussed under the following topics: herbicide uptake and translocation, herbicide mode of action, herbicide selectivity, weeds controlled and crop injury.

*Offering(s):* Offered in odd-numbered years.

*Department(s):* Department of Plant Agriculture

**PLNT\*6230 Colloquium in Plant Physiology and Biochemistry U [0.25]**

An open discussion course designed to review and critically analyze contemporary issues in plant physiology and biochemistry.

*Department(s):* Department of Plant Agriculture

**PLNT\*6240 Colloquium in Crop Production and Management U [0.25]**

An open discussion course designed to review and critically analyze contemporary issues in crop production and management.

*Department(s):* Department of Plant Agriculture

**PLNT\*6250 Colloquium in Plant Genetics and Breeding U [0.25]**

An open discussion course designed to review and critically analyse contemporary issues in plant genetics and breeding.

*Department(s):* Department of Plant Agriculture

**PLNT\*6260 Advanced Plant Genetics I F [0.50]**

A lecture and discussion course examining the underlying principles of genetics and the recent advances in plant genetics. Topics include: structure of the genome, experiments to measure and experimentally describe phenotypes, population structures, and molecular basis of inheritance of a phenotype.

*Department(s):* Department of Plant Agriculture

**PLNT\*6270 Agroecosystem Design and Function F [0.50]**

This lecture-based course critically analyzes the agroecosystem in field crop, horticulture, turfgrass and greenhouse industries. Agroecosystem design is considered in relation to key components such as crop rotation and management of soil, nutrient and water supply. The significance of plant function, soil properties, and nutrient and water cycles to agroecosystem design are examined. Metrics of productivity and environmental sustainability serve to focus discussion on agroecosystem optimization.

*Department(s):* Department of Plant Agriculture

**PLNT\*6280 Invasive Plant Ecology in Natural and Agricultural Systems W [0.50]**

This course focuses on the ecological principles that are important in understanding the potential for a plant species to become invasive. Students are able to use this knowledge to facilitate management of these species under field conditions.

*Offering(s):* Offered in odd-numbered years.

*Prerequisite(s):* CROP\*4240 or BOT\*2100 or BOT\*3120

*Department(s):* Department of Plant Agriculture

**PLNT\*6290 Physiological and Developmental Genetics in Plants F [0.50]**

A lecture and discussion course examining classical and molecular genetic investigations to understand the genetic basis and regulation of physiological and developmental processes in plants.

*Offering(s):* Offered in even-numbered years.

*Department(s):* Department of Plant Agriculture

**PLNT\*6320 Metabolic Processes in Crop Plants F [0.50]**

A comprehensive examination of the metabolic mechanisms and versatility whereby autotrophic organisms sustain themselves. Emphasis is placed on our current understanding of the regulation and integration of metabolic processes in plants and their physiological and agricultural significance including available research methodologies.

*Prerequisite(s):* one undergraduate course in biochemistry

*Restriction(s):* No auditing without permission of Instructor.

*Department(s):* Department of Plant Agriculture

**PLNT\*6330 Metabolism of Natural Products in Plants W [0.50]**

A comprehensive analysis of the metabolism and roles of natural products in plants. Emphasis is placed on the distinction between secondary and primary processes, and the composition, detection, and regulation of the biosynthesis, modification and turnover of natural products. Key research methodologies and the roles of natural products in abiotic and biotic stresses and their effects on human health are discussed.

*Offering(s):* Offered in even-numbered years.

*Department(s):* Department of Plant Agriculture

**PLNT\*6340 Plant Breeding F [0.50]**

This course examines principles of plant breeding in self- and cross-pollinated crops. Additional topics include crop domestication, mating systems, heritability, gain from selection, disease resistance, polyploidy, marker assisted selection and government regulations. Offered in conjunction with MBG\*4160. Extra work is required of graduate students.

*Restriction(s):* Credit may be obtained for only one of MBG\*4160 or PLNT\*6340

*Department(s):* Department of Plant Agriculture

**PLNT\*6400 Seminar F,W [0.25]**

All graduate students present a departmental seminar on their research proposal in their second or third semester. Each student is expected to participate in the seminars of colleagues and faculty.

*Restriction(s):* Restricted to thesis-based students

*Department(s):* Department of Plant Agriculture

**PLNT\*6450 Plant Agriculture International Field Tour U [0.25]**

A field course designed to increase student's knowledge of primary field and animal agricultural production systems, to explore the environmental and political issues related to international agriculture, and to understand the role of agri-business in the rural economy.

*Restriction(s):* CROP\*4260 if PLNT\*6450 is field tour to mid-west USA

*Department(s):* Department of Plant Agriculture

**PLNT\*6500 Applied Bioinformatics W [0.50]**

The goal of this course is to provide an introductory understanding of the databases and methods used in computational molecular biology research. Topics include: reviewing major molecular databases and their structures, constructing sequence alignments, constructing phylogenies, and finding motifs and genes in biological sequences. Lab sessions include an introduction to Unix and Perl for the biologist and hands-on use of several molecular data analysis programs.

*Prerequisite(s):* Undergraduate level statistics class (such as STAT\*2040 or STAT\*2100) and undergraduate level molecular biology class (such as MBG\*2020).

*Department(s):* Department of Plant Agriculture

**PLNT\*6800 Special Topics in Plant Science U [0.50]**

A study of selected contemporary topics in plant science. Proposed course descriptions are considered by the Department of Plant Agriculture on an ad hoc basis, and the course is offered according to demand.

*Department(s):* Department of Plant Agriculture

## Political Science

**POLS\*6050 The Politics of Identity U [0.50]**

This course engages theoretical approaches of identity and identity politics in the global north and/or south. Topics may include contestation over indigenous, racial, ethnic, cultural, sexual, gender, and women's rights.

*Department(s):* Department of Political Science

**POLS\*6120 Theories of International Relations U [0.50]**

This course examines Western and non-Western theories of international relations, such as realism, liberalism, and constructivism, as well as Marxist, critical, indigenous and gender approaches. It will engage with established and emerging theories, exploring contestation and debates within the discipline.

*Department(s):* Department of Political Science

**POLS\*6130 Rights and Public Policy U [0.50]**

Students will study how individual rights can be restricted, protected or expanded through public policy, and how rights considerations and discourse may shape policy and the policy process.

*Department(s):* Department of Political Science

**POLS\*6150 Constitutionalism and Judicial Politics U [0.50]**

This course investigates how the constitution and the judiciary affect political processes and decision-making, and how politics shape constitutions and judicial process. Canadian or comparative examples will be examined.

*Department(s):* Department of Political Science

**POLS\*6160 Multi-Level Governance in Canada U [0.50]**

This course considers the evolving relationship among levels of government in Canada. The growth of cities, the growth of policy responsibilities of provinces, the influence of international organizations, and the development of First Nations government in Canada all challenge the conventional study of federal-provincial relations in Canada. From year to year, this course examines one or several of these contemporary dynamics. Offered in conjunction with POLS\*4160. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of POLS\*4160 or POLS\*6160

*Department(s):* Department of Political Science

**POLS\*6170 Courts and Parliament U [0.50]**

The course critically examines the complex relationship between the judiciary and representative institutions. By comparing the treatment of current political controversies (assisted suicide, prostitution, drug treatment), students will better appreciate the often-subtle exchanges between the two institutions and further enhance their research abilities in regards to both legal and legislative processes. Offered in conjunction with POLS\*4070. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of POLS\*4070 or POLS\*6170

*Department(s):* Department of Political Science

**POLS\*6180 Women, Justice and Public Policy U [0.50]**

This course will use gender-based analysis in examining a series of justice and public policy issues affecting the lives of women, including equality rights, pay and employment equity, domestic violence, sexual assault, family policy, health care policy, and pornography. Offered in conjunction with POLS\*4100. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of POLS\*4100 or POLS\*6180

*Department(s):* Department of Political Science

**POLS\*6200 Law and Politics U [0.50]**

This course explores advanced topics in law and politics depending on the interests of the instructor. Potential topics include investigating the law and politics of social change or analyzing debates about the political power of courts in Canada or in comparative perspectives. Offered in conjunction with POLS\*4050. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of POLS\*4050 or POLS\*6200

*Department(s):* Department of Political Science

**POLS\*6210 Conceptions of Canada U [0.50]**

This course will explore evolving conceptions of Canadian identity and nationalism through consideration of political culture, institutions and constitutional arrangements. Possible topics include: multiculturalism, aboriginal identity and community, Quebec nationalism, social citizenship, rights and representation, as well as Canada's global role and significance.

*Department(s):* Department of Political Science

**POLS\*6380 State-building and Regime Change U [0.50]**

Students will explore theories of states, regimes, state-building, regime change, and democratization. The course critically engages dominant debates and reviews empirical examples.

*Department(s):* Department of Political Science

**POLS\*6390 Resource Scarcity and Conflict U [0.50]**

This course examines domestic, international and global dimensions of environmental governance and resource conflict, as well as stakeholder perspectives on resource politics. Topics may include climate change; the resource curse; commodity production, trade and consumption; food and human security; political ecology and extractive industries.

*Department(s):* Department of Political Science

**POLS\*6400 Citizenship and Social Policy U [0.50]**

Students will study citizenship and the allocation of social goods through social policies. Normative debates, theoretical frameworks, and empirical perspectives in a range of social policy fields – such as health care, pensions, childcare, education, and housing – may be examined.

*Department(s):* Department of Political Science

**POLS\*6500 Qualitative and Quantitative Data Analysis U [0.50]**

This course introduces both qualitative and quantitative methods of data analysis. Students will engage theoretical material on the subject and develop data analysis skills through practice.

*Department(s):* Department of Political Science

**POLS\*6510 Political Participation and Engagement U [0.50]**

Students will study how individual citizens engage in the political process. Informal channels such as social movements or more formal organizations such as interest groups and political parties may be examined.

*Department(s):* Department of Political Science

**POLS\*6520 International Political Economy U [0.50]**

The course relies on theoretical approaches in IPE to examine relationships between politics and economics across national and regional levels. The evolution of the global political economy and its governance structures is explored, as well as contemporary debates about globalization and state and non-state actors' responses. Issue-areas may include: money and power, technology, trade, development and the environment. Offered in conjunction with POLS\*4200. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of POLS\*4200 or POLS\*6520

*Department(s):* Department of Political Science

**POLS\*6530 Human Rights, Ethics and Development U [0.50]**

This course will examine the political and ethical consequences of adopting a human rights framework in national and international contexts by both state and non-state actors. This subject will be explored from a range of historical, theoretical and practical perspectives. Offered in conjunction with POLS\*4300. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of POLS\*4300 or POLS\*6530

*Department(s):* Department of Political Science

**POLS\*6540 Topics in Comparative Politics U [0.50]**

This course considers theories and problems in comparative politics and government in developing and industrialized countries. The geographical and theoretical focus of the course will reflect the interests of the instructor. Offered in conjunction with POLS\*4710. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of POLS\*4710 or POLS\*6540

*Department(s):* Department of Political Science

**POLS\*6550 Topics in Public Management U [0.50]**

This course will examine various topics related to governance, such as public management reform, public sector leadership, third sector organizations or budgeting and human resources. Offered in conjunction with POLS\*4250. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of POLS\*4250 or POLS\*6550

*Department(s):* Department of Political Science

**POLS\*6560 Topics in Public Policy U [0.50]**

This course will examine various public policy issues such as social policy or health care policy in a Canadian or comparative context. Offered in conjunction with POLS\*4260. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of POLS\*4260 or POLS\*6560

*Department(s):* Department of Political Science

<b>POLS*6570 International Relations of the Middle East U [0.50]</b>
This course is designed as an advanced introduction to the international relations of the Middle East. The course focuses on theories of international relations and their applicability to specific case studies of Middle Eastern politics. The course provides a critical examination of conflicts in the region, and contextualizes those conflicts within both realist and neo-realist theories of international relations. Offered in conjunction with POLS*4730. Extra work is required for graduate students.
<i>Restriction(s):</i> Credit may be obtained for only one of POLS*4730 or POLS*6570 <i>Department(s):</i> Department of Political Science
<b>POLS*6580 Topics in International Relations U [0.50]</b>
This course considers theories and problems in the field of International Relations. The theoretical and/or geographical focus of the course will reflect the interests of the instructor. Offered in conjunction with POLS*4720. Extra work is required for graduate students.
<i>Restriction(s):</i> Credit may be obtained for only one of POLS*4720 or POLS*6580 <i>Department(s):</i> Department of Political Science
<b>POLS*6590 Advanced Topics in Rights and Liberties U [0.50]</b>
The course explores rights and liberties from various perspectives depending on the interests of the instructor. Potential topics include exploring the political, social, and legal factors and theories that explain the development of rights and liberties; rights and liberties in a comparative and international context; or the philosophical and policy debates surrounding rights and liberties. Offered in conjunction with POLS*4740. Extra work is required for graduate students.
<i>Restriction(s):</i> Credit may be obtained for only one of POLS*4740 or POLS*6590 <i>Department(s):</i> Department of Political Science
<b>POLS*6630 Approaches to Public Policy U [0.50]</b>
This course introduces students to the main theoretical approaches utilized in understanding public policy making and outcomes. Throughout the course, particular attention is paid to varying conceptions of institutions, ideas and interest and the role of these conceptions in various explanations of policy change and stasis.
<i>Department(s):</i> Department of Political Science
<b>POLS*6640 Canadian Public Administration: Public Sector Management U [0.50]</b>
This course examines the growth of the administrative state in Canada, especially in the post World War II period. It critically reviews issues such as the concept of public sector management, the delegation of authority, personnel management, accountability and the ethics of ministers and officials to Parliament and the public.
<i>Department(s):</i> Department of Political Science
<b>POLS*6730 Development and Global Justice U [0.50]</b>
Students will study Western and non-Western theoretical perspectives on the politics of development and global justice. Topics may include human rights and development, global inequality, environmental justice, indigenous politics, humanitarian ethics, intercultural competency, and faith-based development.
<i>Department(s):</i> Department of Political Science
<b>POLS*6820 PhD Canadian Politics U [0.50]</b>
Students will help to identify and critically engage with key scholarship in the field of Canadian Politics. The course will provide a breadth of understanding of the field, but a portion of the Canadian reading list can be tailored to the student's particular interests.
<i>Department(s):</i> Department of Political Science
<b>POLS*6830 PhD Field Course in Comparative Politics U [0.50]</b>
Students will help to identify and critically engage with key scholarship in the field of Comparative Politics. The course will provide a breadth of understanding of the field, but a portion of the reading list can be tailored to the student's particular interests.
<i>Department(s):</i> Department of Political Science
<b>POLS*6840 PhD Field Course in Gender, Race, Indigeneity, and Sexuality U [0.50]</b>
Students will help to identify and critically engage with key scholarship relating to Gender, Race, Indigeneity and Sexuality. The course will provide a breadth of understanding of the field, but a portion of the reading list can be tailored to the student's particular interests.
<i>Department(s):</i> Department of Political Science
<b>POLS*6850 PhD Field Course in International Relations U [0.50]</b>
Students will help to identify and critically engage with key scholarship relating to International Relations. The course will provide a breadth of understanding of the field, but a portion of the reading list can be tailored to the student's particular interests.
<i>Department(s):</i> Department of Political Science
<b>POLS*6860 PhD Field Course in Law and Politics U [0.50]</b>
Students will help to identify and critically engage with key scholarship relating to Law and Politics. The course will provide a breadth of understanding of the field, but a portion of the reading list can be tailored to the student's particular interests.
<i>Department(s):</i> Department of Political Science

<b>POLS*6870 PhD Field Course in Public Policy and Governance U [0.50]</b>
Students will help to identify and critically engage with key scholarship relating to Public Policy and Governance. The course will provide a breadth of understanding of the field, but a portion of the reading list can be tailored to the student's particular interests.
<i>Department(s):</i> Department of Political Science
<b>POLS*6900 Communications F-W [0.25]</b>
This course trains students in crucial academic skills, in particular writing and presentation skills. Some course elements may be offered through workshops in conjunction with other units, such as the Learning Commons.
<i>Department(s):</i> Department of Political Science
<b>POLS*6940 Research Design and Methods U [0.75]</b>
This course focuses on the elements of designing and writing a research question and proposal. It examines the principles of research design and research ethics, and surveys the strengths and weaknesses of a variety of methods of data collection.
<i>Department(s):</i> Department of Political Science
<b>POLS*6950 Specialized Topics in Political Studies U [0.50]</b>
This course is intended to be an elective course for students wishing to pursue an area of investigation not covered in the other courses offered by the department. This course may also be chosen by students who want to further pursue a subject area to which they were introduced in a previous course.
<i>Department(s):</i> Department of Political Science
<b>POLS*6960 Directed Readings U [0.50]</b>
This is an elective course for students wishing to pursue an area of investigation not covered in other courses offered by the department. This course may also be chosen by students who want to further pursue a subject area to which they were introduced in a previous course.
<i>Department(s):</i> Department of Political Science
<b>POLS*6970 Major Paper U [1.00]</b>
The major paper is an extensive research paper for those who do not elect to complete a thesis. It may be taken over two semesters. The length of the major paper is not to exceed 10,000 words.
<i>Department(s):</i> Department of Political Science

## Population Medicine

<b>POPM*6100 Seminar F [0.00]</b>
A practical course that utilizes tutorials, workshops, self and peer reviewed assessment to help participants develop skills in public speaking and presentation of scientific data. Each student presents at least one seminar on an approved subject during the departmental seminar series.
<i>Department(s):</i> Department of Population Medicine
<b>POPM*6200 Epidemiology I F [0.50]</b>
This course covers concepts, principles and methods of basic and applied epidemiology, including the following topics: sampling, measuring disease frequency, clinical epidemiology, descriptive epidemiology, causal reasoning and design, interpretation and critical appraisal of surveys, observational studies, field trials and critical appraisal.
<i>Restriction(s):</i> MPH and Population medicine students. Instructor consent required. <i>Department(s):</i> Department of Population Medicine
<b>POPM*6210 Epidemiology II W [0.50]</b>
Advanced study design and analytic methods for the analysis of data from observational studies and surveys.
<i>Department(s):</i> Department of Population Medicine
<b>POPM*6220 Analytical Epidemiology S [0.50]</b>
This course focuses on the advanced analysis of epidemiologic studies. Case control, cohort and survival studies are analysed within the generalized linear-model framework. Links between study objectives, study design and data analysis will be emphasized throughout. Special problems, such as the analysis of correlated data arising from cluster sampling of individuals, are discussed.
<i>Prerequisite(s):</i> POPM*6210 and POPM*6290 <i>Department(s):</i> Department of Population Medicine
<b>POPM*6230 Applied Clinical Research F [0.50]</b>
This course is designed to help clinical researchers design, fund, and analyze their clinical research. Emphasis is placed upon planning a well-designed clinical trial and writing a well-organized grant proposal.
<i>Department(s):</i> Department of Population Medicine



**POPM\*6250 Project in Population Medicine F,W,S [1.00]**

Collection and analysis of field data and the preparation of a written report suitable for publication, and oral presentation of the findings to the graduate faculty. This course is part of the MSc program by course work in population medicine.

*Restriction(s):* Restricted to coursework students in the MSc Population Medicine program.

*Department(s):* Department of Population Medicine

**POPM\*6290 Epidemiology III F [0.50]**

This course gives an overview of advanced methods for the analysis of data of clustered/correlated data as opposed to independent data. Special emphasis is on spatial, longitudinal, survival data and time series data.

*Prerequisite(s):* POPM\*6210 (or equivalent graduate course from another university)

*Department(s):* Department of Population Medicine

**POPM\*6350 Safety of Foods of Animal Origins F [0.50]**

The detection, epidemiology, human health risk, and control of hazards in food of animal origin.

*Offering(s):* Offered through Distance Education format only.

*Department(s):* Department of Population Medicine

**POPM\*6400 Dairy Health Management \* S [0.50]**

This course stresses a population-based, herd-level approach to dairy herd health management, in which optimizing the efficiency of the dairy enterprise is the overall goal. The biological and economic impacts of disease and management deficiencies on herd performance will be discussed as they relate to design and implementation of herd health programs. The course will emphasize the critical role of record keeping, data analysis and monitoring on program success.

*Department(s):* Department of Population Medicine

**POPM\*6510 Community Health Promotion F [0.50]**

The objective of this course is to provide students with an understanding of public health, population health and health promotion. Topics will include perspectives on health and illness, injury prevention, determinants of health, population diversity and the role of evidence in public health decision-making.

*Department(s):* Department of Population Medicine

**POPM\*6520 Introduction to Epidemiological and Statistical Methods F [0.50]**

This is a 0.5 credit introductory graduate course for MPH students and students interested in epidemiology. The course will provide an introduction to research design, grant proposal writing, and critical appraisal, as well as survey (questionnaire) design and basic statistical methods for epidemiological studies.

*Co-requisite(s):* POPM\*6200

*Department(s):* Department of Population Medicine

**POPM\*6530 Health Communication W [0.50]**

This course introduces communication theory, best practices, and skills related to public health. Students will learn about the written, oral, and visual communication of health information for professional, peer, and lay audiences. Students will apply their knowledge by creating a portfolio of health communication materials.

*Restriction(s):* MPH students. Instructor consent required.

*Department(s):* Department of Population Medicine

**POPM\*6540 Concepts in Environmental Public Health W [0.50]**

This course covers the main concepts of environmental public health including basic elements of environmental toxicology, risk analysis, air and water quality, food safety, waste, occupational health and eco health.

*Department(s):* Department of Population Medicine

**POPM\*6550 Public Health Policy and Systems W [0.50]**

This course covers concepts and principles of public health policy and systems including: public health systems, their structure, funding and governance and their integration into the healthcare system; evolution of public health policy; models of policy development and analysis; stakeholder analysis; and, public health ethics.

*Department(s):* Department of Population Medicine

**POPM\*6560 Public Health Practicum U [1.00]**

In this 1.0 credit course, students will synthesize theoretical concepts, learned via prior coursework, with public health practice. Students will work in a host public health agency for a 12-to 16-week period, focusing on a major project of significance to the host organization.

*Prerequisite(s):* POPM\*6200, POPM\*6510, POPM\*6520, POPM\*6530, POPM\*6540, and POPM\*6550

*Restriction(s):* MPH students only. Instructor consent required.

*Department(s):* Department of Population Medicine

**POPM\*6570 Public Health Capstone F [0.00]**

This course serves as a capstone for students in the Master of Public Health program to reflect on, interpret, and present their practicum work in a variety of formats, including public presentation, to enhance their communication skills and abilities.

*Prerequisite(s):* POPM\*6560 or instructor's signature required

*Department(s):* Department of Population Medicine

**POPM\*6580 Public Health Administration F [0.50]**

This course will teach students to develop, implement and improve public health programs. Understanding an organization's mission and priorities, and developing business plans is critical for an effective administrator. Furthermore, it introduces theories and effective components of leadership and describes the practical role of the leader.

*Department(s):* Department of Population Medicine

**POPM\*6590 Public Health Practicum II W [1.00]**

This course allows students in the Master of Public Health program to undertake an optional second practicum experience. They will work in a host public health organization or agency for a 12- to 16-week period, focusing on a major project of significance to the host organization.

*Prerequisite(s):* POPM\*6560

*Restriction(s):* Public Health program. Instructor consent required.

*Department(s):* Department of Population Medicine

**POPM\*6600 Applied Public Health Research F,W,S [0.50]**

Students will undertake a supervised research project on a public health issue or problem. The project will involve analysis and interpretation of public health information and the findings will be presented in a written report.

*Prerequisite(s):* POPM\*6560

*Restriction(s):* Public Health program. Instructor consent required.

*Department(s):* Department of Population Medicine

**POPM\*6610 Theriogenology of Cattle \* U [0.50]**

A lecture/seminar course emphasizing the relationship of nutritional, genetic, endocrine, anatomic, and environmental factors with the reproductive health of cattle. Application of reproductive technologies will also be covered.

*Department(s):* Department of Population Medicine

**POPM\*6630 Theriogenology of Horses \* U [0.50]**

A lecture/seminar course covering the genetic, endocrine, anatomic and environmental factors that affect reproductive performance and health of horses. Breeding management, including recent technologies, and management of the infertile animal will be included.

*Department(s):* Department of Population Medicine

**POPM\*6650 Theriogenology of Dogs and Cats \* U [0.50]**

A seminar/lecture series that includes the theory and management of clinical reproduction for the dog and cat, including use of developing technologies.

*Department(s):* Department of Population Medicine

**POPM\*6670 Theriogenology of Small Ruminants \* U [0.50]**

A seminar/laboratory course emphasizing advanced reproductive management of sheep, goats and farmed deer/elk, with the emphasis on a sheep production model. New reproductive technologies will be included.

*Department(s):* Department of Population Medicine

**POPM\*6700 Swine Health Management \* U [0.50]**

Diseases of swine are studied with particular emphasis on preventive medicine and herd-health management.

*Department(s):* Department of Population Medicine

**POPM\*6800 Infectious Disease Modeling W [0.50]**

This course covers concepts, principles and methods of basic and applied epidemiology, including the following topics: sampling, measuring disease frequency, clinical epidemiology, descriptive epidemiology, causal reasoning and design, interpretation and critical appraisal of surveys, observational studies, field trials and critical appraisal.

*Prerequisite(s):* POPM\*6200 and successful completion of an undergraduate course in differential calculus.

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Population Medicine

**POPM\*6950 Studies in Population Medicine U [0.50]**

Assigned reading and/or special projects selected to provide in-depth study of topics appropriate to the specialized interests of individual students. Courses offered under this title have included Special Topics in Public Health; Ecology and Health; Systems Approaches; and Animal Welfare. Different offerings are assigned different section numbers.

*Department(s):* Department of Population Medicine

**POPM\*6960 Systematic Reviews & Meta-Analysis W [0.50]**

This course covers the use of systematic reviews in animal and public health, the steps in conducting a systematic review, and quantitative synthesis of research results from multiple studies (meta-analysis). The course combines didactic lectures and videos with practical exercises during class time.

*Prerequisite(s):* POPM\*6200 and POPM\*6520

*Department(s):* Department of Population Medicine

**Psychology****PSYC\*6000 Developmental Psychopathology: Etiology and Assessment U [0.50]**

The interaction of neurobiological, physiological, familial and social factors to an understanding of developmental psychopathology is the focus of this course. Emphasis is given to etiology and clinical assessment issues.

*Department(s):* Department of Psychology

**PSYC\*6010 Integrated Child and Adolescent Assessment W [0.50]**

This course focuses on the cognitive and academic components of comprehensive cognitive assessment. The conceptualization and clinical skills in assessing cognitive processes and their application to the assessment of neurodevelopmental disorders (e.g., Specific Learning Disorders, ADHD, ASD, FASD) will be examined.

*Prerequisite(s):* PSYC\*6690

*Restriction(s):* Open only to graduate students in the Clinical Child and Adolescent Psychology (CCAP) field

*Department(s):* Department of Psychology

**PSYC\*6020 Clinical and Diagnostic Interviewing Skills S [0.50]**

This course provides practical training in clinical and diagnostic interviewing. Through role-play, direct observation, and in-vivo practice, students will learn how to conduct assessment and diagnostic interviews, and clinical dialogues with children and adults. This course is open only to graduate students in the CCAP field.

*Prerequisite(s):* Completion of all MA level course work except for the thesis

*Restriction(s):* Open only to graduate students in the Clinical Child and Adolescent Psychology (CCAP) field

*Department(s):* Department of Psychology

**PSYC\*6060 Research Design and Statistics U [0.50]**

This course covers non-parametric and parametric hypothesis testing and estimation, analysis of variance and covariance, and multiple correlation and multiple regression. Current controversial issues are presented.

*Department(s):* Department of Psychology

**PSYC\*6270 Issues in Social Policy U [0.50]**

This doctoral course examines historical developments and selected contemporary policy domains in Canada. Topics may include policies affecting children, families, the elderly, First Nations people, the mentally and physically disabled, and one parent families. The course also addresses the interplay between social and psychological research and policy formation, as well as the use of social policy as an instrument of social change.

*Department(s):* Department of Psychology

**PSYC\*6380 Psychological Applications of Multivariate Analysis U [0.50]**

This course emphasizes the use of multivariate techniques in psychological research. Both predictive (e.g., regression, canonical correlation, discriminant analysis, MANOVA) and reduction (e.g., factor analysis, multidimensional scaling, cluster analysis) techniques are considered in addition to the use of both observed and latent variable structural models.

*Department(s):* Department of Psychology

**PSYC\*6401 Reading Course I U [0.25]**

An independent in-depth study of current theoretical and empirical issues in the student's area of specialization.

*Department(s):* Department of Psychology

**PSYC\*6402 Reading Course II U [0.50]**

An independent in-depth study of current theoretical and empirical issues in the student's area of specialization.

*Department(s):* Department of Psychology

**PSYC\*6411 Special Problems in Psychology I U [0.25]**

A critical examination of current problems relating to conceptual and methodological developments in an area of psychology.

*Department(s):* Department of Psychology

**PSYC\*6412 Special Problems in Psychology II U [0.50]**

A critical examination of current problems relating to conceptual and methodological developments in an area of psychology.

*Department(s):* Department of Psychology

**PSYC\*6471 Practicum I U [0.50]**

Students will gain 2-3 days per week of supervised experience in a setting related to their field of specialization.

*Department(s):* Department of Psychology

**PSYC\*6472 Practicum II U [1.00]**

See PSYC\*6471. Students work four to five days a week in the selected setting.

*Department(s):* Department of Psychology

**PSYC\*6473 Practicum III U [0.25]**

See PSYC\*6471. This course is intended for students who wish to gain additional practicum experience after completing the requirements for PSYC\*6471/PSYC\*6472. Students work one day a week in the selected setting.

*Department(s):* Department of Psychology

**PSYC\*6521 Research Seminar I U [0.25]**

An in-depth review of current theoretical and empirical developments in topic areas related to the student's area of specialization.

*Department(s):* Department of Psychology

**PSYC\*6522 Research Seminar II U [0.50]**

An in-depth review of current theoretical and empirical developments in topic areas related to the student's area of specialization. The course requirements may include the completion of an empirical research project.

*Department(s):* Department of Psychology

**PSYC\*6580 Foundations in Child and Adolescent Psychotherapy F [0.50]**

This course introduces foundations of practice in conducting psychotherapy with children and adolescents, highlighting evidence-based practice. Major models of child/adolescent psychotherapy and case conceptualization are introduced.

*Restriction(s):* Open only to graduate students in the Clinical Child and Adolescent Psychology (CCAP) field.

*Department(s):* Department of Psychology

**PSYC\*6610 Advanced Child and Adolescent Psychotherapy U [0.50]**

This course will consider newly emerging developments in child and adolescent psychotherapy, as well as issues of power relationships, cultural sensitivity and empirical support. In preparation, students should endeavor to complete two therapy cases prior to the commencement of the course.

*Prerequisite(s):* PSYC\*6580 and PSYC\*7993 (may be taken concurrently).

*Restriction(s):* This course is open only to graduate students in the CCAP field.

*Department(s):* Department of Psychology

**PSYC\*6630 Developmental Psychology U [0.50]**

This course examines issues in the areas of cognitive, social, and emotional development. Specific research topics and theoretical issues concerning the nature of development are discussed.

*Department(s):* Department of Psychology

**PSYC\*6670 Research Methods U [0.50]**

This course emphasizes those techniques most frequently used in applied and field settings. These include: quasi-experimental designs, survey research, interviewing, questionnaire design, observational techniques, and other more qualitative methods.

*Department(s):* Department of Psychology

**PSYC\*6690 Foundations in Cognitive Assessment of Child and Adolescents F [0.50]**

This course considers standards, ethics, uses and interpretation of selected intelligence and other cognitive tests. Students administer tests, score, interpret and write reports under supervision.

*Restriction(s):* This course is open only to graduate students in the CCAP field.

*Department(s):* Department of Psychology

**PSYC\*6700 Personality and Social Assessment of Children and Adolescents U [0.50]**

This course considers projectives, questionnaires, observations and interviews for assessing children's personality and behaviour. Students administer tests, score, interpret and write reports under supervision.

*Restriction(s):* This course is open only to graduate students in the CCAP field.

*Department(s):* Department of Psychology

**PSYC\*6740 Research Seminar in Neuroscience and Applied Cognitive Science A U [0.50]**

This course will expose graduate students to some of the major theories, issues and methodologies driving research in the broad field of Neuroscience and Applied Cognitive Science. Students will learn to critically evaluate presentations by researchers as well as to communicate the results of their own research, in both a written and oral format. All first year master's students in NACS are required to enroll in this course in both the fall and winter semesters.

*Department(s):* Department of Psychology

<b>PSYC*6750 Applications of Cognitive Science U [0.50]</b>
This course surveys applications of cognitive science to the problem of optimizing human performance. Topics of discussion will include human-system interactions (including Human-Computer and Human-Vehicle), education, and cognitive rehabilitation. <i>Department(s):</i> Department of Psychology
<b>PSYC*6760 Research Seminar in Neuroscience and Applied Cognitive Science B U [0.00]</b>
This course will expose graduate students to some of the major theories, issues and methodologies driving the research broad field of Neuroscience and Applied Cognitive Science. Students will learn to critically evaluate presentations by researchers in this field as well as to communicate the results of their own research, in both a written and oral format. All second year master's and doctoral students in NACS are required to enroll in this course each fall and winter semester of their graduate program until they graduate. <i>Department(s):</i> Department of Psychology
<b>PSYC*6780 Foundations of Cognitive Science U [0.50]</b>
Cognitive Science is an inter-disciplinary field that encompasses cognitive psychology, neuroscience, philosophy, and computer science. The foundational issues and basic methodologies that define cognitive science will be discussed, with specific examples from perception, learning, memory, language, decision-making, and problem solving. <i>Restriction(s):</i> Restricted to Psychology graduate students; all others by permission only <i>Department(s):</i> Department of Psychology
<b>PSYC*6790 Memory and Cognition U [0.50]</b>
This course reviews the major theories, issues and methodologies guiding contemporary research in human memory and related aspects of human cognition. Topics include the encoding and retrieval of information, the nature of representations in memory, classifications of memory, and applications to reading and eyewitness testimony. <i>Department(s):</i> Department of Psychology
<b>PSYC*6800 Neurobiology of Learning U [0.50]</b>
This course reviews the major theories, issues, and methodologies guiding contemporary research in the neurobiology of learning. <i>Department(s):</i> Department of Psychology
<b>PSYC*6810 Neuropsychology U [0.50]</b>
This course focuses on current developments in neuropsychology. Particular emphasis is placed on the aphasias, apraxias, memory disorders, and disorders of movement. <i>Department(s):</i> Department of Psychology
<b>PSYC*6840 Program Evaluation U [0.50]</b>
This course provides an introduction to a variety of methods of social program evaluation and to the process of consultation with program staff. <i>Department(s):</i> Department of Psychology
<b>PSYC*6880 Ethical Issues in Psychology U [0.25]</b>
Relevant issues in the application of professional ethical standards to the practice of psychology, including consultation, field research, intervention, and decision-making models are discussed in this half course. Depending on the particular faculty and students involved, discussion emphasizes specific applications to either I/O or applied developmental/social psychology. <i>Department(s):</i> Department of Psychology
<b>PSYC*6890 Legislation and Professional Practice U [0.25]</b>
This companion course to PSYC*6880, Ethics in Psychology, provides an introduction to the Provincial and Federal legislation governing the practice of psychology. Students will become familiar with legislation relevant to professional practice with children and adults in hospital, educational, community, and other settings. <i>Co-requisite(s):</i> PSYC*6880 <i>Department(s):</i> Department of Psychology
<b>PSYC*6900 Philosophy and History of Psychology as a Science U [0.50]</b>
This doctoral course examines the philosophical and metatheoretical issues involved in the scientific analysis of human experience. Both the historical context of these issues and the status of current metatheoretical debates are covered. <i>Department(s):</i> Department of Psychology
<b>PSYC*6910 Critical Approaches to Applied Social Psychology U [0.50]</b>
The purpose of this course is to introduce students to critical approaches to applied social psychology. The course will address theoretical traditions and methodologies that take as their starting point a reflexive critique and evaluation of culture, society, and its institutions. <i>Department(s):</i> Department of Psychology

<b>PSYC*6920 Applied Social Psychology and intervention U [0.50]</b>
This course will critically examine theoretical approaches and research in the field of applied social psychology with a particular focus on work aimed at generating intervention strategies intended to ameliorate social and practical problems. The course will also consider implications for social policy. <i>Department(s):</i> Department of Psychology
<b>PSYC*6930 Community, Culture &amp; Global Citizenship U [0.50]</b>
The purpose of this course is to conceptualize community and cultural psychological work in the context of global citizenship. The course will cover theory and methods for addressing such issues as community health, poverty, violence, immigration, diversity and acculturation, in an interconnected, interdependent and globalized world. <i>Department(s):</i> Department of Psychology
<b>PSYC*6940 Discrete-variable Statistics U [0.50]</b>
This course is an in-depth examination of statistical approaches used in psychology, with an emphasis on experimental research designs with discrete independent variables (e.g., t-test, ANOVA, general linear model), and how these approaches address ongoing statistical challenges faced by psychological researchers, such as replication and generalizability. <i>Department(s):</i> Department of Psychology
<b>PSYC*6950 Qualitative Methods in Psychology U [0.50]</b>
The purpose of this course is to provide students with foundational knowledge and skills to conduct qualitative research in psychology. Approaches that will be covered may include discursive psychology, critical discourse analysis, grounded theory, thematic analysis, ethnography, and interpretive phenomenological analysis. <i>Department(s):</i> Department of Psychology
<b>PSYC*7010 Recruitment and Selection: Methods and Outcomes U [0.50]</b>
The course explores organizational issues in the recruitment and selection of new employees. Topics may include: individual differences, human rights, survey-based job analysis, recruitment methods and outcomes, selection methods and outcomes, hiring, decision making and employee placement/classification. <i>Department(s):</i> Department of Psychology
<b>PSYC*7020 Employee Performance U [0.50]</b>
This course focuses on issues that relate to employee performance. Individuals and organizations are interested in maximizing the contributions of employees at work. This course focuses on performance-based job analysis, criterion theory, performance management/appraisal, employee socialization, compensation, benefits, technology, and labour relations. <i>Department(s):</i> Department of Psychology
<b>PSYC*7030 Work Attitudes and Behaviour U [0.50]</b>
This course examines micro-level influences on organizational behaviour. Topics may include: organizational commitment, job satisfaction, emotions, other work attitudes and attitude change, organizational citizenship behaviours, withdrawal behaviours, employee well-being, deviance, and work-life integration. <i>Department(s):</i> Department of Psychology
<b>PSYC*7040 Social Processes in the Workplace U [0.50]</b>
This course examines social processes in the workplace. Topics may include: groups, teams, and intergroup processes; justice; diversity in the workplace; prejudice and discrimination; harassment and unethical behaviour; climate, culture change; and, organizational development. <i>Department(s):</i> Department of Psychology
<b>PSYC*7050 Research Seminar in Industrial/Organizational Psychology U [0.00]</b>
This course will expose graduate students to some of the major theories, issues, and methodologies driving research in the field of Industrial/Organizational psychology. Students will learn to critically evaluate presentations by researchers in this field, as well as to communicate the results of their own research, in both written and an oral format. All students are required to enroll in this course. <i>Restriction(s):</i> Psychology students only. <i>Department(s):</i> Department of Psychology
<b>PSYC*7070 Psychological Measurement U [0.50]</b>
Concepts and applications of classical measurement theory, especially reliability and validity of tests and measurements used in applied psychology. Principles of test construction, standardization, norming, administration, and interpretation are discussed, as well as integration of test information and its use in decision making. <i>Restriction(s):</i> Instructor consent required. <i>Department(s):</i> Department of Psychology

**PSYC\*7080 Consulting in Industrial/Organizational Psychology U [0.00]**

The course introduces students to consulting in I/O Psychology through actual consulting projects with local organization. Topics include: marketing consulting services, understanding consulting, client and project management. Specific projects will vary from semester to semester based on work secured with local organizations (e.g. training, surveys, coaching).

*Prerequisite(s):* Registration in the graduate IO psychology program and permission of the Instructor.

*Department(s):* Department of Psychology

**PSYC\*7130 Introduction to Industrial/Organizational Psychology U [0.50]**

This course introduces graduate students to a broad range of topics in Industrial/Organizational psychology. It emphasizes researcher-practitioner issues, consumer behaviour, professionalism, ethics, and theory building. As well, graduate students will learn about contemporary issues in I-O Psychology.

*Department(s):* Department of Psychology

**PSYC\*7140 Industrial/Organizational Psychology Special Topic Doctoral Research Seminar U [0.50]**

Participants investigate a specific area of Industrial/Organizational psychology. They critically review past and current research, including theory development and empirical findings. Participants work together to integrate past theory and findings, to note inconsistencies in the literature, and to identify promising areas for future investigations.

*Prerequisite(s):* PSYC\*7130

*Department(s):* Department of Psychology

**PSYC\*7160 Employee Development: Methods and Outcomes U [0.50]**

This course explores development in an organization context. Employee learning and development is a key focus for employees and organizations. This course covers functional job analysis, career development, succession management, multi-source feedback, training, coaching/mentoring and employee counseling.

*Department(s):* Department of Psychology

**PSYC\*7170 Industrial/Organizational Psychology Doctoral Research Internship I U [0.50]**

Participants work with an Industrial Organizational faculty member to conduct research on a topic of mutual interest (other than their doctoral research). They collect and/or analyze data and write up results with the goal of producing a conference presentation and/or a quality publication manuscript.

*Prerequisite(s):* PSYC\*7130

*Co-requisite(s):* PSYC\*7140

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Psychology

**PSYC\*7180 Industrial/Organizational Psychology Doctoral Research Internship II U [0.50]**

Participants work with an Industrial Organizational faculty member to conduct research on a topic of mutual interest (other than their doctoral research). They collect and/or analyze data and write up results with the goal of producing a conference presentation and/or a quality publication manuscript.

*Prerequisite(s):* PSYC\*7130, PSYC\*7140, PSYC\*7170

*Restriction(s):* Instructor consent required.

*Department(s):* Department of Psychology

**PSYC\*7190 Work Motivation and Leadership U [0.50]**

This course examines theories, research, and application of work motivation and leadership within an organizational context. The course will include a description of classic and contemporary theories of work motivation and leadership, a critical evaluation of the research findings, and a discussion of the application of the research findings to the work environment.

*Restriction(s):* Psychology students only.

*Department(s):* Department of Psychology

**PSYC\*7991 CCAP Clinical Practicum I U [0.25]**

This CCAP practicum is typically undertaken at the Center for Psychological Services, one day a week over a semester, to enhance skills introduced in other clinical courses. Expectations for the course will be based on the student's current level of clinical skill. Students will work with diverse clients, and gain knowledge of ethics and jurisprudence in a clinical setting.

*Restriction(s):* Restricted to students in the CCAP field

*Department(s):* Department of Psychology

**PSYC\*7992 CCAP Clinical Practicum II U [0.50]**

This CCAP practicum is undertaken in a school board, psychological services department for two days a week over one semester. Students will develop clinical assessment skills with a diversity of clients, work with interdisciplinary teams, and apply knowledge of ethics and jurisprudence to educational settings. A passing grade and a satisfactory rating on the practical component must be achieved in PSYC\*6690 and PSYC\*6700 to enroll in this course.

*Prerequisite(s):* PSYC\*6010, PSYC\*6690, and PSYC\*6700

*Restriction(s):* Restricted to students in the CCAP field

*Department(s):* Department of Psychology

**PSYC\*7993 CCAP Clinical Practicum III U [1.00]**

This CCAP practicum is undertaken in a children's mental health setting two days a week over two semesters. Students will develop complex assessment and therapy skills with diverse clients, work with interdisciplinary team, and apply knowledge of ethics and jurisprudence to mental health settings.

*Prerequisite(s):* PSYC\*6471 or PSYC\*7992

*Restriction(s):* Restricted to students in the CCAP field Instructor consent required.

*Department(s):* Department of Psychology

**PSYC\*7994 Cognitive Behaviour Therapy Practicum F,W [1.00]**

The CBT practicum is typically undertaken at the Center for Psychological Training, and is intended to foster clinical psychology graduate student training in cognitive behaviour therapy (CBT). This practicum course will involve didactic and experiential components. Students will gain competency with the basics of CBT, gain capability with treatment manuals and undertake at least one ongoing therapy case.

*Co-requisite(s):* PSYC\*6580

*Restriction(s):* Restricted to PhD students in the CCAP area of Psychology only. Instructor consent required.

*Department(s):* Department of Psychology

**PSYC\*7996 Clinical Supervision, Consultation and Professional Development F [0.50]**

This course is designed to introduce students to the theory, research, and practice of supervision and consultation in the field of clinical psychology. Students will become familiar with the professional literature relevant to supervision, gain competency with ethical, culturally-competent clinical supervision, and explore their own development as a professional in the field of psychology.

*Prerequisite(s):* PSYC\*6580, PSYC\*7994

*Restriction(s):* Restricted to PhD students in the CCAP area of Psychology only. Instructor consent required.

*Department(s):* Department of Psychology

**PSYC\*8000 Clinical Internship U [0.00]**

A mark of satisfactory (SAT) in this course indicates that a student in the Clinical Child and Adolescent Psychology (CCAP) field has successfully completed a full year (1800-2000 hour) internship in an accredited clinical setting (e.g., CPA or APA) approved by the Director of Clinical Training for CCAP.

*Prerequisite(s):* Completion of all course work in the CCAP field, the PhD qualifying examination, and the PhD Thesis proposal at the time of application, one year in advance of beginning the clinical internship.

*Department(s):* Department of Psychology

**Rural Planning and Development****RPD\*6030 International Rural Development Planning: Principles and Practices U [0.50]**

This course presents the scope and nature of international development planning and alternative roles for development planners; has a rural emphasis; reviews the evolution of development planning from macroeconomic beginnings to more integrated local planning approaches; examines the development planning process and its organizational and spatial dimensions; compares policy, program, project, sectoral and integrated area planning; and compares rural development planning in market, mixed and state-driven societies.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6050 Professional Practice Course in Development and Planning U [0.50]**

This course offers a planned but flexible program for developing skills that are relevant to professional practice in the rural planning and development field. It also fills the skill knowledge gaps for students who cannot take full courses. Students, in consultation with their Academic Advisor, assess their knowledge and skills need and acquire them through selected 'modules'.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6070 Project Development: Principles, Procedures, and Selected Methods U [0.50]**

This course introduces students to the principles, procedures and methods in developing a project. It examines the project cycle: identification, preparation, appraisal, implementation/supervision, monitoring and evaluation. It gives an understanding of the major methods involved and teaches selected methods. The focus is on the international, rural context and on small non-farm projects: small industries, small physical infrastructure and social projects.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6080 Environment and Development: Biophysical Resources and Sustainable Development in Rural Environments U [0.50]**

This course will examine the problems and potential for ecologically sustainable development in the context of rural development planning particularly in the Third World environments. The course critically examines the strategic planning approaches and methods which involve the interaction between social systems and natural ecosystems in the context of planned intervention and change in rural environments.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6170 Rural Research Methods U [0.50]**

The course provides rural planning and development professionals with a number of theoretical frameworks and practical approaches to problem solving in rural Canadian and international contexts. The course content provides an introduction to hypothesis development, data collection, analytical frameworks, research management, and information synthesis and presentation methodologies that are appropriate to the practicing rural planner and developer. It views the roles of the researcher and research as interventionist and intervention in the rural community. Research methods are discussed as an integral and supporting part of the planning and development process.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6220 Planning and Development Policy Analysis U [0.50]**

Planning and development policy has experienced a significant evolution. This course examines the history of policy, and the theory, methods and processes of policy development and governance in planning and management of environment and resources.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6240 Planning and Development Theory U [0.50]**

Examines basic concepts, theories and perspectives in rural planning and development. A conceptual examination of 'rural', 'planning' and 'development' precedes an examination of how rural planning and development is viewed from alternative, often conflicting theories of rural change and planned intervention. The implications for practice are discussed.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6250 Foundations in Rural Planning Practice F [0.50]**

This course provides an introduction to rural planning practice. This includes: i) Concepts in Public Administration - The structure, responsibility and functions of public sector administration and government. ii) The workings of local government. iii) Rural Planning Practice - An introduction to planning and development in rural regions and small municipalities.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6260 Land Use Planning Law U [0.50]**

An introduction to the legal tools used to regulate the use of land and other resources. Zoning, subdivision controls, development control, land banking, expropriation, planning appeals, official maps, etc. An intensive study of the Ontario Planning Act and related legislation.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6280 Advanced Planning Practice W [0.50]**

This course explores current issues, techniques, legislation and processes that are relevant to rural planning practice. A number of specific municipal (local and regional) rural planning examples will be presented. Comparisons between different jurisdictions will be reviewed. Students will be engaged in project-based learning.

*Prerequisite(s):* RPD\*6250

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6290 Special Topics in Rural Planning and Development U [0.50]**

Selected study topics focus on the nature of rural planning and development issues and/or practices in Canadian and/or International small communities and rural environments. Among the topics which may be addressed are: rural land use planning, ecological restoration, gender analysis in development planning, GIS in agricultural development, micro-credit, physical/site planning and design, project management.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6291 Rural Development Administration U [0.50]**

This course explores the administration of rural development by considering the main organizational types delivering rural programs. The structure and behaviour of these organizations, their interactions, and their respective sectors will be considered. Students will also be introduced to administrative planning tools.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6310 Environmental Impact Assessment U [0.50]**

This course deals with the role of environmental impact assessments and statements in the planning, development and operation of resource projects. Topics discussed include the philosophical and institutional basis for environmental impact assessments, methods used and the effects of such assessments on resource development projects.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6320 Water Resource Management U [0.50]**

The course provides an assessment of the processes and principles which underlie comprehensive water resource planning and integrated basin management. It also undertakes to evaluate current practice in the context of integrated planning. There is extensive use of Canadian and international practice.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6360 Major Research Paper U [1.00]**

Students not pursuing the thesis route must satisfactorily complete a Major Research Paper. The paper will be supervised by a faculty committee. Content of the paper will generally focus on the placement of a problem in rural planning and development practice using appropriate methodological and analytical procedures. Note: This is a one semester course and must be completed in the semester of registration.

*Restriction(s):* For Major Paper option only. Instructor consent required.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6370 Economic Development Planning and Management for Rural Communities U [0.50]**

Theories and perspectives of local economic development, particularly community-based planning for rural economic development. Economic development within a community development framework, and challenges of sustainable development. Interdisciplinary perspectives and alternative approaches to professional planning practice, strategic planning, management and organizational design/development issues. Alternative economic concepts and perspectives are critically examined. Includes international case studies.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6380 Application of Quantitative Techniques in Rural Planning and Development U [0.50]**

Analysis and application of standard quantitative, statistical and computer-based techniques utilized in rural planning and development. Problems of data collection, analysis and interpretation.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6390 Rural Social Planning U [0.50]**

This course will provide students who have an interest in social development with an avenue for linking that interest to the policy, planning and intervention process.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6410 Readings in Rural Planning U [0.50]**

A program of supervised independent study related to the student's area of concentration. Nature and content of the readings course are agreed upon between the student and the instructor, and are subject to the approval of the student's advisory committee and graduate committee.

*Restriction(s):* Instructor consent required.

*Department(s):* School of Environmental Design and Rural Development

**RPD\*6450 Recreation and Tourism Planning and Development U [0.50]**

This course is intended to instruct the student in the principles of planning for recreation and tourism development. Emphasis is placed on the economic and social benefits and costs that accrue from tourism and recreation development. Planning principles are applied to this context.

*Department(s):* School of Environmental Design and Rural Development

**Rural Studies****RST\*6000 Sustainable Rural Systems F-W [1.00]**

Sustainable development theory in the rural communities and environment context.

*Department(s):* School of Environmental Design and Rural Development

**RST\*6100 Integrative Research Methods F-W [1.00]**

Research design and evaluation with a focus on measures of sustainability and on interdisciplinary applications.

*Department(s):* School of Environmental Design and Rural Development

**RST\*6260 Research Design U [0.50]***Department(s):* School of Environmental Design and Rural Development**RST\*6300 Research Seminar U [0.25]***Department(s):* School of Environmental Design and Rural Development**RST\*6500 Special Topics U [0.50]***Department(s):* School of Environmental Design and Rural Development**Sociology****SOC\*6070 Sociological Theory F [0.50]**

Classical and contemporary theoretical perspectives and their inter-relationships. A central concern will be to develop the student's ability to assess theory critically and to understand how theory and research relate to each other.

*Department(s):* Department of Sociology and Anthropology**SOC\*6130 Quantitative Research Methods W [0.50]**

The application of multiple regression to data generated by non-experimental research, e.g., survey data and data from other sources (census, archival). In large part a course in theory construction, a thorough grounding in the mechanics and statistical assumptions of multiple regression is followed by its application to the construction of structural equation (or causal) models representing substantive theories in sociology and related disciplines.

*Department(s):* Department of Sociology and Anthropology**SOC\*6140 Qualitative Research Methods F [0.50]**

An examination of the methods of qualitative research, including participant observation and unstructured interviews, as well as the ethical considerations of fieldwork. Other topics, such as comparative and historical methods, may be included.

*Department(s):* Department of Sociology and Anthropology**SOC\*6200 Advanced Issues in Mixed Research Methodologies W [0.50]**

This course will examine the foundations and a range of approaches used in mixed methods sociological research. Students will acquire a deeper understanding of how using a mixed methods research approach in sociological research can enhance scholarly rigour in a theoretically informed research project.

*Restriction(s):* Students in the PhD program in Sociology only*Department(s):* Department of Sociology and Anthropology**SOC\*6270 Diversity and Social Equality U [0.50]**

This course will examine a range of approaches used in the study of intergroup relations, with special emphasis on struggles over influence and power. Students will acquire a deeper understanding of the complex intersection, as well as the overlap among forms of identity and group mobilization based on ethnic, linguistic, regional, class, gender, racial and other forms of social division. The course may also cover native issues and policies related to multiculturalism, equity and local or regional autonomy.

*Department(s):* Department of Sociology and Anthropology**SOC\*6350 Society, Crime and Control U [0.50]**

This seminar course surveys classical theoretical perspectives and more recent theoretical developments in the sociology of crime. It will examine the assumptions and logical structure of each perspective and justifications of particular criminal justice/public policy responses. The course will also critically assess recent empirical research relevant to each perspective.

*Department(s):* Department of Sociology and Anthropology**SOC\*6400 Special Topics in Sociology U [0.50]**

Special topics in sociology will critically examine and evaluate contemporary issues/debates in sociology by looking at contemporary research and the associated theoretical and methodological frameworks/perspectives. Course content is unique in each offering.

*Department(s):* Department of Sociology and Anthropology**SOC\*6420 Global Agro-Food Systems, Communities and Rural Change U [0.50]**

This course will reflect recent sociological interests in food studies and global agro-food systems, resources and the environment, community sustainability, rural-urban linkages, the transnationalization of labour regimes, and social movements in the rural context. The course will encourage students to take a comparative and historical approach, focusing on cross-national and inter-regional studies where possible, and to examine how class, gender, race and ethnicity play out in each particular substantive topic comprising the rural field.

*Department(s):* Department of Sociology and Anthropology**SOC\*6460 Gender and Development F [0.50]**

Cross-cultural and historical changes in gender relations and the roles/positions of women brought about by industrialization and the development of the world system. Critical examination of the predominant theories of gender relations, in so far as these inform development research and action in societies with different socio-economic systems. Introduction to the latest theories and research in the area of women and development, as well as with social and political actions undertaken by women themselves. This is one of the two alternative core courses for the collaborative International Development Studies program.

*Department(s):* Department of Sociology and Anthropology**SOC\*6480 Work, Gender and Change in a Global Context U [0.50]**

This course will consider some of the theoretical frameworks available for examining work, workers and work places in the context of globalization, economic restructuring, and shifts in public policy. Using case studies of particular work worlds, the course may include topics such as changing patterns of work and employment in comparative contexts, labour regimes, industrial and organizational change, organizations and protest, education for work, and the regulation of work. The course will focus on the dialectical relationship between the configurations of gender, class, race and ethnicity and the transformation of work.

*Department(s):* Department of Sociology and Anthropology**SOC\*6520 Social Movements and Collective Action F [0.50]**

Students will critically review the major theoretical perspectives on social movements and collective action, and consider their relevance in understanding the emergence, tactics, composition and impact of movements in a variety of national contexts. The specific movements to be examined via empirical scholarship will vary each year, but readings will represent several main kinds of collective demands ranging from the redress of oppression of particular groups, to struggles to sustain and enhance societal and human welfare.

*Restriction(s):* Must be enrolled in a graduate program*Department(s):* Department of Sociology and Anthropology**SOC\*6550 Selected Topics in Theory and Research U [0.50]**

This course will be offered with varying content focusing on theory or research.

*Department(s):* Department of Sociology and Anthropology**SOC\*6600 Reading Course U [0.50]**

A program of directed reading, complemented with the writing of papers or participation in research. Reading courses are arranged by students through their advisors or advisory committees and must be approved by the chair of the department. This course may be repeated provided different content is involved.

*Department(s):* Department of Sociology and Anthropology**SOC\*6660 Major Paper U [1.00]**

The major paper is an extensive research paper for those who do not elect to complete a thesis. It may be taken over two semesters.

*Department(s):* Department of Sociology and Anthropology**SOC\*6700 Pro-seminar F-W [0.00]**

The pro-seminar concerns matters involved in graduate studies and later work as a professional sociologist, including how to form a graduate advisory committee, assistantship responsibilities, presentation skills, exploration of careers in sociology, writing grant proposals, reports and articles, and teaching.

*Restriction(s):* Students in the MA program in Sociology only*Department(s):* Department of Sociology and Anthropology**SOC\*6750 PhD Professional Seminar F-W [0.50]**

This professional seminar provides PhD students in Sociology opportunities to develop professional skills; develop and foster an intellectual culture; facilitate cohort building, mentoring and provide peer support; and contribute to the intergenerational transmission of knowledge.

*Restriction(s):* Students in the PhD program in Sociology only*Department(s):* Department of Sociology and Anthropology**SOC\*6800 Advanced Topics in Sociological Theory F [0.50]**

This course focuses on close readings of, and critical engagement with, select classical and contemporary sociological theories. Students will develop advanced understandings of the philosophical underpinnings of different theoretical approaches and of the ontological and epistemological assumptions of sociological inquiry more generally.

*Prerequisite(s):* MA in Sociology*Restriction(s):* Students in the PhD program in Sociology only*Department(s):* Department of Sociology and Anthropology

**SOC\*6810 Reading Course U [0.50]**

A program of supervised independent reading, complemented with the writing of papers or participation in research. Reading courses are arranged by students in consultation with their advisor or advisory committee and must be approved by the chair of the department.

*Restriction(s):* Students in the PhD program in Sociology only

*Department(s):* Department of Sociology and Anthropology

**SOC\*6820 Directed Readings U [0.50]**

A program of directed readings related to the student's field of specialization. The nature and content of the course are agreed upon by the student and instructor in consultation with the student's advisor or advisory committee. The course must be approved by the chair of the department.

*Restriction(s):* Students in the PhD program in Sociology only

*Department(s):* Department of Sociology and Anthropology

## Social Practice and Transformational Change

**SOPR\*6000 Social Practice and Transformational Change F,W [0.50]**

Students engage with key theories of social practice, ethical community engagement, ways of knowing, reflexivity and change processes, social praxis and orientation, and the role of policy in social change, from inter- and transdisciplinary perspectives.

*Department(s):* Dean's Office, College of Social and Applied Human Sciences

**SOPR\*6100 Research and Social Practice F,W [0.50]**

Students build upon core concepts explored in SOPR\*6000 (Social Practice and Transformational Change) moving beyond analysis and discussion of scholarly contributions, into engagement activities working with or as practitioners on externally identified questions and community needs.

*Prerequisite(s):* SOPR\*6000

*Department(s):* Dean's Office, College of Social and Applied Human Sciences

**SOPR\*6200 Methodologies Lab F,W,S [0.50]**

Students treat methodology as critical research design connected to epistemology and ontology, investigating what counts as knowledge, as data and scholarship, the role of the researcher, issues of representation, and the implications of these for research.

*Department(s):* Dean's Office, College of Social and Applied Human Sciences

## Statistics

**STAT\*6550 Computational Statistics U [0.50]**

This course covers the implementation of a variety of computational statistics techniques. These include random number generation, Monte Carlo methods, non-parametric techniques, Markov chain Monte Carlo methods, and the EM algorithm. A significant component of this course is the implementation of techniques.

*Department(s):* Department of Mathematics and Statistics

**STAT\*6700 Stochastic Processes U [0.50]**

The content of this course is to introduce Brownian motion leading to the development of stochastic integrals thus providing a stochastic calculus. The content of this course will be delivered using concepts from measure theory and so familiarity with measures, measurable spaces, etc., will be assumed.

*Department(s):* Department of Mathematics and Statistics

**STAT\*6721 Stochastic Modelling U [0.50]**

Topics include the Poisson process, renewal theory, Markov chains, Martingales, random walks, Brownian motion and other Markov processes. Methods will be applied to a variety of subject matter areas. Offered in conjunction with STAT\*4360. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of STAT\*4360 or STAT\*6721

*Department(s):* Department of Mathematics and Statistics

**STAT\*6761 Survival Analysis U [0.50]**

Kaplan-Meier estimation, life-table methods, the analysis of censored data, survival and hazard functions, a comparison of parametric and semi-parametric methods, longitudinal data analysis.

*Department(s):* Department of Mathematics and Statistics

**STAT\*6801 Statistical Learning U [0.50]**

Topics include: nonparametric and semiparametric regression; kernel methods; regression splines; local polynomial models; generalized additive models; classification and regression trees; neural networks. This course deals with both the methodology and its application with appropriate software. Areas of application include biology, economics, engineering and medicine.

*Department(s):* Department of Mathematics and Statistics

**STAT\*6802 Generalized Linear Models and Extensions U [0.50]**

Topics include: generalized linear models; generalized linear mixed models; joint modelling of mean and dispersion; generalized estimating equations; modelling longitudinal categorical data; modelling clustered data. This course will focus both on theory and implementation using relevant statistical software. Offered in conjunction with STAT\*4050/4060. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of STAT\*4050 or STAT\*4060 or STAT\*6802

*Department(s):* Department of Mathematics and Statistics

**STAT\*6821 Multivariate Analysis U [0.50]**

This is an advanced course in multivariate analysis and one of the primary emphases will be on the derivation of some of the fundamental classical results of multivariate analysis. In addition, topics that are more current to the field will also be discussed such as: multivariate adaptive regression splines; projection pursuit regression; and wavelets. Offered in conjunction with STAT\*4350. Extra work is required for graduate students.

*Restriction(s):* Credit may be obtained for only one of STAT\*4350 or STAT\*6821

*Department(s):* Department of Mathematics and Statistics

**STAT\*6841 Computational Statistical Inference U [0.50]**

This course covers Bayesian and likelihood methods, large sample theory, nuisance parameters, profile, conditional and marginal likelihoods, EM algorithms and other optimization methods, estimating functions, Monte Carlo methods for exploring posterior distributions and likelihoods, data augmentation, importance sampling and MCMC methods.

*Department(s):* Department of Mathematics and Statistics

**STAT\*6860 Linear Statistical Models U [0.50]**

Generalized inverses of matrices; distribution of quadratic and linear forms; regression or full rank model; models not of full rank; hypothesis testing and estimation for full and non-full rank cases; estimability and testability; reduction sums of squares; balanced and unbalanced data; mixed models; components of variance.

*Department(s):* Department of Mathematics and Statistics

**STAT\*6920 Topics in Statistics U [0.50]**

*Department(s):* Department of Mathematics and Statistics

**STAT\*6950 Statistical Methods for the Life Sciences F [0.50]**

Analysis of variance, completely randomized, randomized complete block and latin square designs; planned and unplanned treatment comparisons; random and fixed effects; factorial treatment arrangements; simple and multiple linear regression; analysis of covariance with emphasis on the life sciences. STAT\*6950 and STAT\*6960 are intended for graduate students of other departments and may not normally be taken for credit by mathematics and statistics graduate students.

*Department(s):* Department of Mathematics and Statistics

**STAT\*6998 MSc Project in Statistics U [1.00]**

This course is intended for students in the course-based MSc program in Statistics. The MSc project will be written under the supervision of a faculty member and will normally be completed within one or two semesters. Once completed, students will submit a final copy of their project to the Department and give an oral presentation of their work

*Restriction(s):* Restricted to MSC.MAST:L-STAT students in Statistics

*Department(s):* Department of Mathematics and Statistics

## Studio Art

**FINA\*6510 Introduction to Graduate Studio F [1.50]**

A qualifying open-studio course to determine the student's interests and level of performance. The student will come in contact with a variety of faculty and may choose to work in a number of areas during this period.

*Department(s):* School of Fine Art and Music

**FINA\*6515 MFA Studio I W [1.50]**

Sustained work at an independent level under the supervision of the chair of the student's advisory committee.

*Prerequisite(s):* FINA\*6510

*Department(s):* School of Fine Art and Music

**FINA\*6530 MFA Teaching Practicum I F [0.50]**

This course will give the MFA student supervised teaching experience in a studio discipline. In addition, a seminar component will consider theoretical and practical issues relevant to the teaching of studio art. Prerequisite: admission to the MFA program.

*Department(s):* School of Fine Art and Music

<b>FINA*6531 MFA Teaching Practicum II F [0.50]</b>
Continuation of teaching practicum under the guidance of a faculty member. The practicum seminar will consider theoretical and practical issues relevant to the teaching of studio art such as educational goals, course and curriculum planning, academic evaluation, health and safety policies, and appropriate materials and equipment. <i>Prerequisite(s):</i> FINA*6530 <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6540 MFA Seminar I F [0.50]</b>
Examination of critical issues in the visual arts relevant to studio practice <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6545 MFA Seminar II W [0.50]</b>
Continuation of issues examined in FINA*6540 <i>Prerequisite(s):</i> FINA*6540 <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6550 Selected Topics in Fine Art U [0.50]</b>
Seminar in a fine art topic in a subject to be specified by the instructor. <i>Prerequisite(s):</i> Admission to the MFA program. <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6551 Seminar in Art Theory and Criticism I W [0.50]</b>
Selected topics in art theory and criticism with particular relevance to studio practice. <i>Prerequisite(s):</i> Admission to MFA program or permission of instructor. <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6610 MFA Studio II F [1.50]</b>
Continuation of FINA*6515 <i>Prerequisite(s):</i> FINA*6515 <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6615 MFA Studio III W [1.50]</b>
Continuation of FINA*6610 <i>Prerequisite(s):</i> FINA*6610 <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6640 MFA Seminar III F [0.50]</b>
Continuation of FINA*6545 <i>Prerequisite(s):</i> FINA*6545 <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6641 MFA Seminar IV W [0.50]</b>
Continuation of FINA*6640 <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6651 Individual Study in Contemporary Art U [0.50]</b>
Students will pursue special study under the guidance of a faculty member with appropriate expertise <i>Prerequisite(s):</i> Approval of the co-ordinator of the MFA program. <i>Department(s):</i> School of Fine Art and Music
<b>FINA*6652 Individual Study in Art Theory and Criticism W [0.50]</b>
Students will pursue special study under the guidance of a faculty member with appropriate expertise. <i>Prerequisite(s):</i> Approval of the co-ordinator of the MFA program. <i>Department(s):</i> School of Fine Art and Music

## Theatre Studies

<b>THST*6150 Theatre Historiography F [0.50]</b>
This variable content course introduces students to the theory and practice of theatre historical analysis. The course is required of all students in the Theatre Studies MA Program. <i>Department(s):</i> School of English and Theatre Studies
<b>THST*6210 Devising W [0.50]</b>
This variable-content course addresses creative practice in the theatre as a site for the production of knowledge. It examines the theoretical and social issues of contemporary theatre practice. <i>Department(s):</i> School of English and Theatre Studies
<b>THST*6220 Theatre Theory F [0.50]</b>
This variable content course introduces students to a range of theoretical approaches and to advanced issues and methods within the fields of drama, theatre, and performance studies. The course is required for all students in the Theatre Studies MA Program. <i>Department(s):</i> School of English and Theatre Studies

<b>THST*6230 Performance and Difference W [0.50]</b>
This variable-content course introduces students to the most recent theoretical and critical international developments in the field of Theatre Studies and investigates sites of cultural diversity and difference. It provides opportunities for culturally specific studies of dramatic literature and performance. <i>Department(s):</i> School of English and Theatre Studies
<b>THST*6250 Bodies and Space in Performance W [0.50]</b>
This variable-content course introduces students to the social, ethical, phenomenological and environmental dimensions of the interaction of bodies and space in theatre practice and research. It provides a theorized context in which students may address questions of acting, directing, and design as research processes. <i>Department(s):</i> School of English and Theatre Studies
<b>THST*6280 Independent Reading Course U [1.00]</b>
Independent Reading Course <i>Department(s):</i> School of English and Theatre Studies
<b>THST*6500 Research Paper U [1.00]</b>
<i>Department(s):</i> School of English and Theatre Studies
<b>THST*6801 Reading Course I U [0.50]</b>
An independent study course, the nature and content of which is agreed upon between the individual and the person offering the course. Subject to the approval of the student's advisory committee and the graduate program committee. <i>Department(s):</i> School of English and Theatre Studies
<b>THST*6802 Reading Course II U [0.50]</b>
An independent study course, the nature and content of which is agreed upon between the individual and the person offering the course. Subject to the approval of the student's advisory committee and the graduate program committee. <i>Department(s):</i> School of English and Theatre Studies

## Tourism and Hospitality

<b>TRMH*6080 Qualitative Research Methods W [0.50]</b>
This course examines qualitative research methods used in food, tourism, and sport, as well as related hospitality and service management areas. Topics include types of qualitative methods, their theoretical foundations, project design, data collection, and analysis procedures and strategies, as well as appropriate communication of results. <i>Prerequisite(s):</i> TRMH*6290 Research Methods for Tourism and Hospitality <i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>TRMH*6100 Foundations of Tourism and Hospitality F [0.50]</b>
The course is designed to discuss theoretical concepts and theories which provide an understanding of societal, managerial and strategic aspects of tourism and hospitality. An emphasis will also be placed on key theories and concepts of relevant disciplines which may affect tourism and hospitality research. <i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>TRMH*6110 Foundations of Food Industry Management F [0.50]</b>
This course introduces students to the theories and practices of the food industry, including global and regional food system, with an examination of food policies that frame supply chains. Students discuss topics that influence food systems such as ethics, supply chains, food product marketing, consumer choice, food literacy, and the food service sector. <i>Restriction(s):</i> Restricted to MSc students in Tourism and Hospitality. Others considered with instructor consent. <i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>TRMH*6120 Foundations of Sport Management U [0.50]</b>
This course introduces students to the vast, growing, and varied literature and conceptual foundations that are directly and indirectly associated with sport management. A decisionmaking frame will be adopted and key stakeholders, applications, and concepts reviewed. Key areas of sport management literature (sponsorship, sport finance, sport communications) will be emphasized. <i>Restriction(s):</i> Restricted to MSc students in Tourism and Hospitality. Others considered with instructor consent. <i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>TRMH*6200 Contemporary Issues in Tourism W [0.50]</b>
The course will acquaint students with the tourism industry. An overview of the scale and scope, involved stakeholders, and the organization of the industry will be examined and critiqued. An emphasis will be placed on the sustainable development and management of tourism resources and organizations. <i>Prerequisite(s):</i> TRMH*6100 <i>Department(s):</i> School of Hospitality, Food and Tourism Management



<b>TRMH*6250 Tourism and Sustainable Development F [0.50]</b>
The course introduces students to the issues affecting planning and development of tourism by understanding tourism planning and sustainable development. Core elements include a discussion on tourism impacts (economic, social, cultural and environmental), issues of sustainability, carrying capacity, 'eco-tourism' and other 'alternative forms' of tourism.
<i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>TRMH*6270 Data Mining Practicum W [0.50]</b>
An applied course introducing popular concepts, methods and applications of data mining utilizing data warehoused at the government agencies and user friendly software and cases. This course covers various topics in data mining association rule, clustering, logistic regression, decision tree and artificial neural network.
<i>Prerequisite(s):</i> TRMH*6100 and PSYC*6060
<i>Co-requisite(s):</i> Must take one of these courses ANTH*6140, MCS*6080 or SOC*6140
<i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>TRMH*6290 Research Methods for Tourism and Hospitality F [0.50]</b>
This course looks at selected analytical techniques in tourism and hospitality research, both empirical and subjective, as well the nature of research questions and theory. The course is intended to help students make informed judgements about selected research tools and designs, and draw logical and substantive conclusions.
<i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>TRMH*6310 Research Applications in Tourism and Hospitality W [0.50]</b>
This course is designed to enhance the student's analytical capability, using both basic and advanced analytical techniques and tools of tourism and hospitality research. They learn to critically evaluate, enabling them to make effective judgments, choose proper statistical techniques, and draw logical and substantive conclusions.
<i>Prerequisite(s):</i> TRMH*6100 and one of TRMH*6290, MCS*6050, SOC*6130 or PSYC*6060
<i>Co-requisite(s):</i> Must take one of these courses ANTH*6140, MCS*6080, FRAN*6020 or SOC*6140
<i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>TRMH*6400 Thesis Proposal F,W,S [1.00]</b>
The students engage in seminars to share experiences and reflections on the research process. This course is a development of the proposal: framing a research question, developing a methodological plan within a challenging interdisciplinary area such as tourism and hospitality, data planning and more.
<i>Prerequisite(s):</i> TRMH*6100, TRMH*6200, TRMH*6310, one of TRMH*6290, MCS*6050, SOC*6130 or PSYC*6060 and one of ANTH*6140, MCS*6080, FRAN*6020 or SOC*6140
<i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>TRMH*6630 Special Topics in Tourism U [0.50]</b>
Advanced course for those specializing in tourism. Deals with theories of tourism generators, multi-markets, tourism multipliers, current and future trends, regulatory environments, and distributions systems.
<i>Department(s):</i> School of Hospitality, Food and Tourism Management

## Toxicology

<b>TOX*6000 Advanced Principles of Toxicology S [0.50]</b>
An intensive course in the principles of modern aspects of toxicology, taught in a lecture/case study format.
<i>Department(s):</i> Department of Chemistry
<b>TOX*6200 Advanced Topics in Toxicology W [0.50]</b>
Advanced topics in toxicology will include oral presentations by students, faculty members, and guest lecturers. The emphasis will be on advanced concepts and techniques in toxicology research with particular relevance to mechanistic, molecular and interpretive toxicology. Offered in conjunction with TOX*4200. Extra work is required of graduate students.
<i>Restriction(s):</i> Credit may be obtained for only one of TOX*6200 or TOX*4200
<i>Department(s):</i> Department of Chemistry
<b>TOX*6590 Biochemical Toxicology F [0.50]</b>
The molecular mechanisms of action of carcinogens and other toxic compounds. Enzymes of biotransformation, including a detailed study of cytochrome P-450. Interactions of reactive species with DNA and other macromolecules. Offered in conjunction with TOX*4590. Extra work is required of graduate students.
<i>Restriction(s):</i> Credit may be obtained for only one of TOX*4590 and TOX*6590
<i>Department(s):</i> Department of Chemistry

## University Courses

<b>UNIV*6000 The Structure and Function of Muscle U [0.50]</b>
An interdisciplinary course covering basic aspects of muscle from a range of viewpoints: structure, metabolism, protein content, energetics, mechanics, biological adaptations, growth and development. The course is designed for graduate students from a wide range of specific disciplines and will provide a broad background to muscle biology as well as more detailed insights into specific aspects of each area covered.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences
<b>UNIV*6010 Regulation in Muscle Metabolism U [0.50]</b>
An interdisciplinary course emphasizing the regulation of muscle metabolism in vivo. The course focuses on the integration of metabolic fuel utilization to meet cellular energy demands under a variety of conditions in the whole animal. Topics include: sources of energy demand, integration of energy supply to meet energy demands, and regulation of cell growth, maintenance and adaptation.
<i>Department(s):</i> Department of Human Health and Nutritional Sciences
<b>UNIV*6030 Seminars and Analysis in Animal Behaviour and Welfare F-W [0.50]</b>
This seminar-based course offers an interdisciplinary forum for the discussion of broad topics in animal welfare and human-animal relationships. Students analyze topics presented by visiting guest lecturers using perspectives from various disciplines such as animal science, philosophy, history, psychology, ethics, and biology.
<i>Department(s):</i> Department of Animal Biosciences
<b>UNIV*6050 Innovation and Entrepreneurship in Agri-Food Systems F-W [1.00]</b>
This course is designed for students in the OMAFRA/UoG HQP Scholarship program, scholars from the Arrell Food Institute, and scholars from Food from Thought, and, space permitting, is open to any graduate student working on a thesis topic related to agri-food. Students work in groups to collaborate with NGOs, government agencies, or businesses on agri-food projects. Through these projects and a series of modules, students build knowledge and competencies in business development, communication, social innovation, project management, and entrepreneurship.
<i>Restriction(s):</i> Limited of 36 students. Priority to HQP Scholarship Program students, Arrell Scholars, and Food from Thought funded graduate students.
<i>Department(s):</i> School of Hospitality, Food and Tourism Management
<b>UNIV*6060 Mechanisms of Tissue and Cellular Mechanotransduction in Health and Disease F [0.50]</b>
This course explores fundamental mechanisms and signalling pathways that dynamically regulate cell and tissues responses to physical forces in health and disease. It is relevant to a wide range of areas of study, from biomechanics and tissue engineering to gastro-intestinal health, food and nutrition.
<i>Restriction(s):</i> Instructor consent required.
<i>Department(s):</i> Department of Food Science
<b>UNIV*6070 Topics and Analysis in Sustainability F [0.50]</b>
This course will allow students to examine, analyze and discuss the evolving concept of "sustainability" in a transdisciplinary context and build upon their knowledge and experience in this area. We will examine various current issues (e.g., climate change, natural resource management, environmental governance) at the interface of more than one discipline (or transdisciplinary) and which require some degree of global understanding. Students will be encouraged to share their diverse backgrounds in discussions and assignments.
<i>Offering(s):</i> Offered in even-numbered years.
<i>Restriction(s):</i> Instructor consent required. Must be enrolled in a graduate program at the University of Guelph.
<i>Department(s):</i> School of Environmental Sciences
<b>UNIV*6080 Computational Thinking for Artificial Intelligence U [0.25]</b>
This course will provide students with an overview of the mathematical and computational foundation that is required to undertake artificial intelligence and machine learning research. Students will also gain an understanding of the historical context, breadth, and current state of the field. Students are expected to have already taken undergraduate courses in probability & statistics, calculus, linear algebra, and data structures & algorithms (STAT*2120, MATH*1210, ENGG*1500, and CIS*2520, or equivalents).
<i>Offering(s):</i> Also offered through Distance Education format.
<i>Department(s):</i> Dean's Office, College of Engineering and Physical Sciences

**UNIV\*6090 Artificial Intelligence Applications and Society U [0.50]**

This multidisciplinary, team-taught course provides an in-depth study of how artificial intelligence methodologies can be applied to solve real-world problems in different fields. Students will work in groups to propose solutions whilst considering social and ethical implications of artificial intelligence technologies.

*Prerequisite(s):* UNIV\*6080

*Restriction(s):* Restricted to students in the collaborative specialization in Artificial Intelligence

*Department(s):* Dean's Office, College of Engineering and Physical Sciences

**UNIV\*6500 International Study Option U [0.00]**

A period of study in another country as part of a graduate program at the University of Guelph. Details may be obtained from the Office of Graduate and Postdoctoral Studies.

*Department(s):* Office of Graduate Studies

**UNIV\*6600 Animal Care Short Course S,F,W [0.00]**

The course includes on-line training modules covering the following topics: Legislation, Regulation & Guidelines, Ethological Considerations in Animal Management, Ethics in Animal Experimentation, Research Issues, The Three Rs of Humane Animal Experimentation, Occupational Health and Safety when Working with Animals, Euthanasia, Recognition and Alleviation of Pain and Distress in Animals. Graduate students using or caring for live animals or assisting in teaching courses involving live vertebrate animals also must attend the Animal Care Services species-specific Workshops as part of the Animal User Training Program.

*Department(s):* Office of Graduate Studies

**UNIV\*6710 Commercialization of Innovation F [0.50]**

This course is designed to help participants better understand the process, the analytical tools that can assist the process and how best to prepare technologies to survive commercialization. The course includes elements of entrepreneurship, relationship building, organizational change, as well as project and personnel management.

*Department(s):* Department of Management

**UNIV\*6800 University Teaching: Theory and Practice F [0.50]**

Participants will critically examine aspects of teaching in higher education and develop teaching skills such as lecturing, demonstrating, leading discussions, and problem solving. Satisfactory (SAT) or unsatisfactory (UNS) will be used to evaluate the student's performance in this course.

*Department(s):* TSS Instructional Development

**UNIV\*7100 Academic Integrity for Graduate Students S,F,W [0.00]**

Academic integrity is a code of ethics for teachers, students, researchers, and writers. It is fundamental to the University of Guelph's educational mission and to ensuring the value of the scholarly work conducted here. This course provides definitions, examples, and exercises to help graduate students understand the importance of academic integrity and learn how to avoid academic misconduct in their own work. This course required of all graduate students has to be completed within 20 days of commencing their graduate program.

*Department(s):* Office of Graduate Studies